



## Standard cylinder

<b>P14 SAI Series</b> 	<ul style="list-style-type: none"> <li>●SAI, SAID, SAIJ, SAIL, SAIF BSAI available</li> <li>●Bore size: 32 40 50 63 80 100 125 160 200</li> <li>●Port size: 1/8" 1/4" 3/8" 1/2" 3/4"</li> </ul>	<b>P27 SE Series</b> 	<ul style="list-style-type: none"> <li>●SE, SED, SEJ available</li> <li>●Bore size: 32 40 50 63 80 100 125</li> <li>●Port size: 1/8" 1/4" 3/8" 1/2"</li> </ul>
<b>P33 SC Series</b> 	<ul style="list-style-type: none"> <li>●SC, SCD, SCJ, SCT available</li> <li>●Bore size: 32 40 50 63 80 100 125 160 200 250</li> <li>●Port size: 1/8" 1/4" 3/8" 1/2" 3/4" 1"</li> </ul>	<b>P44 SGC Series</b> 	<ul style="list-style-type: none"> <li>●SGC, SGCD, SGCJ available</li> <li>●Bore size: 125 160 200 250</li> <li>●Port size: 1/2" 3/4" 1"</li> </ul>
<b>P50 SAU Series</b> 	<ul style="list-style-type: none"> <li>●SAU, SAUD, SAUJ, SAUF available</li> <li>●Bore size: 32 40 50 63 80 100</li> <li>●Port size: 1/8" 1/4" 3/8" 1/2"</li> </ul>	<b>P56 JSI Series</b> 	<ul style="list-style-type: none"> <li>●JSI, JSID, JSIJ available</li> <li>●Bore size: 32 40 50 63 80 100 125</li> <li>●Port size: 1/8" 1/4" 3/8" 1/2"</li> </ul>

## Roundline cylinder



<b>P62 MI Series</b> 	<ul style="list-style-type: none"> <li>●MI, MID, MIJ, MSI, MTI MIC, MICD, MICJ available</li> <li>●Bore size: 8 10 12 16 20 25 32 40</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>	<b>P68 PB Series</b> 	<ul style="list-style-type: none"> <li>●PB, PBD, PBJ, PSB, PTB PBR, PSBR, PTBR available</li> <li>●Bore size: 4 6 8 10 12 16</li> <li>●Port size: Tube, M5</li> </ul>
<b>P76 MF Series</b> 	<ul style="list-style-type: none"> <li>●MF, MFD, MFJ, MSF, MTF MFC, MFCD, MFCJ available</li> <li>●Bore size: 20 25 32 40</li> <li>●Port size: 1/8" 1/4"</li> </ul>	<b>P82 MG Series</b> 	<ul style="list-style-type: none"> <li>●MG, MGD, MSG, MTG MGC, MGCD available</li> <li>●Bore size: 20 25 32 40 50 63</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>
<b>P88 MA Series</b> 	<ul style="list-style-type: none"> <li>●MA, MAD, MAJ, MSA, MTA MAC, MACD, MACJ, MAR available</li> <li>●Bore size: 16 20 25 32 40 50 63</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>	<b>P96 MBL Series</b> 	<ul style="list-style-type: none"> <li>●MBL, MBLD, MBLJ, MSBL, MTBL, MBLC, MBLCD, MBLCJ available</li> <li>●Bore size: 20 25 32 40 50 63</li> <li>●Port size: 1/8" 1/4"</li> </ul>

## Compact cylinder



<b>P102 ACE Series</b> 	<ul style="list-style-type: none"> <li>●ACE, ACED, ACEJ, ASE, ATE TACE, TACED available</li> <li>●Bore size: 12 16 20 25 32 40 50 63 80 100 125</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>	<b>P110 ACQ Series</b> 	<ul style="list-style-type: none"> <li>●ACQ, ACQD, ACQJ ASQ, ATQ, TACQ available</li> <li>●Bore size: 12 16 20 25 32 40 50 63 80 100 125 140 160</li> <li>●Port size: M5 1/8" 1/4" 3/8"</li> </ul>
<b>P124 SDA Series</b> 	<ul style="list-style-type: none"> <li>●SDA, SDAD, SDAJ, SSA STA, SDAT, SDAW available</li> <li>●Bore size: 12 16 20 25 32 40 50 63 80 100</li> <li>●Port size: M5 1/8" 1/4" 3/8"</li> </ul>		





## Mini free mount cylinder and Multi-mount cylinder

<b>P130 MU Series</b> 	<ul style="list-style-type: none"> <li>●MU, MSU available</li> <li>●Bore size: 4 6 8 10 12 16 20</li> <li>●Port size: M3 M5</li> </ul>	<b>P134 MD, MK Series</b> 	<ul style="list-style-type: none"> <li>●MD, MDD, MDJ, MSD, MTD MK, MKD, MKJ, MSK, MTK available</li> <li>●Bore size: 6 10 16 20 25 32</li> <li>●Port size: M5 1/8"</li> </ul>
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## Plate cylinder and Threaded cylinder

<b>P140 MPG Series Plate cylinder</b> 	<ul style="list-style-type: none"> <li>●MPG, MPGH available</li> <li>●Bore size: 6 8 10 12 16</li> <li>●Port size: M3 M5</li> </ul>	<b>P144 MPE Series Threaded cylinder</b> 	<ul style="list-style-type: none"> <li>●MPE, MPEF available</li> <li>●Bore size: 6 8 10 12 16</li> <li>●Port size: M5</li> </ul>
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## Twin-rod cylinder

<b>P148 TN Series</b> 	<ul style="list-style-type: none"> <li>●TN available</li> <li>●Bore size: 10 16 20 25 32</li> <li>●Port size: M5 1/8"</li> </ul>	<b>P151 TR Series</b> 	<ul style="list-style-type: none"> <li>●TR available</li> <li>●Bore size: 6 10 16 20 25 32</li> <li>●Port size: M5 1/8"</li> </ul>
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## Tri-rod cylinder






<b>P154 TC Series</b> 	<ul style="list-style-type: none"> <li>●TCL, TCM available</li> <li>●Bore size: 6 10 12 16 20 25 32 40 50 63 80 100</li> <li>●Port size: M3 M5 1/8" 1/4" 3/8"</li> </ul>	
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## Slide table cylinder and Compact slide cylinder

<b>P160 HGS Series Compact slide cylinder</b> 	<ul style="list-style-type: none"> <li>●HGS available</li> <li>●Bore size: 6 8 10 12</li> <li>●Port size: M3 M5</li> </ul>	<b>P173 HLF Series Compact slide cylinder</b> 	<ul style="list-style-type: none"> <li>●HLF available</li> <li>●Bore size: 8 12 16 20</li> <li>●Port size: M5 1/8"</li> </ul>
<b>P179 HLH Series Compact slide cylinder</b> 	<ul style="list-style-type: none"> <li>●HLH available</li> <li>●Bore size: 6 10 16 20</li> <li>●Port size: M5</li> </ul>	<b>P185 HLQ Series Compact slide cylinder</b> 	<ul style="list-style-type: none"> <li>●HLQ, HLQL available</li> <li>●Bore size: 6 8 12 16 20 25</li> <li>●Port size: M5 1/8"</li> </ul>
<b>P203 HLS Series Compact slide cylinder</b> 	<ul style="list-style-type: none"> <li>●HLS, HLSL available</li> <li>●Bore size: 6 8 12 16 20 25</li> <li>●Port size: M5 1/8"</li> </ul>		



## Rodless magnetic cylinder and Rotary table cylinder

<b>P223 RMS Series Rodless magnetic cylinder</b>		<b>P227 RMT Series Rodless magnetic cylinder</b>	
	<ul style="list-style-type: none"> <li>●RMS available</li> <li>●Bore size: 10 16 20 25 32 40</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>		<ul style="list-style-type: none"> <li>●RMT available</li> <li>●Bore size: 16 20 25 32 40</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>
<b>P233 RMTL Series Rodless magnetic cylinder</b>		<b>P237 RMH Series Rodless magnetic cylinder</b>	
	<ul style="list-style-type: none"> <li>●RMTL available</li> <li>●Bore size: 10 16 20 25 32 40</li> <li>●Port size: M5 1/8" 1/4"</li> </ul>		<ul style="list-style-type: none"> <li>●RMH available</li> <li>●Bore size: 10 16 20 25</li> <li>●Port size: M5 1/8"</li> </ul>
<b>P240 HRQ Series Rotary table cylinder</b>			
	<ul style="list-style-type: none"> <li>●HRQ available</li> <li>●Size: 2 3 7 10 20 30 50 70 100 200</li> <li>●Port size: M5 1/8"</li> </ul>		

## Big size air gripper and air gripper

<b>P248 HFD Series compact air gripper</b>	<b>P258 HFCQ Series air gripper(Hollow type)</b>
	
<b>P266 HFKL Series air gripper(Long stroke)</b>	<b>P274 HFKP Series air gripper(Dustproof)</b>
	
<b>P279 HFZ, HFK Series air gripper</b>	<b>P289 HFP Series air gripper</b>
	
<b>P293 HFY Series air gripper</b>	<b>P298 HFR Series air gripper</b>
	
<b>P301 HFC Series air gripper</b>	<b>P308 HFT Series Big size air gripper</b>
	



## Twist clamp cylinder and Rotary clamp cylinder

### P314 AQK Series Pin clamp cylinder



- AQK, BAQK available
- Bore size: 50
- Port size: 1/8"

### P322 QDK Series Plane Rotary clamp cylinder



- QDK, QDK\*U available
- Bore size: 20 25 32 40
- Port size: M5 1/8"

### P325 QCK Series Rotary clamp cylinder



- QCK, QCK\*M available
- Bore size: 12 16 20 25 32 40 50 63
- Port size: M5 1/8" 1/4"

## Clamp cylinder

### P330 MCK Serie Clamp cylinder



- MCKA, MCKB available
- Bore size: 25 32 40 50 63 80
- Port size: 1/8" 1/4" 3/8"

### P335 JCK Serie Clamp cylinder



- JCK available
- Bore size: 40 50 63 80
- Port size: 1/8" 1/4"

## Cylinder joint accessory and Sensor switch

### P349 Cylinder joint accessory



- I Knuckle, Y Knuckle
- F Knuckle, U Knuckle available

### P353 DMS\CMS Series Sensor switch



- DMS, CMS available
- Waterproof type, General type available for DMS series
- Heat resistant type, General type available for CMS series

## Shock absorber and Linear guide

### P363 ACA\ACJ Series Shock absorber



- ACA, ACJ available
- High speed, Middle speed
- Low speed available
- No cap, Plastic cap
- Iron cap available

### P368 LRM\LGC Series Linear guide



- LRM, LGC available





When designing, producing and using pneumatic system devices, one must be familiar with the requests and attentions of pneumatic components and pneumatic system. Use and operate system devices under the situation that necessary examinations have been conducted and the machinery framework, pneumatic control loop and the electrical control system of pneumatic system are ensured to be in safe condition.


For using our AirTAC products safely, the selection, operation and proper maintenance and management of the products are very important!

To guarantee to use safely, please make sure to operate according to this instruction completely!


## Requests of Pneumatic System on Design-Selector and User


- Confirmation of product models and specifications prior to use The designer of pneumatic system and selector of pneumatic components shall consider the security and faults that may occur according to the requests on performance of pneumatic system and decide the specification of pneumatic components according to the latest product catalog and data. If it is necessary, they shall make relevant analysis and experiment. When the system is used in some newly developed industries or special industries, they should cooperate with the manufacturer of pneumatic components to carry out the selection.  **Attention**


- Special attention to the following conditions  **Danger**
  - Once the compressed air is wrongly used, it is dangerous. Thus the assembly, operation and maintenance of the pneumatic equipment shall be done by welltrained person with certain practical experience.
  - Before making sure that it is safe, prohibit to use pneumatic equipment or to disassemble pneumatic components from the equipment.

- After confirming that the above safe treatment has been conducted, cut off the power and air source, release the remaining air, and conduct maintenance or disassembly on the equipment.  **Warning**
- Before starting the equipment, make sure that the piston rod will not stick out rapidly.

## Requests of Pneumatic System at Application Environment

- It is not allowed to use the system in the environment that includes corrosive gas, chemicals (such as organic solvent), seawater, water and steam or the place with the above substances.
- It is not allowed to use it in the place with explosive gas. (If necessary, consider adopting explosion-proof measure).
- It is not allowed to use it in the situation with oscillation and impact, or the component capacity to resist to oscillation and impact shall accord with the specification in this catalog.  **Attention**
- It is not allowed to use it in the place that has heat source around or is influenced by radiant heat. Otherwise, it is better to adopt measures to interdict the radiant heat.

- Add shields in the place with direct sunshine.
- In case the system is used in the place with large humidity and much dust or the place with water drop, oil drop, cutting oil and dispersing cooling fluid, proper protective measures shall be taken.  **Danger**
- The cylinder with magnet can not be used in the environment with strong magnetic field.

- In special temperature environment:  **Warning**  
High temperature environment: please use seals resisting high temperature Low temperature environment: moisture in loop may freeze and affect the action, at this moment, the moisture shall be eliminated to avoid freeze.



## Attentions on the Design and Selection of Pneumatic System

- Use the product under the stipulated application condition and scope

This catalogue stipulates the operation scope and condition. Please operate according to it. Any operation beyond the scope and condition may cause fault of and damage to the components, even result in danger and harm. Therefore, please contact our company in case that the products are used under the condition beyond the specified application condition and range, or any other fluid except the compressed air is used.



- Please design and install protective devices in the device part which may cause personal injury. The drive part of the cylinder may cause personal injury, please design and install protective devices to make sure people cannot directly contact the drive part when it works.
- Please effectively fasten the drive part of the cylinder to avoid the looseness of connective part. Especially under the circumstance with high action frequency or larger oscillation, effective fastness must be strengthened.
- Design necessary buffer loop or buffer devices  
When drive objects have higher speed or heavier weight, it is difficult to absorb impact solely by cylinder cushion. Therefore, buffer loop or external buffer must be designed or used to absorb the impact. Moreover, the rigidity of the machinery devices must be considered.

- When designing the system, the devices and personal safety shall be considered under the situation of power failure or air failure. For the clamping framework, if the pressure of system loop declines due to power failure and air failure, it will result in falling off of the components and further the harm on machinery devices and people, therefore, it is necessary to consider designing antifalling loop or devices.
- When designing the system, please consider the possibility that power source may produce faults. Please adopt relevant measures to make sure that the drive devices such as air pressure and electrical power will not result in personal injury or damages of devices when the power source has faults.
- Please make a loop that can prevent it from flying out when designing system. When pneumatic system is debugged or overhauled after releasing the remaining pressure, the system starts to pressurize the piston at one side, and the driven object may be pushed in high speed. In this situation, please design loop or device which can prevent cylinder from rapidly flying out to avoid personal injury or machinery damage.



- When designing the system, please consider the action status in emergency stop situation.

The design shall make sure that the action of cylinder will not cause personal injury or component and device damage under the situation that the system is in abnormal status such as emergency stop or power failure and that the safety devices and the machinery stop.



- When designing the system, please consider the actions during restarting after emergency stop and abnormal stop. The design shall make sure that the system will not cause personal injury or component damage when it restarts. In addition, for safely operation, please design return device.
- Intermediate stop  
When the cylinder stop in the middle position controlled by three-position closed center type valve, due to the compressibility of the air, it is hard to control the precise position of the cylinder. In addition, it can not avoid the air leakage of valve or cylinder absolutely, so the stop position is difficult to keep on for a long time. Therefore, please design necessary devices when a long-term stay in stop position is required.
- Synchronization of several cylinders in the system  
Due to the compressibility of the air, it is difficult to control several cylinders precisely by the same direction control valve. In this situation, special devices or loop shall be taken into consideration when designing.
- Please use the purified dry air in the air loop.  
Do not use the air with synthetic oil (including chemicals and organic solvent), salinity and corrosive gas to avoid component damage or poor action.

## Attention for the Use of Lubricant for Pneumatic System

- Generally, the pneumatic components have been lubricated by grease when producing. Therefore, they can be used without additional lubrication for a long time.



- In case of using additional lubrication, please use turbine oil (without additive) ISO-VG32. Engine oil, spindle oil or other oils are not allowed to avoid soaking and expanding of the seals like NBR.
- If lubrication is stopped in the midway, the original lubricated grease in side may have been flushed off, then the lack of lubrication will cause poor action of elements and accelerate the abrasion of relevant parts. Therefore, please make sure to supply oil constantly and an oil misting device with proper flow shall be equipped.

- When lubricating the compressed air, the oil mist quantity can not surpass 25mg/m.
- When the system runs normally, the oil mist quantity is set as 0.2-1 drop or 0.5-5 drops/1000L.
- The simple method for testing the oil mist quantity is: put one piece of white paper at the port of cylinder control valve which is the most far from lubricator, after a while, the white paper takes on lemon yellow. If there are oil drops falling down from the white paper, it indicates the excessive lubrication.



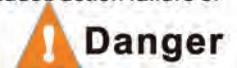


## Requests of Pneumatic System to Compressed Air

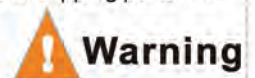
- The compressed air ejected by air compressor can not be directly used in the air loop, since it has certain moisture, oil content and dust, which should be gaseous in the high temperature of about 140-170°C through the compressor.
- Make sure to use compressed air that has been purified
  - The filtration precision of common machinery and common pneumatic loop is < 50µm;
  - The filtration precision of logic elements, jet elements and air motors is < 10µm;
  - The filtration precision of food, medicine, electron, tobacco and liquor and pneumatic bearing is < 5µm;



- The oil mist in compressed air may gather in the container of gas tank, pipeline and pneumatic system and forms combustibles which may cause harm to pneumatic system.
- The degenerative lubricant will make rubber, plastic and seals materials go bad and block the port, which may cause action failure of valve.
- Moisture and dust will cause erosion and rustiness of metal parts, abrade and trap the action parts, block the ports and lead to transmission abnormality of air pressure signal. In cold area, the freezing of moisture will cause freeze and frost-crack of pipeline and the failure of elements and components.
- It is not allowed to use the compressed air with harmful gas (such as acid and alkali). Acid and alkali will cause damage to internal parts of pneumatic components.

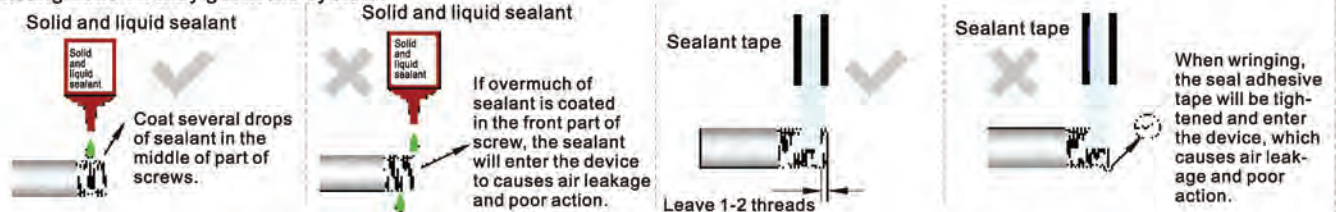


- The compressed air without the content of oxygenated oil of air compressor, tar and carbon shall be used.
- If the oxygenated oil, tar and carbon get into air pressure elements and become additive to them, the resistance of slipping parts will be increased and poor action will be caused. The mixture of oxygenated oil, tar and carbon with lubricant will abrade the slipping parts of air pressure elements.
- It is not suitable to use dry air in air pressure elements. Please use the elements corresponding to ultra-dry air. The ultra-dry compressed air will shorten the service life of air pressure elements.



## Tubing and Installation Pneumatic System

- Please obey the following stipulations on the entwining method of sealant tape when connecting fitting and tube. Please start to entwine sealant tape from 1st-2nd screw thread at the front part of tube thread and on both of positive direction and inverse direction of the thread. If the sealant tape entwines out of the front part of the tubing thread, it will be torn into fragments which will cause faults and wrong action if they get in the system.



- When connecting the tubing, please fasten with proper torque to prevent air leakage and thread damage.

Table one: Reference value of Fasten torque

Unit: N.m

Connective thread	M3	M5	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Fasten torque	0.3~0.6	1.0~1.5	7.0~9.0	12~14	22~24	28~30	28~30	36~40



- Pay attention to the following matters when using nylon tube or polyurethane tube materials:

- Please use flame retardant tube or metal tubing in the environment with high temperature spark;
- The proof pressure is different according to the bore size of tube and the working temperature



Table two: Reference data of maximum proof pressure

(Unit: kgf/cm<sup>2</sup>)

OD/ID(mm)		4/2.5	5/3	6/4	8/6	10/7.5	12/9	14/11	16/12	22/17	28/22
Maximum pressure(-40°C~20°C)	Nylon tube	28	31	25	19	24	18	15	18	15	15
	PU tube	10	11	9	9	9	9	-	-	-	-
Minimum bending radius (mm)	Nylon tube	25	2	30	50	60	75	90	95	125	160
	PU tube	6	7	9	16	17	25	-	-	-	-
Using in different working temperatures, the maximum proof pressure shall multiply the following coefficient.	+30°C										
		0.83		0.72		0.64		0.57		0.47	

- The pipeline shall be cleaned with compressed air prior to connecting the tubing and fittings to the pneumatic components.





## Convert American system and British system unit to international (SI) unit

### Length unit

American and british system	Conversion rates	International
1 in	= 25.4	mm
1 ft	= 0.3048	m
1 mile	= 1609.3	m
1 micron	= $10^{-6}$	m

### Quality unit

American and british system	Conversion rates	International
1 lb	= 453.6	g
1 cwt	= 50.8	kg
1 ton(imp)	= 1016	kg
1 ton(us)	= 907.2	kg
1 tonne	= 1000	kg

### Moment unit

American and british system	Conversion rates	International
1 inlb	= 0.113	Nm
1 ft lb	= 1.356	Nm
1 kgm	= 9.807	Nm
1 ft poundal	= 0.0421	Nm

### Temperature unit

American and british system	International
$(^{\circ}\text{F}-32) \times 5/9$	= $^{\circ}\text{C}$
K-273.15	= $^{\circ}\text{C}$

### Flow unit

Cv value =	It's the constant value of flow, when the water flow(US gal/min)is under 60°F, the D–value of pressure between intake and outlet is 1psi (Cv × 1000 ≈ L/min)
kv value =	It's the constant value of flow, when the water flow(L/min)is under 20°C, the D–value of pressure between intake and outlet is 1kgf/cm <sup>2</sup>
KV value =	It's the constant value of flow, when the water flow(m <sup>3</sup> /min)is under 20°C, the D–value of pressure between intake and outlet is 1kgf/cm <sup>2</sup>
S.T.P =	Standard temperature and pressure (0°C and 101.3kPa absolute pressure)
N.T.P =	Normal temperature and pressure (20°C and 101.3kPa absolute pressure)
M.S.C =	Standard of metric syctem (15°C and 101.3kPa absolute pressure)
ANR =	Temperature: 20°C and relative humidity: 65%

### Equivalence conversion

1 psi	=6.895	kPa	=0.07	kg/cm <sup>2</sup>	=0.06895	bar	=0.0703	atm
1 standard atmosphere	=14.7	psi	=101.3	kPa	=1.01325	bar		
1 kg/cm <sup>2</sup>	=98.07	kPa	=14.22	psi	=28.96	ins mercury		
1 ft lb	=0.13826	kgm	=1.356	Nm				
1 L	=1000	cm <sup>3</sup>	=1.7598	pint	=10 <sup>6</sup>	mm <sup>3</sup>		
1 tonne	=1000	kg	=0.984	ton	=2205	lb		
1 m <sup>3</sup>	=10 <sup>6</sup>	cm <sup>3</sup>						
1 cu ft/min.	=28.3	l/min	=0.0283	m <sup>3</sup> /min				
1 Pa	=28.3	l/min	=0.0283	m <sup>3</sup> /min				

### Area unit

American and british system	Conversion rates	International
1 in <sup>2</sup>	= 6.45	cm <sup>2</sup>
1 ft <sup>2</sup>	= 0.093	m <sup>2</sup>

### Pressure unit

American and british system	Conversion rates	International
1 psi	= 6.89	kPa
1 kgf/cm <sup>2</sup>	= 98.07	kPa
1 bar	= 100	kPa
1 bar	= 14.5	psi
1 atmosphere	= 98.1	kPa
1" (STANDARD)	= 101.33	kPa
1 cm water	= 97.89	Pa
1 in water	= 248.64	Pa
1 mm mercury	= 133.3	Pa
1 in mercury	= 3.39	kPa
1 Torr	= 133.3	Pa
1 ft water	= 0.0298	bar
1 bar	= 33.33	ft water

### Unit of work and energy

American and british system	Conversion rates	International
1 lbft	= 1.356	J
1 Nm	= 1	J
1 kgm	= 9.807	J
1 kW/hr	= 3.6	MJ

### Volume unit

American and british system	Conversion rates	International
1 litre	= 0.001	m <sup>3</sup>
1 cu.ft.	= 0.0283	m <sup>3</sup>
1 cu.in.	= 16.39	cm <sup>3</sup>
1 gal(imp)	= 4.546	L
1 gal(us)	= 3.79	L
1 fluid oz.(imp)	= 28.41	mL
1 fluid oz.(us)	= 29.57	mL

### Force unit

American and british system	Conversion rates	International
1 lbf	= 4.45	N
1 kgf	= 9.81	N
1 kp(kilopond)	= 9.81	N
1 poundal	= 138.3	mN
1 ton force	= 9.964	kM

### Power unit

American and british system	Conversion rates	International
1 lbft/sec	= 1.356	W
1 kgm/sec	= 9.807	W
1 Nm/sec	= 1	W
1 Joule/sec	= 1	W
1 H.P.(imp)	= 745.7	W

### Unit compilation

Unit full name	Abbreviation
Pascal	Pa
Newton	N
metre	m
litre	L
Watt	W
Newton metre	Nm
Jonle	J
Megajoule	MJ
Kelvin	K





# Standard cylinder—SAI Series

In accordance with ISO15552 standard

## Compendium of SAI Series

**ISO15552 Standard cylinder**  
Bore size: 32, 40, 50, 63, 80  
100, 125, 160, 200

**Adjustable air buffer**  
With adjustable air buffer on the front and back cover

**Without tie rod**  
The 米-shaped aluminum pipe without tie rod has good corrosion resistance;

**With sensor switch groove**  
With sensor switch groove on the two sides of body, the counterpart sensor switch type is: CMSE \ DMSE.

**Four kinds of cylinder joints**  
I Knuckle Y Knuckle Floating Joint Universal Joint

**Multi-type cylinder**

**Multi-mounting accessories**  
LB FA FB CA CB CR FTC TCM1 TCM2 TC

SAI: Double acting type    SAID: Double rod type    SAIJ: Adjustable stroke type

SAIL: Double acting with locker type    SAIF: With valve type

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
32	12	Double acting	Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
			Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting	Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1002.4	1130.4
			Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting	Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
			Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1399.2	1484.1
63	20	Double acting	Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
			Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting	Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
			Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting	Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	4288.2	6282.4	7067.7
			Pull side	7362	736.2	1472.4	2208.6	2948.6	3681.0	4417.2	5153.4	5889.6	6625.8
125	32	Double acting	Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8
			Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2
160	40	Double acting	Push side	20106	2010.6	4021.2	6031.8	8042.4	10053.0	12063.6	14074.2	16084.8	18095.4
			Pull side	18849	1884.9	3769.8	5654.7	7539.6	9424.5	11309.4	13194.3	15079.2	16964.1
200	40	Double acting	Push side	31416	3141.6	6283.2	9424.8	12566.4	15708.0	18849.6	21991.2	25132.8	28274.4
			Pull side	30157	3015.7	6031.4	9047.1	12062.8	15078.5	18094.2	21109.9	24125.6	27141.3

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

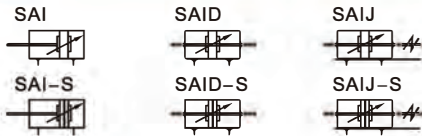


# ISO15552 Standard cylinder

## SAI Series



### Symbol



### Product feature

1. ISO 15552 (original ISO6431) standard cylinder;
2. The piston seal is composed of two Y-shape one-way seal structure, which has compensation function, long service life and low start-up pressure;
3. The ㄨ-shaped aluminum pipe without tie rod has good corrosion resistance. With sensor switch groove on the two sides of body;
4. The buffer adjustment of cylinder is smooth and steady;
5. Cylinders and accessories for installation with several specifications are optional.

### Ordering code

SAI 160  x 50 S

SAID160  x 50 S

SAIJ 160  x 50-20 S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Bore size	③ Rod Material	④ Stroke	⑤ Adjustable stroke	⑥ Magnet	⑦ Mounting type[Note1]	⑧ Seals Material	⑨ Thread type
SAI: Double acting type	32 40 50 63 80 100 125 160 200	Blank: Medium carbon steel A: SUS420J2 B: SUS304	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
						LB		
						FA		
						FB		
						CA		
						CB		
						CR		
SAID: Double rod type						Blank		
						LB		
SAIJ: Adjustable stroke type				10 20 30 40 50 75 100		FA		
						FTC		
						TC		

[Note1] CR is used with CB; FTC, TC are used with TCM1, TCM2.

### Specification

Bore size(mm)	32	40	50	63	80	100	125	160	200
Acting type	Double acting								
Fluid	Air(to be filtered by 40 μm filter element)								
Mounting type	SAI	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2							
	SAID, SAIJ	Basic FA LB TC TCM1 TCM2							
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)								
Proof pressure	1.5MPa(215psi)(15bar)								
Temperature °C	-20~70								
Speed range mm/s	30~800				30~500				
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>				
Cushion type	Variable cushion								
Adjustable cushion stroke	27		30		36		40		50
Port size [Note1]	1/8"		1/4"		3/8"		1/2"		3/4"

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

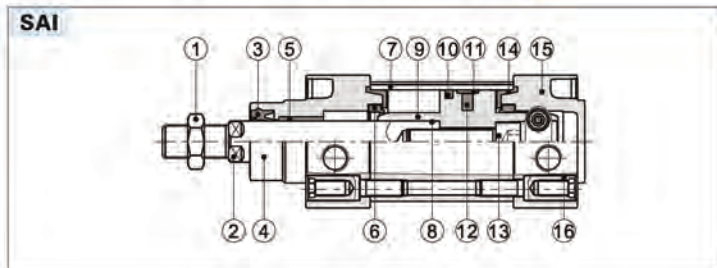
Bore size (mm)	Standard stroke (mm)	Max.std stroke	Max. stroke
32	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	1000	1800
40	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	1200	1800
50	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1200	1800
63	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
80	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
100	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
125	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	1800
160	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	2000
200	25 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	1500	2000

[Note] Consult us for non-standard stroke.

# ISO15552 Standard cylinder

## SAI Series

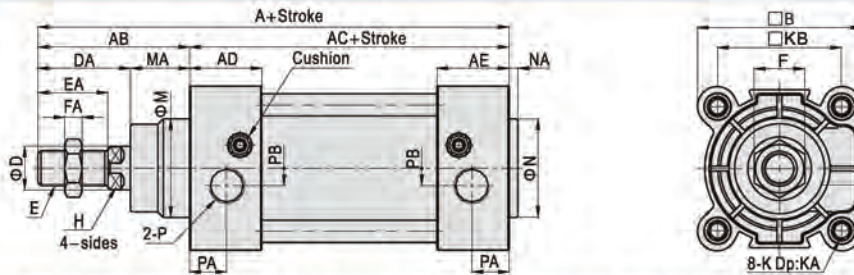
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel\Stainless steel
2	Piston rod	Carbon steel with 20µm chrome plated or Stainless steel
3	Front cover packing	TPU
4	Front cover	Aluminum alloy
5	Bushing	Wear resistant material
6	Cushing O-ring	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston Seal	NBR
11	Wear ring	Wear resistant material
12	Magnet	Plastic(Φ 100 and below)\Rubber(Others)
13	Bolt	Carbon steel
14	Buffer gasket	TPU
15	Back cover	Aluminum alloy
16	Screw	Carbon steel\Stainless steel

### Dimensions

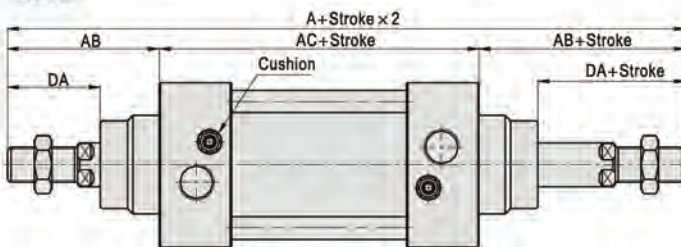
SAI



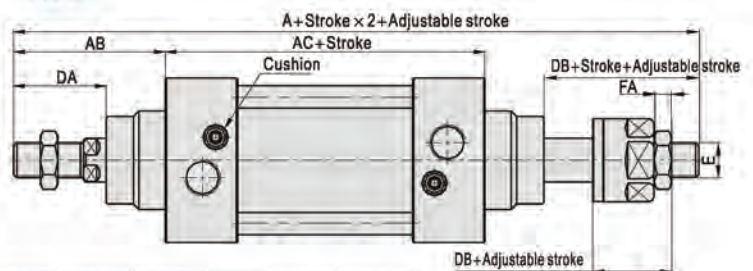
Bore size/Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	M	MA	H	K	KA	KB	N	NA	P	PA	PB
32	142	48	94	27.5	27.5	47	12	29	M10×1.25	22	17	6	30	19	10	M6	16	32.5	30	3	1/8"	13	5.5
40	159	54	105	32	32	53	16	33	M12×1.25	24	17	7	35	21	13	M6	16	38	35	3.5	1/4"	17	6
50	175	69	106	31	31	65	20	42	M16×1.5	32	23	8	40	27	17	M8	16	46.5	40	3.5	1/4"	15.5	7.5
63	190	69	121	33	33	75	20	42	M16×1.5	32	23	8	45	27	17	M8	16	56.5	45	4	3/8"	16.5	7.5
80	214	86	128	33	33	95	25	53	M20×1.5	40	26	10	45	33	22	M10	17	72	45	4	3/8"	16.5	9
100	229	91	138	37	37	115	25	55	M20×1.5	40	26	10	55	36	22	M10	17	89	55	4	1/2"	18.5	9.5
125	279	119	160	46	46	140	32	74	M27×2.0	54	41	13.5	60	45	27	M12	20	110	60	4	1/2"	23	14
160	332	152	180	50	50	180	40	94	M36×2.0	72	55	18	65	58	36	M16	24	140	65	4	3/4"	25	15
200	347	167	180	50	50	220	40	100	M36×2.0	72	55	18	75	67	36	M16	24	175	75	5	3/4"	25	15

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SAID



SAIJ



Bore size/Item	A		AB	AC	DA	DB	E	FA
	SAID	SAIJ						
32	190	188	48	94	29	27	M10X1.25	6
40	213	208	54	105	33	28	M12X1.25	7
50	244	231	69	106	42	29	M16X1.5	8
63	259	246	69	121	42	29	M16X1.5	8
80	300	282.5	86	128	53	35.5	M20X1.5	10
100	320	300.5	91	138	55	35.5	M20X1.5	10
125	398	366.5	119	160	74	42.5	M27X2.0	13.5
160	484	458	152	180	94	68	M36X2.0	18
200	514	482	167	180	100	68	M36X2.0	18

Remark:

1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SAI standard type.

# ISO15552 Standard cylinder

## SAIL Series—With locker type



### Symbol



### Product feature

1. With lock cylinder: front cover with lock type and rear cover lock type;
2. The way of unlocking: automatic and manual.

### Specification

Bore size(mm)	40	50	63	80	100	125	160	200			
Acting type	Double acting										
Fluid	Air(to be filtered by 40 μm filter element)										
Mounting type	Basic	FA	FB	CA	CB	CR	LB	TC	FTC	TCM1	TCM2
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)										
Proof pressure	1.5MPa(215psi)(15bar)										
Temperature °C	-20~70										
Speed range mm/s	30~800				30~500						
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>						
Cushion type	Variable cushion										
Adjustable cushion stroke	No locker end	27	30	36	40	50					
	With locker end	15	13.5	16	19.5	20	23	27			
Port size [Note1]	1/4"		3/8"		1/2"		3/4"				

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)											Max.std stroke	Max. stroke										
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	1200	1800		
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Consult us for non-standard stroke.

### Ordering code

SAIL B 160 × 50 S □ □

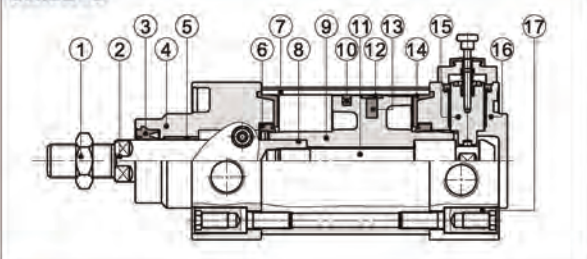
① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Locker position	③ Bore size	④ Stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Thread type
SAIL: Double acting type (with locker)	B: Back cover with locker F: Front cover with locker	40 50 63 80 100 125 160 200	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank LB FA FB CA CB CR FTC TC	Blank: PT G: G

[Note1] CR is used with CB; FTC, TC are used with TCM1, TCM2.

### Inner structure and material of major parts

SAILB-S



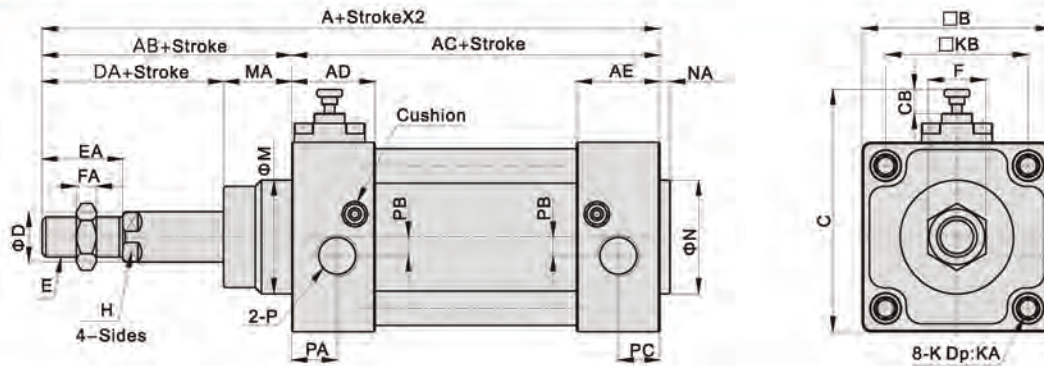
NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	9	Piston	Aluminum alloy
2	Piston rod	Carbon steel with 20μm chrome plated	10	Piston Seal	BNR
3	Front cover packing	TPU	11	Plugger	S45C
4	Front cover	Aluminum alloy	12	Wear ring	Wear resistant material
5	Bushing	Wear resistant material	13	Magnet	Plastic
6	Cushing O-ring	TPU	14	Buffer gasket	TPU
7	Barrel	Aluminum alloy	15	Locker	
8	O-ring	NBR	16	Back cover	Aluminum alloy
			17	Screw	Carbon steel

# ISO15552 Standard cylinder

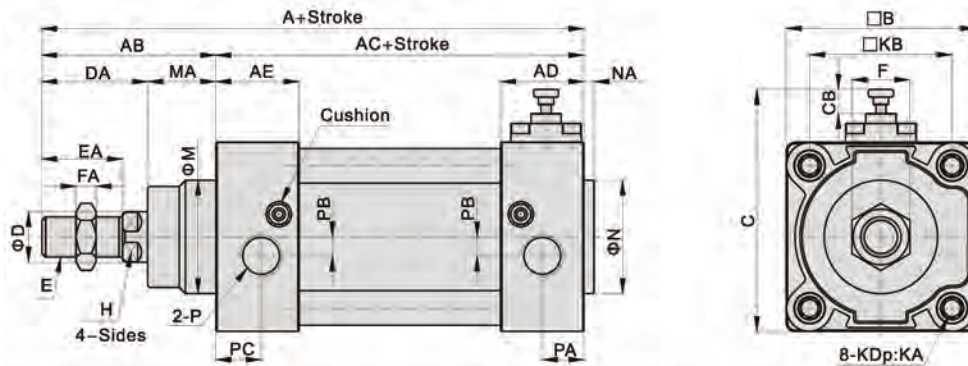
## SAIL Series—With locker type

### Dimensions

#### SAILF



#### SAILB

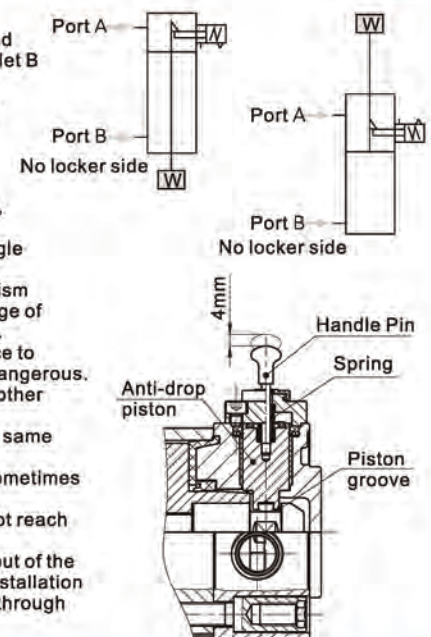


Bore size\Item	A	AB	AC	AD	AE	B	C	CB	D	DA	E	EA	F	FA	H	M	MA	K	KA	KB	N	NA	P	PA	PB	PC
40	159	54	105	32	32	53	75.5	11	16	32	M12×1.25	24	17	7	13	35	22	M6	16.5	38	35	3.5	1/4"	17	6	17
50	175	69	106	31	31	65	87.5	11	20	42	M16×1.5	32	23	8	17	40	27	M8	16.5	46.5	40	3.5	1/4"	19.5	7.5	15.5
63	190	69	121	33	33	75	99	12.5	20	40	M16×1.5	32	23	8	17	45	29	M8	16.5	56.5	45	4	3/8"	18	7.5	16.5
80	220	86	134	39	33	95	121	12.5	25	53	M20×1.5	40	26	10	22	45	33	M10	18.5	72	45	4	3/8"	22.5	9	16.5
100	231	91	140	39	37	115	140	11.5	25	55	M20×1.5	40	26	10	22	55	36	M10	18.5	89	55	4	1/2"	20.5	13.5	18.5
125	279	119	160	46	46	140	172.5	18.5	32	74	M27×2.0	54	41	13.5	27	60	45	M12	21.5	110	60	4	1/2"	23	14	23
160	332	152	180	50	50	180	212.5	18.5	40	94	M36×2.0	72	55	18	36	65	58	M16	30	140	65	4	3/4"	25	15	25
200	347	167	180	50	50	220	252.5	18.5	40	100	M36×2.0	72	55	18	36	75	67	M16	30	175	75	5	3/4"	25	15	25

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### Use and maintenance

- Under the condition of locking, there is a great danger to the gas port A when there is no pressure on both sides of the air port. There is a great danger similar to the release of locking, or the sudden release of lock and the piston rod flying. When the locking mechanism is lifted, it is necessary to supply the pressure of the air inlet B and remove the lock mechanism without load.
- If the fast exhaust valve is used to speed down the drop speed, the cylinder phenomenon is sometimes started with the lock pin first and can not be removed normally. Therefore, please do not use the fast exhaust valve with the lock cylinder.
- Please do not use three solenoid valves: please do not combine with three (especially the seal type metal seal) solenoid valve. If pressure is sealed in the air inlet with the locking mechanism side, the lock will not work. In addition, even if it is temporarily locked, the air leaked from the solenoid valve will enter the cylinder, and the lock will be lifted after a period of time.
- If the locking mechanism side bears the back pressure, sometimes the lock will be lifted, so please use a single or integrated individual exhaust type solenoid valve.
- If the cylinder with adjustable cushioning is excessive, if the air cushion valve needle on the locking mechanism side is screwed too much, the piston will sometimes cause restraint at the stroke terminal, causing the damage of the locking mechanism. Therefore, the needle valve should be adjusted to make the piston not be restrained.
- When the manual operation of the locking mechanism is completed, it is necessary to reset the manual device to the in situ. In addition, please do not do manual operation outside the adjustment, otherwise it will be more dangerous.
- When the cylinder is installed and adjusted, please dissolve the lock: in the lock state of the installation and other operations, sometimes it causes the lock-in parts to be damaged.
- Please do not use multiple cylinders at the same time: please do not use more than 2 locking cylinders at the same time to drive a workpiece. Sometimes one of the cylinders will not be locked out.
- Please use the speed control valve in the exhaust throttle control state: in the intake throttling control, it is sometimes impossible to release the lock.
- In the lock side, please be sure to use the terminal of the cylinder stroke: if the piston of the cylinder does not reach the terminal, locking will fail or lock.
- Manual operation is a non locking way to release: pull the lever into the anti falling piston, and pull the bolt out of the 4mm with the force of more than 20N. After the piston is moved away, it can release the lock. (no load level installation or opposite side port pressurization), or after loosened, the anti falling piston returns to the original position through the action of the stop spring and enters the piston rod groove, and the piston becomes locked.

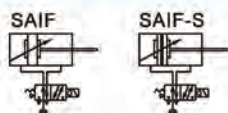


# ISO15552 Standard cylinder

## SAIF Series—With valve type



### Symbol



### Product feature

1. For Standard Cylinders: use 4M210 valve for bore size 32, 40 & 50; 4M310 valve for bore size 63, 80 & 100mm.
2. Individually control, no need for extra solenoid valves.
3. Installation time & space saving; suitable for decentralize installation in large system.
4. Options of mounting accessories & easy installation.

### Stroke

Bore size(mm)		Standard stroke (mm)	Mini. stroke	Max. std. stroke	Max. stroke
32	Standard type	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	50	1000	1800
	With TC type	100 125 150 160 175 200 250 300 350 400 450 500	100		
40	Standard type	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	50	1200	1800
	With TC type	100 125 150 160 175 200 250 300 350 400 450 500 600 700 800	100		
50	Standard type	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50	1200	1800
	With TC type	100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	100		
63 80	Standard type	50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50	1500	1800
	With TC type	100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	100		

[Note] Consult us for non-standard stroke.

### Specification

Cylinder specification						
Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Mounting type	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2					
Operating pressure	0.1~1.0MPa(15~145psi)(1.0~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 <sup>+1.0</sup> / <sub>0</sub> 251~1000 <sup>+1.5</sup> / <sub>0</sub> 1001~1500 <sup>+2.0</sup> / <sub>0</sub>					
Cushion type	Variable cushion					
Adjustable cushionstroke	27		30		36	
Port size	1/8"		1/4"		3/8" 1/2"	
PU tube size(ODXID)	Φ8 × Φ5				Φ10 × Φ6.5	
Solenoid valve specification						
Model	4M210-06 & 4M210-08			4M310-08 & 4M310-10		
Fluid	Air(to be filtered by 40 μm filter element)					
Acting type	Internal piloted					
Port size [Note1]	In=Exhaust=1/8" & In=1/4" Exhaust=1/8"			In=Exhaust=1/4" & In=PT3/8 Exhaust=1/4"		
Orifice size	4M210-06: 14.0mm <sup>2</sup> (Cv=0.78)		4M310-08: 25.0mm <sup>2</sup> (Cv=1.40)			
	4M210-08: 16.0mm <sup>2</sup> (Cv=0.89)		4M310-10: 30.0mm <sup>2</sup> (Cv=1.68)			
Valve type	5 port 2 position					
Operating pressure	0.15~0.8MPa(21~114psi)					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Body material	Aluminum alloy					
Lubrication [Note2]	Not required					
Max. frequency [Note3]	5 cycle/sec			4 cycle/sec		
Coil specification						
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V					
Scope voltage	AC: ±15% DC: ±10%					
Power consumption	AC: 3.5VA DC: 3.0W					
Protection	IP65(DIN40050)					
Temperature classification	B Class					
Electrical entry	Terminal, Grommet					
Activating time	0.05 sec and below					

[Note1] PT thread, G thread are available.

[Note2] It can't stop in the midway of lubricating. Lubricants like ISO VG32 or equivalent are recommended.

[Note3] The maximum actuation frequency is in the no-load state.

Add) Refer to P353 for detail of sensor switch.

### Ordering code

SAIF 50 × 1000 S □ -06 A □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

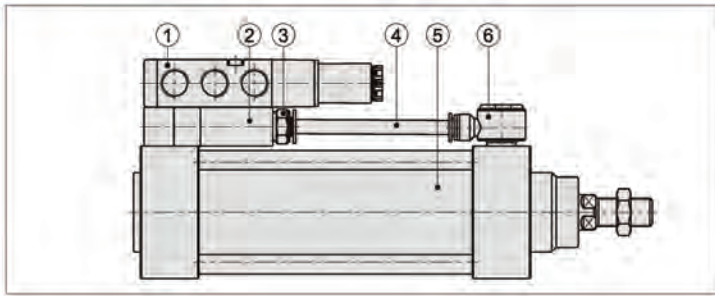
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Mounting type[Note1]	⑥ Port size	⑦ Voltage	⑧ Electrical entry	⑨ Thread type
SAIF: Double acting with valve type	32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	06: 1/8" 08: 1/4" 10: 3/8"	A: AC220V B: DC24V C: AC110V E: AC24V F: DC12V	Blank: Terminal I: Grommet	Blank: PT G: G
				LB				
				FA				
				FB				
				CA				
				CB				
				CR				
				FTC				
				TC				

[Note1] CR is used with CB.FTC and TC are used with TCM1 and TCM2.

# ISO15552 Standard cylinder

## SAIF Series—With valve type

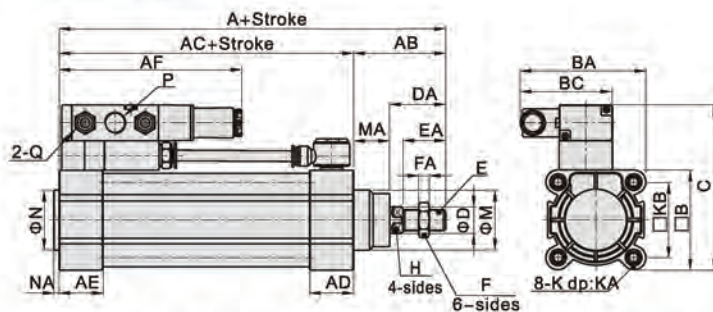
### Inner structure



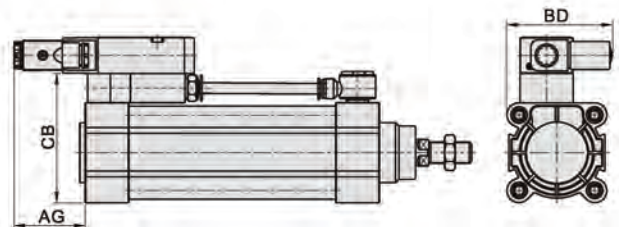
NO.	Item
1	4M series solenoid valve
2	Unite block
3	APC series tube connector
4	PU tube
5	SAI series cylinder
6	APH series tube connector

### Dimensions

#### Pull when energized



#### Push when energized



Bore size/Item	A	AB	AC	AD	AE	AF	AG	B	BA	BC	BD	C	CB
32	142	48	94	27.5	27.5	117.5	53.5	47	78.5	67	67.5	91	69
40	159	54	105	32	32	120	51	53	82	67	70	97	75
50	175	69	106	31	31	118.5	52.5	65	89.5	67	74.5	109	87
63	190	69	121	33	33	137	53	75	94.5	69.5	79.5	124	97
80	214	86	128	33	33	137	53	95	105.5	69.5	88	144	117
100	229	91	138	37	37	137.5	52.5	115	118	69.5	96	164	137

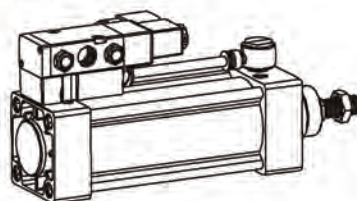
Bore size/Item	valve's type	P	K(NoTC)	K(WithTC)	KA(NoTC)	KA(WithTC)
32	4M210-06	1/8"	M6	M5	16	14
	4M210-08	1/4"				
40	4M210-06	1/8"	M6	M5	16	16
	4M210-08	1/4"				
50	4M210-06	1/8"	M8	M6	16	16
	4M210-08	1/4"				
63	4M310-08	1/4"	M8	M6	16	16
	4M310-10	3/8"				
80	4M310-08	1/4"	M10	M8	17	16
	4M310-10	3/8"				
100	4M310-08	1/4"	M10	M8	17	16
	4M310-10	3/8"				

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

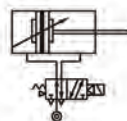
### How to use

- Options for piston rod to retract or extend when solenoid coil is energized.
- Default factory setting will be piston rod to retract when energized(see Drawing one). Should you require piston rod to extend when energized, reposition the solenoid valve as shown in Drawing two.

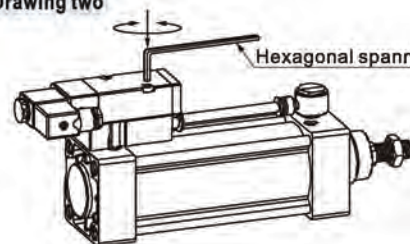
#### Drawing one



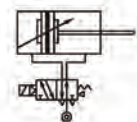
Pull when energized



#### Drawing two



Push when energized



**Attention** Ensure that the seals between the mounting block & valve are placed correctly when repositioning the valve.



# Enclasp cylinder—BSAI Series

In accordance with ISO15552 standard

## Compendium of BSAI Series

**Spring and gripper patch enclasp equipment**  
Simplicity structure  
Celerity and availability locked or unlocked  
State switch steadily

Spring  
Gripper patch

**Multi-kinds unlocked mode**  
Air pressure unlocked mode and manual unlocked mode are available

Air pressure unlocked mode

Manual unlocked screw

Manual unlocked mode

**Multi-type cylinder and bore size**  
BSAI, BSAID type available  
Bore size: 32, 40, 50, 63, 80, 100, 125

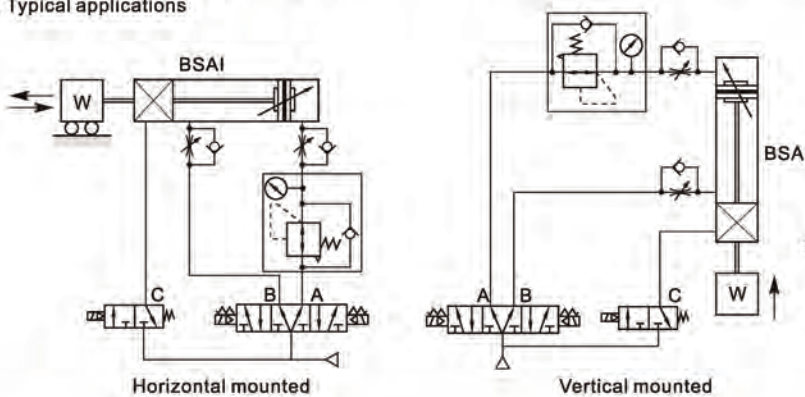
**Bidirectional lock**  
Can be locked no matter piston shoot out or draw back

**Compact enclasp equipment**  
Compact enclasp equipment to save space

**The body is the same as SAI series**  
The body is SAI series standard cylinder's body for mounting expediently.  
The mounting accessories and the sensor switch are the same as SE series cylinder.

## How to mount and use

1. The locker equipment only be locked after cylinder stopped, can't brake the piston rod while it is moving. If the lock cylinder be used for control system with safety demand, other safety measure is required.
2. The locker equipment only be unlocked when the air pressure on both sides of piston rod are equation or the cylinder stopped, otherwise piston rod movies abruptly might produce accident.
3. Typical applications



### Acting type

Yes or No inlet			State of acting	
A Port	B Port	C Port		
Yes	No	Yes	Advance	
Yes	Yes	No	Locked	
Yes	Yes	Yes	unlocked	Over 0.5S
Yes	No	Yes	Advance to rod protruded completely	0~0.5S
No	Yes	Yes	Back	
Yes	Yes	No	Locked	Over 0.5S
Yes	Yes	Yes	unlocked	
No	Yes	Yes	back to rod retracted completely	0~0.5S

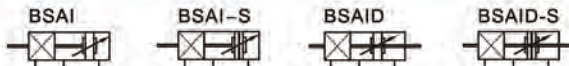


# ISO15552 Standard cylinder

## BSAI Series—Enclasp type



### Symbol



### Specification

<b>Bore size(mm)</b>	<b>32</b>	<b>40</b>	<b>50</b>	<b>63</b>	<b>80</b>	<b>100</b>	<b>125</b>
<b>Acting type</b>	Double acting						
<b>Fluid</b>	Air(to be filtered by 40 μm filter element)						
<b>Mounting type</b>	Basic FA FB CA CB CR LB TC TCM1 TCM2						
<b>type</b>	BSAI BSAID Basic FA LB TC TCM1 TCM2						
<b>Operating pressure</b>	0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
<b>Proof pressure</b>	1.5MPa(215psi)(15bar)						
<b>Temperature °C</b>	-20~70						
<b>Speed range mm/s</b>	30~800						30~500
<b>Stroke tolerance</b>	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>		
<b>Cushion type</b>	Variable cushion						
<b>Adjustable cushion stroke</b>	27		30		36		40
<b>Port size</b>	<b>Cylinder</b>	1/8"	1/4"	3/8"		1/2"	
<b>[Note1]</b>	<b>Enclasp equipment</b>	G1/8					
<b>Unlocked Pressure</b>	0.3~0.7MPa(45~100psi)(3~7bar)						
<b>Static holding force (N)</b>	600	900	1400	2200	3600	5500	8600

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Product feature

1. Belong to SAI series standard cylinder add lock structure.
2. Can be locked at random positions in stroke scope.
3. Reasonable lock structure, the lock state no relation with the direction of piston moving.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke			
	25	50	75	80	100	125	150	160	175	200			250	300	350
32											1000	1800			
40											1200	1800			
50											1200	1800			
63											1500	1800			
80											1500	1800			
100											1500	1800			
125											1500	1800			

[Note] Consult us for non-standard stroke.

### Ordering code

B SAI 80X50 S    
 B SAID 80X50 S    
 ① ② ③ ④ ⑤ ⑥ ⑦

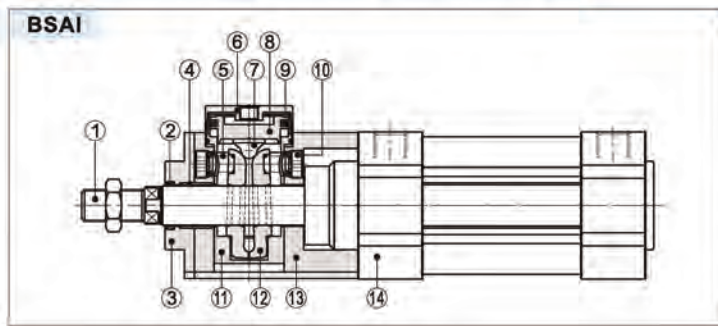
①Type	B: Enclasp cylinder			
②Model	SAI: Double acting type		SAID: Double rod type	
③Bore size	32	40	50	63 80 100 125
④Stroke	Refer to stroke table for details			
⑤Magnet	Blank: Without magnet		S: With magnet	
⑥Mounting type [Note1]	Blank	LB	Blank	LB
	FA	FB	FA	TC
	CA	CB		
	CR	TC		
⑦Thread type	Blank: PT1/4		G: G1/4	

[Note1] CR is used with CB; TC are used with TCM1、TCM2.

# ISO15552 Standard cylinder

## BSAI Series—Enclasp type

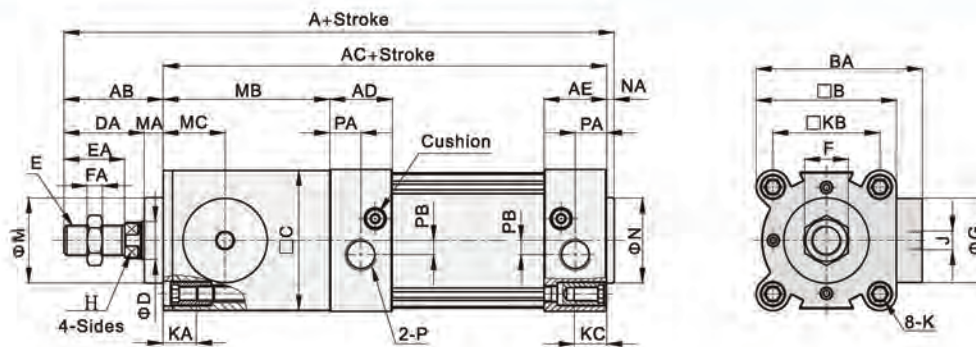
### Inner structure and material of major parts



NO.	Item	Material
1	Piston rod	Carbon steel with 20 μm chrome plated or Stainless steel
2	Packing	Plastic
3	Packing holder	Aluminum alloy
4	Bearing	Carbon steel+Bronze sinter
5	Spring	Spring steel
6	Cover	Aluminum alloy
7	Unlocked header	Wear resistant material
8	Unlocked piston	Aluminum alloy
9	Piston O-ring	NBR
10	Screw	Carbon steel
11	Sleeve	Aluminum alloy
12	Clamp header	Aluminium bronze
13	Fixed holder	Aluminum alloy
14	SAI series cylinder	-

### Dimensions

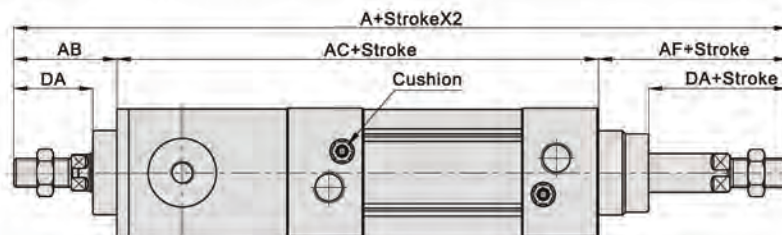
#### BSAI



Bore size\Item	A	AB	AC	AD	AE	B	BA	C	D	DA	E	EA	F	FA	G	H	J	K	KA	KB	KC	M	MA	MB	MC	P	PA	PB	N	NA
32	201	39	159	27.5	27.5	47	65	46.5	12	29	M10×1.25	22	17	6	30	10	G1/8	M6X1.0	14.5	32.5	16	20	10	65	25	1/8"	13.5	6	30	3
40	222.5	43	176	32	32	53	72	52.5	16	33	M12×1.25	24	17	7	28.5	13	G1/8	M6X1.0	14.5	38	16	35	10	71	27.5	1/4"	17.5	6	35	3.5
50	249.5	52	194	31	31	65	83	64	20	42	M16×1.5	32	23	8	35.5	17	G1/8	M8X1.25	16	46.5	16	40	10	88	33	1/4"	14	8	40	3.5
63	265	52	209	33	33	75	88	74	20	42	M16×1.5	32	23	8	44.5	17	G1/8	M8X1.25	16	56.5	16	45	10	88	33	3/8"	17	8	45	4
80	321	68	249	33	33	95	107	94	25	53	M20×1.5	40	26	10	55.5	22	G1/8	M10X1.5	17	72	17	45	15	121	47	3/8"	16.5	8	45	4
100	336	70	262	37	37	115	117.5	113.5	25	55	M20×1.5	40	26	10	55.5	22	G1/8	M10X1.5	17	89	17	55	15	124	47	1/2"	19.5	10	55	4
125	401	92	305	46	46	140	152	138	32	74	M27×2	54	41	13.5	70	27	G1/8	M12X1.75	20	110	20	60	18	145	63	1/2"	23	11	60	4

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### BSAID



Bore size\Item	A	AB	AC	AF	DA	E	FA
32	246	39	159	48	29	M10×1.25	6
40	273	43	176	54	33	M12×1.25	7
50	315	52	194	69	42	M16×1.5	8
63	330	52	209	69	42	M16×1.5	8
80	403	68	249	86	53	M20×1.5	10
100	423	70	262	91	55	M20×1.5	10
125	516	92	305	119	74	M27×2	13.5

Remark:

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as BSAI standard type.

## SAI Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories								
	LB	FA/FB	CA	CB	CR	TC	FTC	TCM1	TCM2
32	F-SI32LB	F-SI32FA	F-SE32CA	F-SE32CB	F-SI32CR	F-SAI32TC	F-SI32FTC	F-SI32TCM1	F-SI32TCM2
40	F-SI40LB	F-SI40FA	F-SE40CA	F-SE40CB	F-SI40CR	F-SAI40TC	F-SI40FTC	F-SI40TCM1	F-SI40TCM2
50	F-SI50LB	F-SI50FA	F-SE50CA	F-SE50CB	F-SI50CR	F-SAI50TC	F-SI50FTC	F-SI40TCM1	F-SI40TCM2
63	F-SI63LB	F-SI63FA	F-SE63CA	F-SE63CB	F-SI63CR	F-SAI63TC	F-SI63FTC	F-SI63TCM1	F-SI63TCM2
80	F-SI80LB	F-SI80FA	F-SE80CA	F-SE80CB	F-SI80CR	F-SAI80TC	F-SI80FTC	F-SI63TCM1	F-SI63TCM2
100	F-SI100LB	F-SI100FA	F-SE100CA	F-SE100CB	F-SI100CR	F-SAI100TC	F-SI100FTC	F-SI125TCM1	F-SI125TCM2
125	F-SI125LB	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	F-SAI125TC	F-SI125FTC	F-SI125TCM1	F-SI125TCM2
160	F-SI160LB	F-SI160FA	F-SI160CA	F-SI160CB	F-SI160CR	F-SI160TC	F-SI160FTC	F-SI160TCM1	F-SI160TCM2
200	F-SI200LB	F-SI200FA	F-SI200CA	F-SI200CB	F-SI200CR	F-SI200TC	F-SI200FTC	F-SI200TCM1	F-SI160TCM2

Accessories Bore size	Knuckle				Sensor switch	
	I	Y	F	U	CMSE	DMSE
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSE	DMSE
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		

### Accessory selection

Accessories Cylinder model	Mounting accessories										Knuckle [Note1]				Sensor switch	
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	F	CMSE	DMSE
SAI	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SAIL	Standard	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	×	●	●	●	●	●	●	●	●
SAIF	Standard	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	×	●	●	●	●	●	●	●	●
BSAI	Standard	●	●	●	●	●	●	×	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	×	●	●	●	●	●	●	●	●
SAID	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●
BSAID	Standard	●	●	×	×	×	×	×	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	×	●	●	●	●	●	●	●	●
SAIJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●

[Note1] Please refer to P349~352 for knuckle detail.

### Material of accessories

Accessories Bore size	Mounting accessories										Knuckle			
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	F	U
32~100	○	●	●	◇	◇	◇	◇	■	■	●	□	□	□	□
125~200	□	□	□	□	□	□	□	□	□	●	□	□	□	□

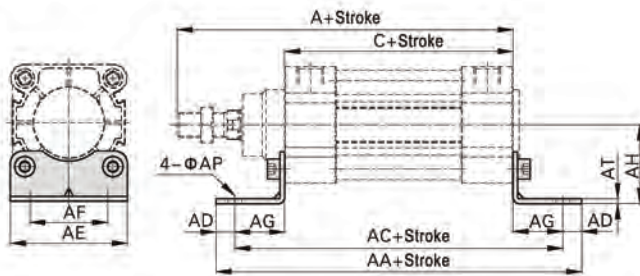
●—Aluminum alloy, ■—Cast steel, ○—Low carbon steel, ◇—Nodular cast iron, □—Carbon steel.

# ISO15552 Standard cylinder

## SAI Series—Accessories

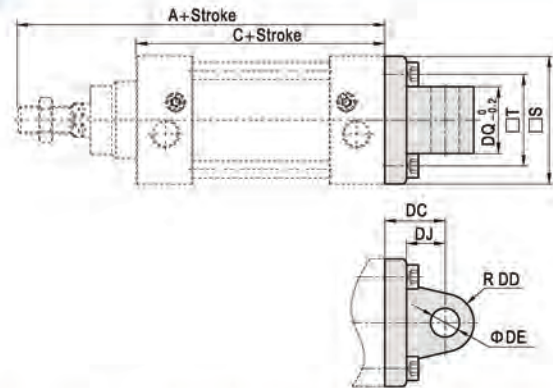
### Dimensions

#### LB



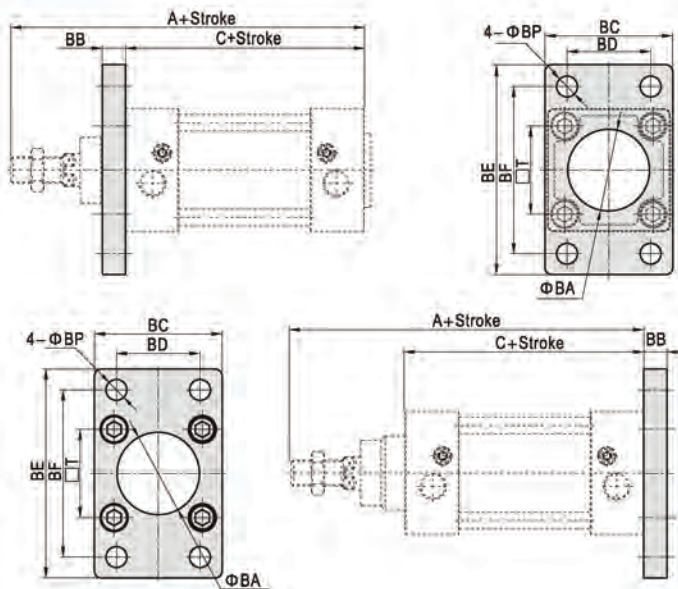
Bore size/Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
32	142	94	158	142	8	47	32	24	32	7	3
40	159	105	179	161	9	53	36	28	36	9	3
50	175	106	190	170	10	65	45	32	45	9	3
63	190	121	209	185	12	75	50	32	50	9	3
80	214	128	248	210	19	95	63	41	63	12.5	4
100	229	138	266	220	19	115	75	41	71	14.5	4
125	279	160	290	250	20	140	90	45	90	16.5	8
160	332	180	340	300	20	180	115	60	115	18.5	8
200	347	180	380	320	30	220	135	70	135	24	9

#### CA



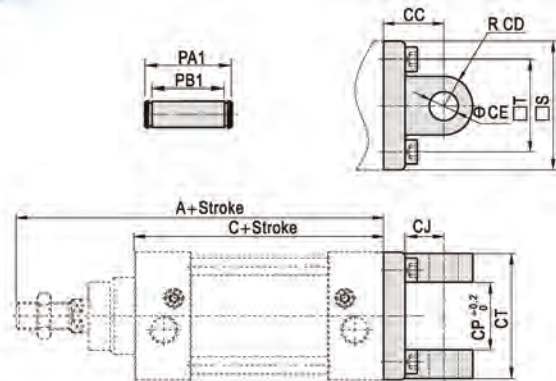
Bore size/Item	A	C	S	T	DC	DD	DE	DJ	DQ
32	142	94	47	32.5	22	9	10	13	25.8
40	159	105	52	38	25	10.5	12	16	27.8
50	175	106	64	46.5	27	11	12	17	31.7
63	190	121	74	56.5	32	13.5	16	22	39.7
80	214	128	94	72	36	14.5	16	22	49.7
100	229	138	113	89	41	17	20	27	59.7
125	279	160	139	110	50	22	25	33	69.7
160	332	180	180	140	55	30	30	35.5	89.7
200	347	180	220	175	60	30	30	37	89.7

#### FA/FB



Bore size/Item	A	C	BA	BB	BC	BD	BE	BF	BP	T
32	142	94	30.5	10	47	32	80	64	7	32.5
40	159	105	35.5	10	53	36	90	72	9	38
50	175	106	40.5	12	65	45	108	90	9	46.5
63	190	121	45.5	12	75	50	118	100	9	56.5
80	214	128	45.5	16	95	63	150	126	12.5	72
100	229	138	55.5	16	115	75	176	150	14.5	89
125	279	160	60.5	20	139	90	218	180	16.5	110
160	332	180	65.5	20	180	115	280	230	18.5	140
200	347	180	75.5	25	220	135	320	270	24	175

#### CB

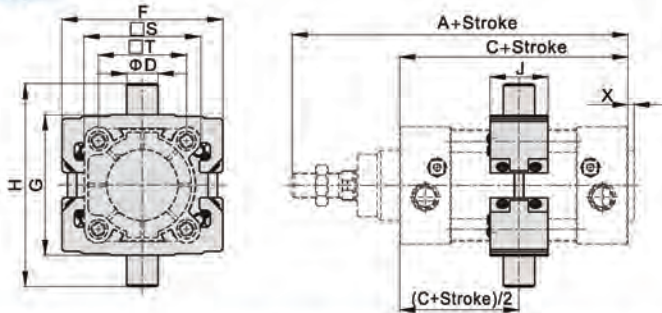


Bore size/Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
32	142	94	22	9	10	13	26	45	51	45.5	47	32.5
40	159	105	25	10.5	12	16	28	52	59	52.5	52	38
50	175	106	27	11	12	17	32	60	67	60.5	64	46.5
63	190	121	32	13	16	22	40	70	77	70.5	74	56.5
80	214	128	36	14	16	22	50	90	97	90.5	94	72
100	229	138	41	17.5	20	27	60	110	119	110.5	113	89
125	279	160	50	21.5	25	33	70	130	139	130.5	139	110
160	332	180	55	30	30	35.5	90	170	181	170.5	180	140
200	347	180	60	30	30	36	90	170	181	170.5	220	175

# ISO15552 Standard cylinder

## SAI Series—Accessories

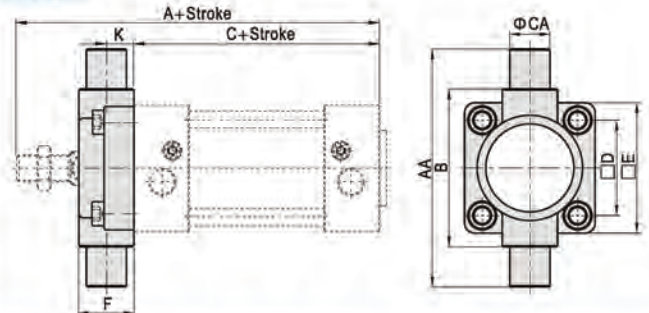
### TC



Bore size\Item	A	C	D	F	G	H	J	S	X	T
32	142	94	12	65	52	76	31	47	3	32.5
40	159	105	16	75	63	95	31	53	3.5	38
50	175	106	16	91	75	107	35	65	3.5	46.5
63	190	121	20	103	90	130	35	75	4	56.5
80	214	128	20	126	110	150	45	95	4	72
100	229	138	25	145	132	182	45	115	4	89
125	279	160	25	175	160	210	51	140	4	110
160	332	180	32	210	200	264	50	180	4	140
200	347	180	32	255	250	314	50	220	5	175

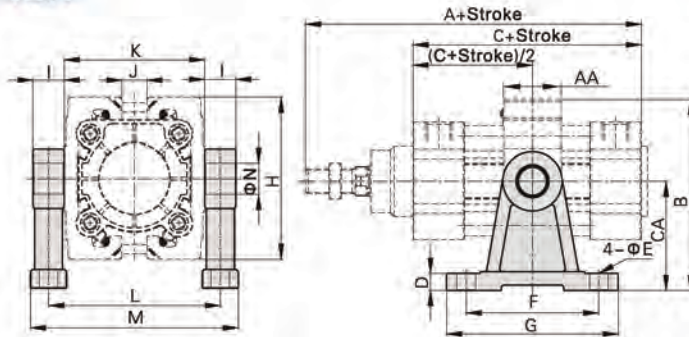
[Note] 160 and 200 TC accessory has been installed on the barrel of cylinder before it worked off, and the position of the accessories can not be adjusted arbitrarily. If consumer orders the TC solely, he will not install it on the barrel of standard cylinder directly.

### FTC



Bore size\Item	A	C	AA	B	CA	D	E	F	K
32	142	94	74	50	12	32.5	46	19	10
40	159	105	95	63	16	38	52	21	10
50	175	106	107	75	16	46.5	64	26	12
63	190	121	130	90	20	56.5	74	28	12
80	214	128	150	110	20	72	94	31	16
100	229	138	182	132	25	89	114	35	16
125	279	160	210	160	25	110	139	43	20
160	332	180	264	200	32	140	179	56	20
200	347	180	314	250	32	175	218	64	20

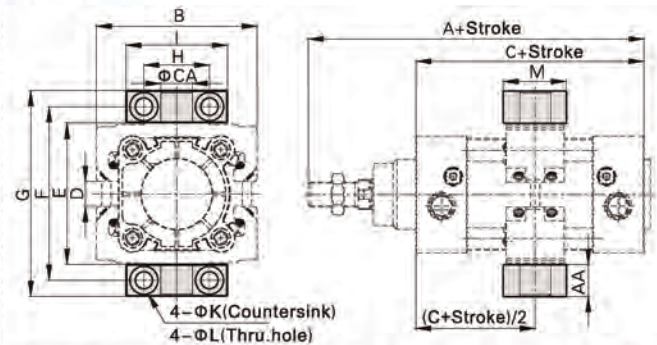
### TCM1



Bore size\Item	A	C	AA	B	CA	D	E	F	G	H	I	J	K	L	M	N
32	142	94	31	72.5	40	11	9	60	80	65	12	5	52	64	79	12
40	159	105	31	91.5	54	11	12	75	100	75	16	8	63	79	98	16
50	175	106	35	99.5	54	11	12	75	100	91	16	10	75	91	110	16
63	190	121	35	121.5	70	11	12	85	110	103	20	16	90	110	133	20
80	214	128	45	133	70	11	12	85	110	126	20	20	110	130	153	20
100	229	138	45	162.5	90	19	18	115	155	145	25	28	132	157	185	25
125	279	160	51	177.5	90	19	18	115	155	175	25	40	160	185	213	25
160	332	180	50	215	110	24	22	140	190	210	32	100	200	232	267	32
200	347	180	50	262.5	135	27	22	150	200	255	32	125	250	282	317	32

[Note] 160/200 installation position of the accessories can not be adjusted arbitrarily. When TCM1 be used with FTC, please refer to page 32.

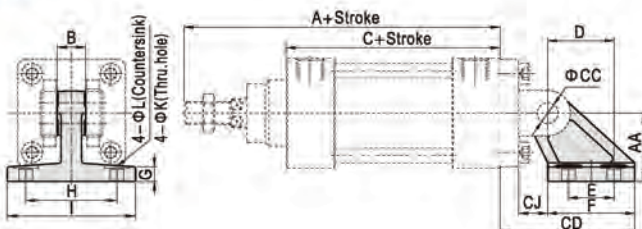
### TCM2



Bore size\Item	A	AA	B	C	CA	D	E	F	G	H	I	K	L	M
32	142	14	65	94	12	5	52	68	82	32	46	11	7	30
40	159	17	75	105	16	8	63	82	99	36	55	15	9	36
50	175	17	91	106	16	10	75	94	111	36	55	15	9	36
63	190	20.5	103	121	20	16	90	113.5	134	42	65	18	11	40
80	214	20.5	126	128	20	20	110	133.5	154	42	65	18	11	40
100	229	24.5	145	138	25	28	132	159.5	184	50	75	20	14	50
125	279	24.5	175	160	25	40	160	187.5	212	50	75	20	14	50
160	332	30	210	180	32	100	200	234	264	60	92	26	18	60
200	347	30	255	180	32	125	250	284	314	60	92	26	18	60

[Note] 160/200 installation position of the accessories can not be adjusted arbitrarily. When TCM2 be used with FTC, please refer to page 32.

### CR



Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
32	142	32	26	94	10	50	10	21	18	31	8	38	51	6.6	-
40	159	36	28	105	12	56	12	24	22	35	10	41	54	6.6	-
50	175	45	32	106	12	68	13	33	30	45	12	50	65	9	-
63	190	50	40	121	16	77	17	37	35	50	12	52	67	9	-
80	214	63	50	128	16	93	19	47	40	60	14	66	86	11	18
100	229	71	60	138	20	106	22	55	50	70	15	76	96	11	18
125	279	90	70	160	25	135	26	70	60	90	20	94	124	14	20
160	332	115	90	180	30	171	25	97	88	126	25	118	156	14	20
200	347	135	90	180	30	185	31	105	90	130	30	122	162	18	26

[Note] CR can't be used alone, it must be used with CB.



# Standard cylinder—SE Series

In accordance with ISO15552 and VDMA24562 standard

## Compendium of SE Series

**ISO15552,VDMA24562 Standard cylinder**  
Bore size: 32, 40, 50, 63, 80, 100, 125

**Adjustable air buffer**  
With adjustable air buffer on the front and back cover

**Without tie rod**  
The square aluminum pipe without tie rod has good corrosion resistance

**With sensor switch groove**  
With sensor switch groove on the three sides of body, the counterpart sensor switch type is: CMSE \ DMSE.

**Four kinds of cylinder joints**

I Knuckle Y Knuckle Floating Joint Universal Joint

**Multi-mounting accessories**

LB FA FB  
CA CB CR  
FTC TCM1 TCM2  
TC

**Multi-type cylinder**

SE: Double acting type  
SED: Double rod type  
SEJ: Adjustable stroke type

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
32	12	Double acting Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
		Double acting Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1002.4	1130.4
		Double acting Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
		Double acting Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1399.2	1484.1
63	20	Double acting Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
		Double acting Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
		Double acting Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	4288.2	6282.4	7067.7
		Double acting Pull side	7362	736.2	1472.4	2208.6	2948.6	3681.0	4417.2	5153.4	5889.6	6625.8
125	32	Double acting Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8
		Double acting Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

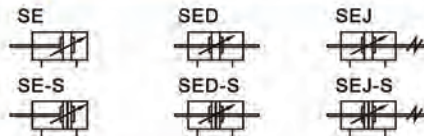


# ISO15552 Standard cylinder

## SE Series



### Symbol



### Product feature

1. ISO15552 and VDMA24562 standard cylinder;
2. The piston seal is composed of two Y-shape one-way seal structure, which has compensation function, long service life and low start-up pressure;
3. The square aluminum pipe without tie rod has good corrosion resistance;
4. The buffer adjustment of cylinder is smooth and steady;
5. Cylinders and accessories for installation with several specifications are optional.

### Specification

Bore size(mm)	32	40	50	63	80	100	125
Acting type	Double acting						
Fluid	Air(to be filtered by 40 μ m filter element)						
Mounting type	SE	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2					
	SED, SEJ	Basic FA LB TC FTC TCM1 TCM2					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)						
Proof pressure	1.5MPa(215psi)(15bar)						
Temperature °C	-20~70						
Speed range mm/s	30~800						30~500
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>		
Cushion type	Variable cushion						
Adjustable cushion stroke	27		30		36		40
Port size [Note1]	1/8"		1/4"		3/8"		1/2"

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke											
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	1800					
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	1200	1800		
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800

[Note] Consult us for non-standard stroke.

### Ordering code

SE 80 □ × 50 S □ □ □  
 SED80 □ × 50 S □ □ □  
 SEJ 80 □ × 50-20 S □ □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

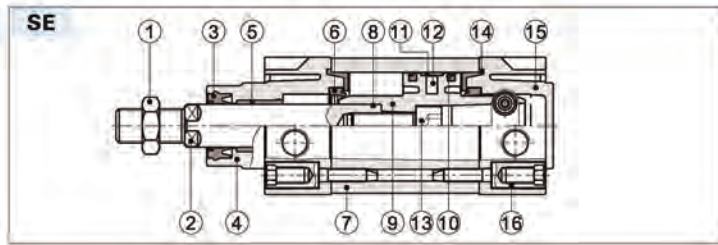
① Model	② Bore size	③ Rod Material	④ Stroke	⑤ Adjustable stroke	⑥ Magnet	⑦ Mounting type[Note1]	⑧ Seals Material	⑨ Thread type
SE: Double acting type	32 40 50 63 80 100 125	Blank: Medium carbon steel A: SUS420J2 B: SUS304 C: SUS316	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank LB FA FB CA CB CR FTC TC	Blank: TPU H: Viton N: NBR	Blank: PT G: G
SED: Double rod type						Blank LB FA FTC TC		
SEJ: Adjustable stroke type				10 20 30 40 50 75 100				

[Note1] CR is used with CB; FTC, TC are used with TCM1, TCM2.

# ISO15552 Standard cylinder

## SE Series

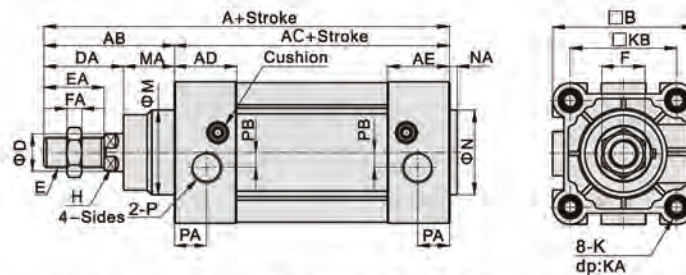
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel\Stainless steel
2	Piston rod	Carbon steel with 20 μ m chrome plated or Stainless steel
3	Front cover packing	TPU
4	Front cover	Aluminum alloy
5	Bushing	Wear resistant material
6	Cushing O-ring	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston Seal	TPU
11	Wear ring	Wear resistant material
12	Magnet	Plastic\Rubber(Φ 125)
13	Bolt	Carbon steel
14	Buffer gasket	TPU
15	Back cover	Aluminum alloy
16	Screw	Carbon steel\Stainless steel

### Dimensions

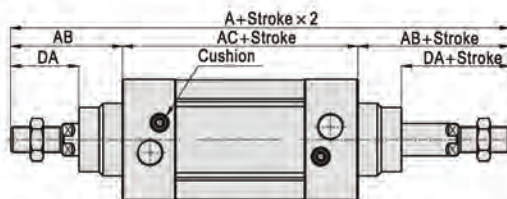
#### SE



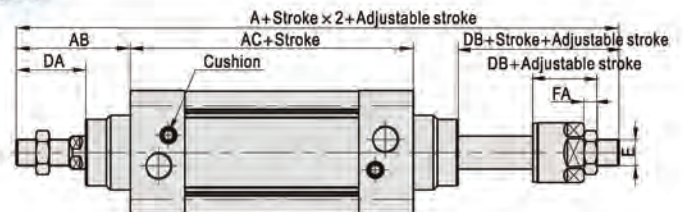
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	NA	N	P	PA	PB
32	142	48	94	27.5	27.5	46.5	12	29	M10×1.25	22	17	6	10	M6	16	32.5	30	19	3	30	1/8"	13.5	6
40	159	54	105	32	32	54	16	33	M12×1.25	24	17	7	13	M6	16	38	35	21	3.5	35	1/4"	17.5	6
50	175	69	106	31	31	64	20	42	M16×1.5	32	23	8	17	M8	16	46.5	40	27	3.5	40	1/4"	14	8
63	190	69	121	33	33	75	20	42	M16×1.5	32	23	8	17	M8	16	56.5	45	27	4	45	3/8"	17	8
80	214	86	128	33	33	93	25	53	M20×1.5	40	26	10	22	M10	17	72	45	33	4	45	3/8"	16.5	8
100	229	91	138	37	37	110	25	55	M20×1.5	40	26	10	22	M10	17	89	55	36	4	55	1/2"	19.5	10
125	279	119	160	46	46	134	32	74	M27×2	54	41	13.5	27	M12	20	110	60	45	4	60	1/2"	23	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### SED



#### SEJ



Bore size\Item	A		AB	AC	DA	DB	E	FA
	SED	SEJ						
32	190	188	48	94	29	27	M10X1.25	6
40	213	208	54	105	33	28	M12X1.25	7
50	244	231	69	106	42	29	M16X1.5	8
63	259	246	69	121	42	29	M16X1.5	8
80	300	282.5	86	128	53	35.5	M20X1.5	10
100	320	300.5	91	138	55	35.5	M20X1.5	10
125	398	366.5	119	160	74	42.5	M27X2.0	13.5

Remark:

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as SE standard type.

## SE Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories								
	LB	FA/FB	CA	CB	CR	TC	FTC	TCM1	TCM2
32	F-SI32LB	F-SI32FA	F-SE32CA	F-SE32CB	F-SI32CR	F-SE32TC	F-SI32FTC	F-SI32TCM1	F-SI32TCM2
40	F-SI40LB	F-SI40FA	F-SE40CA	F-SE40CB	F-SI40CR	F-SE40TC	F-SI40FTC	F-SI40TCM1	F-SI40TCM2
50	F-SI50LB	F-SI50FA	F-SE50CA	F-SE50CB	F-SI50CR	F-SE50TC	F-SI50FTC	F-SI40TCM1	F-SI40TCM2
63	F-SI63LB	F-SI63FA	F-SE63CA	F-SE63CB	F-SI63CR	F-SE63TC	F-SI63FTC	F-SI63TCM1	F-SI63TCM2
80	F-SI80LB	F-SI80FA	F-SE80CA	F-SE80CB	F-SI80CR	F-SE80TC	F-SI80FTC	F-SI63TCM1	F-SI63TCM2
100	F-SI100LB	F-SI100FA	F-SE100CA	F-SE100CB	F-SI100CR	F-SE100TC	F-SI100FTC	F-SI125TCM1	F-SI125TCM2
125	F-SI125LB	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	F-SE125TC	F-SI125FTC	F-SI125TCM1	F-SI125TCM2

Accessories Bore size	Knuckle				Sensor switch	
	I: I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle	CMSE	DMSE
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSE	DMSE
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		

### Accessory selection

Accessories Cylinder model	Mounting accessories										Knuckle [Note1]				Sensor switch	
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	F	CMSE	DMSE
SE	Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SED	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●
SEJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●	●

[Note1] Please refer to P349~352 for knuckle detail.

### Material of accessories

Accessories Bore size	Mounting accessories									Knuckle			
	LB	FA	FB	CA	CB	CR	FTC	TCM1	TCM2	I	Y	F	U
32~100	○	●	●	◇	◇	◇	■	■	●	□	□	□	□
125	■	■	■	■	■	■	■	■	■	□	□	□	□

●—Aluminum alloy, ▲—S45C, ■—Cast steel, ○—Low carbon steel, ◇—Nodular cast iron, △—SPCC; □—Carbon steel.

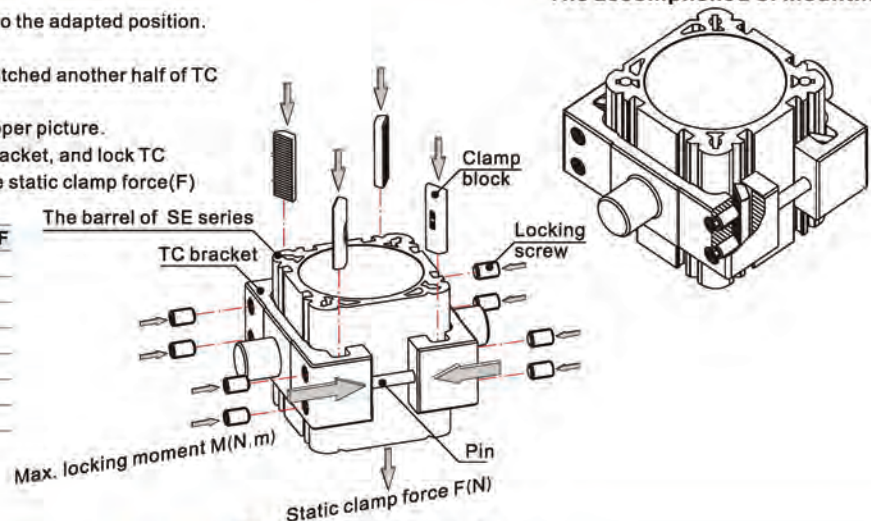
### How to mount TC bracket

Please install TC bracket by below steps:

- Hitched half of TC bracket over the barrel, and adjust it to the adapted position.
- Insert the both sides pin of the TC bracket.
- Aimed another half of TC bracket's pin hole at pin and hitched another half of TC bracket over the barrel.
- Posting clamp block in the four nook of TC bracket by upper picture.
- Screw down eight locked screws from side face of TC bracket, and lock TC bracket with the max. locking moment of below table. the static clamp force(F) as below table:

Bore size	Max. locking moment M	Static clamp force F
32	2~3 N.m	800 N
40	4~6 N.m	1200 N
50	4~6 N.m	2000 N
63	7~12 N.m	3000 N
80	12~20 N.m	5000 N
100	12~20 N.m	8000 N
125	18~30 N.m	12000 N

### The accomplished of mounting



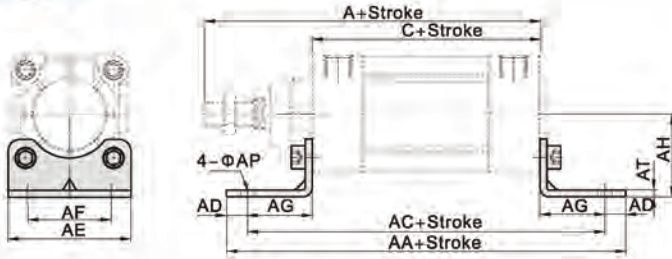
The process of mounting

# ISO1552 Standard cylinder

## SE Series—Accessories

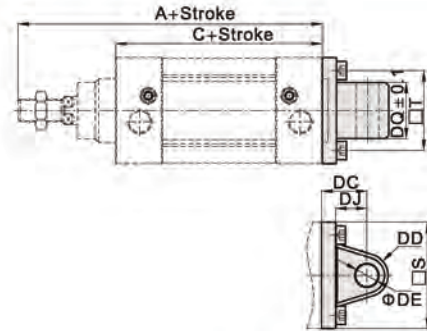
### Dimensions

#### LB



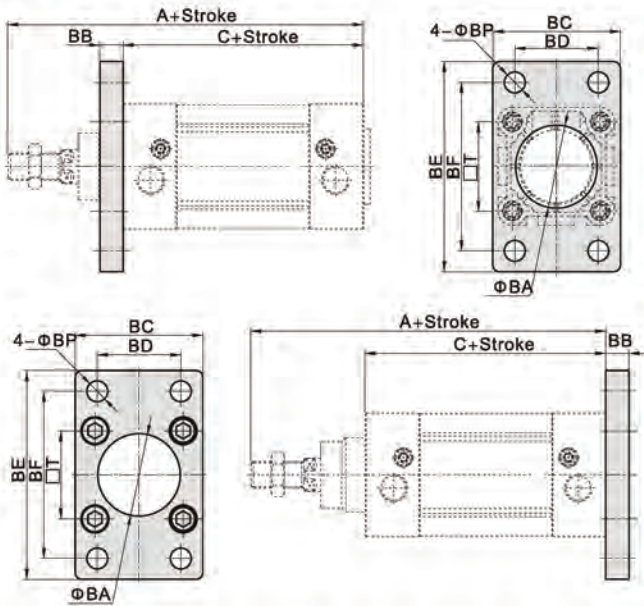
Bore size/Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
32	142	94	158	142	8	47	32	24	32	7	3
40	159	105	179	161	9	53	36	28	36	9	3
50	175	106	190	170	10	65	45	32	45	9	3
63	190	121	209	185	12	75	50	32	50	9	3
80	214	128	248	210	19	95	63	41	63	12.5	4
100	229	138	258	220	19	115	75	41	71	14.5	4
125	279	160	290	250	20	140	90	45	90	16.5	8

#### CA



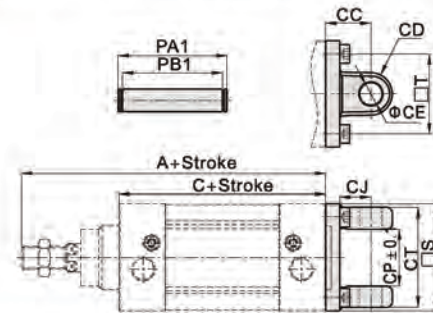
Bore size/Item	A	C	S	T	DC	DD	DE	DJ	DQ
32	142	94	46.5	32.5	22	10.5	10	13	25.8
40	159	105	54	38	25	12	12	16	27.8
50	175	106	64	46.5	27	12	12	17	31.7
63	190	121	75	56.5	32	15	16	22	39.7
80	214	128	93	72	36	15.5	16	22	49.7
100	229	138	110	89	41	20	20	27	59.7
125	279	160	134	110	50	24	25	33	69.7

#### FA/FB



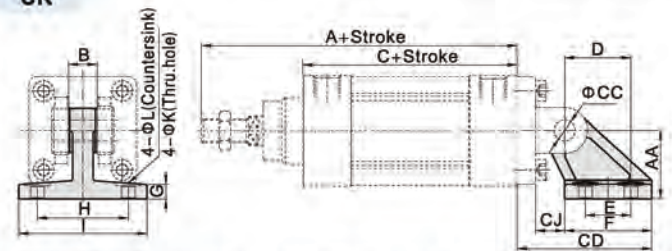
Bore size/Item	A	C	BA	BB	BC	BD	BE	BF	BP	T
32	142	94	30.5	10	47	32	80	64	7	32.5
40	159	105	35.5	10	53	36	90	72	9	38
50	175	106	40.5	12	65	45	108	90	9	46.5
63	190	121	45.5	12	75	50	118	100	9	56.5
80	214	128	45.5	16	95	63	150	126	12.5	72
100	229	138	55.5	16	115	75	176	150	14.5	89
125	279	160	60.5	20	139	90	218	180	16.5	110

#### CB



Bore size/Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
32	142	94	22	10.5	10	13	26	45	51	45.5	46.5	32.5
40	159	105	25	12	12	16	28	52	59	52.5	54	38
50	175	106	27	12	12	17	32	60	67	60.5	64	46.5
63	190	121	32	15	16	22	40	70	77	70.5	75	56.5
80	214	128	36	15.5	16	22	50	90	97	90.5	93	72
100	229	138	41	20	20	27	60	110	119	110.5	110	89
125	279	160	50	24	25	33	70	130	139	130.5	134	110

#### CR



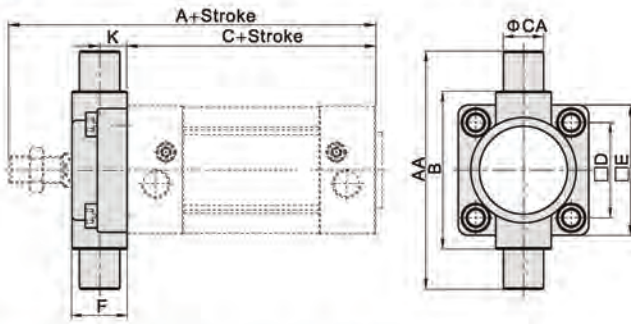
Bore size/Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
32	142	32	26	94	10	50	10	21	18	31	8	38	51	6.6	-
40	159	36	28	105	12	56	12	24	22	35	10	41	54	6.6	-
50	175	45	32	106	12	68	13	33	30	45	12	50	65	9	-
63	190	50	40	121	16	77	17	37	35	50	12	52	67	9	-
80	214	63	50	128	16	93	19	47	40	60	14	66	86	11	18
100	229	71	60	138	20	106	22	55	50	70	15	76	96	11	18
125	279	90	70	160	25	135	26	70	60	90	20	94	124	14	20

[Note] CR can't be used alone, it must be used with CB.

# ISO15552 Standard cylinder

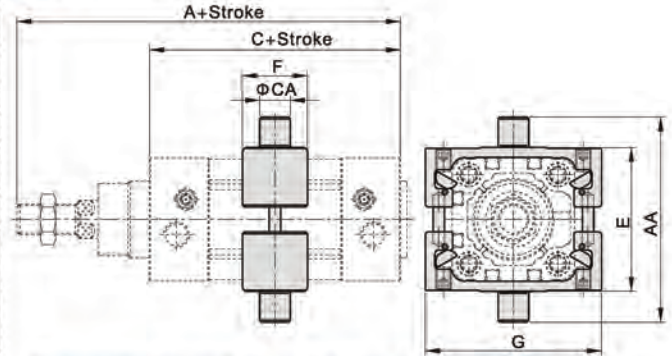
## SE Series—Accessories

### FTC



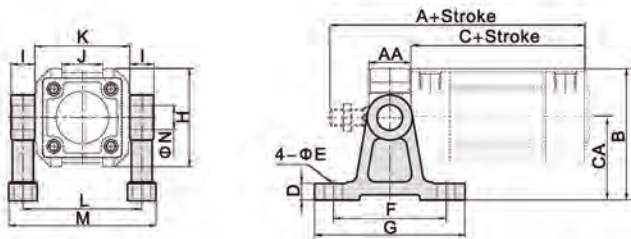
Bore size/Item	A	AA	C	CA	E	F	G
32	142	74	94	12	52	31	68
40	159	95	105	16	63	33	78
50	175	107	106	16	75	35	95
63	190	130	121	20	90	37	108
80	214	150	128	20	110	41	130
100	229	182	138	25	132	47	148
125	279	210	160	25	160	51	173

### TC



Bore size/Item	A	C	AA	B	CA	D	E	F	K
32	142	94	74	50	12	32.5	46	19	10
40	159	105	95	63	16	38	52	21	10
50	175	106	107	75	16	46.5	64	26	12
63	190	121	130	90	20	56.5	74	28	12
80	214	128	150	110	20	72	94	31	16
100	229	138	182	132	25	89	114	35	16
125	279	160	210	160	25	110	139	43	20

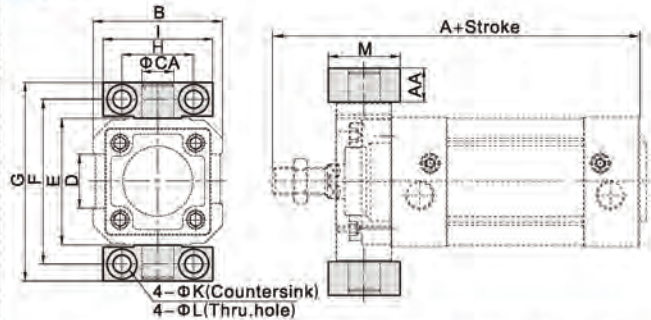
### TCM1



Bore size/Item	A	C	AA	B	CA	D	E	F	G	H	I	J	K	L	M	N
32	142	94	19	66	40	11	9	60	80	52	12	20	50	62	77	12
40	159	105	21	86.5	54	11	12	75	100	65	16	27	63	79	98	16
50	175	106	26	91.5	54	11	12	75	100	75	16	31	75	91	110	16
63	190	121	28	115	70	11	12	85	110	90	20	42	90	110	133	20
80	214	128	31	126	70	11	12	85	110	112	20	54	110	130	153	20
100	229	138	35	157.5	90	19	18	115	155	135	25	68	135	157	185	25
125	279	160	43	169.3	90	19	18	115	155	170	25	80	160	185	213	25

[Note] The installation position of the accessories can not be adjusted arbitrarily.

### TCM2



Bore size/Item	A	AA	B	CA	D	E	F	G	H	I	K	L	M
32	142	14	52	12	20	50	66	80	32	46	11	7	30
40	159	17	65	16	27	63	82	99	36	55	15	9	36
50	175	17	75	16	31	75	94	111	36	55	15	9	36
63	190	20.5	90	20	42	90	113.5	134	42	65	18	11	40
80	214	20.5	112	20	54	110	133.5	154	42	65	18	11	40
100	229	24.5	135	25	68	132	159.5	184	50	75	20	14	50
125	279	24.5	170	25	80	160	187.5	212	50	75	20	14	50

[Note] The installation position of the accessories can not be adjusted arbitrarily.



# Standard cylinder—SC Series

—Tie-rod type

## Compendium of SC Series

Standard cylinder manufactured by our enterprise

Bore size: 32, 40, 50, 63, 80, 100

Tie-rod cylinder

The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.

Convenient and fast fix sensor switch

Sensor switch can be directly fixed on the cylinder, which is convenient and fast.

the counterpart sensor switch type is: CMSG、DMSG(S)

Adjustable air buffer

With adjustable air buffer on the front and back cover

Four kinds of cylinder joints



I Knuckle Y Knuckle Floating Joint Universal Joint

Multi-type cylinder

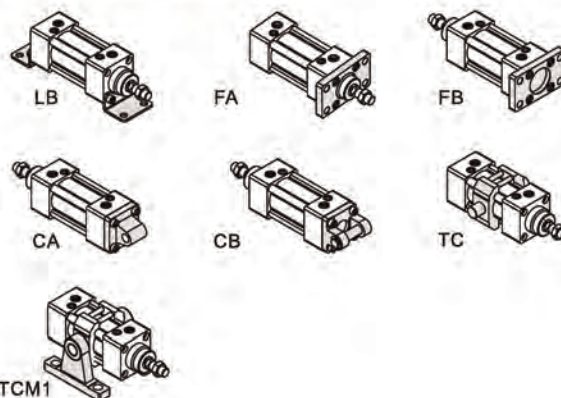


SC: Double acting type SCD: Double rod type SCJ: Adjustable stroke type



SCT: Multi-position type

Multi-mounting accessories



## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
32	12	Double acting Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
		Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8	1130.4
		Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
		Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2	1484.1
63	20	Double acting Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
		Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
		Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	5497.1	6282.4	7067.7
		Pull side	7362	736.2	1472.4	2208.6	2944.8	3681.0	4417.2	5153.4	5889.6	6625.8
125	32	Double acting Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8
		Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2
160	40	Double acting Push side	20106	2010.6	4021.2	6031.8	8042.4	10053.0	12063.6	14074.2	16084.8	18095.4
		Pull side	18849	1884.9	3769.8	5654.7	7539.6	9424.5	11309.4	13194.3	15079.2	16964.1
200	40	Double acting Push side	31416	3141.6	6283.2	9424.8	12566.4	15708.0	18849.6	21991.2	25132.8	28274.4
		Pull side	30159	3015.9	6031.8	9047.7	12063.6	15079.5	18095.4	21111.3	24127.2	27143.1
250	50	Double acting Push side	49087	4908.7	9817.4	14726.1	19634.8	24543.5	29452.2	34360.9	39269.6	44178.3
		Pull side	47124	4712.4	9424.8	14137.2	18849.6	23662.0	28274.4	32986.8	37699.2	42411.6

## Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

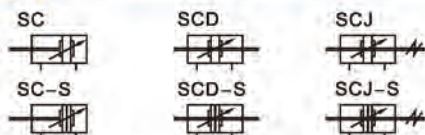


# Standard cylinder(Tir-rod)

## SC Series



### Symbol



### Product feature

- Standard cylinder manufactured by our enterprise.
- The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
- It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
- Compared with ISO15552 standard cylinder, SC series cylinder with the same bore size is shorter.
- The buffer adjustment of cylinder is smooth and steady.
- Cylinders and mounting accessories with several specifications are optional.
- The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C.

### Ordering code

### Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μ m filter element)					
Mounting type	Basic FA FB CA CB LB TC TCM1					
SC type	SCD, SCJ					
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>	
Cushion type	Variable cushion					
Adjustable cushion stroke	21			28		29
Port size [Note1]	1/8"	1/4"	3/8"		1/2"	

[Note1] PT thread, G thread are available.

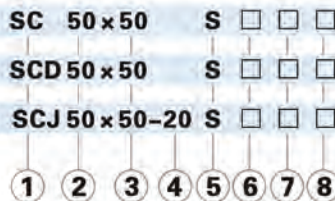
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke
	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500		
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	2000
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1200	2000
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1200	2000
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1500	2000
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1500	2000
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1500	2000

[Note] If the stroke is ≥ 1600mm within the maximum stroke scope, it is treated as non-standard one.

Please contact the company for other special strokes.



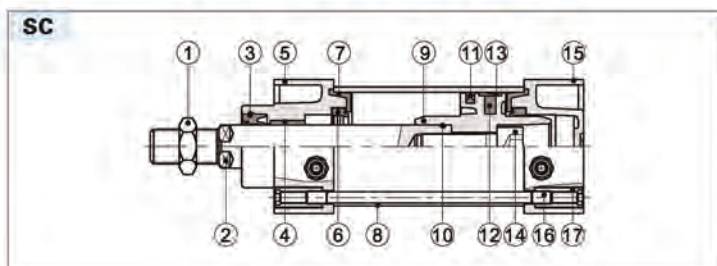
① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SC: Double acting type	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
SCD: Double rod type	Blank						
SCJ: Adjustable stroke type	Blank						
			10 20 30 40 50 75 100		LB		
					FA		
					TC		

[Note1] The accessories are the same as SAU series, please refer to page 40~43 for details; TC is used with TCM1.

# Standard cylinder(Tir-rod)

## SC Series

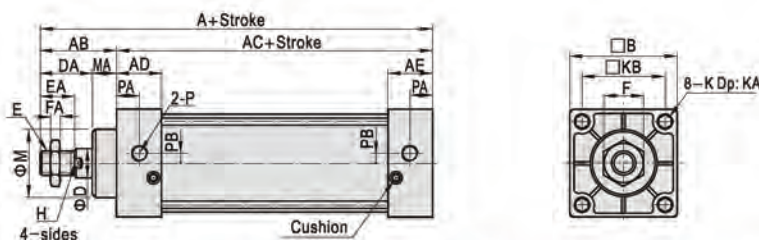
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20 μ m chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	NBR
7	Cushion gasket	TPU
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

### Dimensions

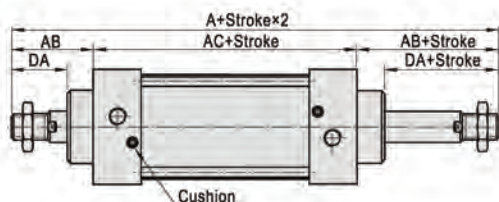
#### SC



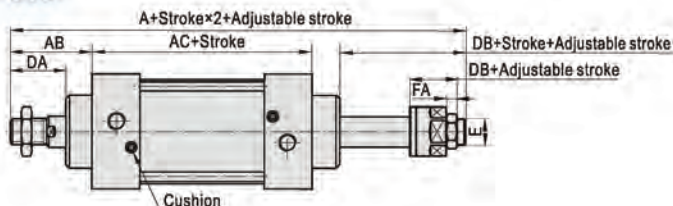
Bore size/Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
32	140	47	93	27.5	27.5	45	12	32	M10×1.25	22	17	6	10	M6×1.0	14.5	33	28	15	1/8"	14	5.5
40	142	49	93	27.5	27.5	50	16	34	M12×1.25	24	17	7	14	M6×1.0	14.5	37	32	15	1/4"	15	6
50	150	57	93	27.5	27.5	62	20	42	M16×1.5	32	23	8	17	M6×1.0	14.5	47	38	15	1/4"	17	8.5
63	153	57	96	27.5	27.5	75	20	42	M16×1.5	32	23	8	17	M8×1.25	14.5	56	38	15	3/8"	15	9.5
80	182	75	107	33	33	94	25	54	M20×1.5	40	26	10	22	M10×1.5	17	70	47	21	3/8"	19.5	10
100	188	75	113	33	33	112	25	54	M20×1.5	40	26	10	22	M10×1.5	17	84	47	21	1/2"	16.5	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### SCD



#### SCJ



Bore size/Item	A(SCD)	A(SCJ)	AB	AC	DA	DB	E	FA
32	187	182	47	93	32	27	M10X1.25	6
40	191	185	49	93	34	28	M12X1.25	7
50	207	194	57	93	42	29	M16X1.5	8
63	210	197	57	96	42	29	M16X1.5	8
80	257	238.5	75	107	54	35.5	M20X1.5	10
100	263	244.5	75	113	54	35.5	M20X1.5	10

Remark:

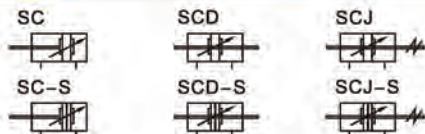
1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SC standard type.

# Standard cylinder(Tir-rod)

## SC Series—Big bore size type



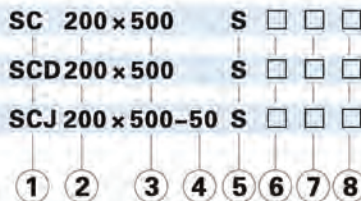
### Symbol



### Product feature

- ISO6430 standard cylinder.
- The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
- It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
- Compared with ISO15552 standard cylinder, SC series cylinder with the same bore size is shorter.
- The buffer adjustment of cylinder is smooth and steady.
- Cylinders and mounting accessories with several specifications are optional.
- The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150℃.

### Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SC: Double acting type	125 160 200 250	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: NBR H: Viton	Blank: PT G: G
					LB		
					FA		
					FB		
					CA		
					CB		
SCD: Double rod type					Blank		
					LB		
SCJ: Adjustable stroke type			10		FA		
			20		TC		
			30 40 50 75 100				

[Note1] Please refer to page 40~43 for accessory parts. TC is used with TCM1.

### Specification

Bore size(mm)	125	160	200	250
Acting type	Double acting			
Fluid	Air(to be filtered by 40 μm filter element)			
Mounting type	Basic FA FB CA CB LB TC TCM1			
Mounting type	SCD, SCJ			
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature ℃	-20~70			
Speed range mm/s	30~800			
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub>	251~1000 <sup>+1.5</sup> <sub>0</sub>	1001~1500 <sup>+2.0</sup> <sub>0</sub>	
Cushion type	Variable cushion			
Adjustable cushion stroke	28	29	33	40
Port size [Note1]	1/2"	3/4"		1"

[Note1] PT thread, G thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

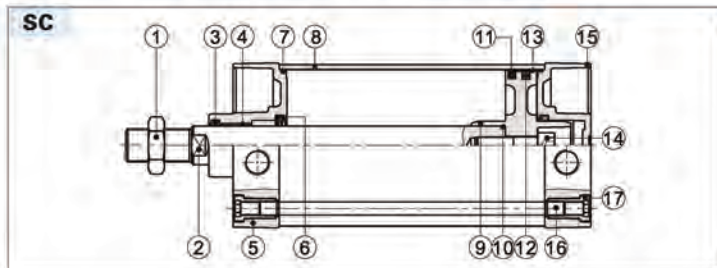
Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke											
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
250	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Please contact the company for other special strokes.

# Standard cylinder(Tir-rod)

## SC Series—Big bore size type

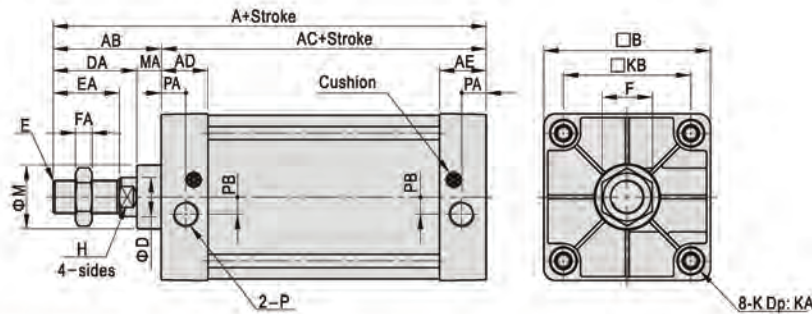
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20 μ m chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	TPU
7	O-ring	NBR
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

### Dimensions

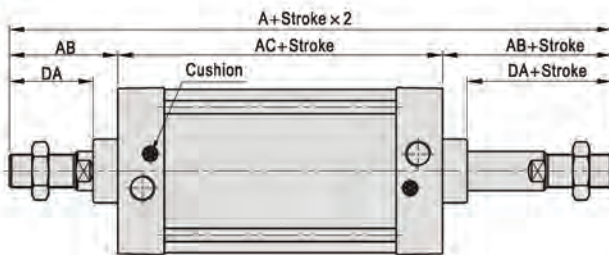
SC



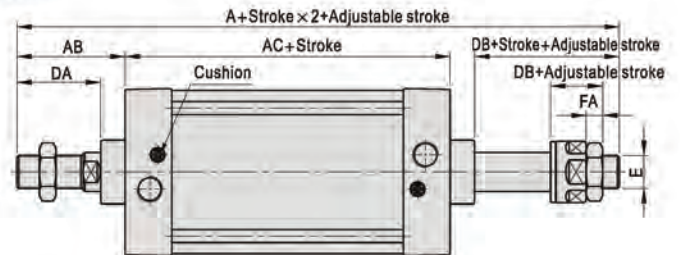
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
125	203	88	115	38	38	136	32	68	M27×2.0	54	41	13.5	27	M12×1.75	21	104	52	20	1/2"	20	14
160	239	113	126	38	38	174	40	88	M36×2.0	72	55	18	36	M16×2.0	21	134	62	25	3/4"	20	15
200	244	118	126	38	38	214	40	88	M36×2.0	72	55	18	36	M16×2.0	21	163	62	30	3/4"	20	15
250	294	141	153	48	48	267	50	106	M42×2.0	84	65	21	46	M20×2.5	26	202	86	35	1"	25.5	22

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

SCD



SCJ



Bore size\Item	A(SCD)	A(SCJ)	AB	AC	DA	DB	E	FA
125	291	265.5	88	115	68	42.5	M27X2.0	13.5
160	352	332	113	126	88	68	M36X2.0	18
200	362	342	118	126	88	68	M36X2.0	18
250	435	409	141	153	106	80	M42X2.0	21

Remark:

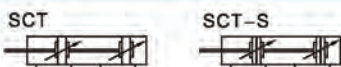
1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SC standard type.

# Standard cylinder(Tir-rod)

## SCT Series—Multi-position type



### Symbol



### Product feature

1. Standard cylinder manufactured by our enterprise.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of grease reservation.
3. It is tie rod cylinder. The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.
4. Piston rod can be positioned in several positions in the whole action process.



5. The buffer adjustment of cylinder is smooth and steady.
6. Cylinders and mounting accessories with several specifications are optional.
7. The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C.

### Specification

<b>Bore size(mm)</b>	32	40	50	63	80	100
<b>Acting type</b>	Double acting					
<b>Fluid</b>	Air(to be filtered by 40 μ m filter element)					
<b>Mounting type</b>	Basic FA FB CA CB LB TC TCM1					
<b>Operating pressure</b>	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
<b>Proof pressure</b>	1.5MPa(215psi)(15bar)					
<b>Temperature °C</b>	-20~70					
<b>Speed range mm/s</b>	30~800					
<b>Stroke tolerance</b>	0~250 <sup>+1.0</sup> <sub>0</sub> 251~1000 <sup>+1.5</sup> <sub>0</sub> 1001~1500 <sup>+2.0</sup> <sub>0</sub>					
<b>Cushion type</b>	Variable cushion					
<b>Adjustable cushion stroke</b>	21			28		29
<b>Port size [Note1]</b>	1/8"	1/4"	3/8"		1/2"	

[Note1] PT thread, G thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)													Max.std stroke	Max. stroke			
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800

[Note] If the stroke is ≥800mm within the maximum stroke scope, it is treated as non-standard one.  
Please contact the company for other special strokes.

### Ordering code

SCT 50 × 50 × 50 S □ □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

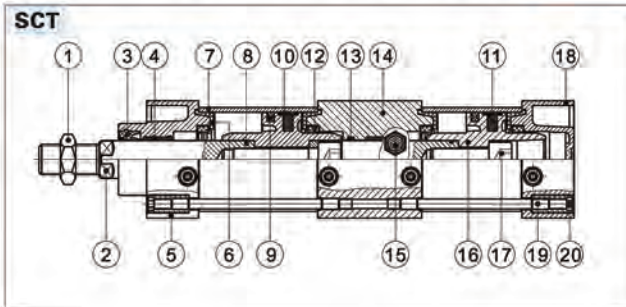
① Model	② Bore size	③ Stroke 1	④ Stroke 2	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SCT: Double acting Multi-position type	32 40 50 63 80 100	Refer to stroke table for details	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
					LB		
					FA		
					FB		
					CA		
					CB		

[Note1] Please refer to page 40~43 for accessory parts.TC is used with TCM1.

# Standard cylinder(Tir-rod)

## SCT Series—Multi-position type

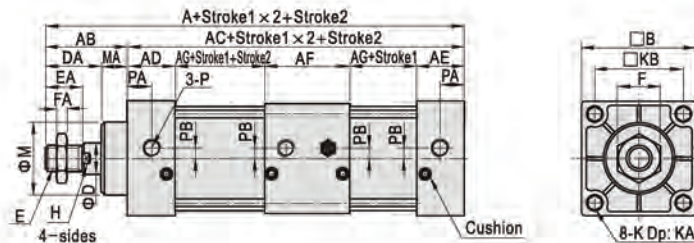
### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	11	Magnet	Plastic
2	Piston rod	Carbon steel with 20 μ m chrome plated	12	Gasket	NBR
			13	O-ring	NBR
3	Packing	TPU	14	Joint seat	Aluminum alloy
4	Bushing	Wear resistant material	15	Silencer	
5	Front cover	Aluminum alloy	16	Piston	Aluminum alloy
6	Cushing O-ring	TPU	17	Bolt	Carbon steel
7	Barrel	Aluminum alloy	18	Back cover	Aluminum alloy
8	Rod O-ring	NBR	19	Tie-rod	Carbon steel
9	Piston seal	NBR	20	Tie-rod nut	Carbon steel
10	Wear ring	Wear resistant material			

### Dimensions

#### SCT



Bore size\Item	A	AB	AC	AD	AE	AF	AG	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	P	PA	PB
32	233	47	186	27.5	27.5	55	38	45	12	32	M10×1.25	22	17	6	10	M6×1.0	14.5	33	28	15	1/8"	14	5.5
40	235	49	186	27.5	27.5	55	38	50	16	34	M12×1.25	24	17	7	14	M6×1.0	14.5	37	32	15	1/4"	15	6
50	243	57	186	27.5	27.5	55	38	62	20	42	M16×1.5	32	23	8	17	M6×1.0	14.5	47	38	15	1/4"	17	8.5
63	249	57	192	27.5	27.5	55	41	75	20	42	M16×1.5	32	23	8	17	M8×1.25	14.5	56	38	15	3/8"	15	9.5
80	296	75	221	33	33	73	41	94	25	54	M20×1.5	40	26	10	22	M10×1.5	17	70	47	21	3/8"	19.5	10
100	308	75	233	33	33	73	47	112	25	54	M20×1.5	40	26	10	22	M10×1.5	17	84	47	21	1/2"	16.5	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Standard cylinder(Tir-rod)

## SC Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories					
	LB	FA/FB	CA	CB	TC	TCM1
32	F-SC32LB	F-SC32FA	F-SC32CA	F-SC32CB	F-SC32TC	F-SI40TCM1
40	F-SC40LB	F-SC40FA	F-SC40CA	F-SC40CB	F-SC40TC	F-SC40TCM1
50	F-SC50LB	F-SC50FA	F-SC50CA	F-SC50CB	F-SC50TC	F-SC40TCM1
63	F-SC63LB	F-SC63FA	F-SC63CA	F-SC63CB	F-SC63TC	F-SC40TCM1
80	F-SC80LB	F-SC80FA	F-SC80CA	F-SC80CB	F-SC80TC	F-SC80TCM1
100	F-SC100LB	F-SC100FA	F-SC100CA	F-SC100CB	F-SC100TC	F-SC80TCM1
125	F-SC125LB	F-SC125FA	F-SC125CA	F-SC125CB	F-SC125TC	F-SC125TCM1
160	F-SC160LB	F-SC160FA	F-SC160CA	F-SC160CB	F-SC160TC	F-SC160TCM1
200	F-SC200LB	F-SC200FA	F-SC200CA	F-SC200CB	F-SC200TC	F-SC160TCM1
250	F-SC250LB	F-SC250FA	F-SC250CA	F-SC250CB	F-SC250TC	F-SC250TCM1

Accessories Bore size	Knuckle				Sensor switch	
	I: I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle	CMSG	DMSG(S)
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U	CMSG	DMSG(S)
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		
250	F-M42X200Y	F-M42X200Y	-	-		

### Accessory selection

Accessories Cylinder model	Mounting accessories							Knuckle [Note1]				Sensor switch		
	LB	FA	FB	CA	CB	TC	TCM1	I	Y	U	F	CMSG	DMSG(S)	
SC	Standard	●	●	●	●	●	●	●	●	●	●	●	x	x
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●
SCD	Standard	●	●	x	x	x	●	●	●	●	●	●	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●	●
SCJ	Standard	●	●	x	x	x	●	●	●	●	●	●	x	x
	With magnet	●	●	x	x	x	●	●	●	●	●	●	●	●
SCT	Standard	●	●	●	●	●	x	x	●	●	●	●	x	x
	With magnet	●	●	●	●	●	x	x	●	●	●	●	●	●

[Note1] Please refer to P349~352 for knuckle detail.

### Material of accessories

Accessories Bore size	Mounting accessories							Knuckle			
	LB	FA	FB	CA	CB	TC	TCM1	I	Y	F	U
32~100	□	●	●	◇	◇	◇	◇	□	□	□	□
125~200	◇	◇	◇	◇	◇	◇	◇	□	□	-	□
250	◇	■	■	◇	◇	◇	◇	■	■	-	-

●—Aluminum alloy, ■—Cast steel, ◇—Nodular cast iron, □—Carbon steel.

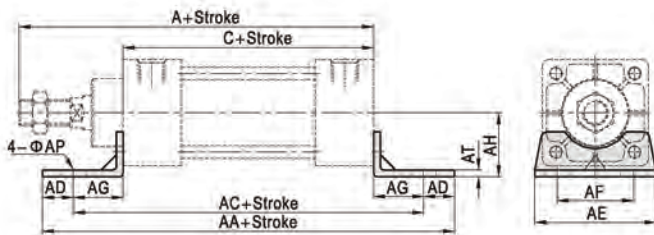
# Standard cylinder(Tir-rod)

## SC Series—Accessories

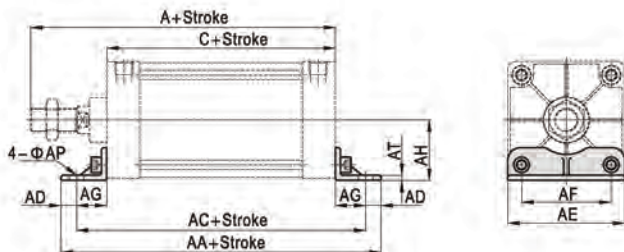
### Dimensions

#### LB

Φ32~Φ100



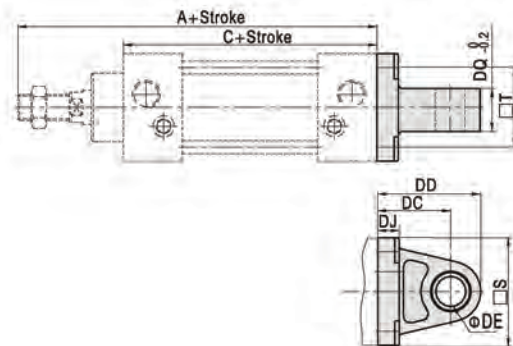
Φ125~Φ250



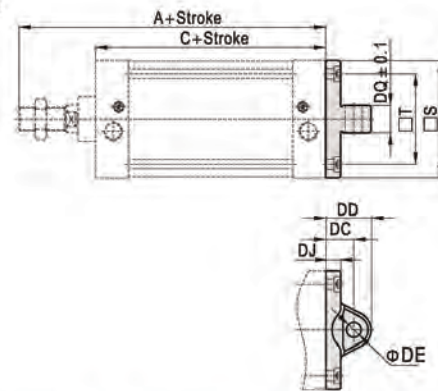
Bore size\Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
32	140	93	153	134	9.5	50	33	20.5	28	9	3
40	142	93	169	140	14.5	57	36	23.5	30	12	3
50	150	93	173	149	12	68	47	28	36.5	12	3
63	153	96	184	158	13	80	56	31	41	12	3
80	182	107	199	167	16	97	70	30	49	14	4
100	188	113	209	173	18	112	84	30	57	14	4
125	203	115	221	185	18	136	104	35	70	17	6
160	239	126	246	206	20	174	134	40	91	17	8
200	244	126	276	226	25	214	163	50	113.5	22	9
250	294	153	323	273	25	267	201	60	141	26	15

#### CA

Φ32~Φ100



Φ125~Φ250



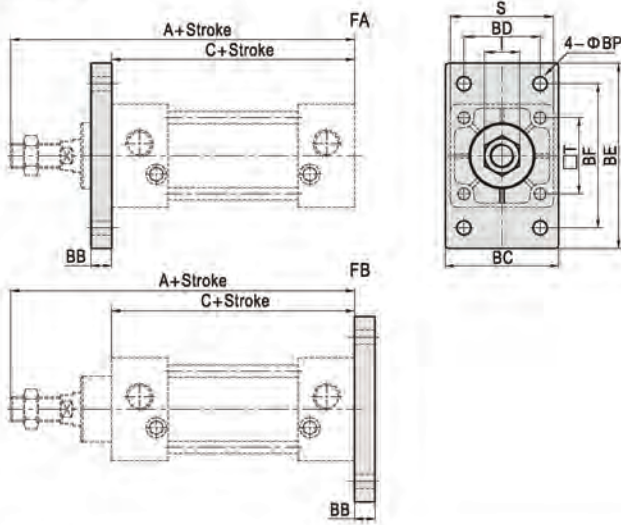
Bore size\Item	A	C	DC	DD	DE	DJ	DQ	S	T
32	140	93	34	44.5	12	9	16	45	33
40	142	93	34	45.5	14	9	20	49	37
50	150	93	34	46	14	10	20	61	47
63	153	96	34	46.5	14	10	20	74	58
80	182	107	48	64.5	20	14	32	93	70
100	188	113	48	65	20	14	32	111	84
125	203	115	32	52	20	17	31.7	135	104
160	239	126	40	68	28	19.5	39.7	173	134
200	244	126	60	90	28	23	39.7	213	163
250	294	153	70	106	36	24	49.7	255	202

# Standard cylinder(Tir-rod)

## SC Series—Accessories

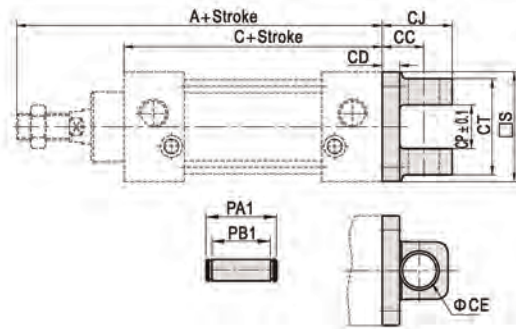
### FA/FB

Φ32-Φ100

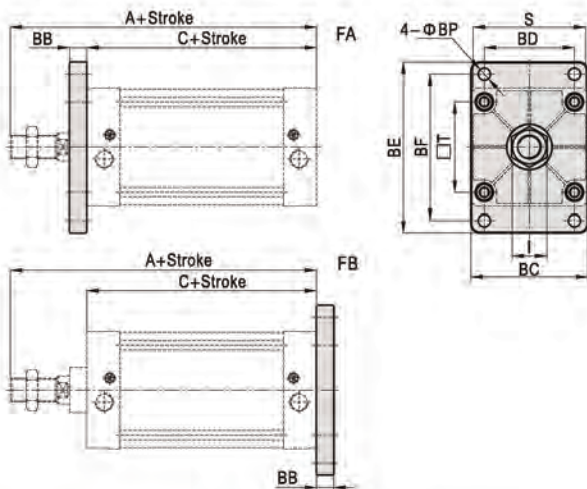


### CB

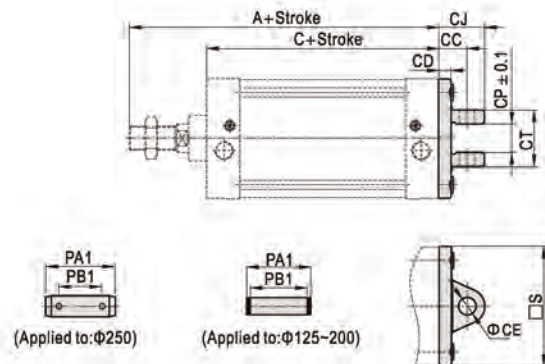
Φ32-Φ100



Φ125-Φ250



Φ125-Φ250



Bore size\Item	A	C	BB	BC	BD	BE	BF	BP	I	S	T
32	140	93	10	47	33	80	58	7	17	45	33
40	142	93	10	53	36	90	70	7	17	50	37
50	150	93	10	65	47	104	86	9	23	62	47
63	153	96	12	75	56	118	98	9	23	75	56
80	182	107	16	95	70	140	119	11	26	94	70
100	188	113	16	115	84	160	138	11	26	112	84
125	203	115	20	135	104	196	168	14	41	136	104
160	239	126	20	173	134	248	212	18	55	174	134
200	244	126	25	213	163	286	250	18	55	214	163
250	294	153	25	255	201	356	312	22	65	267	202

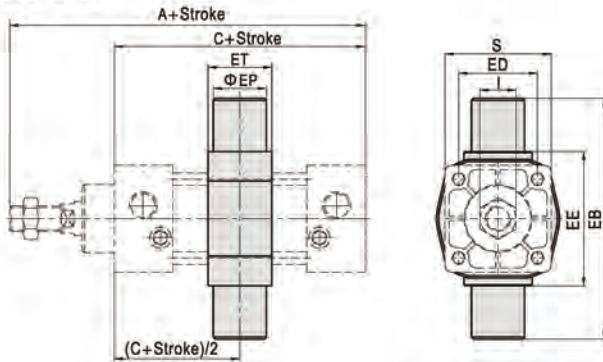
Bore size\Item	A	C	S	CC	CD	CE	CJ	CP	CT	PA1	PB1
32	140	93	45	19	9	12	29.5	16.3	32	39	32.8
40	142	93	49	19	9	14	30.5	20.3	44	51	44.8
50	150	93	61	19	10	14	31	20.3	52	59	52.8
63	153	96	74	19	10	14	31.5	20.3	52	59	52.8
80	182	107	93	32	14	20	48.5	32.3	64	73	64.8
100	188	113	111	32	14	20	49	32.3	64	73	64.8
125	203	115	135	32	14	20	52	32.1	64	73	64.8
160	239	126	173	40	15	28	68	40.1	80	90.2	80.8
200	244	126	213	60	23	28	90	40.1	80	90.2	80.8
250	294	153	255	70	24	36	106	50.1	100	130	108

# Standard cylinder(Tir-rod)

## SC Series—Accessories

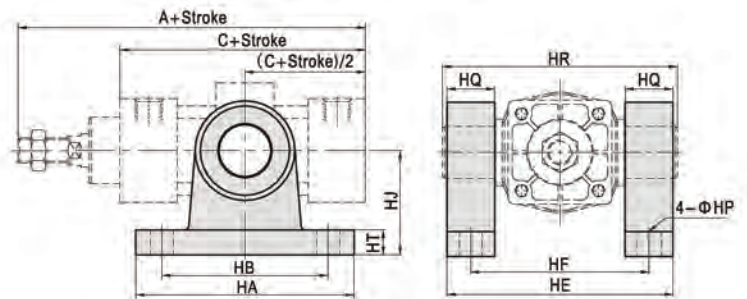
### TC

Φ32~Φ100

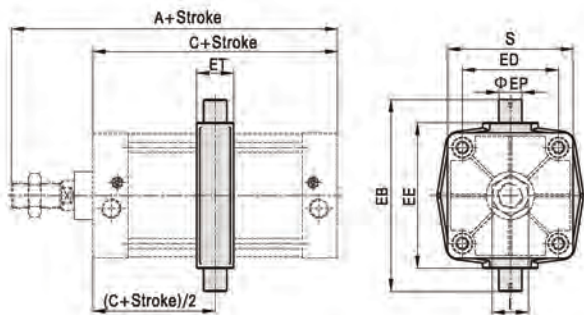


### TCM1

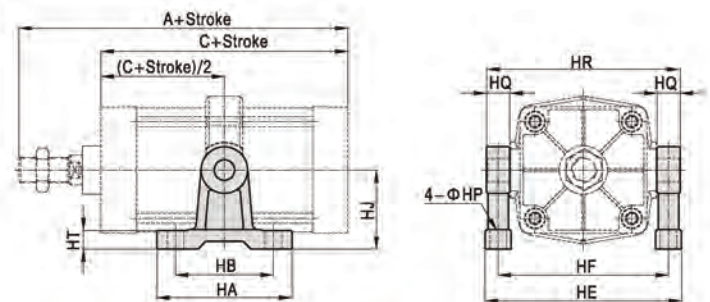
Φ32~Φ100



Φ125~Φ250



Φ125~Φ250



Bore size\Item	A	C	EB	ED	EE	EP	ET	I	S
32	140	93	87	33	55	16	22	17	45
40	142	93	113	37	63	25	28	17	50
50	150	93	126	47	76	25	28	23	62
63	153	96	138	56	88	25	30	23	75
80	182	107	164	70	114	25	32	26	94
100	188	113	182	84	132	25	38	26	112
125	203	115	208	104	158	25	40	41	136
160	239	126	272	134	200	36	46	55	174
200	244	126	318	163	246	36	46	55	214
250	294	153	394	202	304	45	56	65	267

[Note] The installation position of the accessories can not be adjusted arbitrarily.

Bore size\Item	A	C	HA	HB	HE	HF	HP	HQ	HR	HT	HJ
32	140	93	100	75	90	71	12	16	87	11	54
40	142	93	103	80	109	86	11	23	113	12	50
50	150	93	103	80	122	99	11	23	126	12	50
63	153	96	103	80	134	111	11	23	138	12	50
80	182	107	110	85	160	137	13	23	164	12	70
100	188	113	110	85	178	155	13	23	182	12	70
125	203	115	145	105	211	183	18	25	208	20	85
160	239	126	185	140	272	236	22	36	272	25	130
200	244	126	185	140	318	282	22	36	318	25	130
250	294	153	215	165	394	349	26	45	394	28	160

[Note] The installation position of the accessories can not be adjusted arbitrarily.



# Standard cylinder—SGC Series

In accordance with ISO15552 standard

## Compendium of SGC Series

ISO15552(Original ISO6431) Standard cylinder

Bore size:125, 160, 200, 250

**Adjustable air buffer**

With adjustable air buffer on the front and back cover

**Multi-kinds of Seals Material**

**Tie rod cylinder**

The cylinder barrel and front/rear cap is jointed by tie rods with high reliability.

**Three kinds of cylinder joints**



I Knuckle Y Knuckle Universal Joint

**Convenient and fast fix sensor switch**

Sensor switch can be directly fixed onto the cylinder, which is convenient and fast. the counterpart sensor switch type is: CMSG、DMSG(S)

**Multi-type cylinder**



SGC: Double acting type

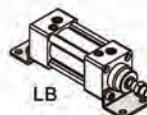


SGCD: Double rod type

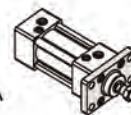


SGCJ: Adjustable stroke type

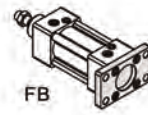
**Multi-mounting accessories**



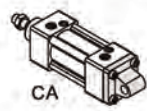
LB



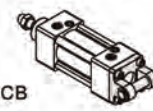
FA



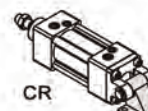
FB



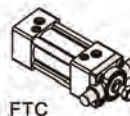
CA



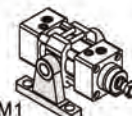
CB



CR



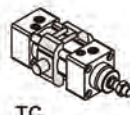
FTC



TCM1



TCM2



TC

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)										
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9		
125	32	Double acting Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8		
		Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2		
160	40	Double acting Push side	20106	2010.6	4021.2	6031.8	8042.4	10053.0	12063.6	14074.2	16084.8	18095.4		
		Pull side	18849	1884.9	3769.8	5654.7	7539.6	9424.5	11309.4	13194.3	15079.2	16964.1		
200	40	Double acting Push side	31416	3141.6	6283.2	9424.8	12566.4	15708.0	18849.6	21991.2	25132.8	28274.4		
		Pull side	30157	3015.7	6031.4	9047.1	12062.8	15078.5	18094.2	21109.9	24125.6	27141.3		
250	50	Double acting Push side	49086	4908.6	9817.2	14725.8	19634.4	24543.0	29451.6	34360.2	39268.8	44177.4		
		Pull side	47123	4712.3	9424.6	14133.2	19045.5	23757.8	28470.1	33182.4	37894.7	42607.0		

### Installation and application



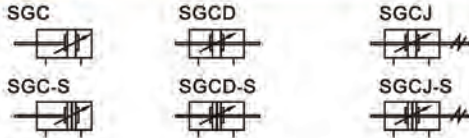
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



## SGC Series



### Symbol



### Product feature

- ISO15552 (original ISO6431) standard cylinder.
- The piston seal is composed of two Y-shape seals of single-direction structure, which has compensation function, long service life and low start-up pressure.
- SGC series cylinders are made of aluminum pipe.
- The buffer adjustment of cylinder is smooth and steady.
- Cylinders and accessories for installation with several specifications are optional.
- The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C.

### Specification

Bore size(mm)	125	160	200	250
Acting type	Double acting			
Fluid	Air(to be filtered by 40µm filter element)			
Mounting type	Basic FA FB CA CB CR LB TC FTC TCM1 TCM2			
type	SGC SGCD, SGCJ			
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	30~500			
Stroke tolerance	0~250 <sup>+1.0</sup> <sub>0</sub> 251~1000 <sup>+1.5</sup> <sub>0</sub> 1001~1500 <sup>+2.0</sup> <sub>0</sub>			
Cushion type	Variable cushion			
Adjustable cushion stroke	40	50		60
Port size [Note1]	1/2"	3/4"		1"

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)												Max.std stroke	Max. stroke									
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
160	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
200	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000
250	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	2000

[Note] Consult us for non-standard stroke.

### Ordering code

SGC 125 x 50 S

SGCD 125 x 50 S

SGCJ 125 x 50-20 S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

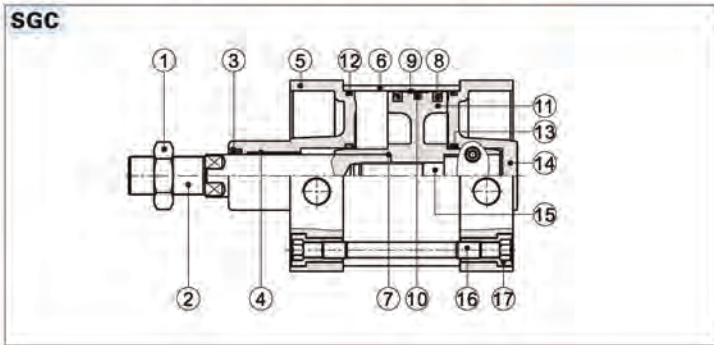
① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SGC: Double acting type (Aluminum barrel)	125 160 200 250	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU [Note2] H: Viton N: NBR	Blank: PT G: G
LB							
FA							
SGCD: Double rod type (Aluminum barrel)					FB		
					CA		
					CB		
					CR		
					FTC		
					TC		
SGCJ: Adjustable stroke type (Aluminum barrel)			10 20 30 40 50 75 100		Blank		
					LB		
					FA		
					FTC		
					TC		

[Note1] CR is used with CB. FTC, TC are used with TCM1, TCM2. [Note2] TPU seals are not available for SGC250.

# ISO15552 Standard cylinder

## SGC Series

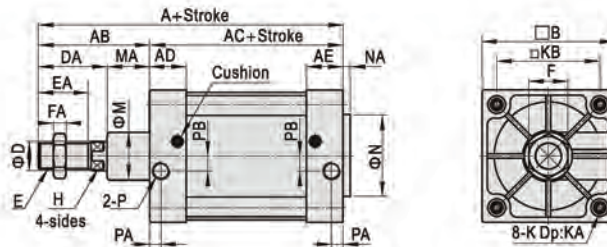
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20μm chrome plated
3	Front cover packing	NBR(SGC250)\TPU(Other)
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Aluminum pipe	Aluminum alloy
7	O-ring	NBR
8	Piston Seal	NBR
9	Wear ring	Wear resistant material
10	Magnet	Rubber
11	Piston	Aluminum alloy
12	O-ring	NBR
13	Buffer gasket	NBR(SGC250)\TPU(Other)
14	Back cover	Aluminum alloy
15	Screw	Carbon steel
16	Tie-rod	Carbon steel
17	Tie-rod nut	Carbon steel

### Dimensions

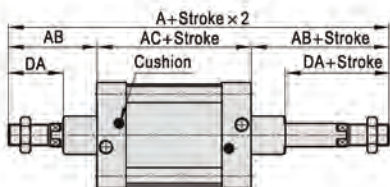
#### SGC



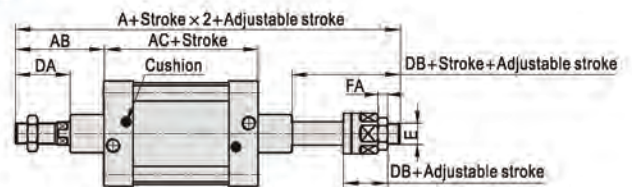
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	K	KA	KB	M	MA	N	NA	P	PA	PB
125	279	119	160	46	46	140	32	74	M27×2.0	54	41	13.5	27	M12	20	110	60	45	60	4	1/2"	23	14
160	332	152	180	50	50	180	40	94	M36×2.0	72	55	18	36	M16	24	140	65	58	65	4	3/4"	25	15
200	347	167	180	50	50	220	40	100	M36×2.0	72	55	18	36	M16	24	175	75	67	75	5	3/4"	25	15
250	389	189	200	58	58	282	50	111	M42×2.0	84	65	21	46	M20	25	220	90	78	90	8	1"	31	22

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### SGCD



#### SGCJ



Bore size\Item	A		AB	AC	DA	DB	E	FA
	SGCD	SGCJ						
125	398	366.5	119	160	74	42.5	M27X2.0	13.5
160	484	458	152	180	94	68	M36X2.0	18
200	514	482	167	180	100	68	M36X2.0	18
250	578	547	189	200	111	80	M42X2.0	21

Remark:

1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
2. The unmarked dimension is the same as SGC standard type.

## SGC Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories								
	LB	FA/FB	CA	CB	CR	TC	FTC	TCM1	TCM2
125	F-SI125LB	F-SI125FA	F-SI125CA	F-SI125CB	F-SI125CR	F-SG125TC	F-SI125FTC	F-SI125TCM1	F-SI125TCM2
160	F-SI160LB	F-SI160FA	F-SI160CA	F-SI160CB	F-SI160CR	F-SG160TC	F-SI160FTC	F-SI160TCM1	F-SI160TCM2
200	F-SI200LB	F-SI200FA	F-SI200CA	F-SI200CB	F-SI200CR	F-SG200TC	F-SI200FTC	F-SI200TCM1	F-SI160TCM2
250	F-SG250LB	F-SG250FA	F-SG250CA	F-SG250CB	-	F-SG250TC	-	F-SG250TCM1	F-SG250TCM2

Accessories Bore size	Knuckle				Sensor switch	
	I: I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle	CMSG	DMSG(S)
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U		
160	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U	CMSG	DMSG(S)
200	F-M36X200I	F-M36X200Y	F-M36X200F	F-M36X200U		
250	F-M42X200I	F-M42X200Y	-	-		

### Accessory selection

Accessories Cylinder model	Mounting accessories									Knuckle [Note1]			Sensor switch		
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U	CMSG	DMSG(S)
SGC	Standard	●	●	●	●	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SGCD	Standard	●	●	×	×	×	×	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●
SGCJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	×	×
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	●	●

[Note1] Please refer to P349-352 for knuckle detail.

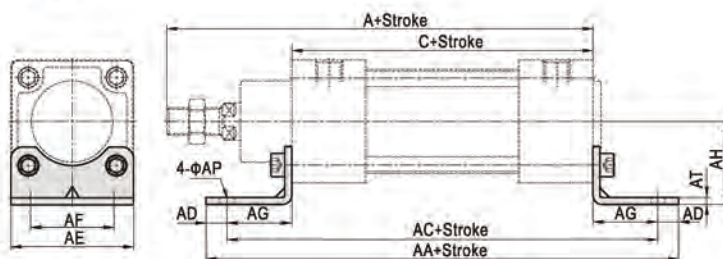
### Material of accessories

Accessories Bore size	Mounting accessories									Knuckle			
	LB	FA	FB	CA	CB	CR	TC	FTC	TCM1	TCM2	I	Y	U
125-200	■	■	■	■	■	■	■	■	■	■	□	□	□
250	■	■	■	■	■	×	■	×	■	■	■	■	×

●—Aluminum alloy, ■—Cast steel, □—Carbon steel, ×—No this type.

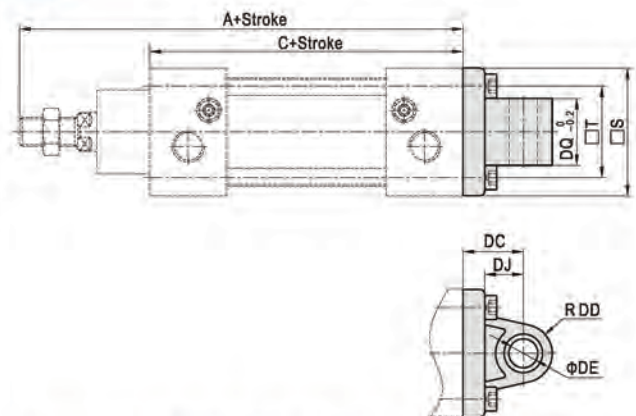
### Dimensions

#### LB



Bore size\Item	A	C	AA	AC	AD	AE	AF	AG	AH	AP	AT
125	279	160	290	250	20	140	90	45	90	16.5	8
160	332	180	340	300	20	180	115	60	115	18.5	8
200	347	180	380	320	30	220	135	70	135	24	9
250	389	200	410	350	30	275	165	75	165	28	19

#### CA



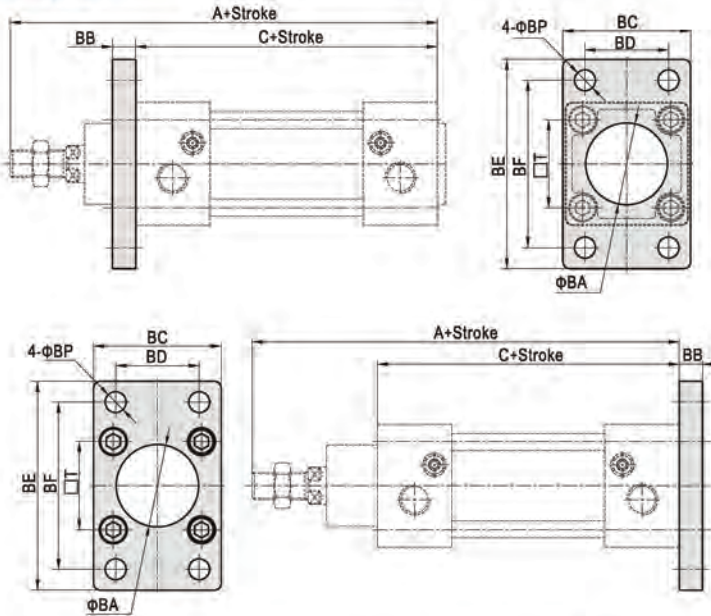
Bore size\Item	A	C	S	T	DC	DD	DE	DJ	DQ
125	279	160	139	110	50	22	25	33	69.7
160	332	180	180	140	55	30	30	35.5	89.7
200	347	180	220	175	60	30	30	37	89.7
250	389	200	270	220	70	35	40	46	109.5

# ISO1552 Standard cylinder

## SGC Series—Accessories

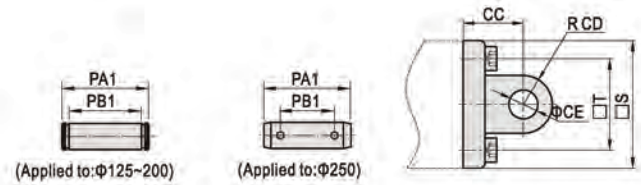
### Dimensions

#### FA/FB



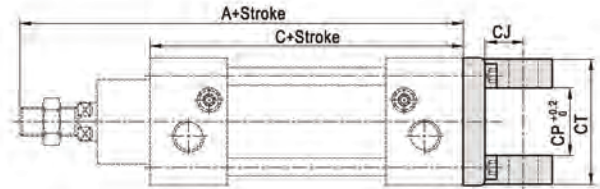
Bore size\Item	A	C	BA	BB	BC	BD	BE	BF	BP	T
125	279	160	60.5	20	139	90	218	180	16.5	110
160	332	180	65.5	20	180	115	280	230	18.5	140
200	347	180	75.5	25	220	135	320	270	24	175
250	389	200	90.5	25	270	165	380	330	26	220

#### CB



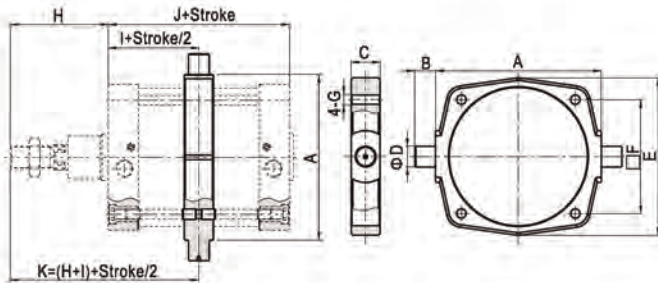
(Applied to: φ125~200)

(Applied to: φ250)



Bore size\Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
125	279	160	50	21.5	25	31	70	130	139	130.5	139	110
160	332	180	55	30	30	35.5	90	170	181	170.5	180	140
200	347	180	60	30	30	36	90	170	181	170.5	220	175
250	389	200	70	35	40	46	110.3	200	230	208	270	220

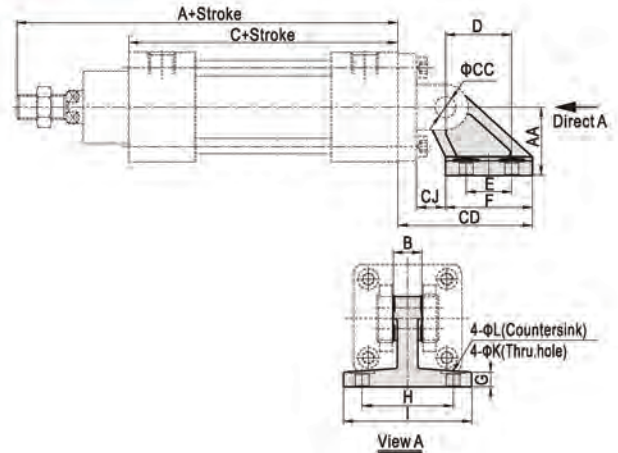
#### TC



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K
125	160	25	40	25	158.5	110	M12	119	80	160	199
160	200	32	46	32	197.5	140	M16	152	90	180	242
200	250	32	46	32	245	175	M16	167	90	180	257
250	320	40	56	40	304	220	M20	189	100	200	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.

#### CR



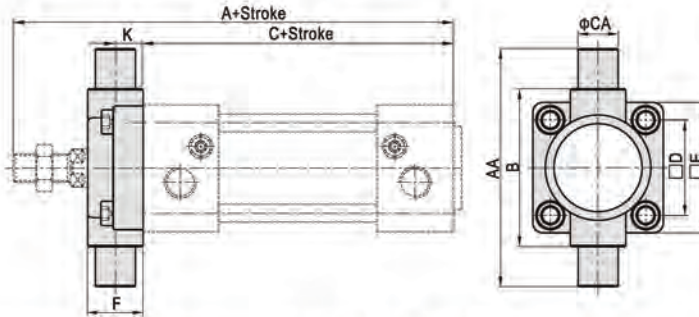
Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
125	279	90	70	160	25	135	26	70	60	90	20	94	124	14	20
160	332	115	90	180	30	171	25	97	88	126	25	118	156	14	20
200	347	135	90	180	30	185	31	105	90	130	30	122	162	18	26

[Note] CR can't be used alone, it must be used with CB.

# ISO15552 Standard cylinder

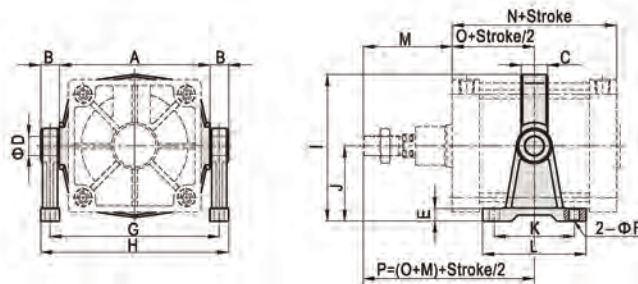
## SGC Series—Accessories

### FTC



Bore size\Item	A	C	AA	B	CA	D	E	F	K
125	279	160	210	160	25	110	139	43	20
160	332	180	264	200	32	140	179	56	20
200	347	180	314	250	32	175	218	64	20

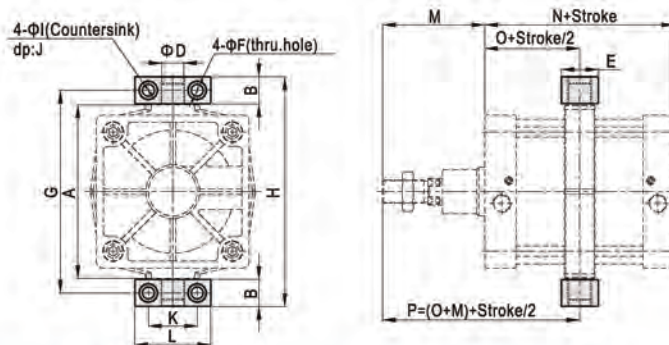
### TCM1



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
125	160	25	40	25	19	18	185	213	169.3	90	115	155	119	160	80	199
160	200	32	46	32	24	22	232	267	208.8	110	140	190	152	180	90	242
200	250	32	46	32	27	22	282	317	257.5	135	150	200	167	180	90	257
250	320	40	56	40	27	22	360	400	312	160	170	220	189	200	100	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.  
When TCM1 be used with FTC, please refer to page 19.

### TCM2



Bore size\Item	A	B	D	E	F	G	H	I	J	K	L	M	N	O	P
125	160	24.5	25	50	14	187.5	212	20	14	50	75	119	160	80	199
160	200	30	32	60	18	234	264	26	17.5	60	92	152	180	90	242
200	250	30	32	60	18	284	314	26	17.5	60	92	167	180	90	257
250	320	50	40	70	22	374	424	33	22	90	140	189	200	100	289

[Note] The installation position of the accessories can not be adjusted arbitrarily.  
When TCM2 be used with FTC, please refer to page 19.



# Standard cylinder——SAU Series

——Profile type

## Compendium of SAU Series

**Standard cylinder manufactured by our enterprise**

Bore size: 32, 40, 50, 63, 80, 100

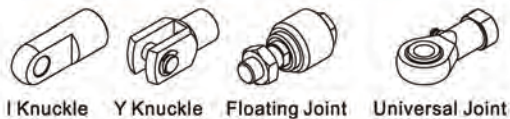
**No tie rod cylinder**

The cylinder barrel is "Mickey Mouse" shape, and have good corrosion.

**Adjustable air buffer**

With adjustable air buffer on the front and back cover

**Four kinds of cylinder joints**

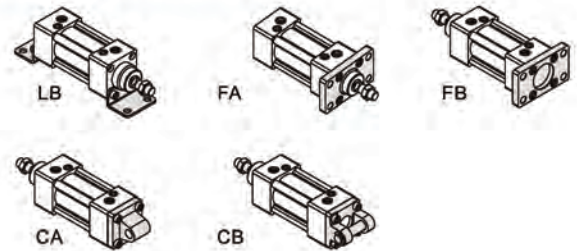


I Knuckle Y Knuckle Floating Joint Universal Joint

**Convenient and fast fix sensor switch**

Sensor switch can be directly fixed onto the groove of the cylinder, which is convenient and fast.  
the counterpart sensor switch type is: CMSG, DMSG(S)

**Multi-mounting accessories**



**Multi-type cylinder**



SAU: Double acting type



SAUD: Double rod type



SAUJ: Adjustable stroke type



SAUF: With valve type

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
32	12	Double acting Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6
		Double acting Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0
40	16	Double acting Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8	1130.4
		Double acting Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5
50	20	Double acting Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7
		Double acting Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2	1484.1
63	20	Double acting Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3
		Double acting Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7
80	25	Double acting Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4
		Double acting Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4
100	25	Double acting Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	5497.1	6282.4	7067.7
		Double acting Pull side	7362	736.2	1472.4	2208.6	2944.8	3681.0	4417.2	5153.4	5889.6	6625.8

## Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40μm or below.
6. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
7. The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
8. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

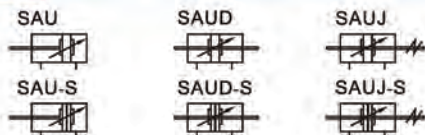


# Standard cylinder(Profile)

## SAU Series



### Symbol



### Specification

<b>Bore size(mm)</b>	32	40	50	63	80	100
<b>Acting type</b>	Double acting					
<b>Fluid</b>	Air(to be filtered by 40µm filter element)					
<b>Mounting type</b>	Basic FA FB CA CB LB					
<b>SAU type</b>	Basic FA LB					
<b>SAUD, SAUJ type</b>	Basic FA LB					
<b>Operating pressure</b>	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					
<b>Proof pressure</b>	1.5MPa(215psi)(15bar)					
<b>Temperature °C</b>	-20~70					
<b>Speed range mm/s</b>	30~800					
<b>Stroke tolerance</b>	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>	
<b>Cushion type</b>	Variable cushion					
<b>Adjustable cushion stroke</b>	21			28		29
<b>Port size [Note1]</b>	1/8"	1/4"	3/8"		1/2"	

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Product feature

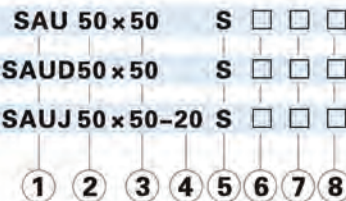
1. Standard cylinder manufactured by our enterprise.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of oil reservation.
3. It is no tie rod cylinder. The cylinder barrel is "Mickey Mouse" shape ,and have good corrosion.
4. Compared with ISO15552 standard cylinder, SAU series cylinder with the same bore size is shorter.
5. The buffer adjustment of cylinder is smooth and steady.
6. Mounting accessories are the same as SC series.
7. The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke											
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	1800					
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800

[Note] Consult us for non-standard stroke.

### Ordering code



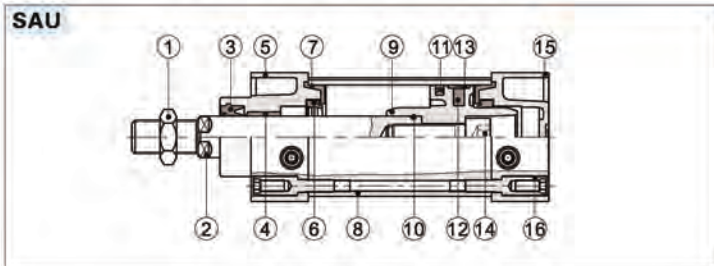
① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Seals Material	⑧ Thread type
SAU: Double acting type	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank	Blank: TPU H: Viton N: NBR	Blank: PT G: G
SAUD: Double rod type	LB						
SAUJ: Adjustable stroke type	FA						

[Note1] The accessories are the same as SC series, please refer to page 40~43 for details.

# Standard cylinder(Profile)

## SAU Series

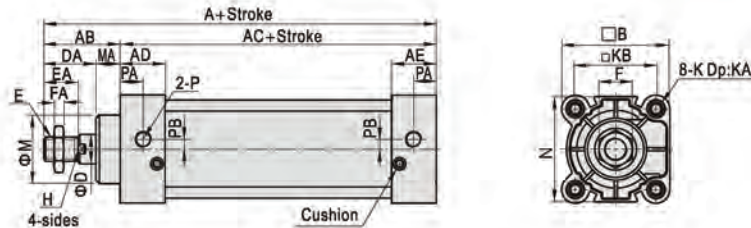
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20µm chrome plated
3	Front cover packing	TPU
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	Cushing O-ring	NBR
7	Cushion gasket	TPU
8	Barrel	Aluminum alloy
9	Piston	Aluminum alloy
10	Piston rod O-ring	NBR
11	Piston seal	NBR
12	Magnet	Plastic
13	Wear ring	Wear resistant material
14	Bolt	Carbon steel
15	Back cover	Aluminum alloy
16	Tie-rod nut	Carbon steel

### Dimensions

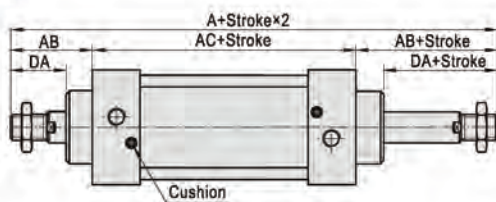
#### SAU



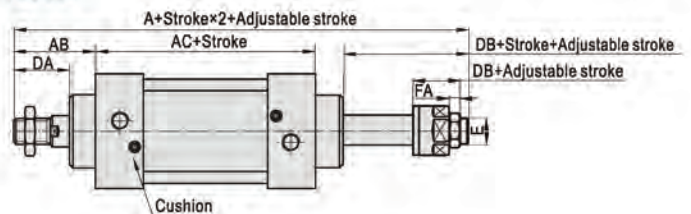
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	M	MA	H	K	KA	KB	P	PA	PB
32	140	47	93	27.5	27.5	45	12	32	M10×1.25	22	17	6	28	15	10	M6×1.0	16	33	1/8"	14	5.5
40	142	49	93	27.5	27.5	50	16	34	M12×1.25	24	17	7	32	15	14	M6×1.0	16	37	1/4"	15	6
50	150	57	93	27.5	27.5	62	20	42	M16×1.5	32	23	8	38	15	17	M6×1.0	16	47	1/4"	17	8.5
63	153	57	96	27.5	27.5	75	20	42	M16×1.5	32	23	8	38	15	17	M8×1.25	16	56	3/8"	15	9.5
80	182	75	107	33	33	94	25	54	M20×1.5	40	26	10	47	21	22	M10×1.5	18	70	3/8"	19.5	10
100	188	75	113	33	33	112	25	54	M20×1.5	40	26	10	47	21	22	M10×1.5	18	84	1/2"	16.5	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### SAUD



#### SAUJ



Bore size\Item	A(SAUD)	A(SAUJ)	AB	AC	DA	DB	E	FA
32	187	182	47	93	32	27	M10X1.25	6
40	191	185	49	93	34	28	M12X1.25	7
50	207	194	57	93	42	29	M16X1.5	8
63	210	197	57	96	42	29	M16X1.5	8
80	257	238.5	75	107	54	35.5	M20X1.5	10
100	263	244.5	75	113	54	35.5	M20X1.5	10

Remark:

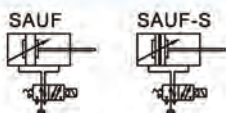
- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as SAU standard type.

# Standard cylinder(Profile)

## SAUF Series—With valve type



### Symbol



### Product feature

1. For Standard Cylinders: use 4M210 valve for bore size 32, 40 & 50; 4M310 valve for bore size 63, 80 & 100mm.
2. Individually control, no need for extra solenoid valves.
3. Installation time & space saving; suitable for decentralize installation in large system.
4. Options of mounting accessories & easy installation.

### Stroke

Bore size(mm)	Standard stroke (mm)	Mini. stroke	Max. std. stroke	Max. stroke
32	Standard type 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500	50	1000	2000
	With TC type 100 125 150 160 175 200 250 300 350 400 450 500	100		
40	Standard type 50 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	50	1200	2000
	With TC type 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	100		
63	Standard type 75 80 100 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	75	1500	2000
	With TC type 125 150 160 175 200 250 300 350 400 450 500 600 700 800 900 1000	125		

[Note] Consult us for non-standard stroke.

### Specification

Cylinder specification						
Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Mounting type	Basic FA FB CA CB LB					
Operating pressure	0.1~1.0MPa(15~145psi)(1.0~10.0bar)					
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	30~800					
Stroke tolerance	0~250 <sup>+1.0</sup> / <sub>0</sub> 251~1000 <sup>+1.5</sup> / <sub>0</sub> 1001~1500 <sup>+2.0</sup> / <sub>0</sub>					
Cushion type	Variable cushion					
Adjustable cushionstroke	21		28		29	
Port size	1/8"	1/4"	3/8"		1/2"	
PU tube size(ODXID)	Φ8 × Φ5			Φ10 × Φ6.5		
Solenoid valve specification						
Model	4M210-06 & 4M210-08			4M310-08 & 4M310-10		
Fluid	Air(to be filtered by 40 μm filter element)					
Acting type	Internal piloted					
Port size [Note1]	In=Exhaust=1/8" & In=1/4" Exhaust=1/8"			In=Exhaust=1/4" & In=PT3/8 Exhaust=1/4"		
Orifice size	4M210-06: 14.0mm <sup>2</sup> (Cv=0.78)		4M310-08: 25.0mm <sup>2</sup> (Cv=1.40)		4M310-10: 30.0mm <sup>2</sup> (Cv=1.68)	
Valve type	5 port 2 position					
Operating pressure	0.15~0.8MPa(21~114psi)					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Body material	Aluminum alloy					
Lubrication [Note2]	Not required					
Max. frequency [Note3]	5 cycle/sec			4 cycle/sec		
Coil specification						
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V					
Scope voltage	AC: ±15% DC: ±10%					
Power consumption	AC: 3.5VA DC: 3.0W					
Protection	IP65(DIN40050)					
Temperature classification	B Class					
Electrical entry	Terminal, Grommet					
Activating time	0.05 sec and below					

[Note1] PT thread is available.

[Note2] It can't stop in the midway of lubricating. Lubricants like ISO VG32 or equivalent are recommended.

[Note3] The maximum actuation frequency is in the no-load state.

Add) Refer to P353 for detail of sensor switch.

### Ordering code

SAUF 50 × 1000 S □ -06 A □ □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

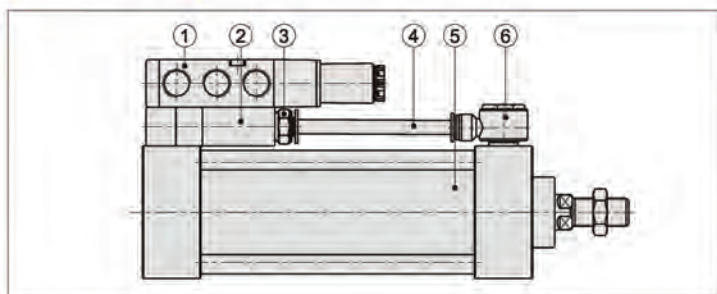
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Mounting type[Note1]	⑥ Port size	⑦ Voltage	⑧ Electrical entry	⑨ Thread type
SAUF: Double acting with valve type	32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank	06: 1/8" 08: 1/4" 10: 3/8"	A: AC220V B: DC24V C: AC110V E: AC24V F: DC12V	Blank: Terminal I: Grommet	Blank: PT
				LB				
				FA				
				FB				
				CA				
				CB				

[Note1] The accessories are the same as SC series, please refer to page 40~43 for details.

# Standard cylinder(Profile)

## SAUF Series—With valve type

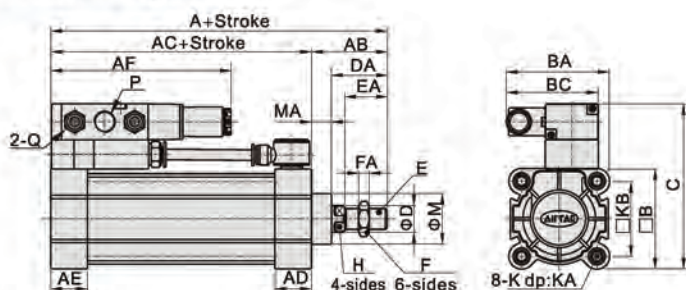
### Inner structure



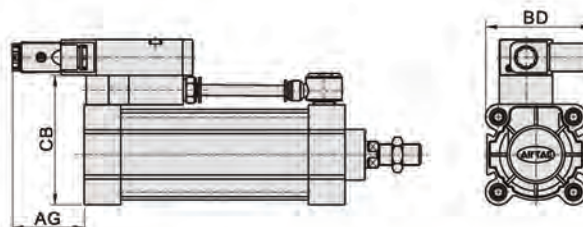
NO.	Item
1	4M series solenoid valve
2	Unite block
3	APC series tube connector
4	PU tube
5	SAU series cylinder
6	APH series tube connector

### Dimensions

#### Pull when energized



#### Push when energized



Bore size\Item	A	AB	AC	AD	AE	AF	AG	B	BA	BC	BD
32	140	47	93	27.5	27.5	118	53	45	67	67	77
40	142	49	93	27.5	27.5	118	53	50	68.5	67	80.5
50	150	57	93	27.5	27.5	120	51	62	72	67	89
63	153	57	96	27.5	27.5	135.5	54.5	75	77.5	69.5	96.5
80	182	75	107	33	33	137	53	94	86.5	69.5	106.5
100	188	75	113	33	33	135.5	54.5	112	96	69.5	115

Bore size\Item	C	CB	D	DA	E	EA	F	FA	H	M	MA
32	89	67	12	32	M10X1.25	22	17	6	10	28	15
40	94	72	16	34	M12X1.25	24	17	7	14	32	15
50	106	84	20	42	M16X1.5	32	23	8	17	38	15
63	124	97	20	42	M16X1.5	32	23	8	17	38	15
80	143	116	25	54	M20X1.5	40	26	10	22	47	21
100	161	134	25	54	M20X1.5	40	26	10	22	47	21

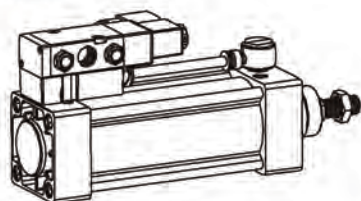
Bore size\Item	valve's type	P	Q	K	KA	KB
32	4M210-06	1/8"	1/8"	M6X1(NoTC)	9.5(No TC)	33
	4M210-08	1/4"		M5X0.8(With TC)	10(With TC)	
40	4M210-06	1/8"	1/8"	M6X1(No TC)	9.5(No TC)	37
	4M210-08	1/4"		M5X0.8(With TC)	9(With TC)	
50	4M210-06	1/8"	1/8"	M6X1(No TC)	9.5(No TC)	47
	4M210-08	1/4"		M5X0.8(With TC)	9.5(With TC)	
63	4M310-08	1/4"	1/4"	M8X1.25(No TC)	9.5(No TC)	56
	4M310-10	3/8"		M6X1(With TC)	7.5(With TC)	
80	4M310-08	1/4"	1/4"	M10X1.5(No TC)	11.5(No TC)	70
	4M310-10	3/8"		M8X1.25(With TC)	11(With TC)	
100	4M310-08	1/4"	1/4"	M10X1.5(No TC)	11.5(No TC)	84
	4M310-10	3/8"		M8X1.25(With TC)	11(With TC)	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

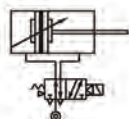
### How to use

- Options for piston rod to retract or extend when solenoid coil is energized.
- Default factory setting will be piston rod to retract when energized(see Drawing one). Should you require piston rod to extend when energized, reposition the solenoid valve as shown in Drawing two.

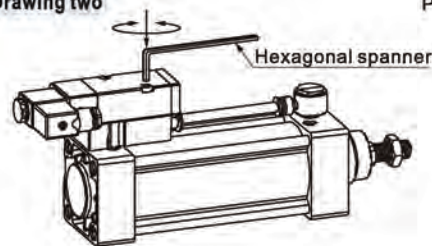
#### Drawing one



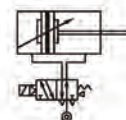
#### Pull when energized



#### Drawing two



#### Push when energized



**Attention** Ensure that the seals between the mounting block & valve are placed correctly when repositioning the valve.

# Standard cylinder(Profile)

## SAU Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories				Sensor switch	
	LB	FA/FB	CA	CB	CMSG	DMSG(S)
32	F-SC32LB	F-SC32FA	F-SC32CA	F-SC32CB		
40	F-SC40LB	F-SC40FA	F-SC40CA	F-SC40CB		
50	F-SC50LB	F-SC50FA	F-SC50CA	F-SC50CB		
63	F-SC63LB	F-SC63FA	F-SC63CA	F-SC63CB		
80	F-SC80LB	F-SC80FA	F-SC80CA	F-SC80CB		
100	F-SC100LB	F-SC100FA	F-SC100CA	F-SC100CB		

Accessories Bore size	Knuckle				Sensor switch	
	I: I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle	CMSG	DMSG(S)
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U		
40	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		
50	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U	CMSG	DMSG(S)
63	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U		
80	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		
100	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U		

### Accessory selection

Accessories Cylinder model	Mounting accessories					Knuckle [Note1]				Sensor switch	
	LB	FA	FB	CA	CB	I	Y	U	F	CMSG	DMSG(S)
SAU	Standard	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●
SAUF	Standard	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●
SAUD	Standard	●	●	×	×	×	●	●	●	×	×
	With magnet	●	●	×	×	×	●	●	●	●	●
SAUJ	Standard	●	●	×	×	×	●	●	●	×	×
	With magnet	●	●	×	×	×	●	●	●	●	●

[Note1] Please refer to P349~352 for knuckle detail.

### Material of accessories

Accessories Bore size	Mounting accessories					Knuckle			
	LB	FA	FB	CA	CB	I	Y	F	U
32~100	□	●	●	◇	◇	□	□	□	□

●—Aluminum alloy, ◇—Cast steel, □—Carbon steel

### Dimensions

The accessories are the same as SC series's accessories, please refer to P40~43 for details.



# Standard cylinder—JSI Series

## Compendium of JSI Series

**JSI Standard cylinder**  
Bore size: 32, 40, 50, 63, 80, 100, 125

**Convenient and fast fix sensor switch**  
Sensor switch can be directly fixed on the cylinder, which is convenient and fast.

**No tie rod cylinder**  
The cylinder barrel is "Mickey Mouse" shape, and have good corrosion.

**Adjustable air buffer**  
With adjustable air buffer on the front and back cover

**Four kinds of cylinder joints**

I Knuckle   Y Knuckle   Floating Joint   Universal Joint

**Multi-mounting accessories**

LB   FA   FB

CA   CB   CR

TC   TCM1   TCM2

**Multi-type cylinder**

JSI: Double acting type   JSID: Double rod type   JSIJ: Adjustable stroke type

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
32	12	Double acting Push side	804	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2	723.6	
		Pull side	690	69.0	138.0	207.0	276.0	345.0	414.0	483.0	552.0	621.0	
40	16	Double acting Push side	1256	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1002.4	1130.4	
		Pull side	1055	105.5	211.0	316.5	422.0	527.5	633.0	738.5	844.0	949.5	
50	20	Double acting Push side	1963	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4	1766.7	
		Pull side	1649	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1399.2	1484.1	
63	20	Double acting Push side	3117	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6	2805.3	
		Pull side	2803	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4	2522.7	
80	25	Double acting Push side	5026	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8	4523.4	
		Pull side	4536	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8	4082.4	
100	30	Double acting Push side	7853	785.3	1570.6	2355.9	3141.2	3926.5	4711.8	4288.2	6282.4	7067.7	
		Pull side	7147	714.7	1429.4	2144.1	2858.9	3573.6	4288.3	5003.0	5717.7	6432.4	
125	32	Double acting Push side	12272	1227.2	2454.4	3681.6	4908.8	6136.0	7363.2	8590.4	9817.6	11044.8	
		Pull side	11468	1146.8	2293.6	3440.4	4587.2	5734.0	6880.8	8027.6	9174.4	10321.2	

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

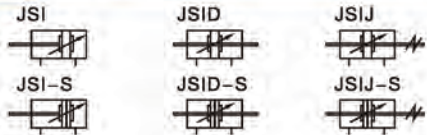


# Standard cylinder

## JSI Series



### Symbol



### Product feature

1. JIS standard cylinder.
2. The seal of piston adopts heterogeneous two way seal structure. It's dimension is tight and it has the function of greasel reservation.
3. The Mickey Mouse-shaped aluminum barrel of JSI series has no tie rod and good performance of corrosion resistance.
4. Compared with ISO15552 standard cylinder, the cylinder of JSI series with the same cylinder diameter is shorter.
5. The buffer adjustment of cylinder is smooth and steady.
6. Cylinders and mounting accessories for installation with several specifications are optional.
7. The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C.

### Specification

<b>Bore size(mm)</b>	<b>32</b>	<b>40</b>	<b>50</b>	<b>63</b>	<b>80</b>	<b>100</b>	<b>125</b>
<b>Acting type</b>	Double acting						
<b>Fluid</b>	Air(to be filtered by 40 μ m filter element)						
<b>Mounting type</b>	Basic FA FB CA CB CR LB TC TCM1 TCM2						
<b>type</b>	JSID、JSIJ Basic FA LB TC TCM1 TCM2						
<b>Operating pressure</b>	0.15~1.0MPa(22~145psi)(1.5~10.0bar)						
<b>Proof pressure</b>	1.5MPa(215psi)(15bar)						
<b>Temperature °C</b>	-20~70						
<b>Speed range mm/s</b>	30~800						30~500
<b>Stroke tolerance</b>	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~1500 <sup>+2.0</sup> <sub>0</sub>		
<b>Cushion type</b>	Variable cushion						
<b>Adjustable cushion stroke</b>	24			32		37.5 40	
<b>Port size [Note1]</b>	1/8"		1/4"		3/8"		1/2"

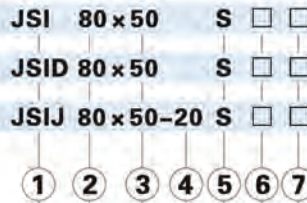
[Note1] PT thread, G thread are available.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke											
32	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	1000	1800					
40	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
50	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1800
63	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
80	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
100	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800
125	25	50	75	80	100	125	150	160	175	200	250	300	350	400	450	500	600	700	800	900	1000	1500	1800

[Note] Consult us for non-standard stroke.

### Ordering code



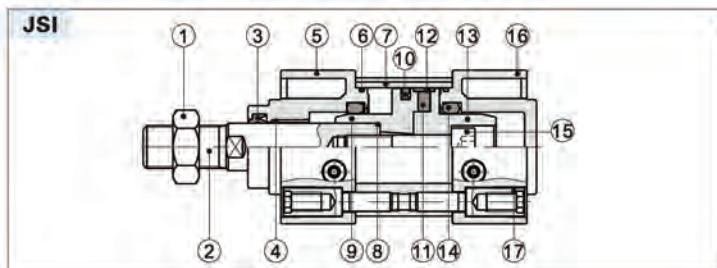
① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Mounting type[Note1]	⑦ Thread type
SI: Double acting type	32 40 50 63 80	Refer to stroke table for details	No this code	Iank: Without magnet S: With magnet	Blank	Blank: PT G: G
JSID: Double rod type	100 125				LB	
	JSIJ: Adjustable stroke type				10 20 30 40 50 75 100	
FB						
CA						
CB						
CR						
TC						

[Note1] Please refer to page 59~61 for details of accessories; TC is used with TCM1, TCM2.

# Standard cylinder

## JSI Series

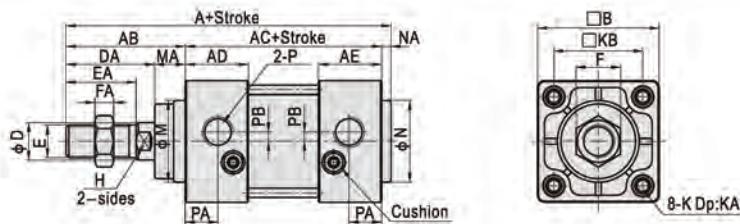
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel/Stainless steel
2	Piston rod	Carbon steel with 20 μm chrome plated or Stainless steel
3	Front cover packing	NBR
4	Bushing	Wear resistant material
5	Front cover	Aluminum alloy
6	O-ring	NBR
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston seal	NBR
11	Magnet	Plastic
12	Wear ring	Wear resistant material
13	Magnet holder	Aluminum alloy
14	Buffer gasket	NBR
15	Screw	Carbon steel
16	Back cover	Aluminum alloy
17	Tie-rod nut	Carbon steel

### Dimensions

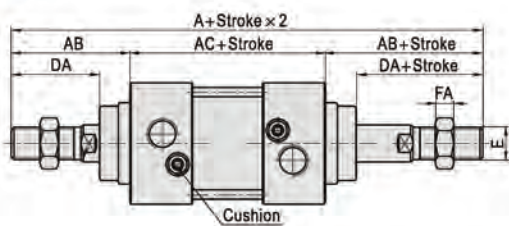
#### JSI



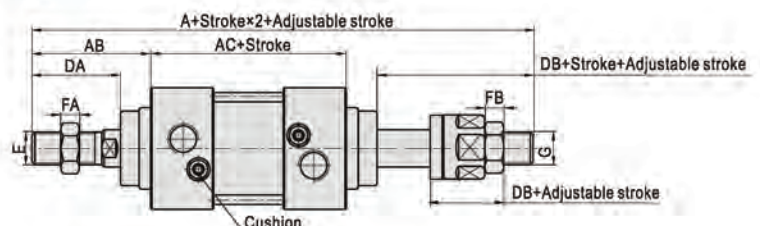
Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA	F	FA	H	M	MA	K(Without TC)	K(With TC)	KA(Without TC)	KA(With TC)	KB	N	NA	P	PA	PB
32	135	47	84	27	27	46	12	34	M10×1.25	22	17	6	10	30	13	M6	M5	16	14	32.5	30	4	1/8"	13	4
40	139	51	84	27	27	52	16	38	M14×1.5	30	19	8	14	35	13	M6	M5	16	14	38	35	4	1/4"	14	4
50	156	58	94	31.5	31.5	65	20	44	M18×1.5	35	27	11	18	40	14	M8	M6	16	16	46.5	40	4	1/4"	15.5	5
63	156	58	94	30.5	30.5	75	20	44	M18×1.5	35	27	11	18	45	14	M8	M6	16	16	56.5	45	4	3/8"	16.5	9
80	190	72	114	38	38	95	25	52	M22×1.5	40	32	13	22	45	20	M10	M8	16	16	72	45	4	3/8"	19	11.5
100	190	72	114	38	38	114	30	52	M26×1.5	40	36	13	26	55	20	M10	M8	16	16	89	55	4	1/2"	19	17
125	223	97	120	38	38	137	32	70	M27×2.0	54	41	13.5	27	60	27	M12	M12	20	18	110	60	6	1/2"	19	17

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### JSID



#### JSIJ



Bore size\Item	A(JSID)	A(JSIJ)	AB	AC	DA	DB	E	FA	FB	G
32	178	171	47	84	34	27	M10X1.25	6	6	M10X1.25
40	186	176	51	84	38	28	M14X1.5	8	7	M12X1.25
50	210	195	58	94	44	29	M18X1.5	11	8	M16X1.5
63	210	195	58	94	44	29	M18X1.5	11	8	M16X1.5
80	258	241.5	72	114	52	35.5	M22X1.5	13	10	M20X1.5
100	258	248.5	72	114	52	42.5	M26X1.5	13	13.5	M27X2.0
125	314	286.5	97	120	70	42.5	M27X2.0	13.5	13.5	M27X2.0

Remark:

- The dimensions of magnet type cylinder are the same as non-magnet type cylinder.
- The unmarked dimension is the same as JSI standard type.

### List for ordering code of accessories

Accessories Bore size	Mounting accessories							
	LB	FA/FA	CA	CB	CR	TC	TCM1	TCM2
32	F-JSI32LB	F-SI32FA	F-JSI32CA	F-JSI32CB	F-JSI32CR	F-SI32TC	F-SI32TCM1	F-SI32TCM2
40	F-JSI40LB	F-SI40FA	F-JSI40CA	F-JSI40CB	F-JSI32CR	F-SI40TC	F-SI40TCM1	F-SI40TCM2
50	F-JSI50LB	F-SI50FA	F-JSI50CA	F-JSI50CB	F-JSI50CR	F-SI50TC	F-SI40TCM1	F-SI40TCM2
63	F-JSI63LB	F-SI63FA	F-JSI63CA	F-JSI63CB	F-JSI50CR	F-SI63TC	F-SI63TCM1	F-SI63TCM2
80	F-JSI80LB	F-SI80FA	F-JSI80CA	F-JSI80CB	F-JSI80CR	F-SI80TC	F-SI63TCM1	F-SI63TCM2
100	F-JSI100LB	F-SI100FA	F-JSI100CA	F-JSI100CB	F-JSI80CR	F-SI100TC	F-SI125TCM1	F-SI125TCM2
125	F-JSI125LB	F-JSI125FA	F-JSI125CA	F-JSI125CB	F-JSI125CR	F-SI125TC	F-SI125TCM1	F-SI125TCM2

Accessories Bore size	Knuckle			
	I: I Knuckle	Y: Y Knuckle	F: F Knuckle	U: U Knuckle
32	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U
40	F-M14X150I	F-M14X150Y	F-M14X150F	F-M14X150U
50	F-M18X150I	F-M18X150Y	F-M18X150F	F-M18X150U
63	F-M18X150I	F-M18X150Y	F-M18X150F	F-M18X150U
80	F-M22X150I	F-M22X150Y	F-M22X150F	-
100	F-M26X150I	F-M26X150Y	F-M26X150F	F-M26X150U
125	F-M27X200I	F-M27X200Y	F-M27X200F	F-M27X200U

### Accessory selection

Accessories Cylinder model	Mounting accessories										Knuckle [Note 1]			
	LB	FA	FB	CA	CB	CR	TC	TCM1	TCM2	I	Y	U	F	
JSI	Standard	●	●	●	●	●	●	●	●	●	●	●	●	
	With magnet	●	●	●	●	●	●	●	●	●	●	●	●	
JSID	Standard	●	●	×	×	×	×	●	●	●	●	●	●	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	
JSIJ	Standard	●	●	×	×	×	×	●	●	●	●	●	●	
	With magnet	●	●	×	×	×	×	●	●	●	●	●	●	

[Note 1] Please refer to P349-352 for knuckle detail.

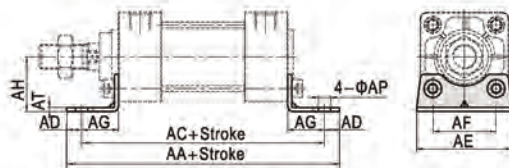
### Material of accessories

Accessories Bore size	Mounting accessories										Knuckle			
	LB	FA	FB	CA	CB	CR	TC	TCM1	TCM2	I	Y	F	U	
32-63	□	●	●	△	△	◇	◇	□	●	□	□	□	□	
80, 100	□	●	●	△	△	◇	◇	□	●	□	□	□	□	
125	□	■	■	□	□	◇	◇	□	●	□	□	□	□	

●—Aluminum alloy, ■—Cast steel, ◇—Nodular cast iron, △—FC25; □—Carbon steel.

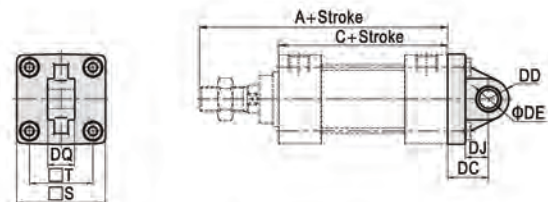
### Dimensions

#### LB



Bore size\Item	AA	AC	AD	AE	AF	AG	AH	AP	AT
32	146	128	9	50	32	22	30	7	3
40	154	132	11	55	38	24	33	9	3
50	170	148	11	70	46	27	40	9	3
63	176	148	14	80	56	27	45	12	4
80	202	174	14	100	72	30	55	12	5
100	210	178	16	120	89	32	65	14	5
125	250	210	20	136	90	45	81	14	8

#### CA

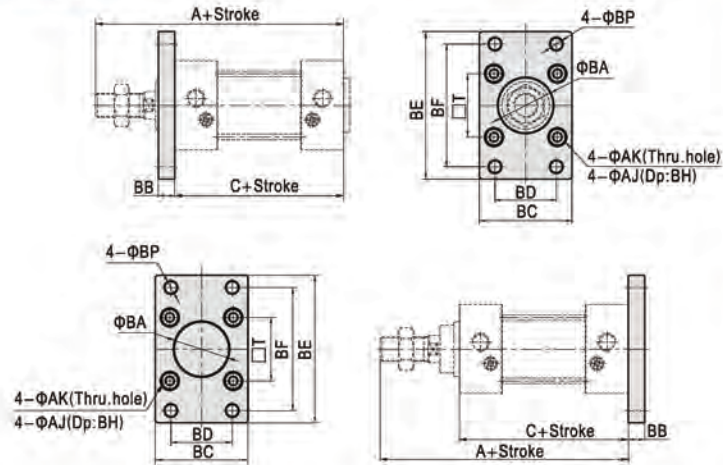


Bore size\Item	A	C	S	T	DC	DD	DE	DJ	DQ
32	131	84	46	32.5	23	10.5	10	13	13.8
40	135	84	52	38	23	11	10	13	13.8
50	152	94	65	46.5	30	15	14	17	19.8
63	152	94	75	56.5	30	15	14	17	19.8
80	186	114	95	72	42	23	22	27	29.8
100	186	114	114	89	42	23	22	27	29.8
125	217	120	136	110	50	28	25	28	31.8

# Standard cylinder

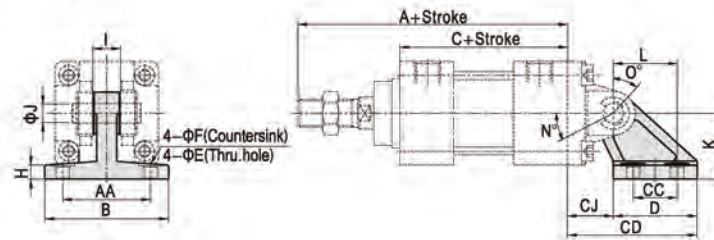
## JSI Series—Accessories

### FA/FB



Bore size\Item	A	C	AJ	AK	BA	BB	BC	BD	BE	BF	BH	BP	T
32	131	84	11	6.5	30.5	10	47	32	80	64	6.5	7	32.5
40	135	84	11	6.5	35.5	10	53	36	90	72	6.5	9	38
50	152	94	14	9	40.5	12	65	45	108	90	8.5	9	46.5
63	152	94	14	9	45.5	12	75	50	118	100	8.5	9	56.5
80	186	114	17	11	45.5	16	95	63	150	126	10.5	12.5	72
100	186	114	17	11	55.5	16	115	75	176	150	10.5	14.5	89
125	217	120	19	13	60.5	20	138	102	216	180	12.5	14	110

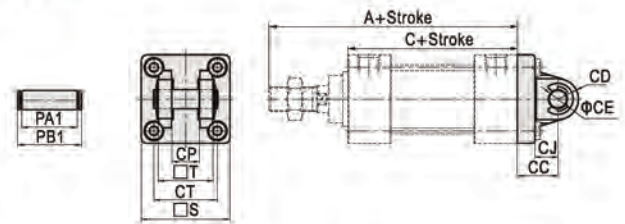
### CR



Bore size\Item	A	AA	B	C	CC	CD	CJ	D	E	F	H	I	J	K	L	N	O	N+O+90°
32	131	44	62	84	22	65	23	42	6.6	12	7	13.8	10	33	32	25	45	160
40	135	44	62	84	22	65	23	42	6.6	12	7	13.8	10	33	32	25	45	160
50	152	60	81	94	30	84.5	31.5	53	9	15	8	19.8	14	45	43	40	60	190
63	152	60	81	94	30	84.5	31.5	53	9	15	8	19.8	14	45	43	40	60	190
80	186	86	111	114	45	120	47	73	11	18	10	29.8	22	65	64	30	55	175
100	186	86	111	114	45	120	47	73	11	18	10	29.8	22	65	64	30	55	175
125	217	110	136	120	60	143	53	90	13.5	20	14	31.8	25	75	78	30	50	170

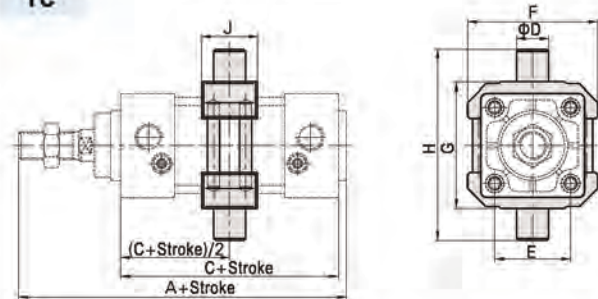
[Note] CR can't be used alone, it must be used with CB.

### CB



Bore size\Item	A	C	CC	CD	CE	CJ	CP	CT	PA1	PB1	S	T
32	131	84	23	10.5	10	14	14.2	32.5	28.8	34.6	46	28
40	135	84	23	11	10	14	14.2	38	28.8	34.6	52	28
50	152	94	30	15	14	18	20.2	46.5	40.8	47	65	40
63	152	94	30	15	14	18	20.2	56.5	40.8	47	75	40
80	186	114	42	23	22	27	30.2	72	60.8	69.2	95	60
100	186	114	42	23	22	27	30.2	89	60.8	69.2	114	60
125	217	120	50	28	25	32	32.2	110	64.8	73.2	136	64

### TC



Bore size\Item	A	C	D	E	F	G	H	J
32	135	84	12	32.5	52	50	74	22
40	139	84	16	38	65	63	95	28
50	156	94	16	46.5	75	75	107	28
63	156	94	20	56.5	90	90	130	30
80	190	114	20	72	112	110	150	32
100	190	114	25	89	135	132	182	38
125	223	120	25	110	170	160	210	40

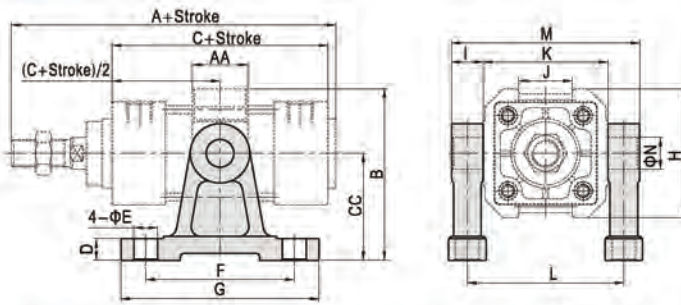
[Note] The TC accessory has been installed on the barrel of cylinder before it worked off, and the position of the accessories can not be adjusted arbitrarily.

If consumer orders the TC solely, he will not install it on the barrel of standard cylinder directly.

# Standard cylinder

## JSI Series—Accessories

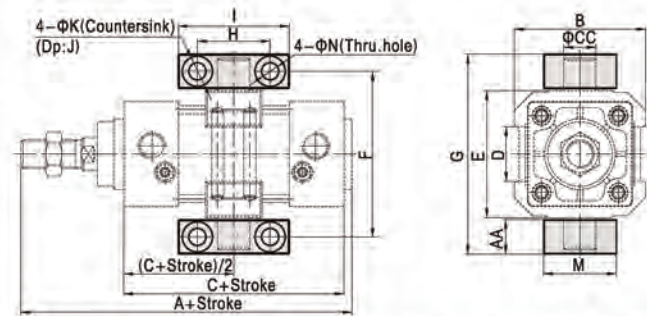
### TCM1



Bore size\Item	B	A	AA	C	CC	D	E	F	G	H	I	J	K	L	M	N
32	66	135	22	84	40	11	9	60	80	52	12	20	50	62	77	12
40	86.5	139	28	84	54	11	12	75	100	65	16	27	63	79	98	16
50	91.5	156	28	94	54	11	12	75	100	75	16	31	75	91	110	16
63	115	156	30	94	70	11	12	85	110	90	20	42	90	110	133	20
80	126	190	32	114	70	11	12	85	110	112	20	54	110	130	153	20
100	157.5	190	38	114	90	19	18	115	155	135	25	68	132	157	185	25
125	175	223	40	120	90	19	18	115	155	170	25	80	160	185	213	25

[Note] The installation position of the accessories can not be adjusted arbitrarily.

### TCM2



Bore size\Item	A	AA	B	C	CC	D	E	F	G	H	I	J	K	M	N
32	135	14	52	84	12	20	50	66	80	32	46	6.8	11	30	7
40	139	17	65	84	16	27	63	82	99	36	55	9	15	36	9
50	156	17	75	94	16	31	75	94	111	36	55	9	15	36	9
63	156	20.5	90	94	20	42	90	113.5	134	42	65	11	18	40	11
80	190	20.5	112	114	20	54	110	133.5	154	42	65	11	18	40	11
100	190	24.5	135	114	25	68	132	159.5	184	50	75	14	20	50	14
125	223	24.5	170	120	25	80	160	187.5	212	50	75	14	20	50	14

[Note] The installation position of the accessories can not be adjusted arbitrarily.



# Mini cylinder(Stainless steel)—MI Series

In accordance with ISO6432 standard

## Compendium of MI Series

**Multi-mounting accessories**

LB Type      FA Type      SDB Type      TC Type

**Rolling packed structure**  
Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Eight bore size are available**  
Bore size: 8, 10, 12, 16, 20, 25, 32, 40

**Four kinds of back cover type**

CA: Pivot type    U: Perpendicular 90°    R: Axial air-in    CM: Round-end type

**Multi-type cylinder**

MI: Mini cylinder (Double acting)      MIC: Mini cylinder (Double acting with cushion)  
MSI: Mini cylinder (Single acting\_push)      MTI: Mini cylinder (Single acting\_pull)  
MID: Mini cylinder(Double rod)  
MICD: Mini cylinder(Double rod with cushion)  
MIJ: Mini cylinder(Adjustable stroke)  
MICJ: Mini cylinder(Adjustable stroke with cushion)

**Multi-kinds of stroke**

**Two kinds of cushion type**  
Variable cushion or Bumper

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)						
					0.1	0.2	0.3	0.4	0.5	0.6	0.7
8	4	Single acting	Push side	50.2	-	3.6	8.6	13.6	18.6	23.6	28.7
			Pull side	37.7	-	1.0	4.8	8.6	12.3	16.1	19.9
		Double acting	Push side	50.2	5.0	10.1	15.1	20.1	25.1	30.1	35.2
			Pull side	37.7	3.7	7.5	11.3	15.1	18.8	22.6	26.4
10	4	Single acting	Push side	78.5	-	5.9	13.8	21.6	29.5	37.3	45.2
			Pull side	65.9	-	3.4	10.0	16.6	23.2	29.8	36.4
		Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull side	65.9	6.6	13.2	19.8	26.4	33.0	39.5	46.1
12	6	Single acting	Push side	113.0	-	10.1	21.4	32.7	44.0	55.3	66.6
			Pull side	84.8	-	4.5	12.9	21.4	29.9	38.4	46.9
		Double acting	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	6	Single acting	Push side	201.0	-	14.6	34.7	54.8	74.9	95.0	115.1
			Pull side	172.7	-	8.9	26.2	43.5	60.8	78.0	95.3
		Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Single acting	Push side	314.0	-	25.3	56.7	88.1	119.5	150.9	182.3
			Pull side	263.8	-	15.3	41.6	68.0	94.4	120.8	147.1
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	43.1	92.2	141.3	190.3	239.3	288.4
			Pull side	412.1	-	27.4	68.6	109.8	151.1	192.3	233.5
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	30.2	110.9	191.3	277.1	352.1	432.6	513.0
			Pull side	691.2	19.1	88.2	157.4	226.5	295.6	364.7	438.8
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	64.7	190.3	316.0	441.7	567.3	693.0	818.7
			Pull side	1055.6	44.6	150.1	255.7	361.2	466.8	572.4	677.9
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9

### Installation and application



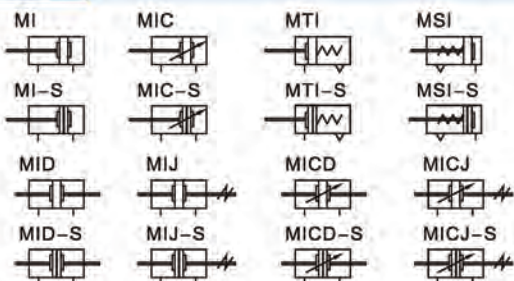
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



## MI Series



### Symbol



### Product feature

- In accordance with ISO6432 standard(Φ8~Φ25).
- Front and back cover owns fixed bumper pad which can reduce the impact of direction-change of the cylinder.
- There are several mode of back cover, which makes the installation of cylinder more convenient.
- Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
- Piston rod and cylinder body with the material of stainless steel make the cylinder adapt general working environment with corrosivity.
- There are cylinders and accessories with several specifications for installation for your choice.

### Specification

Bore size(mm)	8	10	12	16	20	25	32	40
Acting type	Double acting、Single acting_Push、Single acting_Pull							
	- Double acting with cushion							
Fluid	Air(to be filtered by 40 μ m filter element)							
Operating pressure	Double acting 0.15~1.0MPa(22~145psi)(1.5~10.0bar)							
	Single acting 0.2~1.0MPa(28~145psi)(2.0~10.0bar)							
Proof pressure	1.5MPa(215psi)(15bar)							
Temperature °C	-20~70							
Speed range mm/s	Double acting: 30~800 Single acting: 50~800							
Stroke tolerance	0~150 <sup>+1.0</sup> >150 <sup>+1.5</sup>							
Cushion type	MIC Series: Variable cushion				Other series: Bumper			
Port size [Note1]	M5×0.8				1/8"		1/4"	

[Note1] PT thread, G thread thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke	Max. stroke	
MI	8	10 15 20 25 30 40 50 60 75 80 100 125 150	150	200
	10	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	200
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250	250	500
MI	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	500	600
	MIC	20 25 32 40	350 400 450 500	500 800
MID	8	10 15 20 25 30 40 50 60 75 80 100	100	-
	10	10 15 20 25 30 40 50 60 75 80 100	100	-
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	-
MID	16 20	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300	-
	MIJ	25	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300
MICD	32	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	500	-
	MICJ	40	350 400 450 500	500
MSI	8 10 12	10 15 20 25 30 40 50	-	-
	16	10 15 20 25 30 40 50 60 75 80 100	-	-
MTI	20 25 32 40	10 15 20 25 30 40 50 60 75 80 100 125 150	-	-

[Note] Consult us for non-standard stroke.

### Ordering code

MI 10 x 40 S CA    
 MID 10 x 40 S    
 MIJ 10 x 40-30 S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover	⑦ Mounting type[Note1]	⑧ Thread type
MI: Mini cylinder(Double acting)	8 10 12 16 20 25 32 40	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Refer below table for details	Blank: No accessories FA: FA type SDB: SDB type LB: LB type TC: TC type	Blank: PT G: G
MIC: Mini cylinder (Double acting with cushion)	16 20 25 32 40						
MSI: Mini cylinder(Single acting_push)							
MTI: Mini cylinder(Single acting_pull)	8 10 12 16 20 25 32 40						
MID: Mini cylinder(Double rod)							
MICD: Mini cylinder (Double rod with cushion)	16 20 25 32 40						
MIJ: Mini cylinder(Adjustable stroke)	8 10 12 16 20 25 32 40						
MICJ: Mini cylinder(Adjustable stroke with cushion)	16 20 25 32 40	10 20 30 40 50 75 100			No this code	Blank: No accessories FA: FA type LB: LB type TC: TC type	

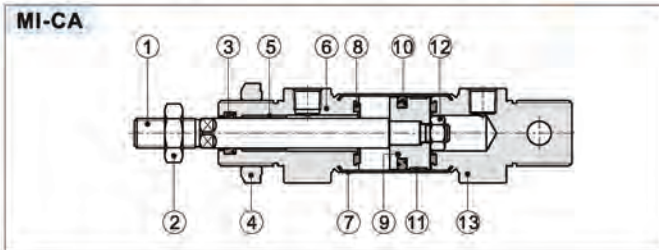
[Note1] Please refer to page 66~67 for accessory parts.

Model	Back cover	Bore size
MI MSI MTI	CA: Pivot type	Φ8~Φ25
	U: Perpendicular 90°	Φ8~Φ40
	R: Axial air-in	Φ16~Φ40
	CM: Round-end type	Φ16~Φ40
MIC	CA: Pivot type	Φ16~Φ25
	U: Perpendicular 90°	Φ16~Φ40
	CM: Round-end type	Φ16~Φ40
Others	No this code	

# Mini cylinder(Stainless steel, ISO6432)

## MI Series

### Inner structure and material of major parts

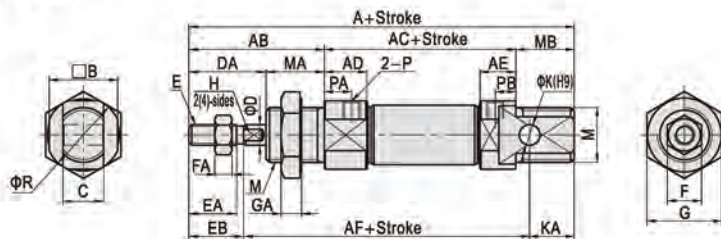


NO.	Item	Material
1	Rod	SUS304
2	Rod nut	Carbon steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Bushing	Wear resistant material
6	Front cover	Aluminum alloy
7	Barrel	SUS304(Φ8~Φ12)\SUS316L(Others)
8	Bumper	TPU
9	Piston	SUS304(Φ8~Φ12)\Aluminum alloy(Others)
10	Piston seal	NBR
11	Wear ring	Wear resistant material
12	Nut	Carbon steel
13	Back cover	Aluminum alloy

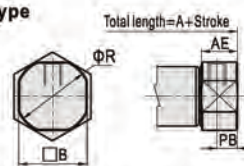
### Dimensions

#### MI

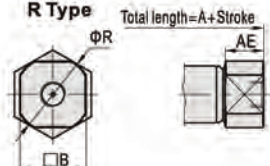
##### CA Type



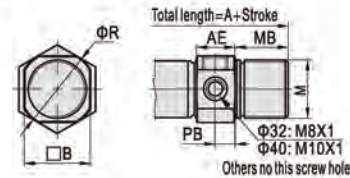
##### U Type



##### R Type



##### CM Type

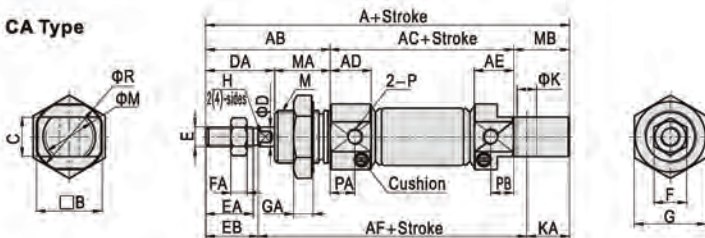


Bore size\Item	A				AB	AC	AD	AE		AF	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB		R
	CA	U	R	CM				CA	U/R/CM																					CA	U/CM	
8	86	74	-	-	28	46	11.5	9.5	9.5	64	15	8	4	16	M4×0.7	10.5	12	7	2.2	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17
10	86	74	-	-	28	46	11.5	9.5	9.5	64	15	8	4	16	M4×0.7	10.5	12	7	2.2	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17
12	105	88	-	-	38	50	12.5	10.5	10.5	75	18	12	6	21	M6×1.0	14	16	10	5	22	6	5(2-Sides)	6	14	M16×1.5	17	17	M5×0.8	8	6	6	20
16	111	94	94	111	38	56	12.5	10.5	10.5	82	20	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	13	M16×1.5	17	17	M5×0.8	8	6	6	22
20	126	106	106	126	44	62	14.5	14.5	14.5	95	25	16	8	24	M8×1.25	18	20	12	6	29	7	6(2-Sides)	8	11	M22×1.5	20	20	1/8"	7.5	7.5	7.5	29
25	137	114.5	115	137	50	65	16	16	16	104	30	16	10	28	M10×1.25	20.5	22	17	6	29	7	8(4-Sides)	8	11	M22×1.5	22	22	1/8"	8	8	8	33.5
32	-	125	126	140	58	-	16.5	-	16.5	-	34.5	-	12	28	M10×1.25	17.5	20	17	6	36	7	10(4-Sides)	-	-	M30×1.5	30	14	1/8"	9	-	9	37.5
40	-	158	158	174	69	-	22	-	22	-	42.5	-	16	34	M12×1.25	21	24	17	7	46	8	14(4-Sides)	-	-	M38×1.5	35	16	1/4"	12	-	12	46.5

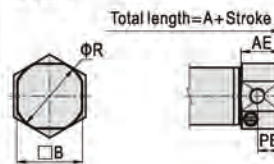
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### MIC Φ16~Φ25

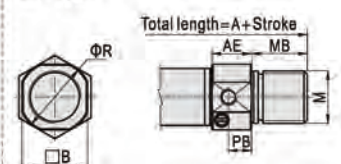
##### CA Type



##### U Type



##### CM Type



Bore size\Item	A			AB	AC	AD	AE		AF	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB	R
	CA/CM	U	U				CA/CM	U																						
16	111	94	38	56	12.5	12	12	82	20	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	13	M16×1.5	17	17	M5×0.8	7.5	7	22	
20	126	106	44	62	14.5	14.5	14.5	95	25	16	8	24	M8×1.25	18	20	12	6	29	7	6(2-Sides)	8	11	M22×1.5	20	20	1/8"	7.5	7.5	29	
25	137	113.5	50	65	16	16	14.5	104	30	16	10	28	M10×1.25	20.5	22	17	6	29	7	8(4-Sides)	8	11	M22×1.5	22	22	1/8"	8	8	33.5	

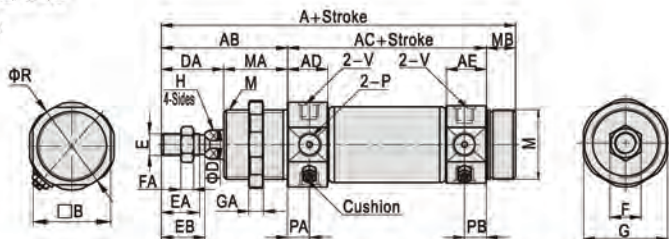
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Stainless steel, ISO6432)

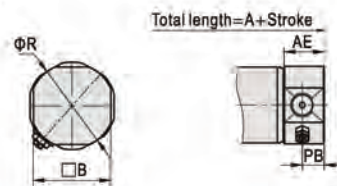
## MI Series

MIC  $\phi 32/\phi 40$

CM Type



U Type

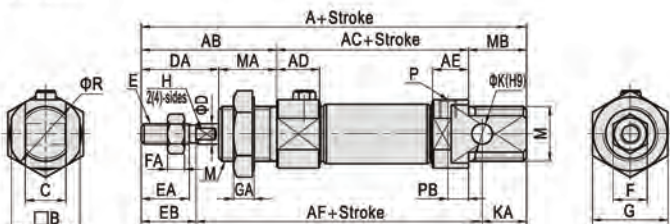


Bore size\Item	A		AB	AC	AD	AE		B	D	DA	E	EA	EB	F	FA	G	GA	H	M	MA	MB	P	PA	PB			R	V
	U	CM				U	CM																	U	CM	U		
32	124	140	58	68	16.5	14.5	16.5	34.5	12	28	M10×1.25	17.5	20	17	6	36	7	10(4-Sides)	M30×1.5	30	14	1/8"	9	7.5	9	37.5	M8X1	
40	157.5	174	69	89	22	21.5	22	42.5	16	32	M12×1.25	21	24	17	7	46	8	24(4-Sides)	M38×1.5	35	16	1/4"	12	11.5	12	46.5	M10X1	

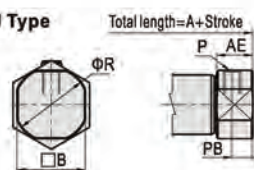
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

## MSI

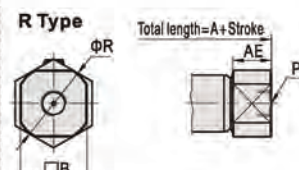
CA Type



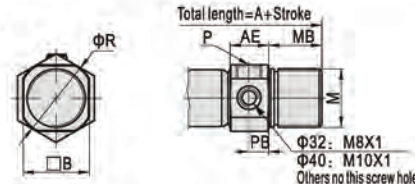
U Type



R Type

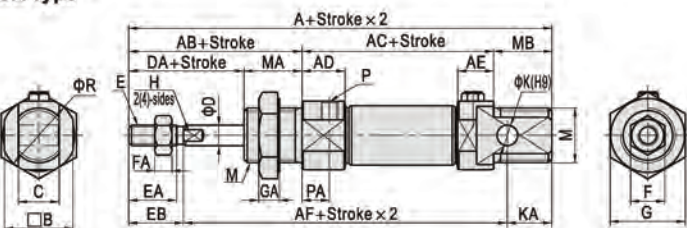


CM Type

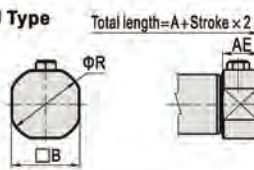


## MTI

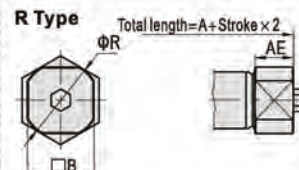
CA Type



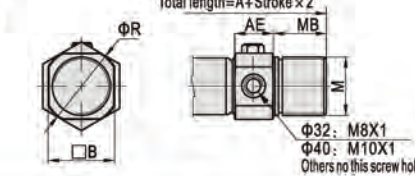
U Type



R Type



CM Type



Item	A												AB	AC			AD	AF		
	CA			U			R			CM				-	-	-		-	-	
Bore size\Stroke	0-50	51-100	101-150	0-50	51-100	101-150	0-50	51-100	101-150	0-50	51-100	101-150	-	0-50	51-100	101-150	-	0-50	51-100	101-150
8	111	-	-	99	-	-	-	-	-	-	-	-	28	71	-	-	11.5	89	-	-
10	111	-	-	99	-	-	-	-	-	-	-	-	28	71	-	-	11.5	89	-	-
12	130	-	-	113	-	-	-	-	-	-	-	-	38	75	-	-	12.5	100	-	-
16	136	161	-	119	144	-	119	144	-	136	161	-	38	81	106	-	12.5	107	132	-
20	151	176	201	131	156	181	131	156	181	151	176	201	44	87	112	137	14.5	120	145	170
25	162	187	212	139.5	164.5	189.5	140	165	190	162	187	212	50	90	115	140	16	129	154	179
32	-	-	-	150	175	200	151	176	201	165	190	215	58	-	-	-	16.5	-	-	-
40	-	-	-	183	208	233	183	208	233	199	224	249	69	-	-	-	22	-	-	-

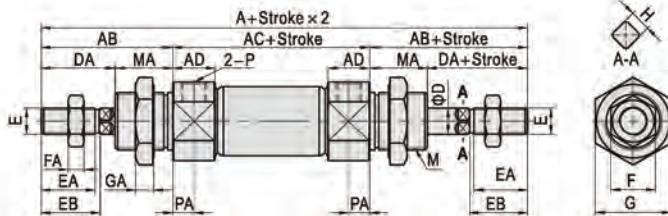
Bore size\Item	AE		B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA	PB			R
	CA	U/R/CM																				CA	U/CM	R	
8	9.5	9.5	15	8	4	16	M4×0.7	10.5	12	7	2.2	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17	
10	9.5	9.5	15	8	4	16	M4×0.7	10.5	12	7	2.2	17	6	-	4	10	M12×1.25	12	12	M5×0.8	7	5	5	17	
12	10.5	10.5	18	12	6	21	M6×1.0	14	16	10	5	22	6	5(2-Sides)	6	14	M16×1.5	17	17	M5×0.8	8	6	6	20	
16	10.5	10.5	20	12	6	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	6	13	M16×1.5	17	17	M5×0.8	8	6	6	20	
20	14.5	14.5	25	16	8	24	M8×1.25	18	20	12	6	29	7	6(2-Sides)	8	11	M22×1.5	20	20	1/8"	7.5	7.5	7.5	29	
25	16	16	30	16	10	28	M10×1.25	20.5	22	17	6	29	7	8(4-Sides)	8	11	M22×1.5	22	22	1/8"	8	8	8	33.5	
32	-	16.5	34.5	-	12	28	M10×1.25	17.5	20	17	6	36	7	10(4-Sides)	-	-	M30×1.5	30	14	1/8"	9	-	9	37.5	
40	-	22	42.5	-	16	34	M12×1.25	21	24	17	7	46	8	14(4-Sides)	-	-	M38×1.5	35	16	1/4"	12	-	12	46.5	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

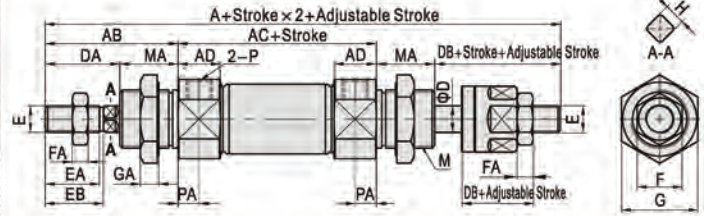
# Mini cylinder(Stainless steel, ISO6432)

## MI Series

### MID



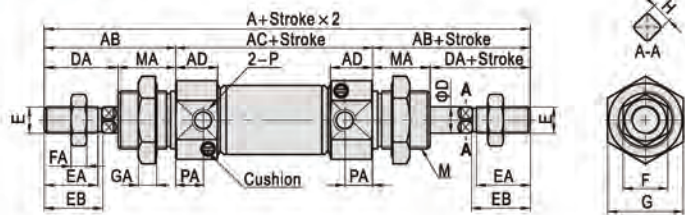
### MIJ



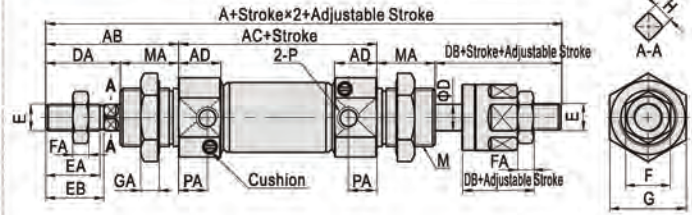
Bore size\Item	A(MID)	A(MIJ)	AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA
8	104	103	28	48	11.5	4	16	15	M4×0.7	10.5	12	7	2.2	17	6	-	M12×1.25	12	M5×0.8	7
10	104	103	28	48	11.5	4	16	15	M4×0.7	10.5	12	7	2.2	17	6	-	M12×1.25	12	M5×0.8	7
12	128	128	38	52	12.5	6	21	21	M6×1.0	14	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	8
16	134	134	38	58	12.5	6	21	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	8
20	150	151	44	62	14.5	8	24	25	M8×1.25	18	20	12	6	29	7	6(2-Sides)	M22×1.5	20	1/8"	7.5
25	165	164	50	65	16	10	28	27	M10×1.25	20	22	17	6	29	7	8(4-Sides)	M22×1.5	22	1/8"	8
32	184	183	58	68	16.5	12	28	27	M10×1.25	17.5	20	17	6	36	7	10(4-Sides)	M30×1.5	30	1/8"	9
40	227	222	69	89	22	16	34	29	M12×1.25	21	24	17	7	46	8	14(4-Sides)	M38×1.5	35	1/4"	12

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### MICD Φ16~Φ40



### MICJ Φ16~Φ40



Bore size\Item	A(MICD)	A(MICJ)	AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA
16	132.5	132.5	38	56.5	12.5	6	21	21	M6×1.0	14.5	16	10	5	22	6	5(2-Sides)	M16×1.5	17	M5×0.8	7.5
20	150	151	44	62	14.5	8	24	25	M8×1.25	18	20	12	6	29	7	6(2-Sides)	M22×1.5	20	1/8"	7.5
25	165	164	50	65	16	10	28	27	M10×1.25	20.5	22	17	6	29	7	8(4-Sides)	M22×1.5	22	1/8"	8
32	184	183	58	68	16.5	12	28	27	M10×1.25	17.5	20	17	6	36	7	10(4-Sides)	M30×1.5	30	1/8"	9
40	227	221	69	89	22	16	34	28	M12×1.25	21	24	17	7	46	8	14(4-Sides)	M38×1.5	35	1/4"	12

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

## List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle				Sensor switch	
	LB	FA	SDB	TC	I	Y	F	U	CMSG	DMSG(S)
8	F-MI10LB	F-MI8FA	F-MI8SDB	F-MI10TC	F-M4X070I	F-M4X070Y	F-M4X070F	F-M4X070U	CMSG	DMSG(S)
10										
12	F-MI12LB	F-MA12FA	F-MI12SDB	F-MI12TC	F-M6X100I	F-M6X100Y	F-M6X100F	F-M6X100U		
16										
20	F-MI20LB	F-MA20FA	F-MI20SDB	F-MI20TC	F-M8X125I	F-M8X125Y	F-M8X125F	F-M8X125U		
25										
32	F-MI32LB	-	F-MI32SDB	F-MI32TC	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U		
40	F-MI40LB	-	F-MI40SDB	F-MI40TC	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U		

## Accessory selection

Accessories Cylinder model	Mounting accessories	Knuckle [Note 1]				Sensor switch					
		LB	FA	SDB	TC	I	Y	U	F	CMSG	DMSG(S)
MI Standard	●	●	●	●	●	●	●	●	●	×	×
MIC With magnet	●	●	●	●	●	●	●	●	●	●	●
MSI Standard	●	●	●	●	●	●	●	●	●	×	×
MTI With magnet	●	●	●	●	●	●	●	●	●	●	●
MID Standard	●	●	×	●	●	●	●	●	●	×	×
MICD With magnet	●	●	×	●	●	●	●	●	●	●	●
MIJ Standard	●	●	×	●	●	●	●	●	●	×	×
MICJ With magnet	●	●	×	●	●	●	●	●	●	●	●

## Material of accessories

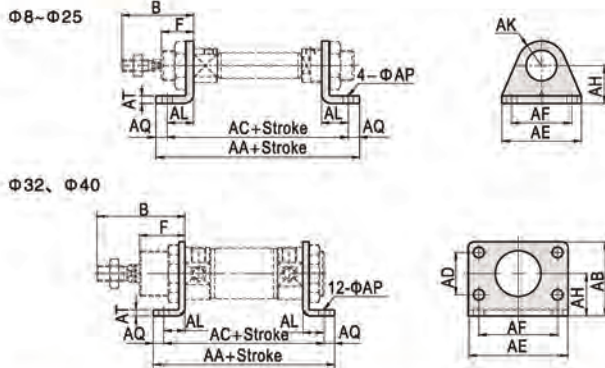
Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	SDB	TC	I	Y	F	U
8-40	△	△	△	▲	□	□	□	□

▲—SUS304; △—SPCC; □—Carbon steel;

[Note 1] Please refer to P349-352 for knuckle detail.

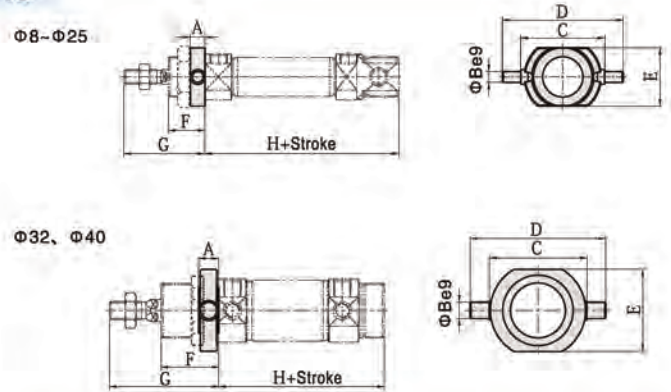
### Dimensions

#### LB



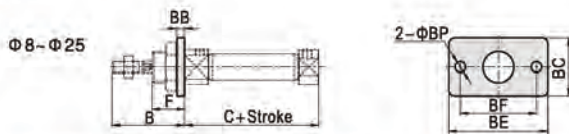
Bore size\Item	AA	AB	AC	AD	AE	AF	AH	AK	AL	AP	AQ	AT	B	F
8	78	-	68	-	35	25	16	10	11	4.5	5	2	28	12
10	78	-	68	-	35	25	16	10	11	4.5	5	2	28	12
12	90	-	78	-	42	32	20	13	14	5.5	6	2.5	38	17
16	96	-	84	-	42	32	20	13	14	5.5	6	2.5	38	17
20	112	-	96	-	54	40	25	20	17	7	8	3	44	20
25	115	-	99	-	54	40	25	20	17	7	8	3	50	22
32	110	49	96	28	66	52	28	-	14	7	7	3.5	58	30
40	149	58	129	30	80	60	33	-	20	9	10	3.5	69	35

#### TC



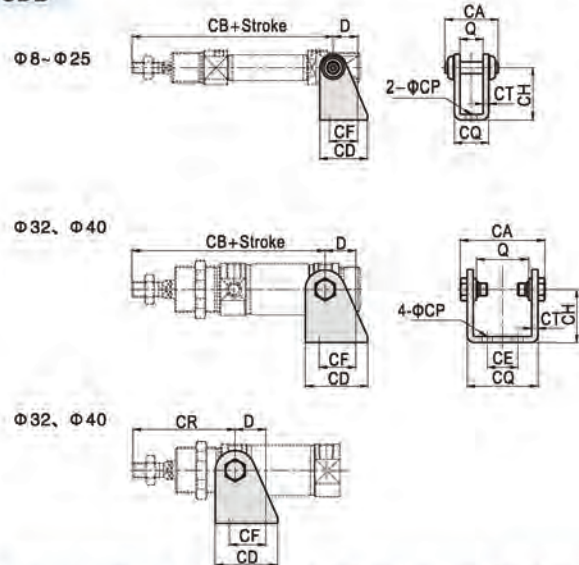
Bore size\Item	A	B	C	D	E	F	G	H
8	6	4	26	38	20	12	28	58
10	6	4	26	38	20	12	28	58
12	8	6	38	58	25	17	38	67
16	8	6	38	58	25	17	38	73
20	8	6	46	66	32	20	44	82
25	8	6	46	66	32	22	50	87
32	11	9	54	74	45	30	58	82
40	12	10	64	84	55	35	69	101

#### FA



Bore size\Item	B	C	BB	BC	BE	BF	BP	F
8	28	46	2	22	40	30	4.5	12
10	28	46	2	22	40	30	4.5	12
12	38	50	3	26	52	40	5.5	17
16	38	56	3	26	52	40	5.5	17
20	44	62	3.5	38	64	50	7	20
25	50	65	3.5	38	64	50	7	22

#### SDB



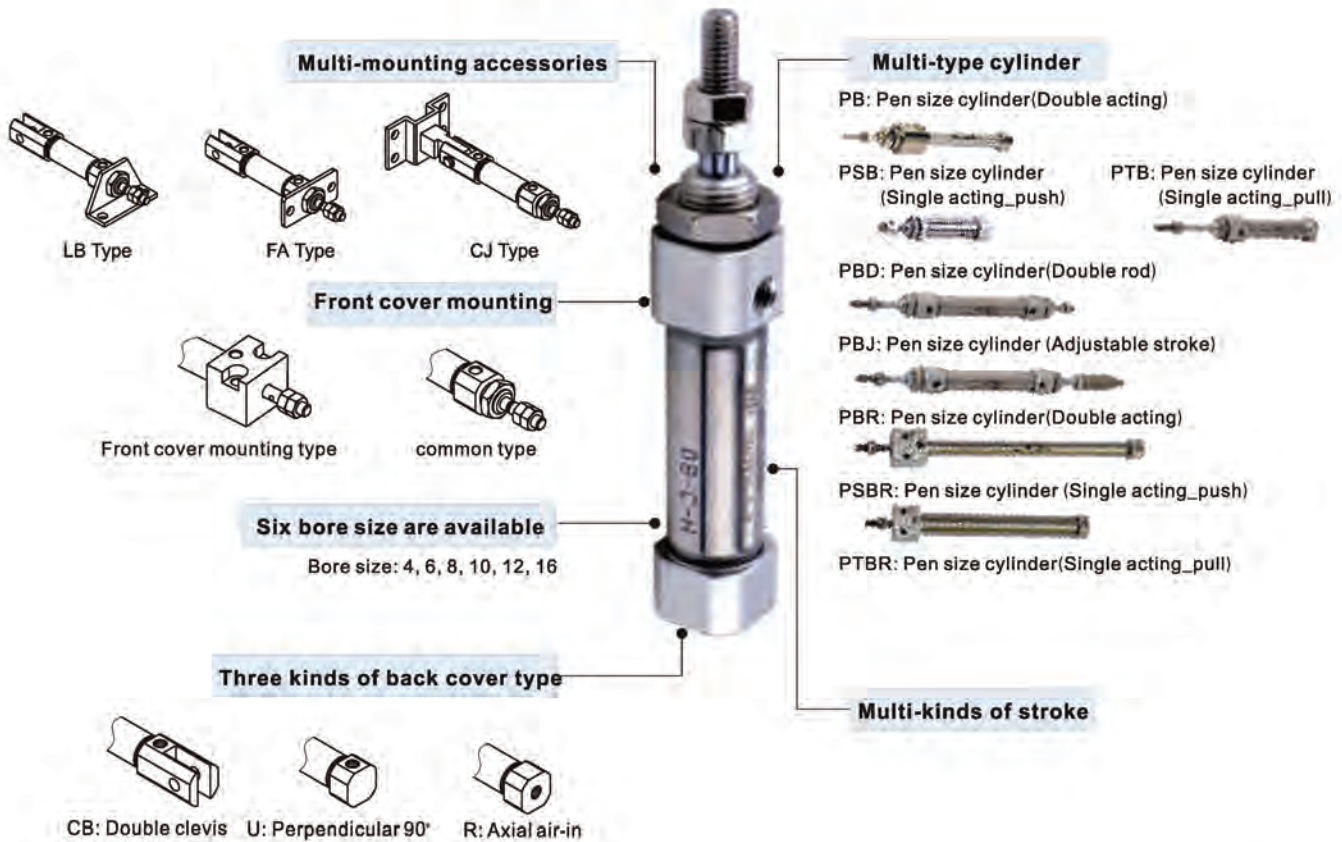
Bore size\Item	D	Q	CA	CB	CD	CE	CF	CH	CP	CQ	CT	CR
8	11	8.1	18.4	76	20	-	12.5	24	4.5	13.1	2	-
10	11	8.1	18.4	76	20	-	12.5	24	4.5	13.1	2	-
12	13	12.1	28	91	25	-	15	27	5.5	18.1	2	-
16	13	12.1	28	98	25	-	15	27	5.5	18.1	2	-
20	16	16.1	38	115	32	-	20	30	7	24.1	2.5	-
25	16	16.1	38	126	32	-	20	30	7	24.1	2.5	-
32	20	34.6	55.5	117	41	20	24	35	7	46.6	3	67
40	27	42.6	69.6	146	52	28	30	40	9	58.6	3	81

[Note] SDB is attached with relevant PIN.



# Pen size cylinder—PB Series

## Compendium of PB Series



### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
4	2	Single acting_Push side	12.6	-	0.3	1.6	2.8	4.1	5.3	6.6
		Double acting_Pull side	9.4	0.9	1.9	2.8	3.8	4.7	5.6	6.6
6	3	Single acting_Push side	28.3	-	2.2	5.0	7.8	10.6	13.5	16.3
		Double acting_Pull side	21.2	-	0.7	2.9	5.0	7.1	9.2	11.3
8	4	Single acting_Push side	50.3	-	3.6	8.6	13.6	18.7	23.7	28.7
		Double acting_Pull side	37.7	-	1.0	4.8	8.6	12.4	16.1	19.9
10	4	Single acting_Push side	78.5	-	6.2	14.1	21.9	29.8	37.6	45.5
		Double acting_Pull side	65.9	-	3.7	10.3	16.9	23.5	30.1	36.7
12	5	Single acting_Push side	113.0	-	9.0	20.3	31.6	42.9	54.2	65.5
		Double acting_Pull side	93.4	-	5.1	14.4	23.8	33.1	42.4	51.8
16	5	Single acting_Push side	201.0	-	14.5	34.6	54.7	74.8	94.9	115.0
		Double acting_Pull side	181.3	-	10.6	28.7	46.8	65.0	83.1	101.2

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The load of the cylinder with the diameter of Φ4 needs to be coaxial with the cylinder to avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
- If the cylinder is dismantled and stored for a long time, Please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

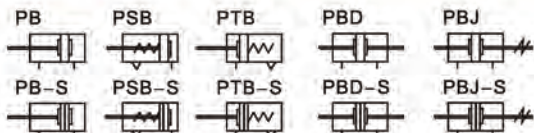


# Pen size cylinder

## PB Series



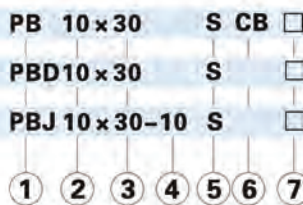
### Symbol



### Product feature

1. JIS standard is implemented.
2. It belongs to mini cylinder that has compact structure, small volume and light weight.
3. The guide precision of piston rod is high and no additional lubricant is needed.
4. PB4 and PB6 can only be front mounted. PB10, PB12 and PB16 has the flexibility of both front and rear mount.
5. Piston rod stainless steel barrel make the cylinder adapt general corrosive working environment.
6. There are cylinders and accessories with several specifications for installation for your choice.
7. It has small cylinder diameter and quick reaction, suitable for the working environment with higher frequency.

### Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover			⑦ Mounting type [Note 1]					
PB: Pen size cylinder (Double acting) PSB: Pen size cylinder (Single acting_push)	4	Refer to stroke table for details	No this code	Blank: Without magnet	Model	Back cover	Bore size	Model	Mounting type				
	6					CB: Double clevis				φ10~φ16			
	10				U: Perpendicular 90°	φ10~φ16							
	12				R: Axial air-in	φ6~φ16							
PTB: Pen size cylinder (Single acting_pull) PBD: Pen size cylinder (Double rod)	6			Refer to stroke table for details	No this code	Blank: Without magnet S: With magne	Model	Back cover	Bore size	Model	Mounting type		
	10							CB: Double clevis				φ10~φ16	
	12						R: Axial air-in	φ6~φ16					
	16												
PBJ: Pen size cylinder (Adjustable stroke)	10					Refer to stroke table for details	10 20 30 40 50 75 100	Blank: Without magnet S: With magne	Model	No this code	-	Model	Mounting type
	12												
	16												

[Note 1] Please refer to page 75 for accessory parts.

### Specification

Bore size (mm)	4		6	10	12	16
Acting type	Double acting		Single acting_Push		Double acting、Single acting	
Fluid	Air (to be filtered by 40 μ m filter element)					
Operating pressure	Double acting	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			0.15~0.7MPa(22~100psi)(1.5~7.0bar)	
	Single acting	0.3~0.7MPa(36~100psi)(3.0~7.0bar)			0.2~0.7MPa(28~100psi)(2.0~7.0bar)	
Proof pressure	1.2MPa(175psi)(12bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500			50~800		
Stroke tolerance	+0.5 0			0~150 <sup>+1.0</sup> <sub>0</sub> >150 <sup>+1.5</sup> <sub>0</sub>		
Cushion type	No cushion					
Port size	Tube			M5 × 0.8		

Add) Refer to P353 for detail of sensor switch.

### Stroke

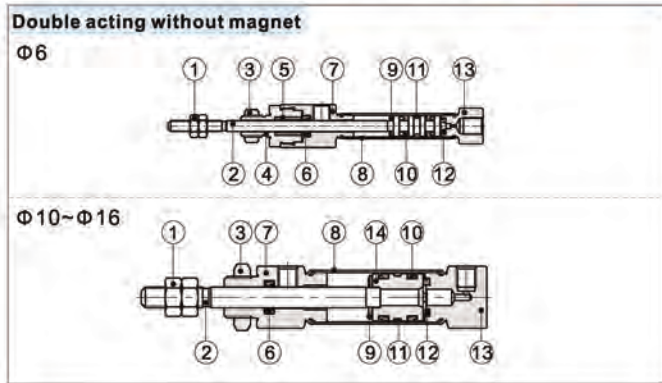
Bore size (mm)	Standard stroke (mm)										Max.std stroke	Max. stroke	
PB	4	5 10 15 20										20	20
	6	10 15 20 25 30 40 50 60										60	60
	10	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200										200	200
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200										200	300
	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300										300	300
PBD	6	5 10 15 20 25 30 40 50										50	-
	10	10 15 20 25 30 40 50 60 75 80 100										100	-
PBD PBJ	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200										200	-
	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200										200	-
PSB	4	5 10 15 20										-	-
	6	5 10 15 20 25 30 40 50 60										-	-
PSB PTB	10	5 10 15 20 25 30 40 50 60										-	-
	12	5 10 15 20 25 30 40 50 60										-	-
	16	5 10 15 20 25 30 40 50 60										-	-

[Note] Consult us for non-standard stroke.

# Pen size cylinder

## PB Series

### Inner structure and material of major parts

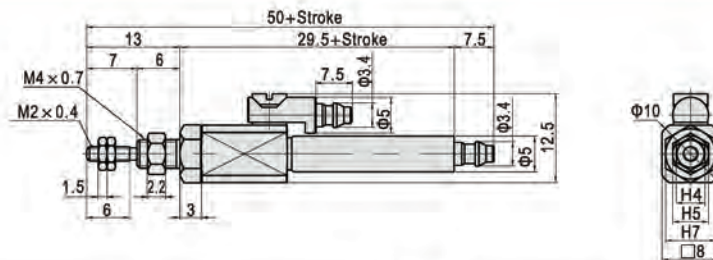


NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	SUS304
3	Front cover nut	Carbon steel
4	Packing retainer	Brass( $\Phi 4$ )\Aluminum alloy(Others)
5	Bushing	Wear resistant material
6	Front cover O-ring	NBR
7	Front cover	Brass( $\Phi 4$ )\Aluminum alloy(Others)
8	Barrel	Bronze( $\Phi 4$ )\SUS304(Others)
9	Bumper	TPU
10	Piston seal	NBR
11	Wear ring	Wear resistant material
12	Bumper	TPU
13	Back cover	Brass( $\Phi 4$ )\Aluminum alloy(Others)

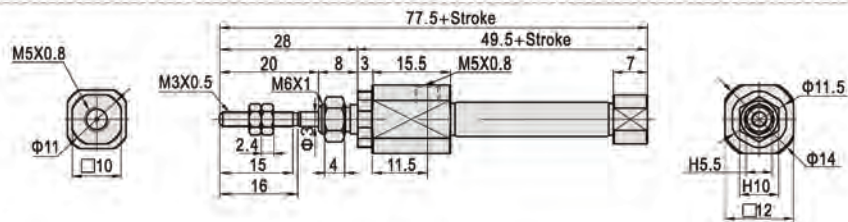
### Dimensions

#### PB

$\Phi 4$ (Without magnet)(R Type)



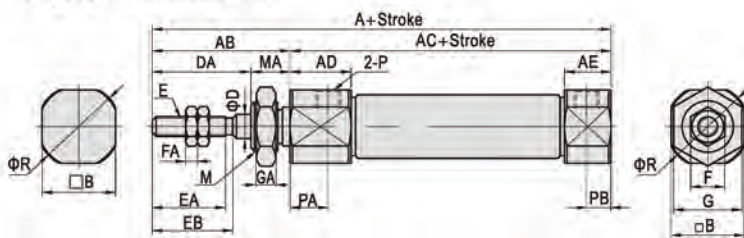
$\Phi 6$ (R Type)



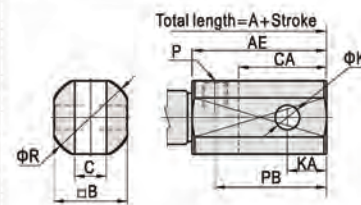
Note) Only axial air intake type of back cover is available for  $\Phi 4$ ,  $\Phi 6$ mm bore size.

$\Phi 10 \sim \Phi 16$

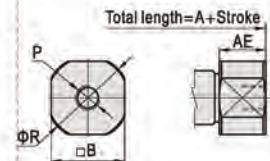
U Type(Perpendicular  $90^\circ$ )



CB Type(Double clevis)



R Type(Axial air-in)



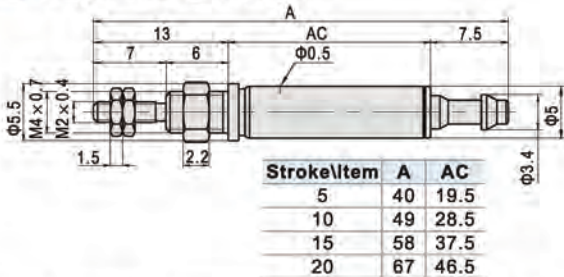
Bore size\Item	A		AB	AC	AD	AE		B	C	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PA	PB			
	U	CB				R	U/R																			CB	U	CB	R
10	74	87	74	28	46	11.5	9.5	22.5	12	3.3	13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	7.5	5	18	14
12	74	92	74	28	46	11.5	9.5	27.5	15	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	5	23	17
16	76	94	76	28	48	12	9.5	27.5	18	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	5	23	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

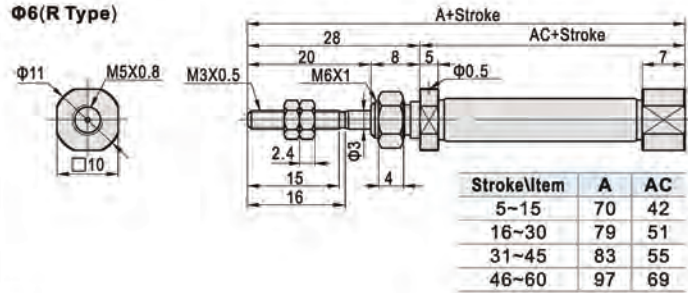
# Pen size cylinder

## PB Series

### PSB $\Phi 4$ (Without magnet)(R Type)



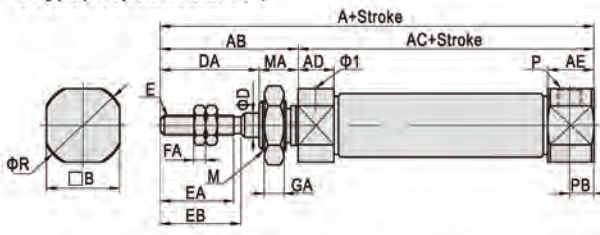
### $\Phi 6$ (R Type)



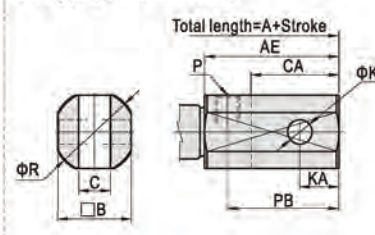
Note) Only axial air intake type of back cover is available for  $\Phi 4$ ,  $\Phi 6$ mm bore size.

### $\Phi 10$ ~ $\Phi 16$

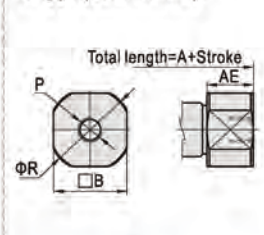
#### U Type(Perpendicular $90^\circ$ )



#### CB Type(Double clevis)



#### R Type(Axial air-in)

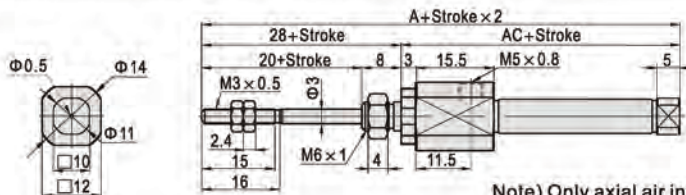


Bore size\Item	A												AB	AC				AD	AE	B	C	
	U				CB				R					5~15	16~30	31~45	46~60					
Stroke	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	28	45.5	53	65	77	5	9.5	22.5	12	3.3
10	73.5	81	93	105	86.5	94	106	118	73.5	81	93	105	28	45.5	53	65	77	5	9.5	22.5	12	3.3
12	73.5	81	93	105	91.5	99	111	123	73.5	81	93	105	28	45.5	53	65	77	5	9.5	27.5	15	6.6
16	74.5	83	95	107	92.5	101	113	125	74.5	83	95	107	28	46.5	55	67	79	5	9.5	27.5	18	6.6

Bore size\Item	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PB		
																U	CB	R
10	13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	5	18	14
12	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	5	23	17
16	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	5	23	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### PTB $\Phi 6$ (R Type)

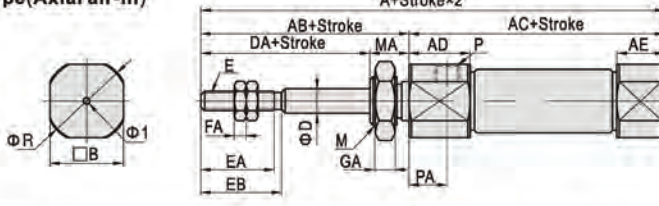


Stroke\Item	A	AC
5~15	82	54
16~30	91	63
31~45	95	67
46~60	109	81

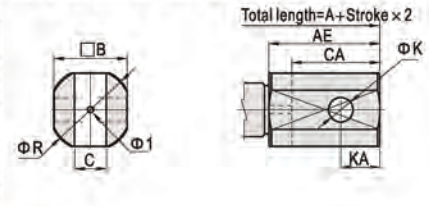
Note) Only axial air intake type of back cover is available for  $\Phi 6$ mm bore size.

### $\Phi 10$ ~ $\Phi 16$

#### R Type(Axial air-in)



#### CB Type(Double clevis)



Bore size\Item	A												AB	AC				AD	
	R				CB				R										
Stroke	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	5~15	16~30	31~45	46~60	28	48.5	56	68	80	11.5	
10	76.5	84	96	108	89.5	97	109	121	28	48.5	56	68	80	28	48.5	56	68	80	11.5
12	76.5	84	96	108	94.5	102	114	126	28	48.5	56	68	80	28	48.5	56	68	80	11.5
16	77.5	86	98	110	95.5	104	116	128	28	49.5	58	70	82	28	49.5	58	70	82	12

Bore size\Item	AE	B	C	CA	D	DA	E	EA	EB	F	FA	G	GA	K	KA	M	MA	P	PA	R	
																					R
10	5	18	12	3.3	13	4	20	M4×0.7	15	16.5	7	3	11	4	3.3	5	M8×1.0	8	M5×0.8	7.5	14
12	5	23	15	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	17
16	5	23	18	6.6	18	5	20	M5×0.8	15	16.5	8	4	14	4	5	8	M10×1.0	8	M5×0.8	7.5	20

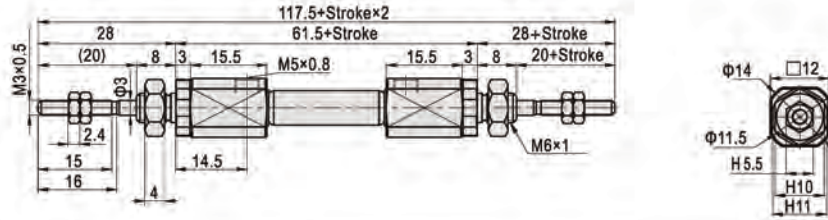
Note) $\Phi 10$ ~ $\Phi 16$  bore sized don't have perpendicular( $90^\circ$ ) air-in.

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

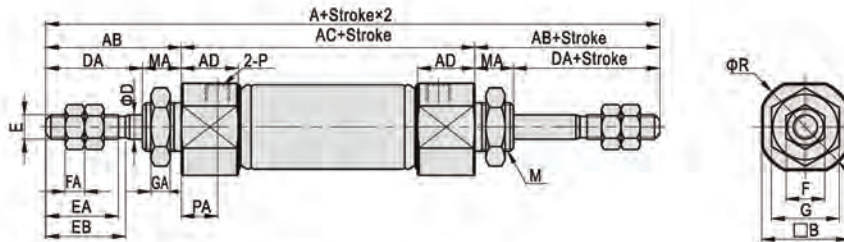
# Pen size cylinder

## PB Series

PBD  
Φ6

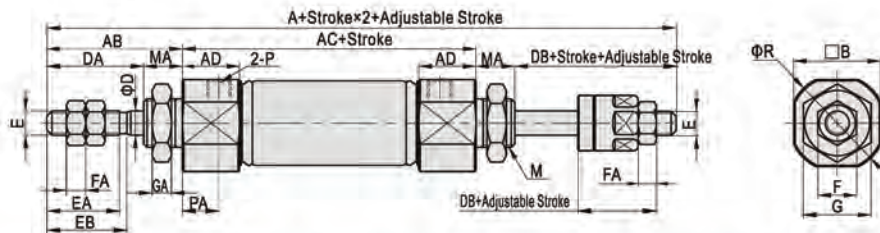


Φ10-Φ16



PBJ

Φ10-Φ16



Bore size/Item Model	A		AB	AC	AD	B	D	DA	DB	E	EA	EB	F	FA	G	GA	M	MA	P	PA
	PBD	PBJ																		
10	104	99	28	48	11.5	12	4	20	15	M4×0.7	15	16.5	7	3	11	4	M8×1.0	8	M5×0.8	7.5
12	104	101	28	48	11.5	15	5	20	17	M5×0.8	15	16.5	8	4	14	4	M10×1.0	8	M5×0.8	7.5
16	107	104	28	51	12	18	5	20	17	M5×0.8	15	16.5	8	4	14	4	M10×1.0	8	M5×0.8	7.5

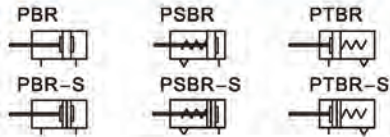
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Pen size cylinder

## PBR Series



### Symbol



### Product feature

1. JIS standard is implemented.
2. It belongs to mini cylinder that has compact structure, small volume and light weight.
3. The guide precision of piston rod is high and no additional lubricant is needed.
4. Screw holes are designed for mounting directly at the front cover without any accessories.
5. Piston rod stainless steel barrel make the cylinder adapt general corrosive working environment.
6. It has small cylinder diameter and quick reaction, suitable for the working environment with higher frequency.

### Specification

Bore size(mm)	6	8	10	12	16
Acting type	Double acting, Single acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	Double acting	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
	Single acting	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			
Proof pressure	1.2MPa(175psi)(12bar)				
Temperature °C	-20~70				
Speed range mm/s	50~800				
Stroke tolerance	0~150 <sup>+1.0</sup> <sub>0</sub> >150 <sup>+1.5</sup> <sub>0</sub>				
Cushion type	Bumper				
Port size	M5×0.8				

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke	Max. stroke	
PBR	6	10 15 20 25 30 40 50 60	60	60
	8	10 15 20 25 30 40 50 60 75 80 100 125 150	150	200
	10	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	200
	12	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200	200	300
	16	10 15 20 25 30 40 50 60 75 80 100 125 150 160 175 200 250 300	300	300
PSBR PTBR	6	5 10 15 20 25 30 40 50 60	-	-
	8	5 10 15 20 25 30 40 50 60	-	-
	10	5 10 15 20 25 30 40 50 60	-	-
	12	5 10 15 20 25 30 40 50 60 75	-	-
	16	5 10 15 20 25 30 40 50 60 75 100	-	-

[Note] Consult us for non-standard stroke.

### Ordering code

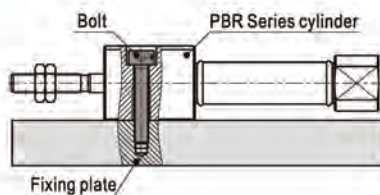
#### PBR 16×30 S U



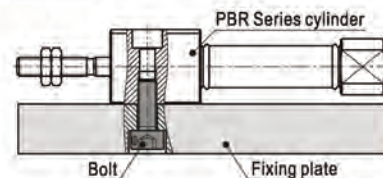
①Model	②Bore size	③Stroke	④Magnet	⑤Back cover		
PBR: Pen size cylinder(Double acting) PSBR: Pen size cylinder (Single acting_push) PTBR: Pen size cylinder(Single acting_pull)	6	Refer to stroke table for details	Blank: Without magnet S: With magne	Model	Back cover	Bore size
	8			PBR	U: Perpendicular 90°	Φ8-Φ16
	10			PSBR	R: Axial air-in	Φ6-Φ16
	12			PTBR	R: Axial air-in	Φ6-Φ16
16						

### Mounting type

#### Top bolt mounting



#### Bottom bolt mounting

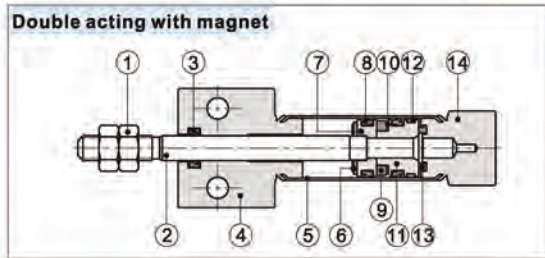


Note: Use an applicable bolt to mount upward from the bottom.

# Pen size cylinder

## PBR Series

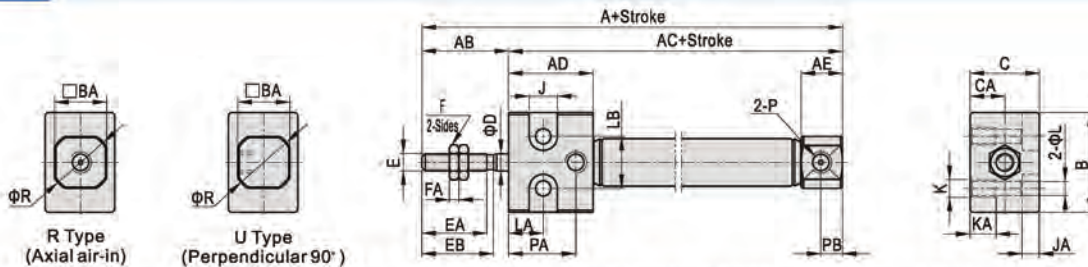
### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	8	Piston seal	NBR
2	Piston rod	SUS304	9	Magnet	Sintered metal(Neodymium-iron-boron)
3	Front cover O-ring	NBR	10	Magnet washer	NBR
4	Front cover	Aluminum alloy	11	Magnet holder	Aluminum alloy
5	Barrel	SUS316L	12	Wear ring	Wear resistant material
6	Bumper	TPU	13	Bumper	TPU
7	Piston	SUS303/Aluminum alloy	14	Back cover	Aluminum alloy

### Dimensions

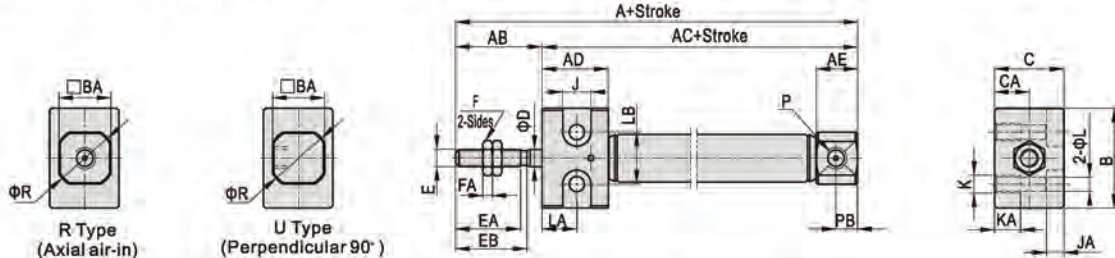
#### PBR



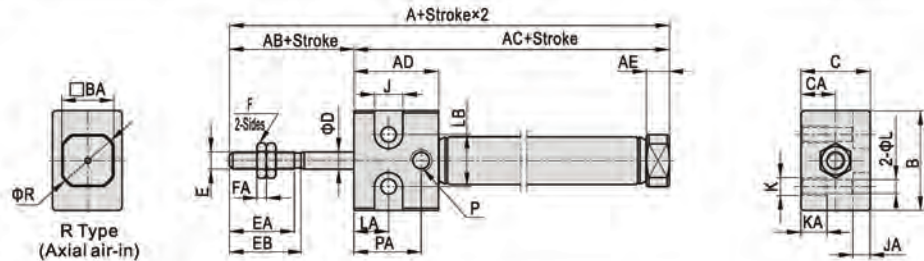
Bore size\Item	A	AB	AC	AD	AE	B	BA	C	CA	D	E	EA	EB	F	FA	J	JA	K	KA	L	LA	LB	P	PA	PB	R
6	70	20	50	19	7	17.2	10	14	7	3	M3×0.5	15	16	5.5	2.4	6.5	4	M4×0.7	7	3.3	8	10	M5×0.8	14	-	11
8	74	20	54	19.5	9.5	19.2	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15	5	14
10	74	20	54	19.5	9.5	19.2	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15.5	5	14
12	74	20	54	19.5	9.5	24.2	15	20	10	5	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	17
16	76	20	56	20	9.5	24.2	18	20	10	6	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Only axial air intake type of back cover is available for Φ6mm bore size.

#### PSBR



#### PTBR



Bore size\Item	A														AC									
	PSBR							PTBR							PSBR					PTBR				
Model	5-15	16-30	31-45	46-60	61-75	76-100	5-15	16-30	31-45	46-60	61-75	76-100	5-15	16-30	31-45	46-60	61-75	76-100	5-15	16-30	31-45	46-60	61-75	76-100
Stroke	6	70	79	83	97	-	74.5	83.5	87.5	101.5	-	-	50	59	63	77	-	-	54.5	63.5	67.5	81.5	-	-
8	76.5	82.5	93.5	101.5	-	-	78.5	84.5	95.5	103.5	-	-	56.5	62.5	73.5	81.5	-	-	58.5	64.5	75.5	83.5	-	-
10	73.5	81	93	105	-	-	76.5	84	96	108	-	-	53.5	61	73	85	-	-	56.5	64	76	88	-	-
12	73.5	81	93	105	111.5	-	76.5	84	96	108	114.5	-	53.5	61	73	85	91.5	-	56.5	64	76	88	94.5	-
16	74.5	83	95	107	113	119	77.5	86	98	110	116	122	54.5	63	75	87	93	99	57.5	66	78	90	96	102

Bore size\Item	AD		AE		B	BA	C	CA	D	E	EA	EB	F	FA	J	JA	K	KA	L	LA	LB	P	PA	PB	R	
	PSBR	PTBR	PSBR	PTBR																						
6	13	19	20	7	5	17.2	10	14	7	3	M3×0.5	15	16	5.5	2.4	6.5	4	M4×0.7	7	3.3	8	10	M5×0.8	14	-	11
8	13	19.5	20	9.5	5	19.2	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15	5	14
10	13	19.5	20	9.5	5	19.2	12	16	8	4	M4×0.7	15	16.5	7	3	6.5	4	M4×0.7	7	3.3	8	12	M5×0.8	15.5	5	14
12	13	19.5	20	9.5	5	24.2	15	20	10	5	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	17
16	13	20	20	9.5	5	24.2	18	20	10	6	M5×0.8	15	16.5	8	4	8	5	M5×0.8	8	4.3	8	16	M5×0.8	15.5	5	20

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Only axial air intake type of back cover is available for Φ6mm bore size.



# Pen size cylinder

## PB Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	CJ	I	Y	F	U	CMSG	DMSG(S)
4	-	-	-	-	-	-	-	-	-
6	F-PB6LB	F-PB6FA	-	F-PB6I	F-PB6Y	F-M3X040F	-	-	-
10	F-PB10LB	F-PB10FA	F-PB10CJ	F-PB10I	F-PB10Y	F-M4X070F	F-M4X070U	CMSG	DMSG(S)
12	F-PB12LB	F-PB12FA	F-PB12CJ	F-PB12I	F-PB12Y	F-M5X080F	F-M5X080U		
16			F-PB16CJ						

### Accessory selection

Accessories Cylinder model	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	CJ	I	Y	U [1]	F	CMSG	DMSG(S)
PB	Standard	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●
PSB	Standard	●	●	●	●	●	●	×	×
PTB	With magnet	●	●	●	●	●	●	●	●
PBD	Standard	●	●	×	●	●	●	×	×
PBJ	With magnet	●	●	×	●	●	●	●	●

### Material of accessories

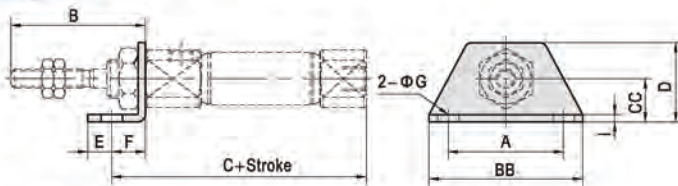
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	CJ	I	Y	F	U
4~16	△	△	△	□	□	□	□

△—SPCC; □—Carbon steel;

[Note1] Please refer to P349~352 for knuckle detail.

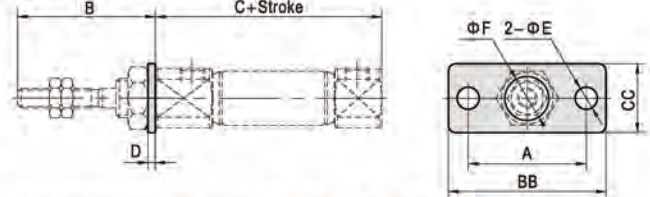
### Dimensions

#### LB



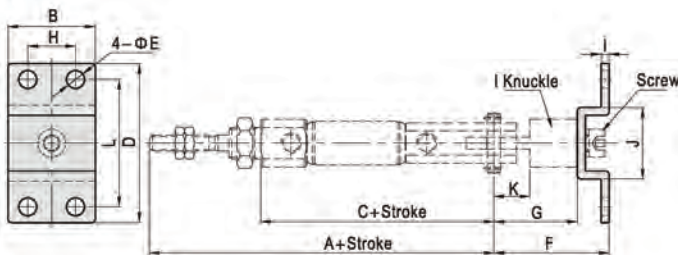
Bore size\Item	A	B	BB	C	CC	D	E	F	G	I
6	24	28	32	56.5	9	16.5	5	7	4.5	1.5
10	24	28	32	53	9	16.5	5	7	4.5	2
12	33	28	42	55	14	25	6	9	5.5	2.5
16	33	28	42	57	14	25	6	9	5.5	2.5

#### FA



Bore size\Item	A	B	BB	C	CC	D	E	F
6	24	28	32	49.5	14	1.5	4.5	6.3
10	24	28	32	46	14	2	4.5	8.3
12	33	28	42	46	20	3	5.5	10.3
16	33	28	42	48	20	3	5.5	10.3

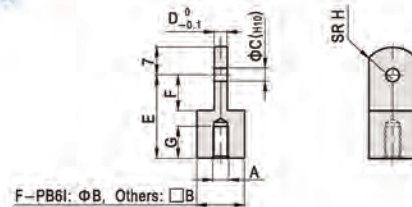
#### CJ



Bore size\Item	A	B	C	D	E	F	G	H	I	J	K	L
10	82	22	54	40	4.5	29	21	12	2	18	9.1	32
12	84	28	56	48	5.5	35	25	16	2.5	20.4	14.1	38
16	86	28	58	48	5.5	35	25	16	2.5	20.4	14.1	38

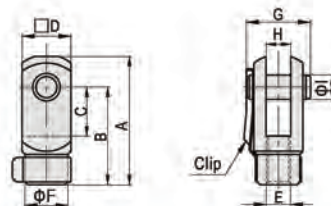
[Note] CJ type accessories includes I knuckle and PIN. It need to be matched with I knuckle and with relevant PIN.

#### I Knuckle



Bore size\Item	A	B	C	D	E	F	G	H
F-PB6I	M3×0.5	6	3	3	12	5	5	5
F-PB10I	M4×0.7	12	3.3	3	21	9.1	7.5	8
F-PB12I	M5×0.8	12	5	6.3	25	14.1	7.5	12

#### Y Knuckle



Bore size\Item	A	B	C	D	E	F	G	H	I
F-PB6Y	15.5	12	5	6	M3×0.5	6	9	3	3
F-PB10Y	28	21	10.2	12	M4×0.7	10	15.5	3.2	3.3
F-PB12Y	28	21	10.2	12	M5×0.8	10	15.5	6.5	5



# Mini cylinder(Stainless steel)—MF Series

## Compendium of MF Series

**Multi-mounting accessories**

LB Type      FA Type      SDB Type      TC Type

**Rolling packed structure**

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Four bore size are available**

Bore size: 20, 25, 32, 40

**Three kinds of back cover type**

CA: Pivot type      U: Flat-end type      CM: Round-end type

**Multi-type cylinder**

MF: Mini cylinder(Double acting)

MSF: Mini cylinder (Single acting\_push)      MTF: Mini cylinder (Single acting\_pull)

MFD: Mini cylinder(Double rod)

MFJ: Mini cylinder(Adjustable stroke)

MFC: Mini cylinder(Double acting with cushion)

MFCD: Mini cylinder(Double rod with cushion)

MFCJ: Mini cylinder(Adjustable stroke with cushion)

**Two kinds of cushion type**

Variable cushion or Bumper

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	24.3	55.7	87.1	117.5	149.9	181.3
			Pull side	263.8	-	14.3	40.6	67.0	93.4	119.8	146.1
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	45.6	94.7	143.8	192.8	241.9	290.9
			Pull side	412.1	-	29.9	71.1	112.4	153.6	194.8	236.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	82.2	162.6	242.9	323.3	403.7	484.1
			Pull side	691.2	-	59.6	128.6	197.7	266.8	335.9	405.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	158.5	284.1	409.7	535.3	660.9	786.5
			Pull side	1055.6	-	118.3	223.8	329.3	434.8	540.3	645.8
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

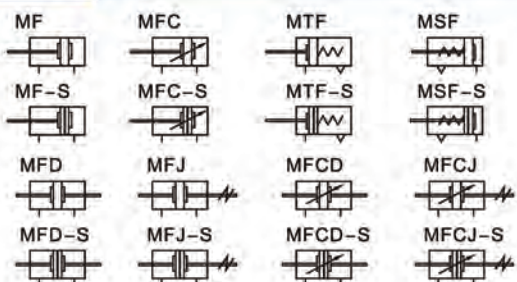


# Mini cylinder(Stainless steel)

## MF Series



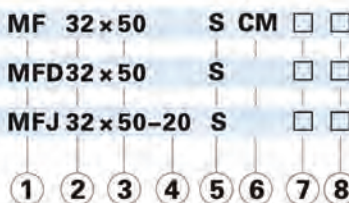
### Symbol



### Product feature

1. JIS standard is implemented.
2. Piston adopts heterogeneous two way seal structure. It has compact size and has the function of oil reservation.
3. Front cover owns fixed anti-impact pad which can reduce the impact of direction-change of the cylinder.
4. There are several modes of back cover, which makes the installation of cylinder more convenient.
5. Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
6. The cylinder body has stainless steel pipes with high precision to produce high strength and corrosion resistance.
7. With the same bore size and stroke, cylinders of MF series are shorter than ISO6432 standard cylinders.
8. There are cylinders and mounting accessories with several specifications for your choice.

### Ordering code



① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Back cover	⑦ Mounting type[Note1]	⑧ Thread type
MF: Mini cylinder(Double acting) MFC: Mini cylinder (Double acting with cushion) MSF: Mini cylinder (Single acting_push) MTF: Mini cylinder (Single acting_pull)	20 25	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	CA: Pivot type U: Flat-end type CM: Round-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type TC: TC type	Blank: PT G: G T: NPT
MFD: Mini cylinder(Double rod) MFCJ: Mini cylinder (Double rod with cushion)	32 40						
MFJ: Mini cylinder (Adjustable stroke) MFCJ: Mini cylinder (Adjustable stroke with cushion)			10 20 30 40 50 75 100				

[Note1] Please refer to page 80~81 for accessory parts.

### Specification

Bore size(mm)	20	25	32	40
Acting type	Double acting、Double acting with cushion、Single acting			
Fluid	Air(to be filtered by 40 μ m filter element)			
Operating pressure	0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
Single acting pressure	0.2~1.0MPa(28~145psi)(2.0~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	Double acting: 30~800 Single acting: 50~800			
Stroke tolerance	0~150 <sup>+1.0</sup> >150 <sup>+1.5</sup>			
Cushion type	MFC/MFCD/MFCJ Series: Variable cushion; Other series: Bumper			
Port size [Note1]	1/8"			1/4"

[Note1] PT thread, G thread thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

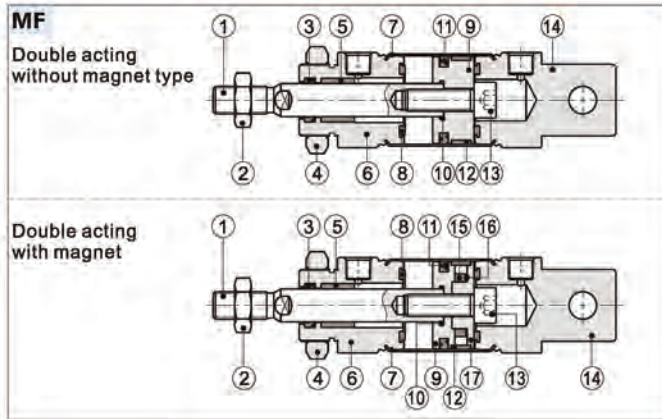
Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke							
	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175			200	250	300	350	400	450	500
MF	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MFC	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MFD	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
MFCJ	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MFCJ	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MSF	20	10	15	20	25	30	40	50	60	75	80	100	125	150										-	-
MTF	32	10	15	20	25	30	40	50	60	75	80	100	125	150										-	-
	40	10	15	20	25	30	40	50	60	75	80	100	125	150										-	-

[Note] Consult us for non-standard stroke.

# Mini cylinder(Stainless steel)

## MF Series

### Inner structure and material of major parts

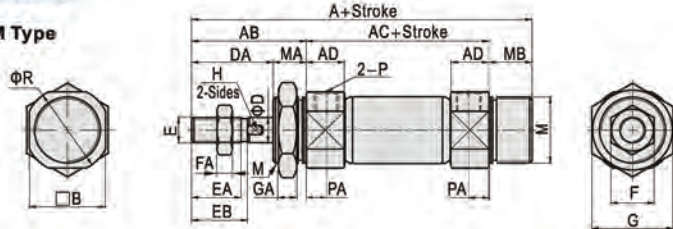


NO.	Item	Material
1	Piston rod	Carbon steel with 20 μm chrome plated
2	Rod nut	Carbon steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Bushing	Wear resistant material
6	Front cover	Aluminum alloy
7	Barrel	SUS304
8	Bumper	TPU
9	Piston	Aluminum alloy
10	O-ring	NBR
11	Piston seal	NBR
12	Wear ring	Wear resistant material
13	Screw	Carbon steel
14	Back cover	Aluminum alloy
15	Magnet	Sintered metal (Neodymium-iron-boron)
16	Magnet washer	NBR
17	Magnet holder	Aluminum alloy

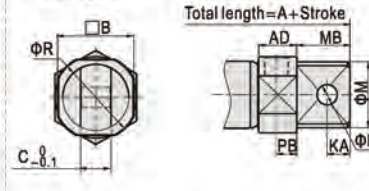
### Dimensions

#### MF/MFC

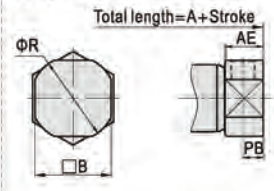
##### CM Type



##### CA Type



##### U Type

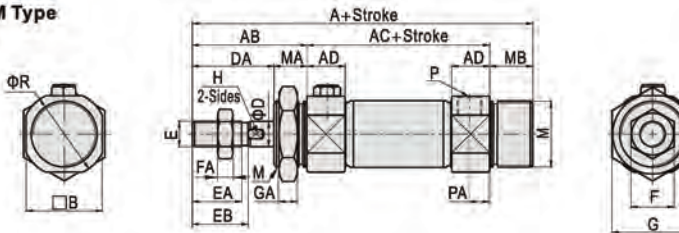


Bore size\Item	A												M				D				E				EA				EB				F				FA				G				GA				H				K				KA				P				PA				PB				R			
	CM	CA	U	AB	AC	AD	AE	B	C	CM	CA	MA	CA	CM	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	P	PA	PB	R	CM	CA	MA	CA	CM	P	PA	PB	R	CM	CA	MA	CA	CM	P	PA	PB	R																												
20	116	124	103	41	62	14.5	14.5	25	12	M20×1.5	20	14	21	13	8	27	M8×1.25	15.5	18	13	5	26	8	6	8	9	1/8"	7.5	7.5	29	20	14	21	13	8	27	15.5	18	13	5	26	8	6	8	9	1/8"	7.5	7.5	29																											
25	120	128	108	45	62	14.5	15.5	30	12	M26×1.5	26	14	21	13	10	31	M10×1.25	19.5	22	17	6	32	8	8	8	9	1/8"	7.5	8	33.5	26	14	21	13	10	31	19.5	22	17	6	32	8	8	8	9	1/8"	7.5	8	33.5																											
32	122	136	110	45	64	14.5	15.5	34.5	20	M26×1.5	26	14	27	13	12	31	M10×1.25	19.5	22	17	6	32	8	10	10	12	1/8"	7.5	8	37.5	26	14	27	13	12	31	19.5	22	17	6	32	8	10	10	12	1/8"	7.5	8	37.5																											
40	154	165	138.5	50	88	21.5	22	42.5	20	M32×2.0	32	16	27	16	16	34	M14×1.5	21	24	19	8	41	10	14	10	12	1/4"	11	11.5	46.5	32	16	27	16	16	34	21	24	19	8	41	10	14	10	12	1/4"	11	11.5	46.5																											

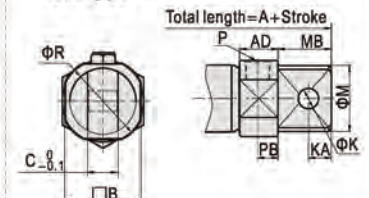
Remark:  
 1. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.  
 2. The dimensions of MFC series are the same as MF series.

#### MSF

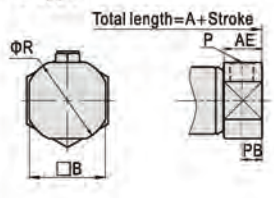
##### CM Type



##### CA Type



##### U Type



Bore size\Item	A												M				D				E				EA				EB				F				FA				G				GA				H				K				KA				P				PA				PB				R			
	CM	CA	U	AB	AD	AE	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	P	PA	PB	R	CM	CA	MA	CA	CM	P	PA	PB	R	CM	CA	MA	CA	CM	P	PA	PB	R	CM	CA	MA	CA	CM	P	PA	PB	R																									
20	141	166	191	149	174	199	128	153	178	87	112	137	20	14	21	13	8	27	15.5	18	13	5	26	8	6	8	9	1/8"	7.5	7.5	29	20	14	21	13	8	27	15.5	18	13	5	26	8	6	8	9	1/8"	7.5	7.5	29																										
25	145	170	195	153	178	203	133	158	183	87	112	137	26	14	21	13	10	31	19.5	22	17	6	32	8	8	8	9	1/8"	7.5	8	33.5	26	14	21	13	10	31	19.5	22	17	6	32	8	8	8	9	1/8"	7.5	8	33.5																										
32	147	172	197	161	186	211	135	160	185	89	114	139	26	14	27	13	12	31	19.5	22	17	6	32	8	10	10	12	1/8"	7.5	8	37.5	26	14	27	13	12	31	19.5	22	17	6	32	8	10	10	12	1/8"	7.5	8	37.5																										
40	179	204	229	190	215	240	163.5	188.5	213.5	113	138	163	32	16	27	16	16	34	21	24	19	8	41	10	14	10	12	1/4"	11	11.5	46.5	32	16	27	16	16	34	21	24	19	8	41	10	14	10	12	1/4"	11	11.5	46.5																										

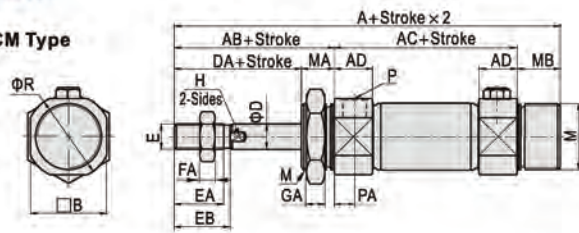
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Stainless steel)

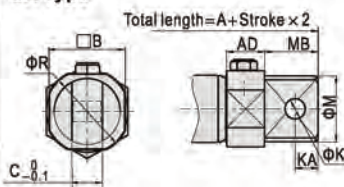
## MF Series

### MTF

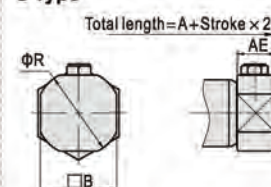
#### CM Type



#### CA Type



#### U Type



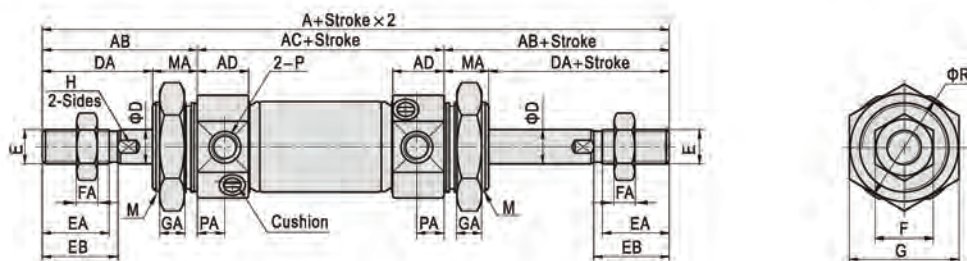
Bore size\Item	CM			A			U			AC			M		MA	MB	
	Back cover	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	
20	141	166	191	149	174	199	128	153	178	87	112	137	M20×1.5	20	14	21	13
25	145	170	195	153	178	203	133	158	183	87	112	137	M26×1.5	26	14	21	13
32	147	172	197	161	186	211	135	160	185	89	114	139	M26×1.5	26	14	27	13
40	179	204	229	190	215	240	163.5	188.5	213.5	113	138	163	M32×2.0	32	16	27	16

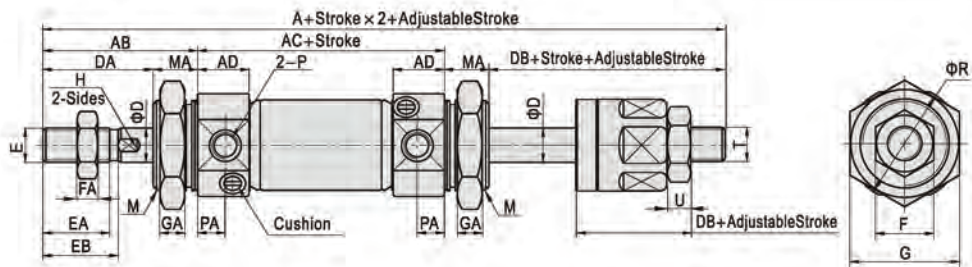
Bore size\Item	AB	AD	AE	B	C	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	P	PA	R
20	41	14.5	14.5	25	12	8	27	M8×1.25	15.5	18	13	5	26	8	6	8	9	1/8"	7.5	29
25	45	14.5	15.5	30	12	10	31	M10×1.25	19.5	22	17	6	32	8	8	8	9	1/8"	7.5	33.5
32	45	14.5	15.5	34.5	20	12	31	M10×1.25	19.5	22	17	6	32	8	10	10	12	1/8"	7.5	37.5
40	50	21.5	22	42.5	20	16	34	M14×1.5	21	24	19	8	41	10	14	10	12	1/4"	11	46.5

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### MFD/MFCD



### MFJ/MFCJ



Bore size\Item	A		AB	AC	AD	D	DA	DB	E	EA	EB	F	FA	G	GA	H	M	MA	P	PA	R	T	U
	Back cover	MFJ\MFCJ																					
20	144	141	41	62	14.5	8	27	24	M8×1.25	15.5	18	13	5	26	8	6	M20×1.5	14	1/8"	7.5	29	M8×1.25	5
25	152	148	45	62	14.5	10	31	27	M10×1.25	19.5	22	17	6	32	8	8	M26×1.5	14	1/8"	7.5	33.5	M10×1.25	6
32	154	150	45	64	14.5	12	31	27	M10×1.25	19.5	22	17	6	32	8	10	M26×1.5	14	1/8"	7.5	37.5	M10×1.25	6
40	188	182	50	88	21.5	16	34	28	M14×1.5	21	24	19	8	41	10	14	M32×2.0	16	1/4"	11	46.5	M12×1.25	7

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle				Sensor switch	
	LB	FA	TC	SDB	I	Y	F	U	CMSG	DMSG(S)
20	F-MF20LB	F-MF20FA	F-MF20TC	F-MF20SDB	F-MF20I	F-MF20Y	F-M8X125F	F-M8X125U	CMSG	DMSG(S)
25	F-MF32LB	F-MF32FA	F-MF32TC		F-MF25I	F-MF25Y	F-M10X125F	F-M10X125U		
32	F-MF40LB	F-MF40FA	F-MF40TC	F-MF32SDB	F-MF40I	F-MF40Y	F-M14X150F	F-M14X150U		
40										

### Accessory selection

Accessories Cylinder model		Mounting accessories				Knuckle				Sensor switch	
		LB	FA	SDB	TC	I	Y	U [1]	F	CMSG	DMSG(S)
MF	Standard	●	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●	●
MSF	Standard	●	●	●	●	●	●	●	●	×	×
MTF	With magnet	●	●	●	●	●	●	●	●	●	●
MFD	Standard	●	●	×	●	●	●	●	●	×	×
MFC	With magnet	●	●	×	●	●	●	●	●	●	●
MFJ	Standard	●	●	×	●	●	●	●	●	×	×
MFCJ	With magnet	●	●	×	●	●	●	●	●	●	●

### Material of accessories

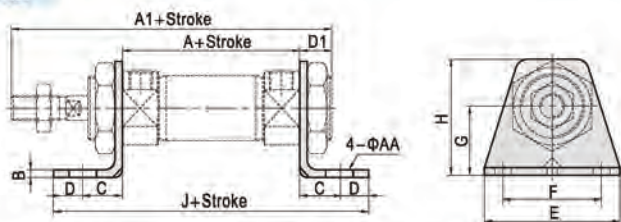
Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	SDB	TC	I	Y	F	U
20-40	△	△	△	■	□	□	□	□

■—Cast steel; △—SPCC; □—Carbon steel;

[Note 1] Please refer to P349~352 for knuckle detail.

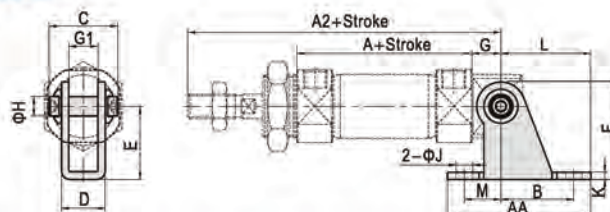
### Dimensions

#### LB



Bore size\Item	A	A1	AA	B	C	D	D1	E	F	G	H	J
20	62	116	7	3	20	8	13	55	40	25	40	118
25	62	120	7	3.5	20	8	13	55	40	28	47	118
32	64	122	7	3.5	20	8	13	55	40	28	47	120
40	88	154	7	3.5	23	10	16	75	55	30	54	154

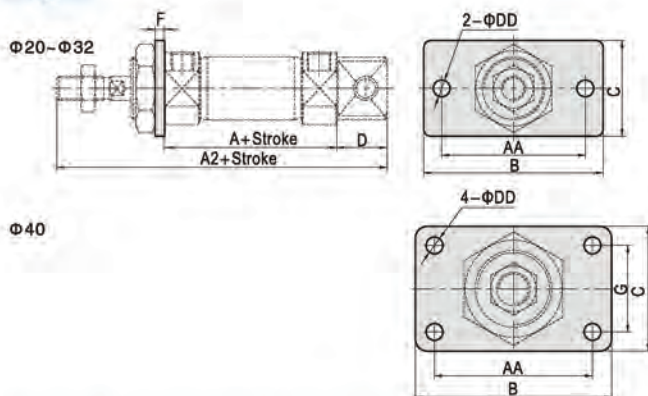
#### SDB



Bore size\Item	A	A2	AA	B	C	D	E	F	G	G1	H	K	J	L	M
20	62	115	59	30	32	18.1	30	40	12	12.1	8	2.5	6.8	37	15
25	62	119	59	30	32	18.1	30	40	12	12.1	8	2.5	6.8	37	15
32	64	124	75	40	44	28.1	40	53	15	20.1	10	3	9	50	15
40	88	153	75	40	44	28.1	40	53	15	20.1	10	3	9	50	15

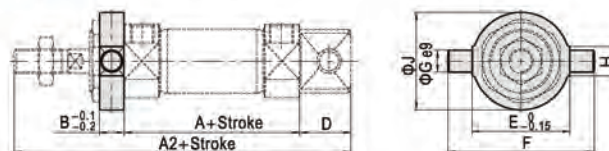
[Note] SDB is attached with relevant PIN.

#### FA



Bore size\Item	A	A2	AA	B	C	D	DD	F	G
20	62	124	60	75	34	21	7	3.5	-
25	62	128	60	75	40	21	7	4	-
32	64	136	60	75	40	27	7	4	-
40	88	165	66	82	52	27	7	4	36

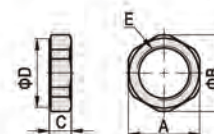
#### TC



Bore size\Item	A	A2	B	D	E	F	G	H	J
20	62	124	10	21	32	52	8	12	32
25	62	128	10	21	40	60	9	12	40
32	64	136	10	27	40	60	9	12	40
40	88	165	11	27	53	77	10	14	53

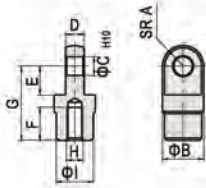
#### Special nut for TC

Bore size\Item	A	B	C	D	E
20	26	28	8	25	M20×1.5
25	32	34	8	31	M26×1.5
32	32	34	8	31	M26×1.5
40	41	45	10	40	M32×2.0

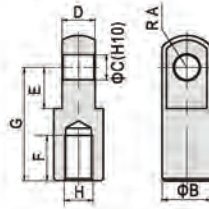


### I Knuckle

F-MF20I, F-MF25I



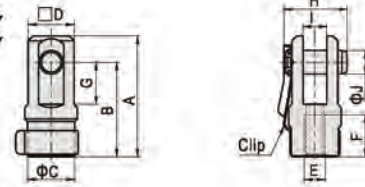
F-MF40I



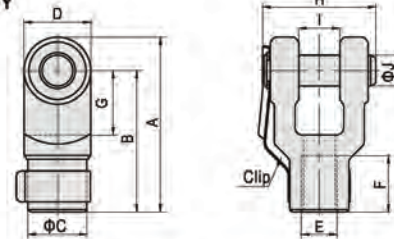
Type\Item	A	B	C	D	E	F	G	H	I
F-MF20I	9.5	20	9	9	14	16	36	M8×1.25	18
F-MF25I	9.5	20	9	9	14	18	38	M10×1.25	18
F-MF40I	15	24	12	16	20	22	55	M14×1.5	-

### Y Knuckle

F-MF20Y  
F-MF25Y



F-MF40Y



Type\Item	A	B	C	D	E	F	G	H	I	J
F-MF20Y	46	36	18	17.5	M8×1.25	16	16	24	9	9
F-MF25Y	48	38	18	17.5	M10×1.25	18	16	24	9	9
F-MF40Y	68	55	23	26	M14×1.5	22	25	44	16	12



# Mini cylinder(Stainless steel)——MG Series

## Compendium of MG Series

**Multi-mounting accessories**

LB Type      FA Type  
SDB+CB Type      CB Type

**Six bore size are available**  
Bore size: 20, 25, 32, 40, 50, 63

**Rolling packed structure**  
Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Multi-type cylinder**

- MG: Mini cylinder(Double acting)
- MSG: Mini cylinder (Single acting\_push)
- MTG: Mini cylinder(Single acting\_pull)
- MGD: Mini cylinder(Double rod)
- MGC: Mini cylinder(Double acting with cushion)
- MGCD: Mini cylinder(Double rod with cushion)

**Two kinds of cushion type**  
Variable cushion or Bumper

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	20	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
		Pull side	1648.5	164.9	329.7	494.6	659.4	824.3	989.1	1154.0	
63	20	Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
		Pull side	2801.7	280.2	560.3	840.5	1120.7	1400.9	1681.0	1961.2	

### Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40 μm or below.
6. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
7. The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
8. To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

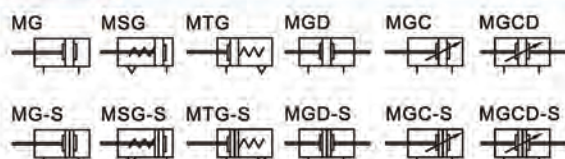


# Mini cylinder(Stainless steel)

## MG Series



### Symbol



### Product feature

1. JIS standard is implemented.
2. Piston adopts heterogeneous two way seal structure. It has compact size and has the function of oil reservation.
3. Front cover owns fixed anti-impact pad which can reduce the impact of direction-change of the cylinder.
4. Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
5. The cylinder body has stainless steel pipes with high precision to produce high strength and corrosion resistance.
6. There are cylinders and mounting accessories with several specifications for your choice.

### Specification

Bore size(mm)	20	25	32	40	50	63
Acting type	MSG/MTG		Single acting			-
	MG/MGD		Double acting			-
	MGC/MGCD		Double acting with cushion			-
Fluid	Air(to be filtered by 40 μ m filter element)					
Operating pressure	Double acting		0.15~1.0MPa(22~145psi)(1.5~10.0bar)			
	Single acting		0.2~1.0MPa(28~145psi)(2.0~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)					
Temperature °C	-20~70					
Speed range mm/s	Double acting:		30~800		Single acting: 50~800	
Stroke tolerance	0~150 <sup>+1.0</sup> >150 <sup>+1.5</sup>					
Cushion type	Variable cushion		Bumper		Variable cushion	
Port size [Note1]	Variable cushion		M5×0.8		1/8"	
	Bumper		1/8"		1/4"	

[Note1] PT thread, G thread thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	stroke (mm)															Max.std stroke	Max. stroke				
	Standard stroke										Longer stroke										
MG MGC	20	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	201~500	500	800		
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	50	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
	63	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	301~500	500	800
MGD MGCD	20	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	300	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	300	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	50	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
	63	10	15	20	25	30	40	50	60	75	80	100	125	150	175	200	250	300	-	500	-
MSG MTG	20	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-				
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-				
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-				
	40	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-				

[Note] Consult us for non-standard stroke.

### Ordering code

MG 20 x 100 S FA □



①Model	②Bore size		③Stroke	④Magnet	⑤Mounting type[Note1]	⑥Thread type [Note2]
MG: Mini cylinder(Double acting) MGC: Mini cylinder (Double acting with cushion) MSG: Mini cylinder (Single acting_push) MTG: Mini cylinder (Single acting_pull)	Model	Bore size	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: No accessories FA: FA type LB: LB type CB: CB type SDB: SDB type	Blank: PT G: G T: NPT
	MG	20				
	MSG	25				
	MTG	32				
	MGD	40				
MGD: Mini cylinder(Double rod) MGCD: Mini cylinder (Double rod with cushion)	MGC	20 25			Blank: No accessories FA: FA type LB: LB type	
	MGCD	32 40				
		50 63				

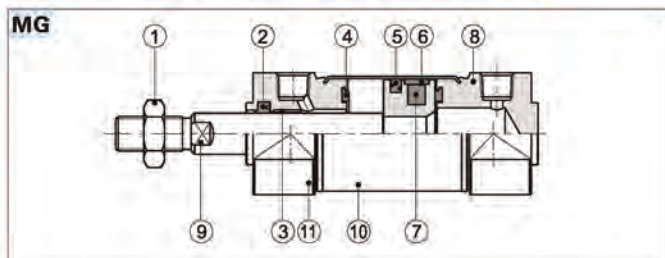
[Note1] Please refer to page 86~87 for accessory parts. SDB must be used with CB.

[Note2] Standard thread is blank here.

# Mini cylinder(Stainless steel)

## MG Series

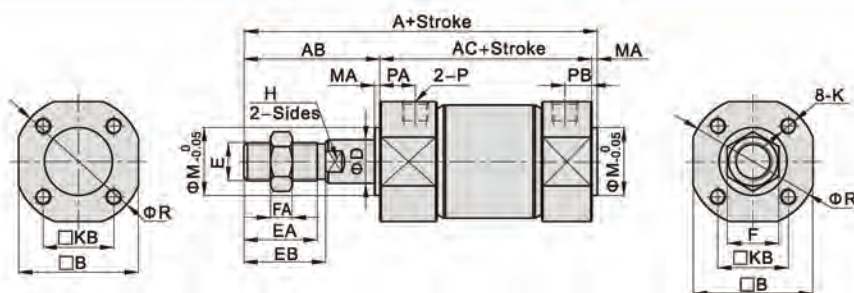
### Inner structure and material of major parts



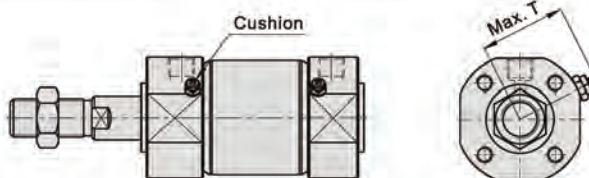
NO.	Item	Material
1	Rod nut	Carbon steel
2	Front cover packing	NBR
3	Bushing	Wear resistant material
4	Bumper	TPU
5	Piston seal	NBR
6	Wear ring	Wear resistant material
7	Magnet	Rubber
8	Back cover	Aluminum alloy
9	Piston rod	Carbon steel with 20 μm chrome plated
10	Barrel	SUS304
11	Front cover	Aluminum alloy

### Dimensions

MG  $\Phi 20\sim\Phi 40$



MGC  $\Phi 20\sim\Phi 63$



Bore size\Item	Standard stroke	Longer stroke	A	AB	AC	B	D	E	EA	EB	F	FA
20	≤200	201~500	106(114)	35	69(77)	24	8	M8×1.25	15.5	18	13	5
25	≤300	301~500	111(119)	40	69(77)	29	10	M10×1.25	19.5	22	17	6
32	≤300	301~500	113(121)	40	71(79)	35.5	12	M10×1.25	19.5	22	17	6
40	≤300	301~500	130(139)	50	78(87)	44	16	M14×1.5	27	30	19	8
50	≤300	301~500	150(162)	58	90(102)	55	20	M18×1.5	32	35	27	11
63	≤300	301~500	150(162)	58	90(102)	69	20	M18×1.5	32	35	27	11

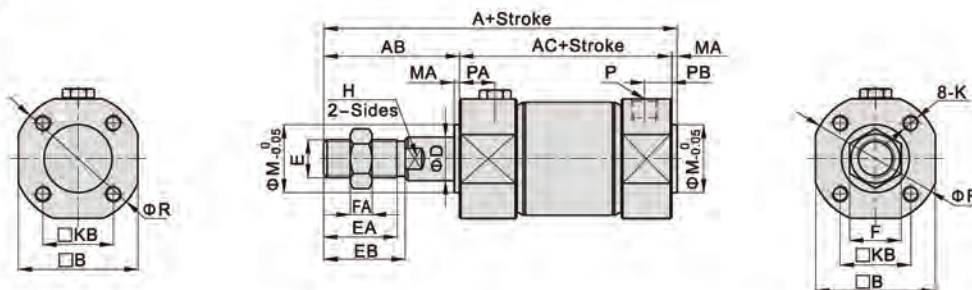
Bore size\Item	H	K	KB	M	MA	P		PA		PB		R	T
						MG	MGC	MG	MGC	MG	MGC		
20	6	M4×0.7 dp:7	14	12	2	1/8"	M5×0.8	12(15)	15(17.5)	8	10	26.5	22.5
25	8	M5×0.8 dp:7.5	16.5	14	2	1/8"	PT1/8	12.5(15)	12.5(15)	9	9	31.5	24.5
32	10	M5×0.8 dp:7.5	20	18	2	1/8"	PT1/8	13(15)	13(15)	10.5	10.5	38.5	30.5
40	14	M6×1.0 dp:12	26	25	2	1/8"	PT1/8	13(14)	13(14)	12	12	47.5	35
50	18	M8×1.25 dp:16	32	30	2	-	PT1/4	-	15.5(22.5)	-	13	58.5	40.5
63	18	M10×1.5 dp:16	38	32	2	-	PT1/4	-	15.5(22.5)	-	13	72	47.5

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. The value in the "( )" is longer stroke type's value.

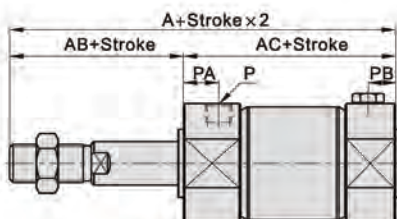
# Mini cylinder(Stainless steel)

## MG Series

MSG  $\phi 20\sim\phi 40$



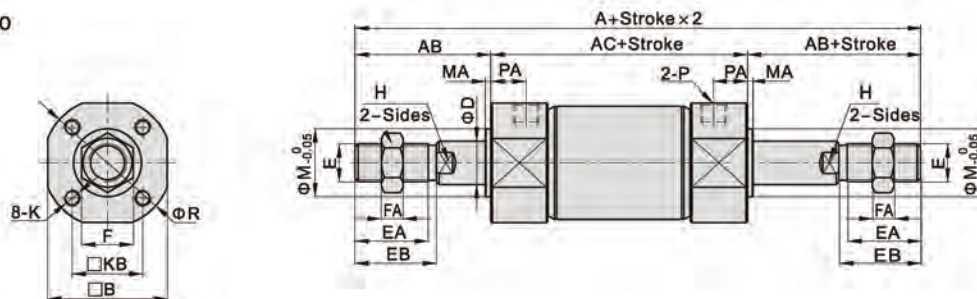
MTG  $\phi 20\sim\phi 40$



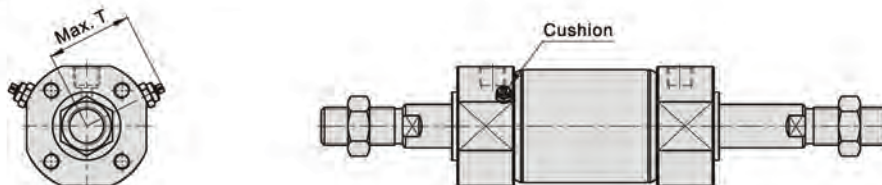
Bore size\Item	A			AB	AC				B	D	E	EA	EB	F	FA	H	K	KB	M	MA	P	PA	PB	R
	1~50	51~100	101~150		1~50	51~100	101~150																	
20	131	156	181	35	94	119	144	24	8	M8×1.25	15.5	18	13	5	6	M4×0.7 Dp:7	14	12	2	1/8"	12	8	26.5	
25	136	161	186	40	94	119	144	29	10	M10×1.25	19.5	22	17	6	8	M5×0.8 Dp:7.5	16.5	14	2	1/8"	12.5	9	31.5	
32	138	163	188	40	96	121	146	35.5	12	M10×1.25	19.5	22	17	6	10	M5×0.8 Dp:7.5	20	18	2	1/8"	13	10.5	38.5	
40	155	180	205	50	103	128	153	44	16	M14×1.5	27	30	19	8	14	M6×1.0 Dp:12	26	25	2	1/8"	13	12	47.5	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MGD  $\phi 20\sim\phi 40$



MGCD  $\phi 20\sim\phi 63$



Bore size\Item	A	AC	AB	B	D	E	EA	EB	F	FA	H	K	KB	M	MA	P		PA		R	T
																MGD	MGCD	MGD	MGCD		
20	147	77	35	24	8	M8×1.25	15.5	18	13	5	6	M4×0.7 Dp:7	14	12	2	1/8"	M5×0.8	12	15	26.5	22.5
25	157	77	40	29	10	M10×1.25	19.5	22	17	6	8	M5×0.8 Dp:7.5	16.5	14	2	1/8"	1/8"	12.5	12.5	31.5	24.5
32	159	79	40	35.5	12	M10×1.25	19.5	22	17	6	10	M5×0.8 Dp:7.5	20	18	2	1/8"	1/8"	13	13	38.5	30.5
40	187	87	50	44	16	M14×1.5	27	30	19	8	14	M6×1.0 Dp:12	26	25	2	1/8"	1/8"	13	13	47.5	35
50	218	102	58	55	20	M18×1.5	32	35	27	11	18	M8×1.25 Dp:16	32	30	2	-	1/4"	-	15.5	58.5	40.5
63	218	102	58	69	20	M18×1.5	32	35	27	11	18	M10×1.5 Dp:16	38	32	2	-	1/4"	-	15.5	72	47.5

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Stainless steel)

## MG Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories				Knuckle		Sensor switch	
	LB	FA	SDB	CB	I	Y	CMSSG	DMSG(S)
20	F-MG20LB	F-MG20FA	F-MG20SDB	F-MG20CB	F-ACQ20I	F-ACQ20Y	CMSSG	DMSG(S)
25	F-MG25LB	F-MG25FA	F-MG25SDB	F-MG25CB	F-ACQ25I	F-ACQ25Y		
32	F-MG32LB	F-MG32FA	F-MG32SDB	F-MG32CB	F-ACQ32I	F-ACQ32Y		
40	F-MG40LB	F-MG40FA	F-MG40SDB	F-MG40CB	F-ACQ32I	F-ACQ32Y		
50	F-MG50LB	F-MG50FA	F-MG50SDB	F-MG50CB	F-ACQ50I	F-ACQ50Y		
63	F-MG63LB	F-MG63FA	F-MG63SDB	F-MG63CB				

### Accessory selection

Accessories Cylinder model		Mounting accessories				Knuckle		Sensor switch	
		LB	FA	SDB	CB	I	Y	CMSSG	DMSG(S)
MG	Standard	●	●	●	●	●	●	×	×
MGC	With magnet	●	●	●	●	●	●	●	●
MSG	Standard	●	●	●	●	●	●	×	×
MTG	With magnet	●	●	●	●	●	●	●	●
MGD	Standard	●	●	×	×	●	●	×	×
MGCD	With magnet	●	●	×	×	●	●	●	●

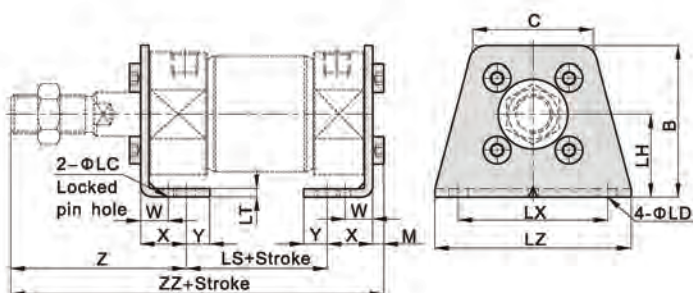
### Material of accessories

Accessories Bore size	Mounting accessories				Knuckle	
	LB	FA	SDB	CB	I	Y
20 25	△	○	△	△	□	□
32-63	△	○	△	△	□	◇

△—SPCC; ○—cast iron; □—S45C; ◇—cast steel

### Dimensions

#### LB

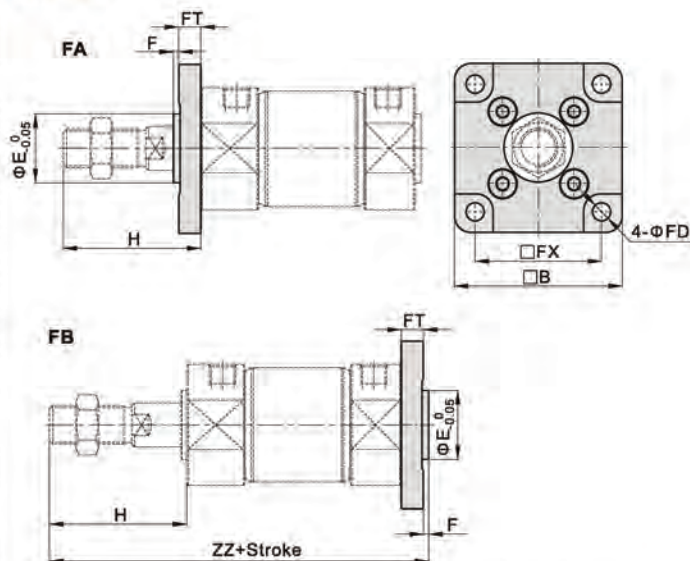


Bore size/Item	Standard stroke	Longer stroke	B	C	LC	LD	LH	LS
20	≤200	201~500	34	27.5	4	6	20	45(53)
25	≤300	301~500	38.5	30	4	6	22	45(53)
32	≤300	301~500	45	35.5	4	7	25	45(53)
40	≤300	301~500	54.5	43.5	4	7	30	51(60)
50	≤300	301~500	70.5	50.5	5	10	40	55(67)
63	≤300	301~500	82.5	64	5	12	45	55(67)

Bore size/Item	LT	LX	LZ	M	W	X	Y	Z	ZZ
20	3	32	44	2.8	10	15	7	47	110(118)
25	3	36	49	3.5	10	15	7	52	115.5(123.5)
32	3.5	44	58	3.5	10	16	8	53	117.5(125.5)
40	3.5	54	71	4	10	16.5	8.5	63.5	135(144)
50	4.5	66	86	5	17.5	22	11	75.5	157.5(169.5)
63	4.5	82	106	6	17.5	22	13	75.5	158.5(170.5)

Remark: The value in the "( )" is longer stroke type's value.

#### FA/FB



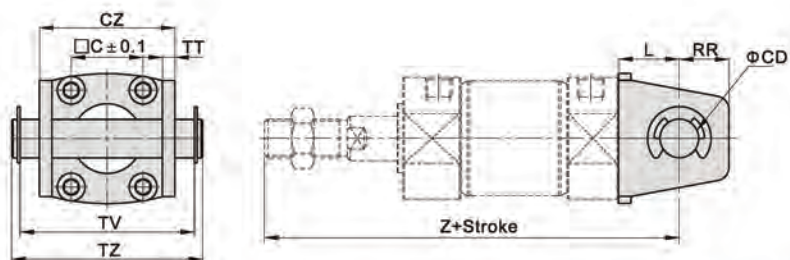
Bore size/Item	Standard stroke	Longer stroke	B	E	F	FD	FX	FT	H	ZZ
20	≤200	201~500	40	12	2	5.5	28	6	35	112(120)
25	≤300	301~500	44	14	2	5.5	32	7	40	118(126)
32	≤300	301~500	53	18	2	6.5	38	7	40	120(128)
40	≤300	301~500	61	25	2	6.5	46	8	50	138(147)
50	≤300	301~500	76	30	2	9	58	9	58	159(171)
63	≤300	301~500	92	32	2	11	70	9.5	58	159.5(171.5)

Remark: The value in the "( )" is longer stroke type's value.

# Mini cylinder(Stainless steel)

## MG Series—Accessories

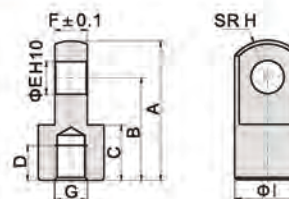
### CB



Bore size\Item	Standard stroke	Longer stroke	C	CD	CZ	L	RR	TT	TV	TZ	Z
20	≤200	201~500	14	8	29	14	11	2.5	41	46	118(126)
25	≤300	301~500	16.5	10	33	16	13	2.5	44	50	125(133)
32	≤300	301~500	20	12	40	20	15	3	54	60.5	131(139)
40	≤300	301~500	26	14	49	22	18	3	63	69.5	150(159)
50	≤300	301~500	32	16	60	25	20	4	77	83	173(185)
63	≤300	301~500	38	18	74	30	22	4	95	103	178(190)

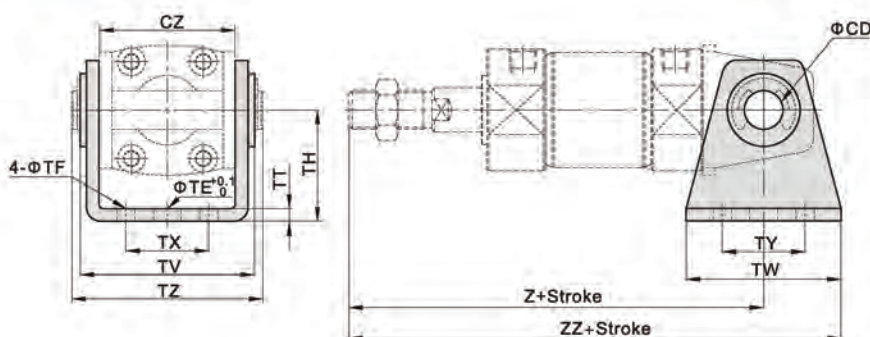
Remark: The value in the "( )" is longer stroke type's value.

### I Knuckle



Type\Item	A	B	C	D	E	F	G	H	I
F-ACQ20I	34	25	13.5	8.5	8	7.7	M8×1.25	10.3	16
F-ACQ25I	41	30	16	11	10	9.7	M10×1.25	12.8	20
F-ACQ32I	42	30	16	14	10	17.6	M14×1.5	12	22
F-ACQ50I	56	40	20	18	14	21.6	M18×1.5	16	28

### SDB(+CB)

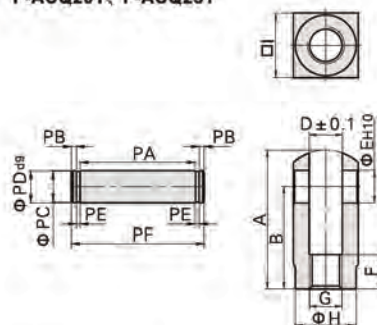


Bore size\Item	Standard stroke	Longer stroke	CD	CZ	TE	TF	TH	TT	TV	TW	TX	TY	TZ	Z	ZZ
20	≤200	201~500	8	29	10	5.5	25	2.5	40.5	42	16	28	46	118(126)	139(147)
25	≤300	301~500	10	33	10	5.5	30	2.5	43.5	42	20	28	50	125(133)	146(154)
32	≤300	301~500	12	40	10	6.5	35	3	53.5	48	22	28	60.5	131(139)	155(163)
40	≤300	301~500	14	49	10	6.5	40	3	62.5	56	30	30	69.5	150(159)	178(187)
50	≤300	301~500	16	60	20	9	50	4	76	64	36	36	83	173(185)	205(217)
63	≤300	301~500	18	74	20	11	60	4	94	74	46	46	103	178(190)	215(227)

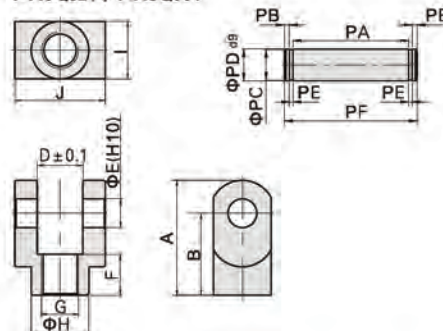
Remark: SDB is attached with relevant PIN.  
The value in the "( )" is longer stroke type's value.

### Y Knuckle

#### F-ACQ20Y, F-ACQ25Y



#### F-ACQ32Y, F-ACQ50Y



Type\Item	A	B	D	E	F	G
F-ACQ20Y	34	25	8.3	8	8.5	M8×1.25
F-ACQ25Y	41	30	10.3	10	10.5	M10×1.25
F-ACQ32Y	42	30	18.4	10	16	M14×1.5
F-ACQ50Y	56	40	22.4	14	20	M18×1.5

Type\Item	H	I	J	PA	PB	PC	PD	PE	PF
F-ACQ20Y	15	16	-	16.2	1.5	7	8	0.9	21
F-ACQ25Y	19	20	-	20.2	2	8	10	1.1	26.4
F-ACQ32Y	22	22	36	36.2	2	8	10	1.1	42.4
F-ACQ50Y	28	28	44	44.2	2	12	14	1.1	50.4



# Mini cylinder(Stainless steel)——MA Series

## Compendium of MA Series

**Multi-mounting accessories**

FA Type      SDB Type      LB Type

**Rolling packed structure**

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Seven bore size are available**

Bore size: 16, 20, 25, 32, 40, 50, 63

**Three kinds of back cover type**

CA: Pivot type      U: Flat-end type      CM: Round-end type

**Multi-type cylinder**

- MA: Mini cylinder(Double acting)
- MSA: Mini cylinder (Single acting\_push)
- MTA: Mini cylinder (Single acting\_pull)
- MAD: Mini cylinder(Double rod)
- MAJ: Mini cylinder(Adjustable stroke)
- MAR: Mini cylinder(Double acting with cushion)
- MAC: Mini cylinder(Double acting with cushion)
- MACD: Mini cylinder(Double rod with cushion)
- MACJ: Mini cylinder(Adjustable stroke with cushion)

**Two kinds of cushion type**

Variable cushion or Bumper

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
16	6	Single acting	Push side	201.0	-	-	20.1	40.2	60.3	80.4	100.5
			Pull side	172.7	-	-	11.6	28.9	46.2	63.4	80.7
		Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	16	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
			Pull side	1761.5	176.2	352.3	528.5	704.6	880.8	1056.9	1233.1
		Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
			Pull side	2914.7	291.5	582.9	874.4	1165.9	1457.4	1748.8	2040.3

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall be carried out test run without load before application. Prior to run, buffer shall be turned to the minimum and gradually released to avoid the damage on cylinder caused by excessive impact.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return.
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

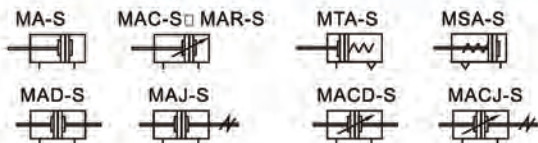


# Mini cylinder(Stainless steel)

## MA Series



### Symbol



### Product feature

- Standard cylinder manufactured by our enterprise.
- Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
- Front cover has fixed bumper which can reduce the impact of direction change of the cylinder.
- There are several modes of back cover, which makes the installation of cylinder more convenient.
- Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.
- The cylinder body has stainless steel pipes with high precision to produce high strength and anticorrosion resistance.
- There are cylinders and mounting accessories with several specifications for your choice.
- All cylinders of this series have magnet.

### Ordering code

**MA 20 x 50 S CM**    
**MAD 20 x 50 S**    
**MAJ 20 x 50-20 S**    
**MAR U 20 x 50 S**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Model	② Front cover	③ Bore size	④ Stroke	⑤ Adjustable St.	⑥ Magnet	⑦ Back cover	⑧ Mounting type[Note1]	⑨ Thread type[Note2]
MA: Mini cylinder(Double acting) MAC: Mini cylinder (Double acting with cushion) MSA: Mini cylinder(Single acting_push) MTA: Mini cylinder(Single acting_pull) MAD: Mini cylinder(Double rod) MACD: Mini cylinder (Double rod with cushion)	No this code	Model    Bore size MA        16 MSA       20 MTA       25 MAD       32 MAJ       40	Refer to stroke table for details	No this code	S: With magnet	CA: Pivot type U: Flat-end type CM: Round-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type	Blank: PT G: G T: NPT
MAJ: Mini cylinder(Adjustable stroke) MACJ: Mini cylinder (Adjustable stroke with cushion)		MAC       16 MACD    16 MACJ    16 MAC       20 MAR       25 MACD    32 MACJ    40 MACJ    50 MACJ    63				10 20 30 40 50 75 100	No this code	
MAR: Mini cylinder (Double acting with cushion)	F: Front mounting U: Up mounting			No this code			No this code	

[Note1] Please refer to page 94~95 for accessory parts.

[Note2] Standard thread is blank here.

### Specification

Bore size(mm)	16	20	25	32	40	50	63
Acting type	MSA/MTA Single acting						-
	MA/MAD/MAJ Double acting						-
	MAR Double acting						-
	MAC/MACD/MACJ Double acting with cushion						-
Fluid	Air(to be filtered by 40µm filter element)						
Operating pressure	Double acting		0.15~1.0MPa(22~145psi)(1.5~10.0bar)				
	Single acting		0.2~1.0MPa(28~145psi)(2.0~10.0bar)				
Proof pressure	1.5MPa(215psi)(15bar)						
Temperature ℃	-20~70						
Speed range mm/s	Double acting: 30~800			Single acting: 50~800			
Stroke tolerance	0~150 <sup>+1.0</sup> <sub>0</sub>			>150 <sup>+1.5</sup> <sub>0</sub>			
Cushion type	MAC/MACD/MACJ Series: Variable cushion; Other series: Bumper						
Port size [Note1]	M5x0.8		1/8"			1/4"	

[Note1] PT thread, G thread thread and NPT thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

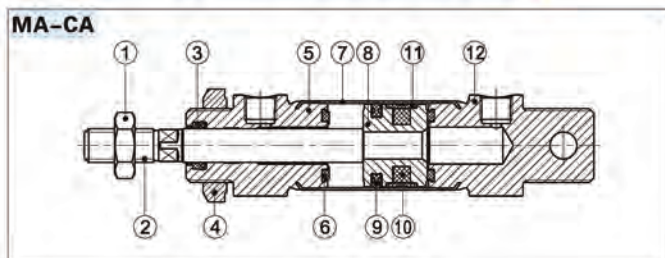
Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke							
MA/MAC	16	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	600
MA	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAC	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAR	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAC	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAD	50	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAJ	63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800
MAD	16	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
MAJ	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
MAD	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300					300	-
MACD	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MACJ	40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MACD	50	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MACJ	63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MSA	16	10	15	20	25	30	40	50	60	75	80	100													-
	20	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150											-
MTA	40	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	50	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	63	10	15	20	25	30	40	50	60	75	80	100	125	150											-
	80	10	15	20	25	30	40	50	60	75	80	100	125	150											-

[Note] Consult us for non-standard stroke.

# Mini cylinder(Stainless steel)

## MA Series

### Inner structure and material of major parts

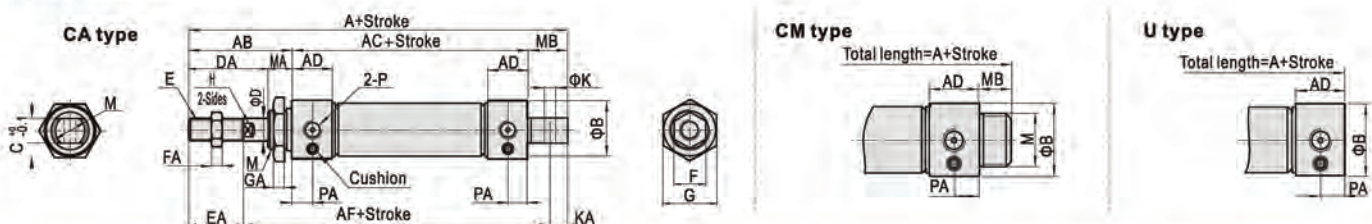


NO.	Item	Material
1	Rod nut	Stainless steel/Carbon steel
2	Piston rod	Carbon steel with 20 μ mchrome plated
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Barrel	Stainless steel
8	Piston	Aluminum alloy
9	Piston seal	NBR
10	Magnet	Plastic
11	Wear ring	Wear resistant material
12	Back cover	Aluminum alloy

### Dimensions

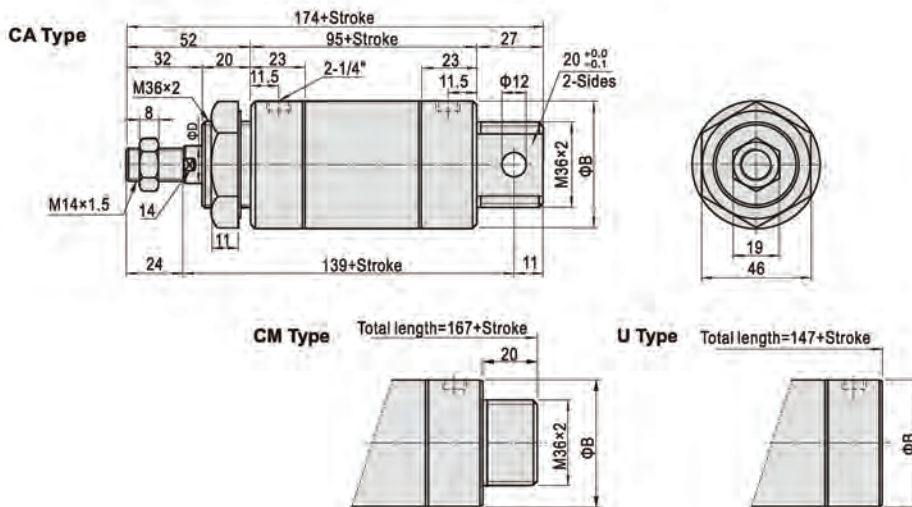
MA  $\Phi 16-\Phi 40$

MAC  $\Phi 16-\Phi 40$



Bore size/Item	A																	MB		P	PA					
	CA	CM	U	AB	AC	AD	AF	B	C	D	DA	E	EA	F	FA	G	GA	H	K			KA	M	MA	CA	CM
16	114	114	98	38	60	10	91	21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	M5×0.8	5
20	137	128	116	40	76	16	108	27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	1/8"	8
25	141	134	120	44	76	16	110	30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	1/8"	8
32	147	134	120	44	76	16	113	35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	1/8"	8
40	149	136	122	46	76	16.5	113	41.5	20	16	32	M12×1.25	24	17	7	41	9	14	12	12	M30×2.0	14	27	14	1/8"	8

MAC  $\Phi 50 \setminus \Phi 63$



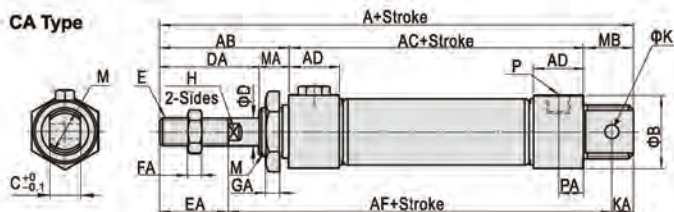
Bore size/Item	B	D
50	53	16
63	67	16

# Mini cylinder(Stainless steel)

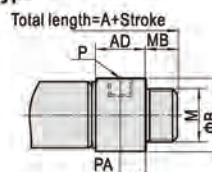
## MA Series

MSA  $\Phi 16-\Phi 40$

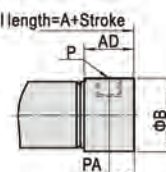
### CA Type



### CM Type



### U Type



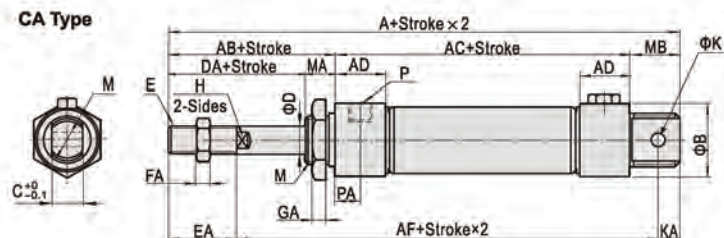
Item	A									AB	AC			AD	AF		
	CA			CM			U				-	-	-		-	-	-
Back cover	CA			CM			U			-	AC			-	AF		
Bore size/Stroke	≤50	51~100	≥101	≤50	51~100	≥101	≤50	51~100	≥101	-	≤50	51~100	≥101	-	≤50	51~100	≥101
16	139	164	-	139	164	-	123	148	-	38	85	110	-	10	116	141	-
20	162	187	212	153	178	203	141	166	191	40	101	126	151	16	133	158	183
25	166	191	216	159	184	209	145	170	195	44	101	126	151	16	135	160	185
32	172	197	222	159	184	209	145	170	195	44	101	126	151	16	138	163	188
40	174	199	224	161	186	211	147	172	197	46	101	126	151	16.5	138	163	188

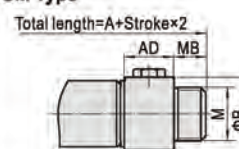
Bore size/Item	Back cover	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
		CA	CM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	16	M5×0.8	5
20	27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	12	1/8"	8
25	30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	14	1/8"	8
32	35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	14	1/8"	8
40	41.5	20	16	32	M12×1.25	24	17	7	41	9	14	12	12	M30×2.0	14	27	14	14	1/8"	8

MTA  $\Phi 16-\Phi 40$

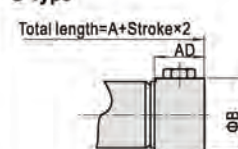
### CA Type



### CM Type



### U Type



Item	A												AC				AF			
	CA				CM				U				-		-		-		-	
Back cover	CA				CM				U				-		-		-		-	
Bore size/Stroke	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100	≤25	≤50	≤75	≤100
16	129	139	154	164	129	139	154	164	113	123	138	148	75	85	100	110	106	116	131	141
20	152	162	177	187	143	153	168	178	131	141	156	166	91	101	116	126	123	133	148	158
25	156	166	181	191	149	159	174	184	135	145	160	170	91	101	116	126	125	135	150	160
32	162	172	192	202	149	159	179	189	135	145	165	175	91	101	121	131	128	138	158	168
40	164	174	194	204	151	161	181	191	137	147	167	177	91	101	121	131	128	138	158	168

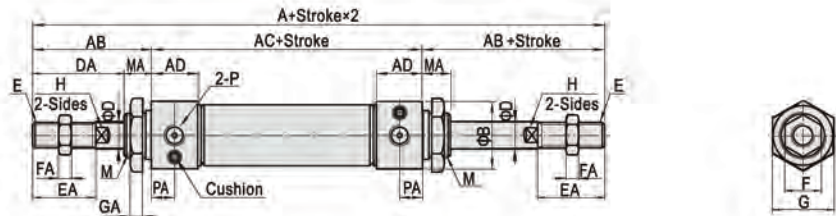
Bore size/Item	Back cover	AB	AD	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
		CA	CM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	38	10	21	12	6	22	M6×1.0	16	10	5	22	6	5	6	7	M16×1.5	16	16	16	16	M5×0.8	5
20	40	16	27	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	12	1/8"	8
25	44	16	30	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	14	1/8"	8
32	44	16	35	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	14	1/8"	8
40	46	16.5	41.5	20	16	32	M12×1.25	24	17	7	41	9	14	12	12	M30×2.0	14	27	14	14	1/8"	8

# Mini cylinder(Stainless steel)

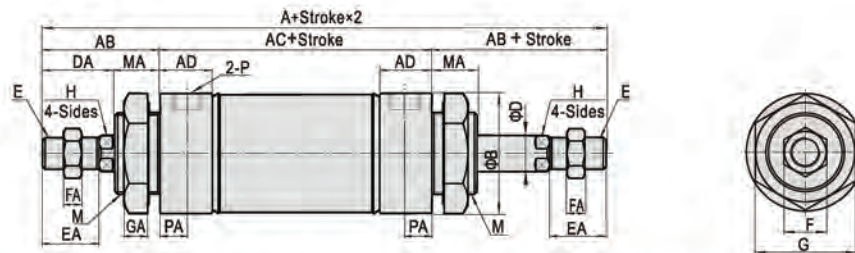
## MA Series

### MAD/MACD

Φ16~Φ40



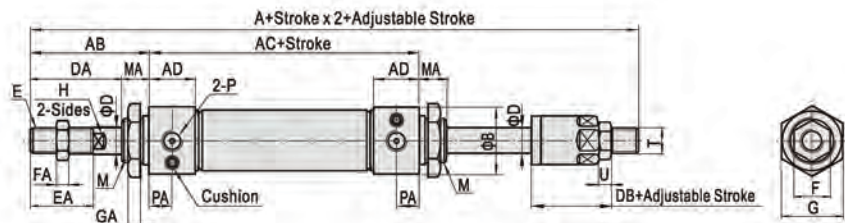
Φ50/Φ63



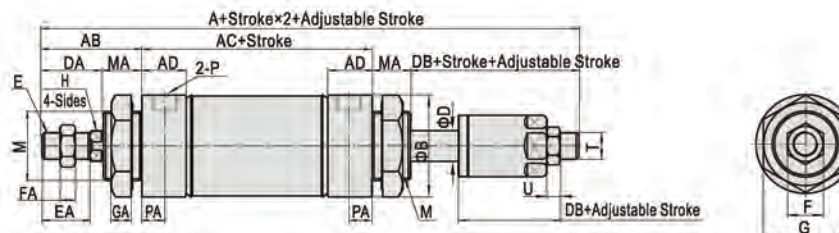
Bore size/Item	A	AB	AC	AD	B	D	DA	E	EA	F	FA	G	GA	H	M	MA	P	PA
16	136	38	60	10	21	6	22	M6×1.0	16	10	5	22	6	5	M16×1.5	16	M5×0.8	5
20	156	40	76	16	27	8	28	M8×1.25	20	12	6	29	7	6	M22×1.5	12	1/8"	8
25	164	44	76	16	30	10	30	M10×1.25	22	17	6	29	7	8	M22×1.5	14	1/8"	8
32	164	44	76	16	35	12	30	M10×1.25	22	17	6	32	8	10	M24×2.0	14	1/8"	8
40	168	46	76	16.5	41.5	16	32	M12×1.25	24	17	7	41	9	14	M30×2.0	14	1/8"	8
50	199	52	95	23	53	16	32	M14×1.5	24	19	8	46	11	14	M36×2.0	20	1/4"	11.5
63	199	52	95	23	67	16	32	M14×1.5	24	19	8	46	11	14	M36×2.0	20	1/4"	11.5

### MAJ/MACJ

Φ16~Φ40



Φ50/Φ63



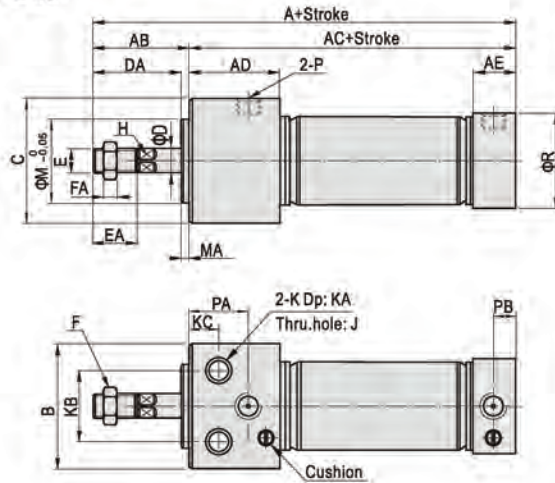
Bore size/Item	A	AB	AC	AD	B	D	DA	DB	E	EA	F	FA	H	M	MA	P	PA	G	GA	T	U
16	135	38	60	10	21	6	22	21	M6×1.0	16	10	5	5	M16×1.5	16	M5×0.8	5	22	6	M6×1.0	5
20	153	40	76	16	27	8	28	25	M8×1.25	20	12	6	6	M22×1.5	12	1/8"	8	29	7	M8×1.25	6
25	161	44	76	16	30	10	30	27	M10×1.25	22	17	6	8	M22×1.5	14	1/8"	8	29	7	M10×1.25	6
32	161	44	76	16	35	12	30	27	M10×1.25	22	17	6	10	M24×2.0	14	1/8"	8	32	8	M10×1.25	6
40	164	46	76	16.5	41.5	16	32	28	M12×1.25	24	17	7	14	M30×2.0	14	1/8"	8	41	9	M12×1.25	7
50	195	52	95	23	53	16	32	28	M14×1.5	24	19	8	14	M36×2.0	20	1/4"	11.5	46	11	M12×1.25	7
63	195	52	95	23	67	16	32	28	M14×1.5	24	19	8	14	M36×2.0	20	1/4"	11.5	46	11	M12×1.25	7

# Mini cylinder(Stainless steel)

## MA Series

### MARU(Up mounting type)

Φ 20~Φ 40



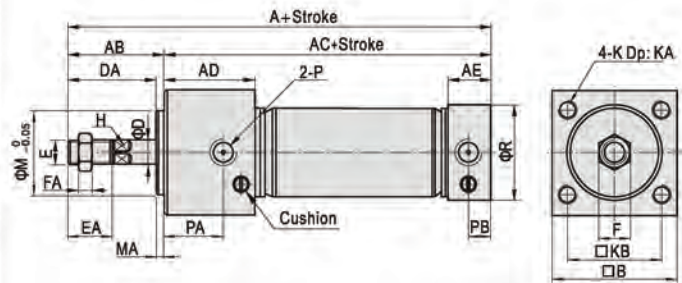
Bore size\Item	A	AB	AC	AD	AE	B	C	D	DA	E	EA	F	FA
20	120	31	89	29	16	33.5	30.5	8	28	M8×1.25	20	13	5
25	122	33	89	29	16	39	36.5	10	30	M10×1.25	22	17	6
32	122	33	89	29	16	47	42.5	12	30	M10×1.25	22	17	6
40	132.5	35	97.5	37.5	16.5	58.5	52.5	16	32	M14×1.5	24	19	8

Bore size\Item	H	J	K	KA	KB	KC	M	MA	P	PA	PB	R
20	6	Φ5.5	Φ9.5	6.5	21	12	20	3	1/8"	22	8	27
25	8	Φ6.5	Φ11.0	7.5	25	12	26	3	1/8"	22	8	30
32	10	Φ9.0	Φ14.0	10	30	12	26	3	1/8"	22	8	35
40	14	Φ11	Φ17.5	12.5	38	15	32	3	1/8"	27	8	41.5

### MARF(Front mounting type)

Φ 20~Φ 40

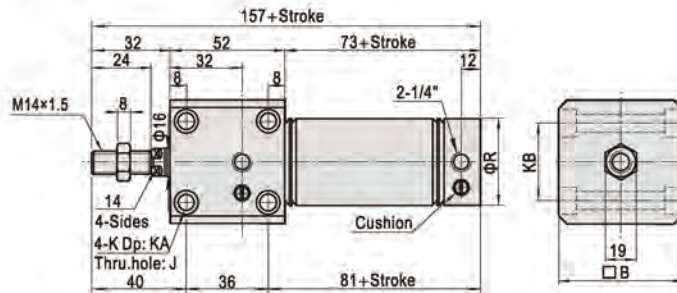


Bore size\Item	A	AB	AC	AD	AE	B	D	DA	E	EA
20	120	31	89	29	16	30.5	8	28	M8×1.25	20
25	122	33	89	29	16	36.5	10	30	M10×1.25	22
32	122	33	89	29	16	42.5	12	30	M10×1.25	22
40	132.5	35	97.5	37.5	16.5	52.5	16	32	M14×1.5	24

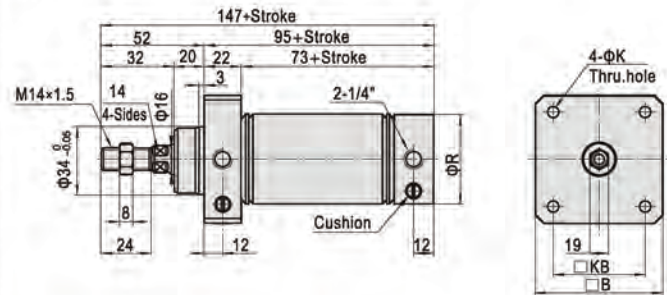
Bore size\Item	F	FA	H	K	KA	KB	M	MA	P	PA	PB	R
20	13	5	6	M5×0.8	9	22	20	3	1/8"	22	8	27
25	17	6	8	M6×1.0	11	26	26	3	1/8"	22	8	30
32	17	6	10	M6×1.0	11	30	26	3	1/8"	22	8	35
40	19	8	14	M8×1.25	14	36	32	3	1/8"	27	8	41.5

Φ50/Φ63



Bore size\Item	B	J	K	KA	KB	R
50	62	Φ6.5	2-Sides: Φ11.0	6.5	44	53
63	74	Φ9.0	2-Sides: Φ14.0	8.5	48	67

Φ50/Φ63



Bore size\Item	B	K	KB	R
50	62	6.5	48	53
63	74	9.0	58	67

# Mini cylinder(Stainless steel)

## MA Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	SDB	I	Y	F	U	CMSG	DMSG(S)
16	F-MA16LB	F-MA16FA	F-MA16SDB	F-MA16I	F-MA16Y	F-M6X100F	F-M6X100U	CMSG	DMSG(S)
20	F-MA20LB	F-MA20FA	F-MA20SDB	F-MA20I	F-MA20Y	F-M8X125F	F-M8X125U		
25									
32	F-MA32LB	F-MA32FA	F-MA32SDB	F-MA25I	F-MA25Y	F-M10X125F	F-M10X125U		
40	F-MA40LB	F-MA40FA		F-MA40I	F-MA40Y	F-M12X125F	F-M12X125U		
50	F-MA50LB		F-MA40SDB	F-MAC50I	F-MAC50Y	F-M14X150F	F-M14X150U		
63	F-MA63LB	F-MA50FA							

### Accessory selection

Accessories Cylinder model	Mounting accessories			Knuckle[Note 1]				Sensor switch	
	LB	FA	SDB	I	Y	U	F	CMSG	DMSG(S)
MAIMAC	●	●	●	●	●	●	●	●	●
MSAIMTA	●	●	●	●	●	●	●	●	●
MADIMACD	●	●	×	●	●	●	●	●	●
MAJMACJ	●	●	×	●	●	●	●	●	●
MARF/MARU	×	×	×	●	●	●	●	●	●

### Material of accessories

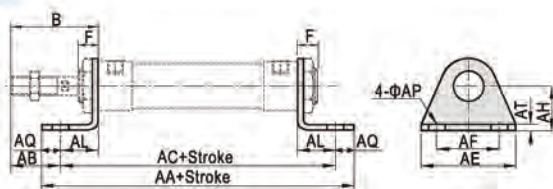
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	F	U
16-63	○	○	○	□	□	□	□

○—Lower carbon steel; □—Carbon steel;

[Note 1] Please refer to P349-352 for knuckle detail.

### Dimensions

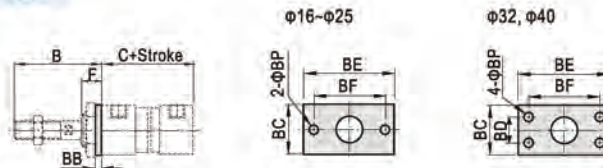
#### LB



Bore size/Item Stroke	AA	AA(MSA)			AC	AC(MSA)		
	(MA/MAC)	0-50	51-100	101-150	(MA/MAC)	0-50	51-100	101-150
16	98	123	148	-	86	111	136	-
20	122	147	172	197	106	131	156	181
25	122	147	172	197	106	131	156	181
32	142	167	192	217	126	151	176	201
40	142	167	192	217	126	151	176	201
50	175	-	-	-	151	-	-	-
63	183	-	-	-	157	-	-	-

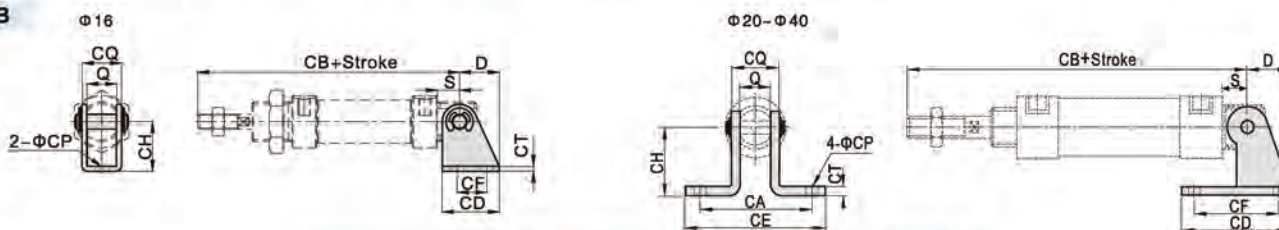
Bore size/Item	B	F	AB	AE	AF	AL	AQ	AP	AT	AH
16	38	16	25	44	32	13	6	5.5	2.5	20
20	40	12	25	54	40	15	8	6.5	3	25
25	44	14	29	54	40	15	8	6.5	3	25
32	44	14	19	59	45	25	8	7	3.5	32
40	46	14	21	64	50	25	8	7	3.5	36
50	52	20	24	86	66	28	12	11	4.5	40
63	52	20	21	106	82	31	13	11	4.5	45

#### FA



Bore size/Item Stroke	B	C	C(MSA)			BB	BC	BD	BE	BF	BP	F
	(MA/MAC)	0-50	51-100	101-150	3.5	3.8	-	64	50	7	12	
16	38	60	85	110	-	3	26	-	52	40	5.5	16
20	40	76	101	126	151	3.5	38	-	64	50	7	12
25	44	76	101	126	151	3.5	38	-	64	50	7	14
32	44	76	101	126	151	4	47	33	72	58	6.5	14
40	46	76	101	126	151	4	50	36	84	70	6.5	14
50	54	147				4.5	65	47	104	86	9	22
63	54	147				4.5	65	47	104	86	9	22

#### SDB



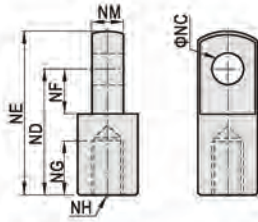
Bore size/Item Stroke	D	S	Q	CA	CB	CB(MSA)			CD	CE	CF	CH	CT	CP	CQ
	(MA)	0-50	51-100	101-150	107 <th>132 <th>157 <th>- <th>23 <th>- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th></th></th></th></th></th>	132 <th>157 <th>- <th>23 <th>- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th></th></th></th></th>	157 <th>- <th>23 <th>- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th></th></th></th>	- <th>23 <th>- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th></th></th>	23 <th>- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th></th>	- <th>12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th></th>	12 <th>20 <th>2 <th>5.5 <th>16</th> </th></th></th>	20 <th>2 <th>5.5 <th>16</th> </th></th>	2 <th>5.5 <th>16</th> </th>	5.5 <th>16</th>	16
16	16	9	12	-	107	132	157	-	23	-	12	20	2	5.5	16
20	21	12	16	51	128	153	178	203	48	67	32	32	2.5	7	21
25	21	12	16	51	132	157	182	207	48	67	32	32	2.5	7	21
32	27	15	16	51	135	160	185	210	52	67	36	36	3	7	22
40	27	15	20	55	137	162	187	212	56	71	40	40	3	7	26

[Note] SDB is attached with relevant PIN.

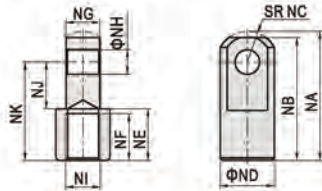
# Mini cylinder(Stainless steel)

## MA Series—Accessories

### I Knuckle

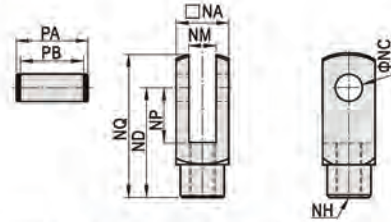


Type\Item	NC	ND	NE	NF	NG	NH	NM
F-MA16I	5	21	28	8.5	8	M6×1.0	6
F-MA20I	8	30	40	11	15	M8×1.25	8
F-MA25I	10	40	50	15	20	M10×1.25	10
F-MA40I	10	45	57	16	23	M12×1.25	14

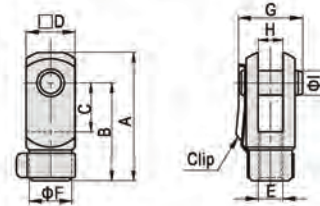


Type\Item	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NI
F-MAC50I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5

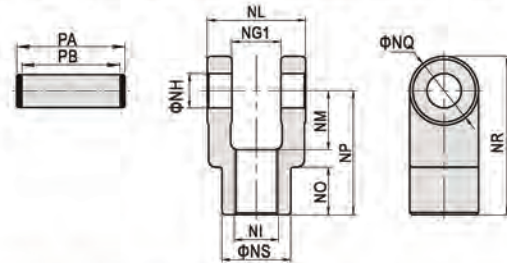
### Y Knuckle



Type\Item	NA	NC	ND	NP	NQ	NM	NH	PA	PB
F-MA16Y	12	5	21	8.5	27.4	6	M6×1.0	16.8	12.4
F-MA40Y	25.4	10	45	20	57	14	M12×1.25	32	26.2



Type\Item	A	B	C	D	E	F	G	H	I
F-MA20Y	42	32	16	16	M8×1.25	14	21	8	8
F-MA25Y	52	40	20	19	M10×1.25	18	25	10	10



Type\Item	Ng1	NH	NI	NL	NM	NO	NP	NQ	NR	NS	PA	PB
F-MAC50Y	14.2	10	M14×1.5	27.8	19	17	40	22	51	22	34.6	28.8



# Mini cylinder(Aluminum barrel)——MBL Series

## Compendium of MBL Series

**Multi-mounting accessories**

LB Type      FA Type

SDB Type

**Rolling packed structure**

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Six bore size are available**

Bore size: 20, 25, 32, 40, 50, 63

**Two kinds of back cover type**

U: Flat-end type      CA: Pivot type

**Multi-type cylinder**

MBL: Mini cylinder(Double acting)

MBLC: Mini cylinder(Double acting with cushion)

MSBL: Mini cylinder(Single acting\_push)

MTBL: Mini cylinder(Single acting\_pull)

MBLD: Mini cylinder(Double rod)

MBLCD: Mini cylinder(Double rod with cushion)

MBLJ: Mini cylinder(Adjustable stroke)

MBLCJ: Mini cylinder(Adjustable stroke with cushion)

**Multi-kinds of stroke**

**Two kinds of cushion type**

Variable cushion or Bumper

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
20	8	Single acting	Push side	314.0	-	15.7	47.1	78.5	109.9	141.3	172.7
			Pull side	263.8	-	5.7	32.0	58.4	84.8	111.2	137.5
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7
25	10	Single acting	Push side	490.6	-	24.6	73.7	122.8	171.8	220.9	269.9
			Pull side	412.1	-	8.9	50.1	91.4	132.6	173.8	215.0
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4
			Pull side	412.1	41.2	82.4	123.6	164.8	206.1	247.3	288.5
32	12	Single acting	Push side	804.3	-	40.2	120.6	200.9	281.3	361.7	442.1
			Pull side	691.2	-	17.6	86.6	155.7	224.8	293.9	363.0
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0
			Pull side	691.2	69.1	138.2	207.4	276.5	345.6	414.7	483.8
40	16	Single acting	Push side	1256.6	-	62.8	188.4	314.0	439.6	565.2	690.8
			Pull side	1055.6	-	22.6	128.1	233.6	339.1	444.6	550.1
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9
50	16	Double acting	Push side	1962.5	196.3	392.5	588.8	785.0	981.3	1177.5	1373.8
		Pull side	1761.5	176.2	352.3	528.5	704.6	880.8	1056.9	1233.1	
63	16	Double acting	Push side	3115.7	311.6	623.1	934.7	1246.3	1557.9	1869.4	2181.0
		Pull side	2914.7	291.5	582.9	874.4	1165.9	1457.4	1748.8	2040.3	

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return;
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

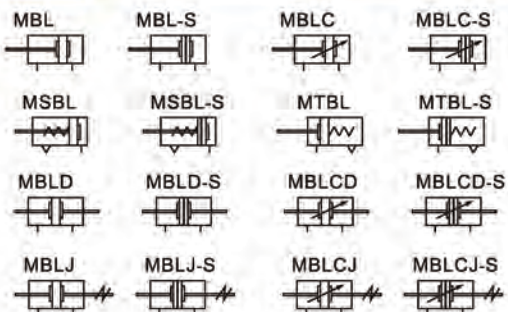


# Mini cylinder(Aluminum barrel)

## MBL Series



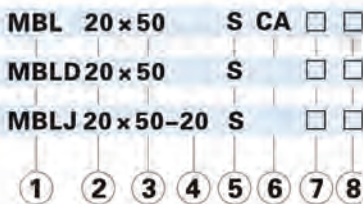
### Symbol



### Product feature

1. Manufactured by our enterprise.
2. Riveted structure is adopted to connect front and bak cover and cylinder tube to make it credibility.
3. Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
4. There are several modes of back cover, which makes the installation of cylinder more convenient.
5. There are cylinders and mounting accessories with several specifications for your choice.

### Ordering code



①Model	②Bore size	③Stroke	④Adjustable Stroke	⑤Magnet	⑥Back cover	⑦Mounting type [Note1]	⑧Thread type		
MBL: Mini cylinder(Double acting)	20 25 32	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	CA: Pivot type U: Flat-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type	Blank: PT G: G T: NPT		
MBLC: Mini cylinder(Double acting with cushion)	40 50 63								
MSBL: Mini cylinder(Single acting_push)	20 25 32 40								
MTBL: Mini cylinder(Single acting_pull)	20 25 32 40								
MBLD: Mini cylinder(Double rod)	20 25 32				10 20 30 40 50 75 100	No this code		No this code	Blank: No accessories FA: FA type LB: LB type
MBLCD: Mini cylinder(Double rod with cushion)	40 50 63								
MBLJ: Mini cylinder(Adjustable stroke)	40 50 63								
MBLCJ: Mini cylinder(Adjustable stroke with cushion)	40 50 63								

[Note1] Please refer to page 100~101 for accessory parts.

### Specification

Bore size(mm)		20	25	32	40	50	63	
Acting type	MSBL/MTBL	Single acting					-	
	MBL/MBLD/MBLJ	Double acting					-	
	MBLC/MBLCD/MBLCJ	Double acting with cushion					-	
Fluid		Air(to be filtered by 40μm filter element)						
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)(1.5~10.0bar)					-	
	Single acting	0.2~1.0MPa(28~145psi)(2.0~10.0bar)					-	
Proof pressure		1.5MPa(215psi)(15bar)						
Temperature °C		-20~70						
Speed range mm/s		Double acting: 30~800			Single acting: 50~800			
Stroke tolerance		0~150 <sup>+1.0</sup> <sub>0</sub>			>150 <sup>+1.5</sup> <sub>0</sub>			
Cushion type		MBLC, MBLCD, MBLCJ: Adjustable cushion; Others: Bumper						
Port size [Note1]		1/8"				1/4"		

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

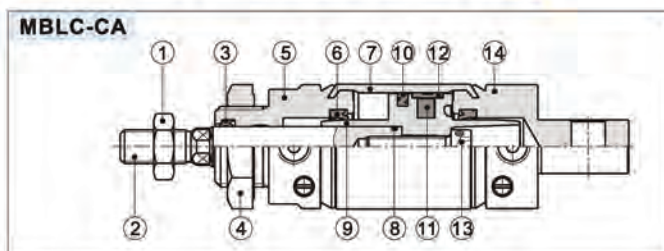
Bore size (mm)	Standard stroke (mm)																Max.std stroke	Max. stroke								
	20	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200			250	300	350	400	450	500		
MBL	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800	
MBLC	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800	
	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	800	
MBLD	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	300	-	
MBLJ	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-	
MBLCD	50/63	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-	
MSBL	20/25	10	15	20	25	30	40	50	60	75	80	100	125	150											-	-
	32/40	10	15	20	25	30	40	50	60	75	80	100	125	150											-	-
MTBL	20/25	10	15	20	25	30	40	50	60	75	80	100											-	-		
	32/40	10	15	20	25	30	40	50	60	75	80	100											-	-		

[Note] Consult us for non-standard stroke.

# Mini cylinder(Aluminum barrel)

## MBL Series

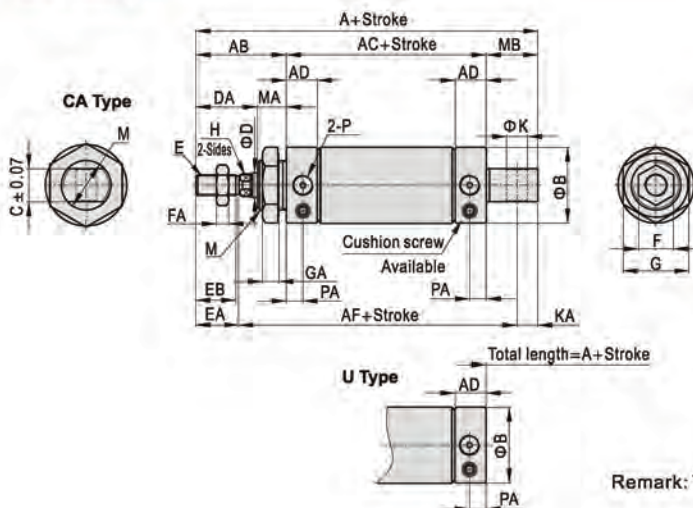
### Inner structure and material of major parts



NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20 μ m chrome plated
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Front cover	Aluminum alloy
6	Bumper	TPU
7	Barrel	Aluminum alloy
8	O-ring	NBR
9	Piston	Aluminum alloy
10	Piston seal	NBR
11	Magnet	Plastic
12	Wear ring	Wear resistant material
13	Bolt	Carbon steel
14	Back cover	Aluminum alloy

### Dimensions

#### MBL/MBLC

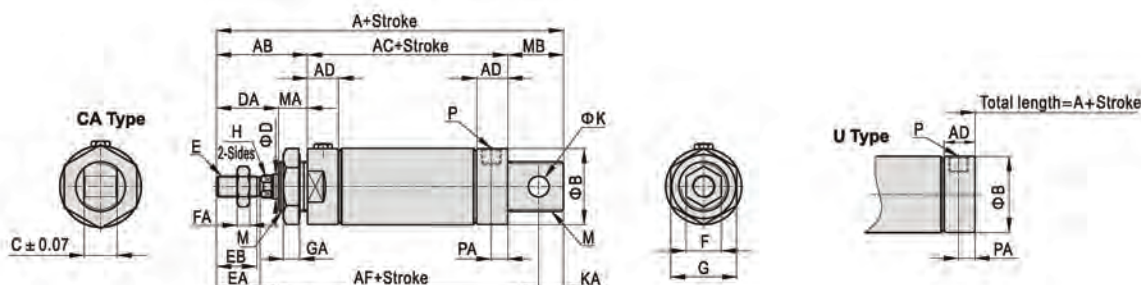


Bore size/Item	A												
	CA	U	AB	AC	AD	AF	B	C	D	DA	M	MA	MB
20	131	110	40	70	15.5	102	27	16	8	26	M22×1.5	14	21
25	135	114	44	70	15.5	105	30	16	10	30	M22×1.5	14	21
32	141	114	44	70	15.5	108	37	16	12	28	M24×2.0	16	27
40	165	138	46	92	22	130.5	45	20	16	30	M30×2.0	16	27
50	173	146	54	92	22	138	55	20	16	32	M36×2.0	22	27
63	173	146	54	92	22	138	68	20	16	32	M36×2.0	22	27

Bore size/Item	A													
	E	EA	EB	F	FA	G	GA	H	P	K	KA	PA	PA	
20	M8×1.25	20	18.5	12	6	29	7	6	1/8"	8	9	7.5	7.5	
25	M10×1.25	21	19.5	17	6	29	7	8	1/8"	8	9	7.5	7.5	
32	M10×1.25	21	19.5	17	6	32	8	10	1/8"	10	12	7.5	7.5	
40	M12×1.25	22.5	21	17	7	41	9	14	1/4"	12	12	11	11	
50	M14×1.5	24	22.5	19	8	46	11	14	1/4"	12	11	11	11	
63	M14×1.5	24	22.5	19	8	46	11	14	1/4"	12	11	11	11	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### MSBL



Item	A												AB	AC			AD	AF			B	C
	CA			U			≤50	51-100	≥101	≤50	51-100	≥101		≤50	51-100	≥101						
Bore size/Stroke	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	
20	156	181	206	135	160	185	40	95	120	145	15.5	127	152	177	27	16	16	16	16	16	16	
25	160	185	210	139	164	189	44	95	120	145	15.5	130	155	180	30	16	16	16	16	16	16	
32	166	191	216	139	164	189	44	95	120	145	15.5	133	158	183	37	16	16	16	16	16	16	
40	190	215	240	163	188	213	46	117	142	167	22	155.5	180.5	205.5	45	20	20	20	20	20	20	

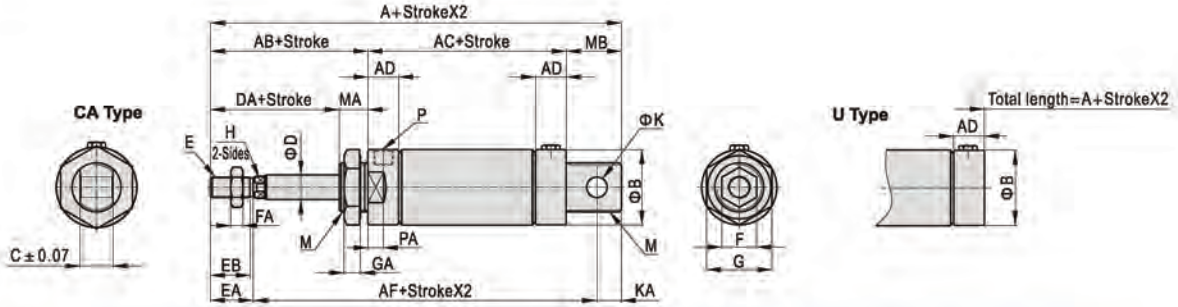
Bore size/Item	A																
	D	DA	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA
20	8	26	M8×1.25	20	18.5	12	6	29	7	6	8	9	M22×1.5	14	21	1/8"	7.5
25	10	30	M10×1.25	21	19.5	17	6	29	7	8	8	9	M22×1.5	14	21	1/8"	7.5
32	12	28	M10×1.25	21	19.5	17	6	32	8	10	10	12	M24×2.0	16	27	1/8"	7.5
40	16	30	M12×1.25	22.5	21	17	7	41	9	14	12	12	M30×2.0	16	27	1/4"	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Aluminum barrel)

## MBL Series

### MTBL

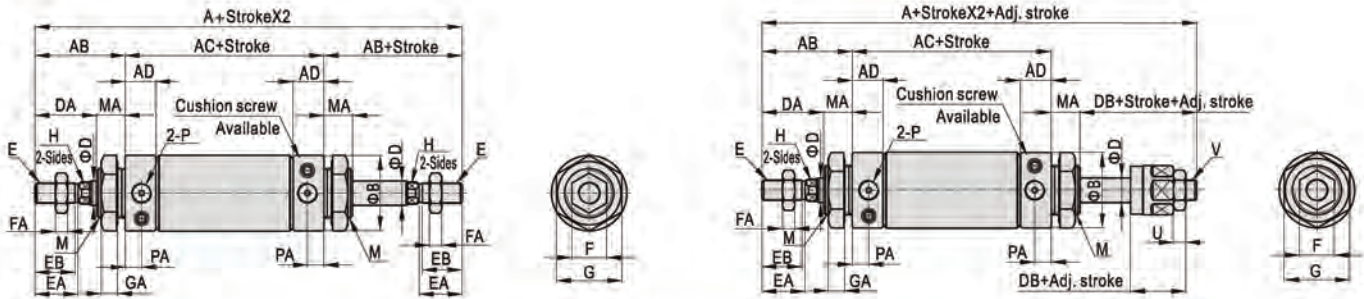


Item	A				AB	AC		AD	AF		B	C	D	DA	
	CA		U			≤50	51-100		≤50	51-100					
Back cover	≤50	51-100	≤50	51-100		≤50	51-100		≤50	51-100					
Bore size/Stroke	20	25	32	40	40	95	120	15.5	127	152	27	16	8	26	
	156	185	185	185	44	95	120	15.5	130	155	30	16	10	30	
	166	191	139	164	44	95	120	15.5	133	158	37	16	12	28	
	190	215	163	188	46	117	142	22	155.5	180.5	45	20	16	30	
Bore size/Item	E	EA	EB	F	FA	G	GA	H	K	KA	M	MA	MB	P	PA
20	M8×1.25	20	18.5	12	6	29	7	6	8	9	M22×1.5	14	21	1/8"	7.5
25	M10×1.25	21	19.5	17	6	29	7	8	8	9	M22×1.5	14	21	1/8"	7.5
32	M10×1.25	21	19.5	17	6	32	8	10	10	12	M24×2.0	16	27	1/8"	7.5
40	M12×1.25	22.5	21	17	7	41	9	14	12	12	M30×2.0	16	27	1/4"	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### MBLD/MBLCD

### MBLJ/MBLCJ



Bore size/Item	A				AB	AC	AD	B	D	DA	DB	E	
	Model	MBLD	MBLCD	MBLJ									MBLCJ
20		150		149	40	70	15.5	27	8	26	25	M8×1.25	
25		158		155	44	70	15.5	30	10	30	27	M10×1.25	
32		158		157	44	70	15.5	37	12	28	27	M10×1.25	
40		184		182	46	92	22	45	16	30	28	M12×1.25	
50		200		196	54	92	22	55	16	32	28	M14×1.5	
63		200		196	54	92	22	68	16	32	28	M14×1.5	
Bore size/Item	EA	EB	F	FA	G	GA	H	M	MA	P	PA	U	V
20	20	18.5	12	6	29	7	6	M22×1.5	14	1/8"	7.5	6	M8×1.25
25	21	19.5	17	6	29	7	8	M22×1.5	14	1/8"	7.5	6	M10×1.25
32	21	19.5	17	6	32	8	10	M24×2.0	16	1/8"	7.5	6	M10×1.25
40	22.5	21	17	7	41	9	14	M30×2.0	16	1/4"	11	7	M12×1.25
50	24	22.5	19	8	46	11	14	M36×2.0	22	1/4"	11	7	M12×1.25
63	24	22.5	19	8	46	11	14	M36×2.0	22	1/4"	11	7	M12×1.25

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Aluminum barrel)

## MBL Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	SDB	I	Y	F	U	CMSG	DMSG(S)
20	F-MA20LB	F-MA20FA	F-MA20SDB	F-MA20I	F-MA20Y	F-M8X125F	F-M8X125U	CMSG	DMSG(S)
25				F-MA25I	F-MA25Y	F-M10X125F	F-M10X125U		
32	F-MA32LB	F-MA32FA	F-MA32SDB	F-MA40I	F-MA40Y	F-M12X125F	F-M12X125U		
40	F-MA40LB	F-MA40FA	F-MA40SDB	F-MAC50I	F-MAC50Y	F-M14X150F	F-M14X150U		
50	F-MA50LB	F-MA50FA		F-MAC50I	F-MAC50Y	F-M14X150F	F-M14X150U		
63	F-MA63LB								

### Accessory selection

Accessories Cylinder model	Mounting accessories	Knuckle[Note1]						Sensor switch		
		LB	FA	SDB	I	Y	U	F	CMSG	DMSG(S)
MBL Standard	●	●	●	●	●	●	●	●	×	×
MBLC With magnet	●	●	●	●	●	●	●	●	●	●
MSBL Standard	●	●	●	●	●	●	●	●	×	×
MTBL With magnet	●	●	●	●	●	●	●	●	●	●
MBLD Standard	●	●	×	●	●	●	●	●	×	×
MBLCD With magnet	●	●	×	●	●	●	●	●	●	●
MBLJ Standard	●	●	×	●	●	●	●	●	×	×
MBLCJ With magnet	●	●	×	●	●	●	●	●	●	●

### Material of accessories

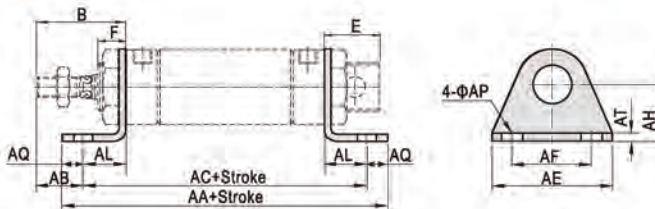
Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	F	U
20-63	○	○	○	□	□	□	□

○—Lower carbon steel; □—Carbon steel;

[Note1] Please refer to P349-352 for knuckle detail.

### Dimensions

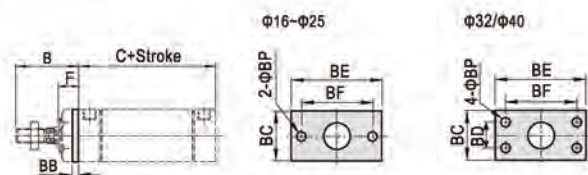
#### LB



Bore size/Item Stroke	AA	AA(MSBL)			AC	AC(MSBL)		
	(MBL)	0-50	51-100	101-150	(MBL)	0-50	51-100	101-150
20	116	141	166	191	100	125	150	175
25	116	141	166	191	100	125	150	175
32	136	161	186	211	120	145	170	195
40	158	183	208	233	142	167	192	217
50	172	-	-	-	148	-	-	-
63	180	-	-	-	154	-	-	-

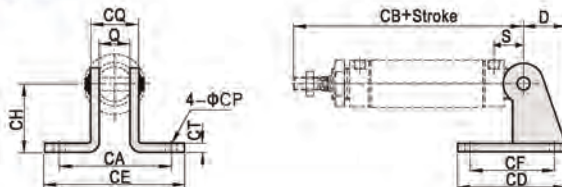
Bore size/Item	B	E	F	AB	AE	AF	AL	AQ	AP	AT	AH
20	40	21	14	25	54	40	15	8	6.5	3	25
25	44	21	14	29	54	40	15	8	6.5	3	25
32	44	27	16	19	59	45	25	8	7	3.5	32
40	46	27	16	21	64	50	25	8	7	3.5	36
50	54	27	22	26	86	66	28	12	11	4.5	40
63	54	27	22	23	106	82	31	13	11	4.5	45

#### FA



Bore size/Item Stroke	B	C	C(MSBL)			BB	BC	BD	BE	BF	BP	F
	(MBL)	0-50	51-100	101-150								
20	40	70	95	120	145	3.5	38	-	64	50	7	14
25	44	70	95	120	145	3.5	38	-	64	50	7	14
32	44	70	95	120	145	4	47	33	72	58	6.5	16
40	46	92	117	142	167	4	50	36	84	70	6.5	16
50	54	92	-	-	-	4.5	65	47	104	86	9	22
63	54	92	-	-	-	4.5	65	47	104	86	9	22

#### SDB



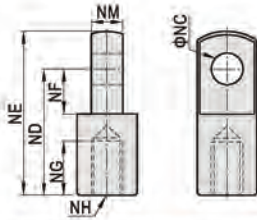
Bore size/Item Stroke	D	S	Q	CA	CB	CB(MSBL)			CD	CE	CF	CH	CT	CP	CQ
	(MBL)	0-50	51-100	101-150											
20	21	12	16	51	122	147	172	197	48	67	32	32	2.5	7	22
25	21	12	16	51	126	151	176	201	48	67	32	32	2.5	7	22
32	27	15	16	51	129	154	179	204	52	67	36	36	3	7	24
40	27	15	20	55	153	178	203	228	56	71	40	40	3	7	28

[Note] SDB is attached with relevant PIN.

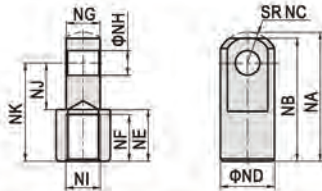
# Mini cylinder(Aluminum barrel)

## MBL Series—Accessories

### I Knuckle

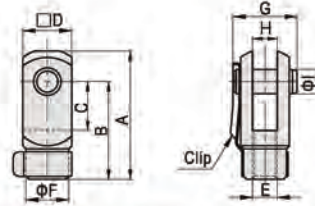


Type/Item	NC	ND	NE	NF	NH	NG	NM
F-MA20I	8	30	40	11	M8×1.25	15	8
F-MA25I	10	40	50	15	M10×1.25	20	10
F-MA40I	10	45	57	16	M12×1.25	23	14

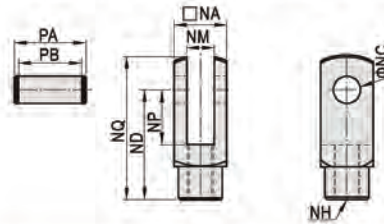


Type/Item	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NI
F-MAC50I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5

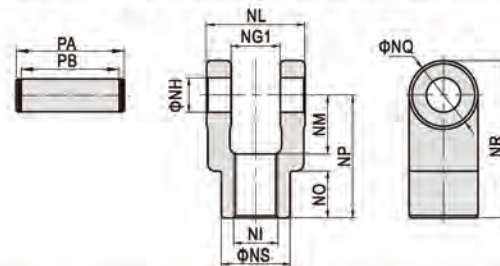
### Y Knuckle



Type/Item	A	B	C	D	E	F	G	H	I
F-MA20Y	42	32	16	16	M8×1.25	14	21	8	8
F-MA25Y	52	40	20	19	M10×1.25	18	25	10	10



Type/Item	NA	NC	ND	NP	NQ	NM	NH	PA	PB
F-MA40Y	25.4	10	45	20	57	14	M12×1.25	32	26.2



Type/Item	Ng1	NH	NI	NL	NM	NO	NP	NQ	NR	NS	PA	PB
F-MAC50Y	14.2	10	M14×1.5	27.8	19	17	40	22	51	22	34.6	28.8



# Compact cylinder—ACE Series

In accordance with ISO21287 standard

## Compendium of ACE Series

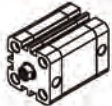
In accordance with ISO21287 standard

In accordance with ISO21287 standard, the mounting size is vogue.

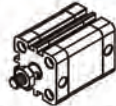
### Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

### Two kinds of rod type

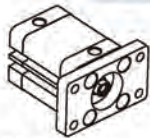


Female thread

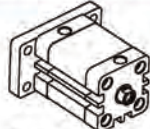


Male thread

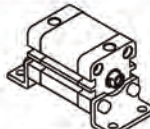
### Multi-mounting accessories



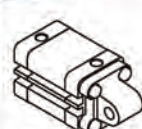
FA Type



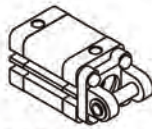
FB Type



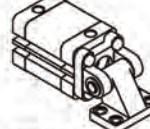
LB Type



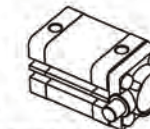
CA Type



CB Type



CR Type



FTC Type



SDB Type

### Multi-type cylinder

ACE: Compact cylinder (Double acting)



ASE: Compact cylinder (Single acting-push)



ATE: Compact cylinder (Single acting-pull)



ACED: Compact cylinder (Double rod)



ACEJ: Compact cylinder (Adjustable stroke)



TACE: Compact cylinder (Double acting non-rotating with yoke)



TACED: Compact cylinder (Double rod non-rotating with yoke)



### Compact structure

Compact structure can effectively save fifty percent installation space with ISO15552 standard cylinder.

### Eleven bore size are available

Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7		
12	6	Single acting	Push side	113.1	-	6.1	17.4	28.7	40.0	51.4	62.7	40	12	Single acting	Push side	1256.6	54.2	179.8	305.5	431.2	556.8	682.5	808.1
			Pull side	84.8	-	0.5	8.9	17.4	25.9	34.4	42.9				1143.5	42.9	157.2	271.6	385.9	500.3	614.6	729.0	
		Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2			1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6		
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4			1143.5	114.4	228.7	343.1	457.4	571.8	686.1	800.5		
16	8	Single acting	Push side	201.1	-	18.1	38.2	58.3	78.4	98.5	118.6	50	16	Single acting	Push side	1963.5	90.1	286.5	482.8	679.2	875.5	1071.9	1268.2
			Pull side	150.8	-	8.1	23.1	38.2	53.3	68.4	83.5				1762.4	70.0	246.3	422.5	598.8	775.0	951.3	1127.5	
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7			1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4		
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6			1762.4	176.2	352.5	528.7	705.0	881.2	1057.5	1233.7		
20	10	Single acting	Push side	314.2	-	33.1	64.5	96.0	127.4	158.8	190.2	63	16	Single acting	Push side	3117.2	173.6	485.3	797.1	1108.8	1420.5	1732.2	2044.0
			Pull side	235.6	-	17.4	41.0	64.5	88.1	111.7	135.2				2916.2	153.5	445.1	736.8	1028.4	1320.0	1611.6	1903.2	
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9			3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1		
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9			2916.2	291.6	583.2	874.9	1166.5	1458.1	1749.7	2041.3		
25	10	Single acting	Push side	490.9	13.8	62.9	112.0	161.0	210.1	259.2	308.3	80	20	Single acting	Push side	5026.5	305.6	808.2	1310.9	1813.5	2316.2	2818.8	3321.5
			Pull side	412.3	5.9	47.2	88.4	129.6	170.9	212.1	253.3				4712.4	274.1	745.4	1216.6	1687.9	2159.1	2630.3	3101.6	
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6			5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6		
			Pull side	412.3	41.2	82.5	123.7	164.9	206.2	247.4	288.6			4712.4	471.2	942.5	1413.7	1885.0	2356.2	2827.4	3298.7		
32	12	Single acting	Push side	804.2	30.8	111.2	191.7	272.1	352.5	432.9	513.4	100	20	Single acting	Push side	7854.0	499.1	1284.5	2069.9	2855.3	3640.7	4426.1	5211.5
			Pull side	691.2	19.5	88.6	157.7	226.9	296.0	365.1	434.2				7539.8	467.7	1221.7	1975.7	2729.6	3483.6	4237.6	4991.6	
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0			7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8		
			Pull side	691.2	69.1	138.2	207.3	276.5	345.6	414.7	483.8			7539.8	754.0	1508.0	2262.0	3015.9	3769.9	4523.9	5277.9		
Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0	12271.8	1227.2	2454.4	3681.5	4908.7	6135.9	7363.1	8590.3						
	Pull side	691.2	69.1	138.2	207.3	276.5	345.6	414.7	483.8	11780.9	1178.1	2356.2	3534.3	4712.4	5890.5	7086.5	8246.6						

## Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

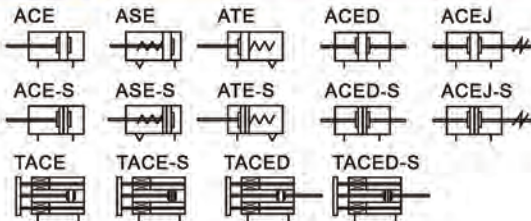


# Compact cylinder

## ACE Series



### Symbol



### Product feature

- In accordance with ISO21287 standard, the mounting size is vogue.
- The cylinder body connects with the threads of the front and back cover, forming high strength and convenient maintenance.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of oil reservation.
- Compact structure can effectively save fifty percent installation space with ISO15552 standard cylinder.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- Bumper is available and it can availably absorb excrement energy.
- Installing accessories with various specifications are optional.

### Ordering code

ACE 20 x 30 S B    
 ACED 20 x 30 S B    
 ACEJ 20 x 30-30 S B

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
ACE: Compact cylinder (Double acting)	12 16 20 25 32 40 50 63 80 100 125	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CA: CA type CB: CB type	CR: CR type FTC: FTC type LB: LB type SDB: SDB type
ASE: Compact cylinder (Single acting-push)	12 16 20 25 32 40 50 63 80 100					Blank: No accessories FB: FB type CA: CA type FTC: FTC type	
ATE: Compact cylinder (Single acting-pull)					Blank: No accessories FB: FB type	Blank: No accessories FB: FB type	
TACE: Compact cylinder (Double acting non-rotating with yoke)					Blank: No accessories FA: FA type FTC: FTC type LB: LB type		Blank: PT G: G
TACED: Compact cylinder (Double rod non-rotating with yoke)					12 16 20 25 32 40 50 63 80 100 125	10 20 30 40 50 75 100	
ACED: Compact cylinder (Double rod)							
ACEJ: Compact cylinder (Adjustable stroke)							

[Note1] Please refer to page 107~109 for accessory parts; CR must be used with CB, SDB must be used with CA, FTC must be used with TCM2.

[Note2] Standard thread is blank here.

### Specification

Bore size (mm)	12	16	20	25	32	40	50	63	80	100	125
Acting type	Double acting										
	Single acting_Push type、Single acting_Pull type										
Fluid	Air (to be filtered by 40μm filter element)										
Operating pressure	Double acting: 0.15~1.0MPa(22~145psi) Single acting: 0.2~1.0MPa(28~145psi)										
Proof pressure	1.5MPa(215psi)										
Temperature ℃	-20~70										
Speed range mm/s	Double acting: 30~500 Single acting: 50~500										
Stroke tolerance	Strokes≤100 <sup>+0</sup> / <sub>0</sub> Stroke>100 <sup>+1.5</sup> / <sub>0</sub>										
Cushion type	Bumper										
Port size [Note1]	M5×0.8								1/8"		1/4"

[Note1] PT thread, G thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)											Max.stroke																		
Common type	Double acting	12	5	10	15	20	25	30	35	40	45	50	50																	
		16	5	10	15	20	25	30	35	40	45	50	55	60	70	75														
		20	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100											
	Single acting	25	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150							
		32 40	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200				
		50 63	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250		
Non-rotating with yoke	Double acting	80 100 125	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100	110	120	125	150	160	175	200	225	250	275	300
		12	5	10	15	20	25	30	35	40	45	50	50																	
		16~100	5	10	15	20	25	30	35	40	45	50	50																	
	Single acting	12	5	10	15	20	25	30	35	40	45	50	50																	
		16	5	10	15	20	25	30	35	40	45	50	55	60	70	75														
		20 25	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100											
Double acting	32 40	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100												
	50 63	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100												
	80 100	5	10	15	20	25	30	35	40	45	50	55	60	70	75	80	90	100												

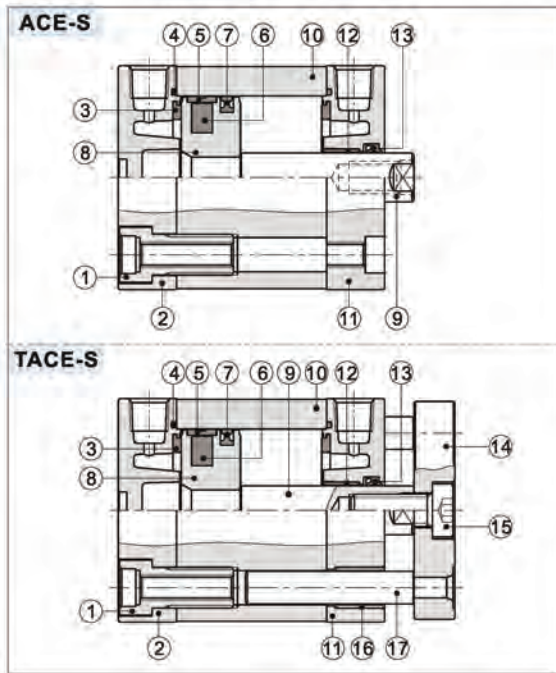
Note) 1. Please contact the company for other special strokes.

2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

# Compact cylinder

## ACE Series

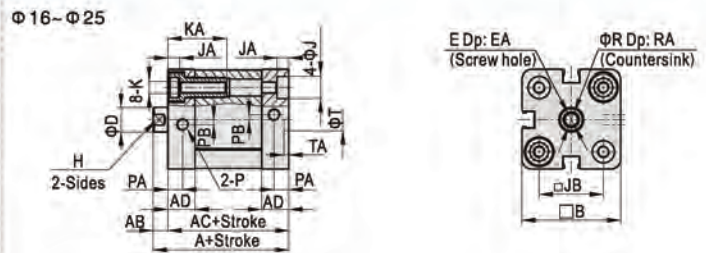
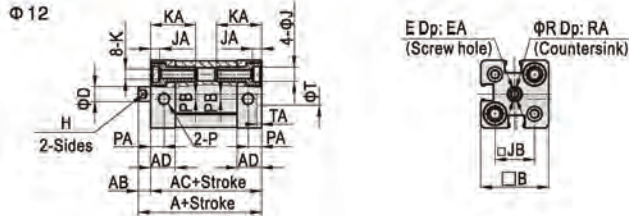
### Inner structure and material of major parts



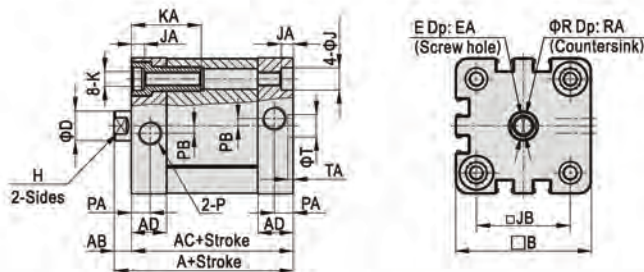
NO.	Item	Material
1	Screw	Carbon steel
2	Back cover	Aluminum alloy
3	Bumper	TPU
4	O-ring	NBR
5	Wear ring	No(Φ12~20)\Wear resistant material(Others)
6	Magnet	Sintered metal(Neodymium-iron-boron)(Φ12~20)\Plastic(Others)
7	Piston seal	NBR
8	Piston	Aluminum alloy
9	Piston rod	S45C
10	Body	Aluminum alloy
11	Front cover	Aluminum alloy
12	Bushing	No(Φ12~25)\Wear resistant material(Others)
13	Front cover packing	NBR
14	Panel	Aluminum alloy
15	Screw	Carbon steel
16	Bushing	Wear resistant material
17	Guide rod	Stainless steel(Φ12~40)\S45C(Others)

### Dimensions

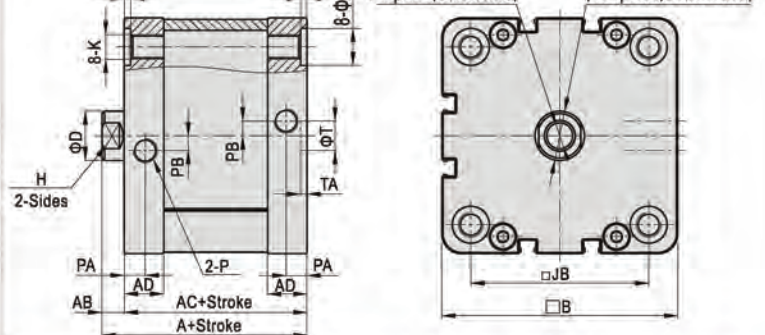
#### ACE



#### Φ32 - Φ63



#### Φ80 - Φ125



Bore size/Item	A	AB	AC	AD	B	D	E	EA	H	J	JA	JB	K	KA	P	PA	PB	R	RA	T	TA
12	40	5	35	10	27.5	6	M3×0.5	8	5	6	3.5	16	M4×0.7	18.5	M5×0.8	5.5	2	3.5	1.5	9	2.1
16	40	5	35	10	30	8	M4×0.7	10	7	6	3.5	18	M4×0.7	18.5	M5×0.8	5.5	2	4.5	1.5	9	2.1
20	43	6	37	10.5	35.5	10	M6×1.0	14	9	9	4.5	22	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
25	45	6	39	11	40	10	M6×1.0	14	9	9	4.5	26	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
32	51	7	44	14	49.5	12	M8×1.25	16	10	9	4.5	32.5	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
40	52.5	7	45.5	14.5	55	12	M8×1.25	16	10	9	4.5	38	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
50	53.5	8	45.5	14.5	65.5	16	M10×1.5	20	13	11	4.5	46.5	M8×1.25	30.5	G1/8	7.5	3	10.5	4.5	12	2.6
63	57	8	49	15	75.5	16	M10×1.5	20	13	11	4.5	56.5	M8×1.25	30.5	G1/8	7.5	4	10.5	4.5	12	2.6
80	63	9	54	16	95.5	20	M12×1.75	20	17	15	2.5	72	M10×1.5	-	G1/8	8.5	6	12.5	6	12	2.6
100	76	9	67	19	113.5	20	M12×1.75	20	17	15	2.5	89	M10×1.5	-	G1/8	10.5	7	12.5	6	12	2.6
125	92	11	81	20	134.5	25	M16×2.0	25	21	-	-	110	M12×1.75	-	G1/4	10.5	8	16.5	7	12	2.6

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Please refer to page 106 for male thread dimensions.

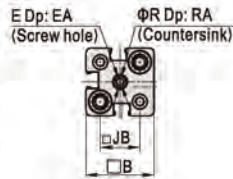
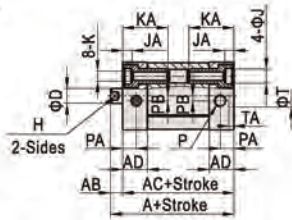


# Compact cylinder

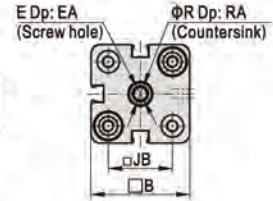
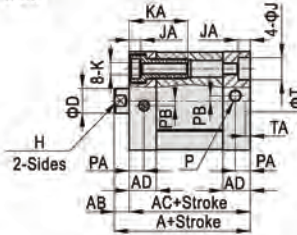
## ACE Series

### ASE

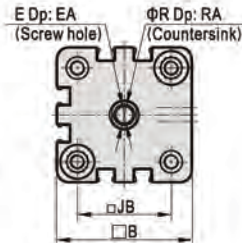
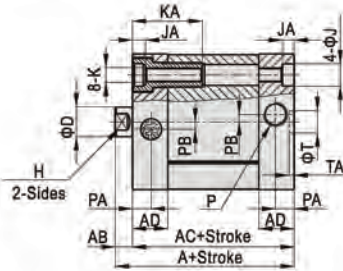
Φ 12



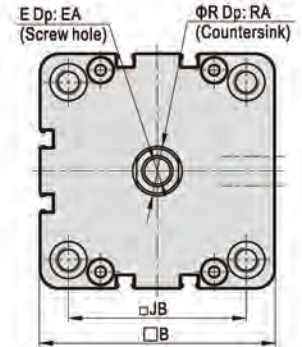
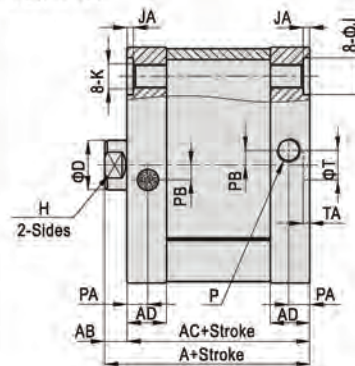
Φ 16~Φ 25



Φ 32~Φ 63

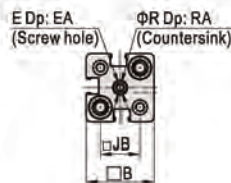
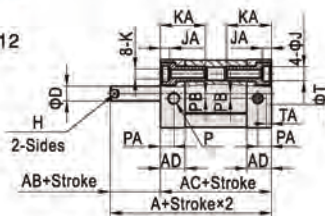


Φ 80/Φ 100

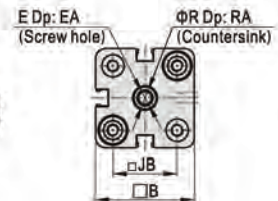
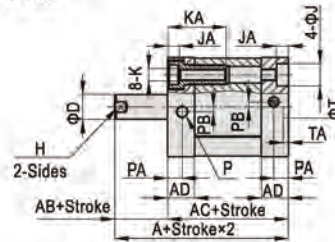


### ATE

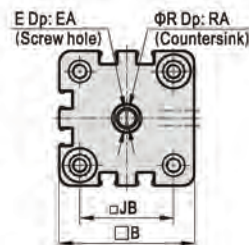
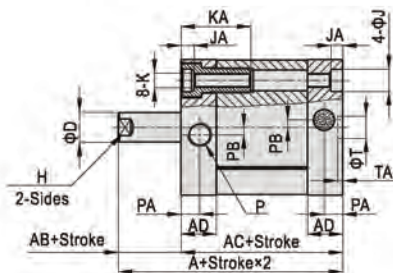
Φ 12



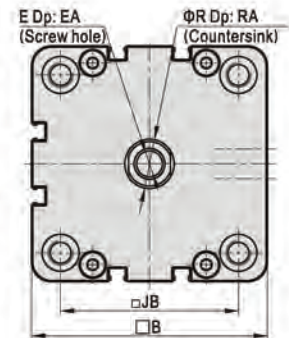
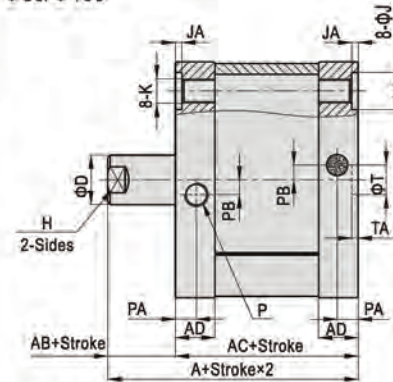
Φ 16~Φ 25



Φ 32~Φ 63



Φ 80/Φ 100



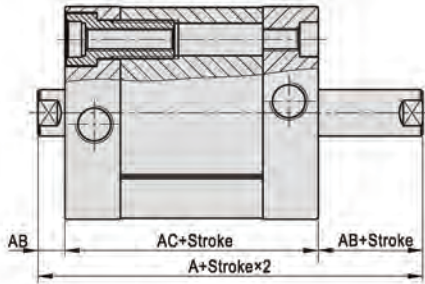
Bore size/Item	A	AB	AC	AD	B	D	E	EA	H	J	JA	JB	K	KA	P	PA	PB	R	RA	T	TA
12	40	5	35	10	27.5	6	M3×0.5	8	5	6	3.5	16	M4×0.7	18.5	M5×0.8	5.5	2	3.5	1.5	9	2.1
16	40	5	35	10	30	8	M4×0.7	10	7	6	3.5	18	M4×0.7	18.5	M5×0.8	5.5	2	4.5	1.5	9	2.1
20	43	6	37	10.5	35.5	10	M6×1.0	14	9	9	4.5	22	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
25	45	6	39	11	40	10	M6×1.0	14	9	9	4.5	26	M5×0.8	23.5	M5×0.8	6	2	6.5	2.5	9	2.1
32	51	7	44	14	49.5	12	M8×1.25	16	10	9	4.5	32.5	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
40	52.5	7	45.5	14.5	55	12	M8×1.25	16	10	9	4.5	38	M6×1.0	28.5	G1/8	7.5	3	8.5	3.5	9	2.1
50	53.5	8	45.5	14.5	65.5	16	M10×1.5	20	13	11	4.5	46.5	M8×1.25	30.5	G1/8	7.5	3	10.5	4.5	12	2.6
63	57	8	49	15	75.5	16	M10×1.5	20	13	11	4.5	56.5	M8×1.25	30.5	G1/8	7.5	4	10.5	4.5	12	2.6
80	63	9	54	16	95.5	20	M12×1.75	20	17	15	2.5	72	M10×1.5	—	G1/8	8.5	6	12.5	6	12	2.6
100	76	9	67	19	113.5	20	M12×1.75	20	17	15	2.5	89	M10×1.5	—	G1/8	10.5	7	12.5	6	12	2.6

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder. Please refer to page 106 for male thread dimensions.

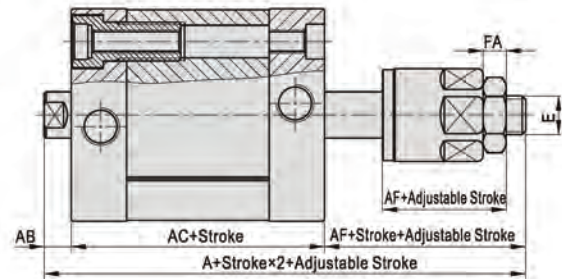
# Compact cylinder

## ACE Series

### ACED



### ACEJ

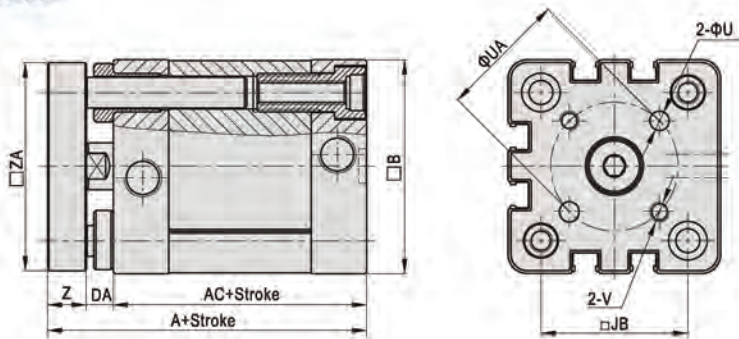


Bore size/Item	A(ACED)	A(ACEJ)	AB	AC	AF	FA	E
12	45	57	5	35	17	4	M5×0.8
16	45	61	5	35	21	5	M6×1.0
20	49	68	6	37	25	6	M8×1.25
25	51	70	6	39	25	6	M8×1.25
32	58	78	7	44	27	6	M10×1.25
40	59.5	79.5	7	45.5	27	6	M10×1.25
50	61.5	81.5	8	45.5	28	7	M12×1.25
63	65	85	8	49	28	7	M12×1.25
80	72	92	9	54	29	8	M16×1.5
100	85	105	9	67	29	8	M16×1.5
125	103	127.5	11	81	35.5	10	M20×1.5

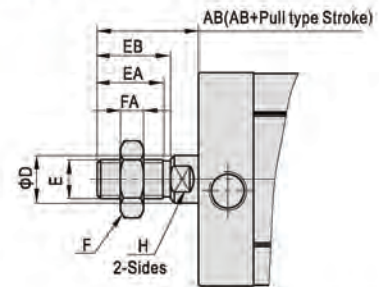
Remark:

1. The unmarked dimension is the same as ACE standard type
2. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### TACE

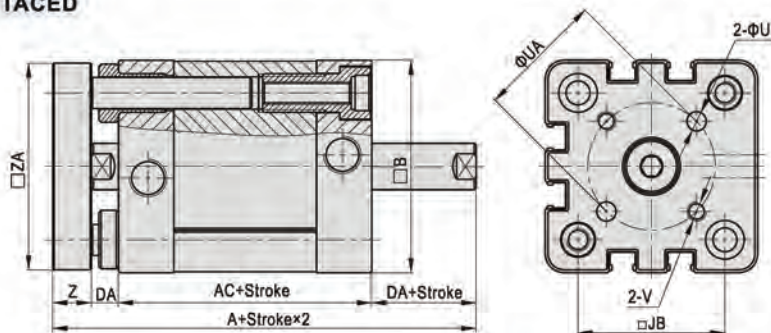


### Male thread



Bore size/Item	AB	D	E	EA	EB	F	FA	H
12	15	6	M5×0.8	9	10	8	4	5
16	17	8	M6×1.0	11	12	10	5	7
20	22	10	M8×1.25	15	16	12	6	9
25	22	10	M8×1.25	15	16	12	6	9
32	26	12	M10×1.25	17	19	17	6	10
40	26	12	M10×1.25	17	19	17	6	10
50	30	16	M12×1.25	20	22	17	7	13
63	30	16	M12×1.25	20	22	17	7	13
80	37	20	M16×1.5	26	28	23	8	17
100	37	20	M16×1.5	26	28	23	8	17
125	51	25	M20×1.5	38	40	26	10	21

### TACED



Bore size/Item	A(TACE)	A(TACED)	AC	B	DA	JB	U	UA	V	Z	ZA
12	46	51	35	27.5	5	16	3	12	M3×0.5	6	26.5
16	46	51	35	30	5	18	3	14	M3×0.5	6	29
20	51	57	37	35.5	6	22	4	17	M4×0.7	8	34.5
25	53	59	39	40	6	26	5	22	M5×0.8	8	39
32	61	68	44	49.5	7	32.5	5	28	M5×0.8	10	48
40	62.5	69.5	45.5	55	7	38	5	33	M5×0.8	10	53.5
50	65.5	73.5	45.5	65.5	8	46.5	6	42	M6×1.0	12	64
63	69	77	49	75.5	8	56.5	6	50	M6×1.0	12	74
80	77	86	54	95.5	9	72	8	65	M8×1.25	14	94
100	90	99	67	113.5	9	89	10	80	M10×1.5	14	112

Remark:

1. The unmarked dimension is the same as ACE standard type
2. The dimensions of magnet type cylinder are the same as non-magnet type cylinder.



### List for ordering code of accessories

Accessories Bore size	Mounting accessories									Knuckle				Sensor switch	
	LB	FA/FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	F	U	CMSE	DMSE	
12	F-ACE12LB	F-ACE12FA	F-ACE12CA	-	-	F-M12SDB	-	-	F-ACQ12I	F-ACQ12Y	F-M5X080F	F-M5X080U	CMSE	DMSE	
16	F-ACP12LB	F-ACE16FA	F-ACE16CA	-	-	F-M12SDB	-	-	F-M6X100I	F-M6X100Y	F-M6X100F	F-M6X100U			
20	F-ACP20LB	F-ACE20FA	F-ACE20CA	-	-	F-M20SDB	-	-	F-M8X125I	F-M8X125Y	F-M8X125F	F-M8X125U			
25	F-ACP25LB	F-ACE25FA	F-ACE25CA	-	-	F-M20SDB	-	-	F-M10X125I	F-M10X125Y	F-M10X125F	F-M10X125U			
32	F-ACE32LB	F-SI32FA	F-SE32CA	F-SE32CB	F-SI32CR	-	F-SI32FTC	F-SI32TCM2	F-M12X125I	F-M12X125Y	F-M12X125F	F-M12X125U			
40	F-ACE40LB	F-SI40FA	F-SE40CA	F-SE40CB	F-SI40CR	-	F-SI40FTC	F-SI40TCM2	F-M16X150I	F-M16X150Y	F-M16X150F	F-M16X150U			
50	F-ACE50LB	F-SI50FA	F-SE50CA	F-SE50CB	F-SI50CR	-	F-SI50FTC	F-SI40TCM2	F-M20X150I	F-M20X150Y	F-M20X150F	F-M20X150U			
63	F-ACE63LB	F-SI63FA	F-SE63CA	F-SE63CB	F-SI63CR	-	F-SI63FTC	F-SI63TCM2							
80	F-ACE80LB	F-SI80FA	F-SE80CA	F-SE80CB	F-SI80CR	-	F-SI80FTC	F-SI63TCM2							
100	F-ACE100LB	F-SI100FA	F-SE100CA	F-SE100CB	F-SI100CR	-	F-SI100FTC	F-SI125TCM2							
125	-	F-SI125FA	F-SE125CA	F-SE125CB	F-SI125CR	-	F-SI125FTC	F-SI125TCM2							

### Accessory selection

Cylinder model\Accessories			Mounting accessories									Knuckle[Note1]				Sensor switch	
			LB	FA	FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	U	F	CMSE	DMSE
ACE	Female thread	Without magnet										×	×	×	×	×	×
		With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Male thread	Without magnet										●	●	●	●	×	×
		With magnet										●	●	●	●	●	●
ASE ATE	Female thread	Without magnet										×	×	×	×	×	×
		With magnet	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Male thread	Without magnet										●	●	●	●	×	×
		With magnet										●	●	●	●	●	●
ACED ACEJ	Female thread	Without magnet										×	×	×	×	×	×
		With magnet	●	●	×	×	×	×	×	●	●	●	●	●	●	●	●
	Male thread	Without magnet										●	●	●	●	×	×
		With magnet										●	●	●	●	●	●
TACE	Female thread	Without magnet	×	×	●	●	●	●	●	●	●	×	×	×	×	×	×
		With magnet										●	●	●	●	●	●
TACED	Female thread	Without magnet	×	×	●	×	×	×	×	×	×	×	×	×	×	×	×
		With magnet											●	●	●	●	●

[Note1] The I knuckle and Y knuckle for bore  $\Phi 12$  are adaptable to ACQ cylinders, and other knuckles are common parts. Please refer to P349-352 for knuckle detail.

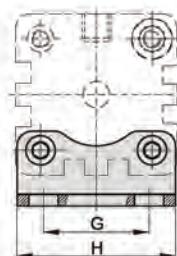
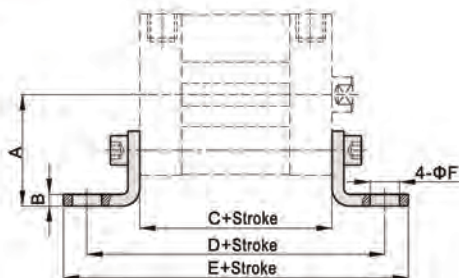
### Material of accessories

Accessories Bore size	Mounting accessories									Knuckle			
	LB	FA	FB	CA	CB	CR	SDB	FTC	TCM2	I	Y	F	U
12~25	△	●	●	●	-	-	△	■	●	□	□	□	□
32~100	△	●	●	◇	◇	◇	-	■	●	□	□	□	□
125	-	◇	◇	◇	◇	◇	-	■	●	□	□	□	□

●—Aluminum alloy; ■—Cast iron; ◇—Ductile Iron; △—SPCC; □—Carbon Steel

### Dimensions

#### LB



Bore size\Item	A	B	C	D	E	F	G	H
12	21	3	35	61	71	5.5	16	25
16	22	3	35	61	70.6	5.5	18	27
20	27	3.8	37	69	81.6	6.5	22	34
25	29	3.8	39	71	83.6	6.5	26	38
32	33.5	4	44	76	89	7	32	48
40	38	4	45.5	81.5	97.5	10	36	54
50	45	5	45.5	87.5	103.5	10	45	65
63	50	5	49	91	107	10	50	75
80	63	6	54	106	127	12	63	95
100	74	6	67	121	146	14.5	75	112

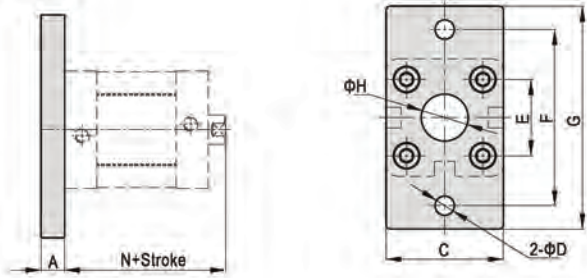
[Note] Valve C in the above table is only for ACE series. Please refer to relevant content for valve C of other series.

# Compact cylinder

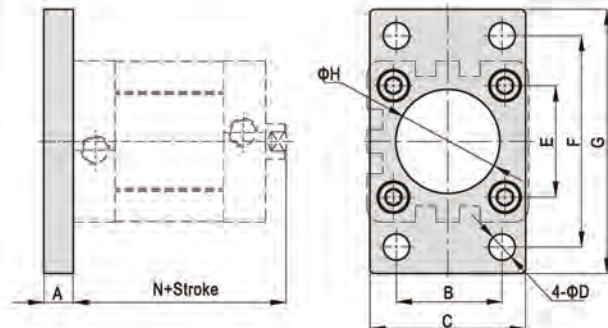
## ACE Series—Accessories

### FA/FB

Φ 12~Φ 25



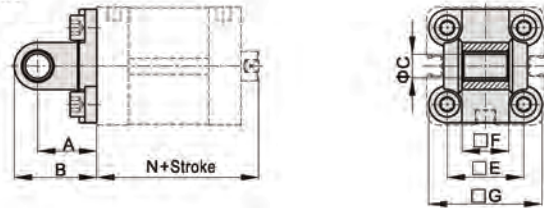
Φ 32~Φ 125



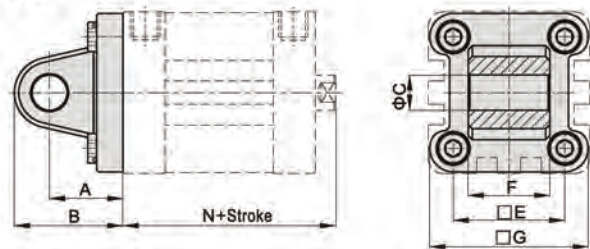
Bore size/Item	A	B	C	D	E	F	G	H	N
12	8	-	25	5.5	16	40	55	10	40
16	8	-	30	5.5	18	43	55	10	40
20	8	-	35	6.6	22	55	68	16	43
25	8	-	39.5	6.6	26	60	76	16	45
32	10	32	47	7	32.5	64	80	30.5	51
40	10	36	53	9	38	72	90	35.5	52.5
50	12	45	65	9	46.5	90	108	40.5	53.5
63	12	50	75	9	56.5	100	118	45.5	57
80	16	63	95	12.5	72	126	150	45.5	63
100	16	75	115	14.5	89	150	176	55.5	76
125	20	90	139	16.5	110	180	218	60.5	92

### CA

Φ 12~Φ 25

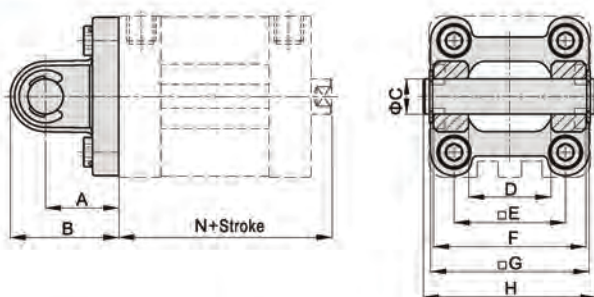


Φ 32~Φ 125



Bore size/Item	A	B	C	E	F	G	N
12	16	22	6	16	11.9	24	40
16	16	22	6	18	11.9	28.5	40
20	20	28	8	22	15.9	34.5	43
25	20	28	8	26	15.9	38.5	45
32	22	32.5	10	32.5	25.8	46.5	51
40	25	37	12	38	27.8	54	52.5
50	27	39	12	46.5	31.7	64	53.5
63	32	47	16	56.5	39.7	75	57
80	36	51.5	16	72	49.7	93	63
100	41	61	20	89	59.7	110	76
125	50	74	25	110	69.7	134	92

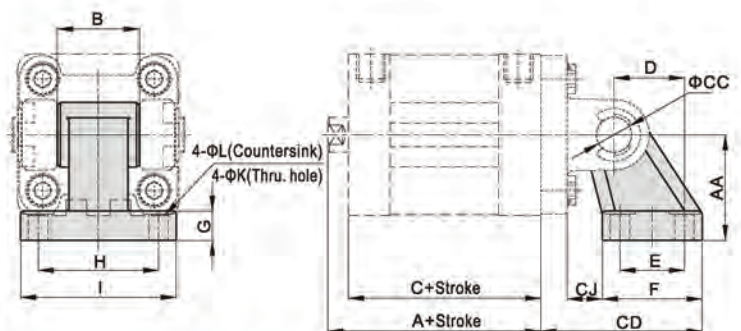
### CB Φ 32~Φ 125



Bore size/Item	A	B	C	D	E	F	G	H	N
32	22	32.5	10	26	32.5	45	46.5	51	51
40	25	37	12	28	38	52	54	59	52.5
50	27	39	12	32	46.5	60	64	67	53.5
63	32	47	16	40	56.5	70	75	77	57
80	36	51.5	16	50	72	90	93	97	63
100	41	61	20	60	89	110	110	119	76
125	50	74	25	70	110	130	134	139	92

[Note] CB is attached with relevant PIN.

### CR Φ 32~Φ 125



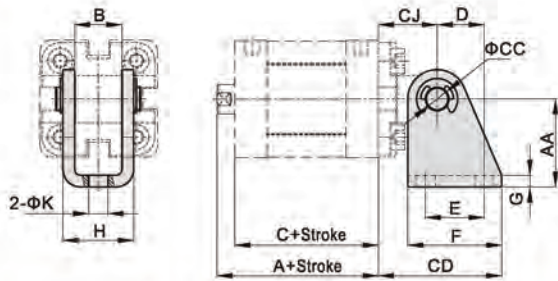
Bore size/Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	I	K	L
32	51	32	26	44	10	50	10	21	18	31	8	38	51	6.6	11
40	52.5	36	28	45.5	12	56	12	24	22	35	10	41	54	6.6	11
50	53.5	45	32	45.5	12	68	13	33	30	45	12	50	65	9	14
63	57	50	40	49	16	77	17	37	35	50	12	52	67	9	14
80	63	63	50	54	16	93	19	47	40	60	14	66	86	11	17
100	76	71	60	67	20	106	22	55	50	70	15	76	96	11	17
125	92	90	70	81	25	135	26	70	60	90	20	94	124	14	20

[Note] CR can't be used alone, it must be used with CB.

# Compact cylinder

## ACE Series—Accessories

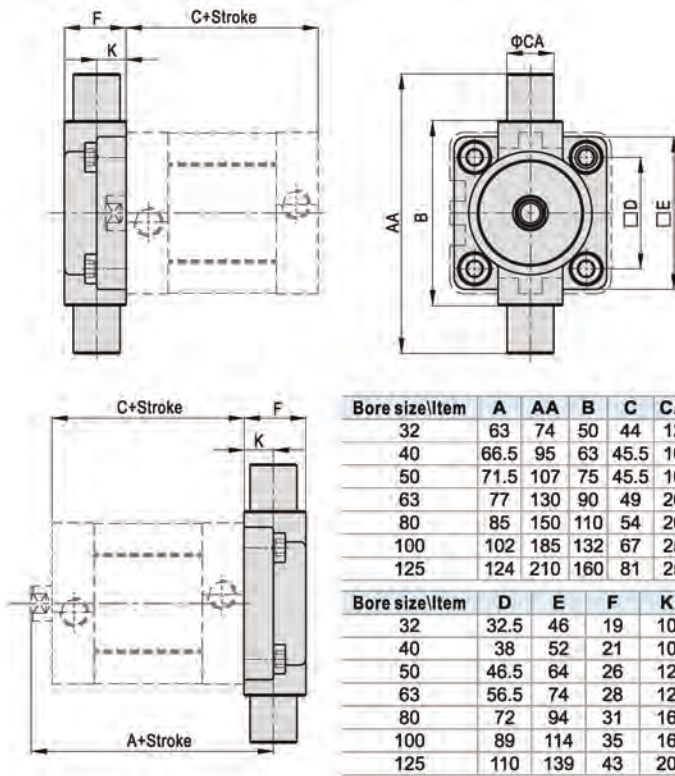
**SDB**  $\phi 12\text{--}\phi 25$



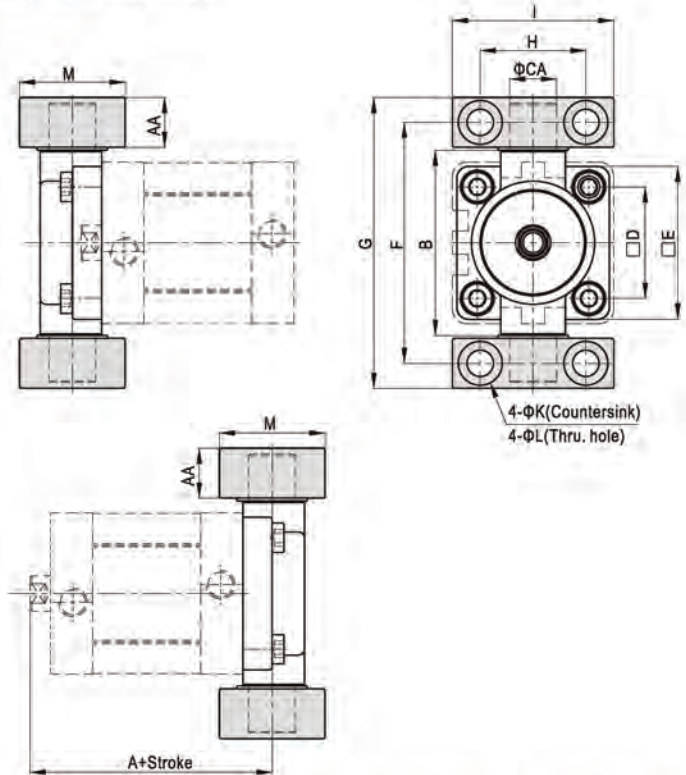
Bore size/Item	A	AA	B	C	CC	CD	CJ	D	E	F	G	H	K
12	40	27	12.1	35	6	34	16	13	15	25	2	18.1	5.5
16	40	27	12.1	35	6	34	16	13	15	25	2	18.1	5.5
20	43	30	16.1	37	8	42	20	16	20	32	2.5	24.1	6.6
25	45	30	16.1	39	8	42	20	16	20	32	2.5	24.1	6.6

[Note] SDB can't be used alone, it must be used with CA.

**FTC**  $\phi 32\text{--}\phi 125$



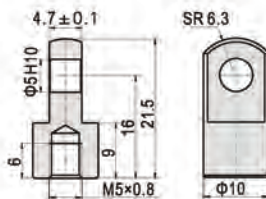
**TCM2**  $\phi 32\text{--}\phi 125$



Bore size/Item	A	AA	B	CA	D	E	F	G	H	I	K	L	M
32	63	14	52	12	32.5	46	66	80	32	46	11	7	30
40	66.5	17	65	16	38	52	82	99	36	55	15	9	36
50	71.5	17	75	16	46.5	64	94	111	36	55	15	9	36
63	77	20.5	90	20	56.5	74	113.5	134	42	65	18	11	40
80	85	20.5	112	20	72	94	133.5	154	42	65	18	11	40
100	102	24.5	135	25	89	114	159.5	184	50	75	20	14	50
125	124	24.5	170	25	110	139	187.5	212	50	75	20	14	50

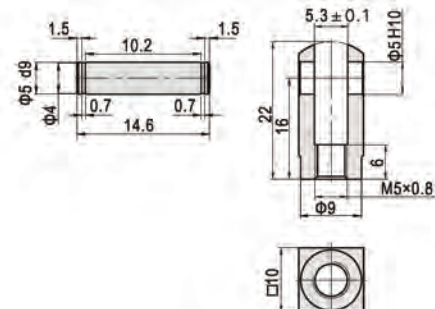
[Note] TCM2 can't be used alone, it must be used with FTC.  
The installation position of the accessories can not be adjusted arbitrarily.

**I Knuckle** F-ACQ12I



[Note] Other I knuckles are common parts.  
Please refer to P349 for knuckle detail.

**Y Knuckle** F-ACQ12Y



[Note] Other Y knuckles are common parts.  
Please refer to P350 for knuckle detail.



# Compact cylinder—ACQ Series

## Compendium of ACQ Series

**In accordance with JIS standard**

**Magnetic switch slots around the cylinder body**  
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

**Two kinds of rod type**  
Female thread      Male thread

**Multi-mounting accessories**  
FA Type      FB Type      LB Type      CB Type

**Thirteen bore size are available**  
Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160

**Multi-type cylinder**

ACQ: Compact cylinder (Double acting)	
ASQ: Compact cylinder (Single acting-push)	
ATQ: Compact cylinder (Single acting-pull)	
ACQD: Compact cylinder (Double rod)	
ACQJ: Compact cylinder (Adjustable stroke)	
TACQ: Compact cylinder (Double acting with guider)	

**Compact structure**  
C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7		
12	6	Single acting	Push side	113.1	-	13.6	24.9	36.2	47.5	58.9	70.2	40	16	Single acting	Push side	1256.6	44.7	170.3	296.0	421.7	547.3	673.0	798.6
			Pull side	84.8	-	8.0	16.4	24.9	33.4	41.9	50.4				1055.6	24.6	130.1	235.7	341.2	446.8	552.3	657.9	
		Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2			Double Push side	1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6	
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4			Double Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9	
16	8	Single acting	Push side	201.1	-	27.0	47.1	67.2	87.3	107.4	127.5	50	20	Single acting	Push side	1963.5	96.3	292.7	489.0	685.4	881.7	1078.1	1274.4
			Pull side	150.8	-	17.0	32.0	47.1	62.2	77.3	92.4				Double Push side	1649.3	64.9	229.9	394.8	559.7	724.7	889.6	1054.5
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7			Double Push side	1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4	
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6			Double Pull side	1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5	
20	10	Single acting	Push side	314.2	-	36.8	66.2	99.7	131.1	162.5	193.9	63	20	Single acting	Push side	3117.2	141.7	453.4	765.2	1076.9	1388.6	1700.3	2012.1
			Pull side	235.6	-	21.1	44.7	68.2	91.8	115.4	138.9				Double Push side	2803.1	110.3	390.6	670.9	951.2	1231.5	1511.9	1792.2
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9			Double Pull side	3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1	
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9			Double Push side	2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2	
25	12	Single acting	Push side	490.9	18.1	67.2	116.3	165.3	214.4	263.5	312.6	80	25	Double acting	Push side	5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
			Pull side	377.8	6.8	44.6	82.3	120.1	157.9	195.7	233.4				Double Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6			Double Push side	7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8	
			Pull side	377.8	37.8	75.6	113.3	151.1	188.9	226.7	264.4			Double Pull side	7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8	
32	16	Single acting	Push side	804.2	27.4	107.8	188.3	268.7	349.1	429.5	510.0	100	32	Double acting	Push side	12271.8	1227.2	2454.4	3681.5	4908.7	6135.9	7363.1	8590.2
			Pull side	603.2	7.3	67.6	128.0	188.3	248.6	308.9	369.2				Double Pull side	11467.6	1146.8	2293.5	3440.3	4587.0	5733.8	6880.6	8027.3
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0			Double Push side	15393.8	1539.4	3078.8	4618.1	6157.5	7696.9	9236.3	10775.7	
			Pull side	603.2	60.3	120.6	181.0	241.3	301.6	361.9	422.2			Double Pull side	14589.6	1459.0	2917.9	4376.9	5835.8	7294.8	8753.8	10212.7	
140	32	Double acting	Push side	20106.2	2010.6	4021.2	6031.9	8042.5	10053.1	12063.7	14074.3	160	40	Double acting	Push side	18849.6	1885.0	3769.9	5654.9	7539.8	9424.8	11309.8	13194.7
			Pull side	14589.6	1458.9	2917.9	4376.9	5835.8	7294.8	8753.8	10212.7				Double Pull side	18849.6	1884.9	3769.9	5654.9	7539.8	9424.8	11309.8	13194.7

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.
- C clip Installation:
  - Removal & Installation of C clip must be done with proper tool & care.
  - Ensure C clip is securely fitted into the proper slot to prevent leakage.

## ACQ Series

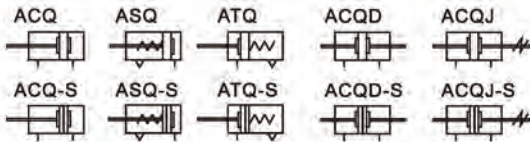


### Specification

Bore size(mm)		12	16	20	25	32	40	50	63	80	100	
Acting type		Double acting										
		Single acting_Push type、Single acting_Pull type										
Fluid		Air(to be filtered by 40 μ m filter element)										
Operating pressure	Double acting	0.15~1.0MPa(22~145psi)										
	Single acting	0.2~1.0MPa(28~145psi)										
Proof pressure		1.5MPa(215psi)										
Temperature °C		-20~70										
Speed range mm/s		Double acting: 30~500					Single acting: 50~500					
Stroke tolerance		Stroke≤100 <sup>+1.0</sup> <sub>0</sub> Stroke>100 <sup>+1.5</sup> <sub>0</sub>										
Cushion type		Bumper										
Port size [Note1]		M5×0.8					1/8"	1/4"	3/8"			

[Note1] PT thread, G thread thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

- JIS standard is implemented.
- C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
- Compact structure can effectively save installation space.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- Installing accessories with various specifications are optional.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke						
	5	10	15	20	25	30	35	40	45	50							
12	Double acting	5	10	15	20	25	30	35	40	45	50	50					
	Single acting	5	10	15	20							20					
16	Double acting	5	10	15	20	25	30	35	40	45	50	55	60				
	Single acting	5	10	15	20							20					
20	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										30
25	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
32	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
40	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
50	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
63	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
80	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
100	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										

- Note) 1. Please contact the company for other special strokes.  
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

### Ordering code

ACQ 20×30 S B □ □  
 ACQD 20×30 S B □ □  
 ACQJ 20×30-30 S B □ □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

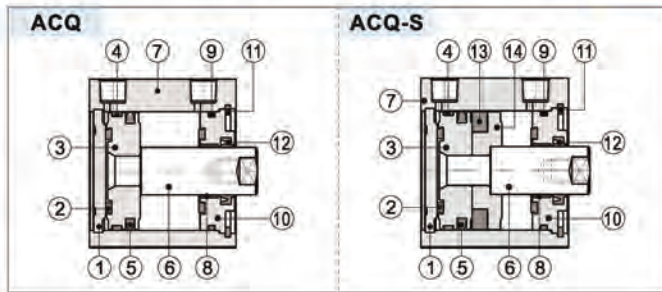
① Model	② Bore size	③ Stroke	④ Adjustable Stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
ACQ: Compact cylinder (Double acting)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	Blank: PT G: G T: NPT
ASQ: Compact cylinder (Single acting-push)	12 16 20 25 32 40 50 63						
ATQ: Compact cylinder (Single acting-pull)	12 16 20 25 32 40 50 63						
ACQD: Compact cylinder (Double rod)	12 16 20 25 32 40 50 63						
ACQJ: Compact cylinder (Adjustable stroke)	80 100						
			10 20 30 40 50 75 100			Blank: No accessories FA: FA type FB: FB type LB: LB type	

[Note1] Please refer to page 122~123 for accessory parts.

[Note2] Standard thread is blank here.

## ACQ Series

### Inner structure and material of major parts

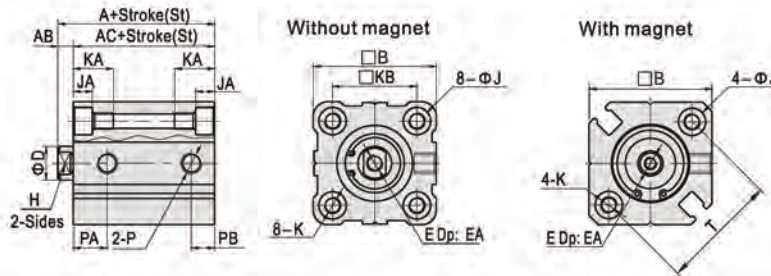


NO.	Item	Material
1	Back cover	No(Φ 12, 16)\Aluminum alloy(Others)
2	Bumper	TPU(Φ 12~25)\NBR(Others)
3	Piston	Brass(Φ 12, 16)\Aluminum alloy(Others)
4	Wear ring	No(Φ 12~32)\Wear resistant material(Others)
5	Piston seal	NBR
6	Piston rod	Carbon steel with 20 μ m chrome plated
7	Body	Aluminum alloy
8	Bushing	No(Φ 12~32)\Wear resistant material(Others)
9	O-ring	NBR
10	Front cover	Aluminum alloy
11	C clip	Spring steel
12	Front cover packing	NBR
13	Magnet	Sintered metal(Neodymium-iron-boron)(Φ 12~25)\Plastic(Others)
14	Magnet holder	Brass(Φ 12, 16)\Aluminum alloy(Others)

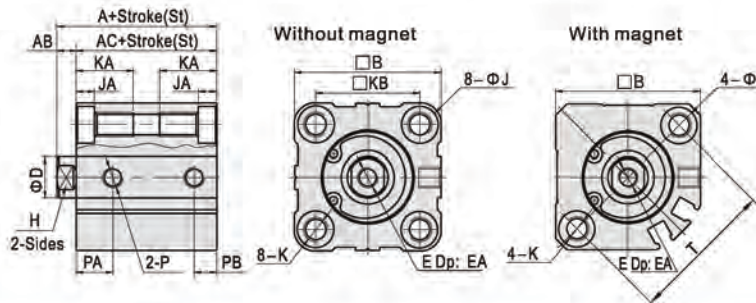
### Dimensions

#### ACQ

Φ 12, Φ 16

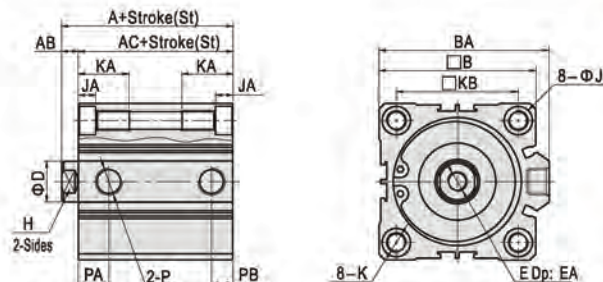


Φ 20, Φ 25



Type	Without magnet				With magnet														Without magnet		With magnet				
	A		AC		A	AC	AB	B	D	E	EA	H	J	JA	K		KA	KB	P	PA	PB	PA	PB	T	
Bore size\Item	St≤50	St=55	St≥60	St≤50	St=55	St≥60																			
Stroke	20.5	-	-	17	-	-	31.5	28	3.5	25	6	M3×0.5	6	5	6	3.5	M4×0.7 Thru.hole: Φ3.4	11	15.5	M5×0.8	7.5	5	9	7	22
	22	22	-	18.5	18.5	-	34	30.5	3.5	29	8	M4×0.7	8	6	6	3.5	M4×0.7 Thru.hole: Φ3.4	11	20	M5×0.8	8	5.5	9.5	5.5	28
	24	-	34	19.5	-	29.5	36	31.5	4.5	36	10	M5×0.8	7	8	9	5.5	M6×1.0 Thru.hole: Φ5.2	17	25.5	M5×0.8	9	5.5	9.5	5.5	36
	27.5	-	37.5	22.5	-	32.5	37.5	32.5	5	40	12	M6×1.0	12	10	9	5.5	M6×1.0 Thru.hole: Φ5.2	17	28	M5×0.8	11	5.5	11	5.5	40

Φ 32-Φ 100 (Stroke≤100)



Note) The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 55mm stroke cylinder has the same dimensions of 60 std. stroke cylinder.

Item	A(Without magnet)		A	AB	AC(Without magnet)		AC	B	BA	D	E
	St≤50	St≥60			(With magnet)	St≤50					
Bore size	St≤50	St≥60	(With magnet)		St≤50	St≥60	(With magnet)				
32	30	40	40	7	23	33	33	45	49.5	16	M8×1.25
40	36.5	46.5	46.5	7	29.5	39.5	39.5	53	57	16	M8×1.25
50	38.5	48.5	48.5	8	30.5	40.5	40.5	64	71	20	M10×1.5
63	44	54	54	8	36	46	46	77	84	20	M10×1.5
80	53.5	63.5	63.5	10	43.5	53.5	53.5	98	104	25	M16×2.0
100	65	75	75	12	53	63	63	117	123.5	32	M20×2.5

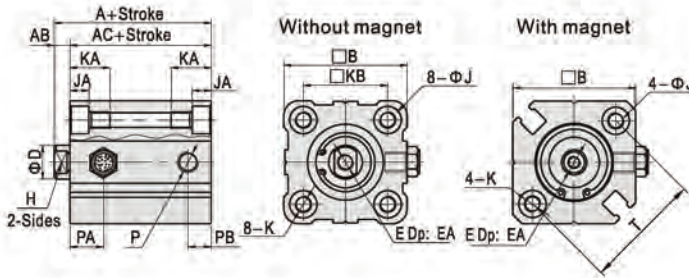
Item	Bore size	EA	H	J	JA	K	KA	KB	P	Without magnet		With magnet	
										PA	PB	PA	PB
32	St=5	13	14	9	5.5	M6×1.0 Thru.hole: Φ5.2	17	34	1/8"	7.5	6.5	10.5	7.5
	St>5	10.5	7.5										
40	St=5	13	14	9	5.5	M6×1.0 Thru.hole: Φ5.2	17	40	1/8"	11	8	11	8
	St>5	9	9										
50	St=5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.8	22	50	1/4"	10.5	10.5	10.5	10.5
	St>5	14	9.5										
63	St=5	15	17	14	9	M10×1.5 Thru.hole: Φ8.5	28.5	60	1/4"	14	9.5	15	10.5
	St>5	15	10.5										
80	St=5	20	22	17	11	M12×1.75 Thru.hole: Φ10.3	35.5	77	3/8"	16	14	16	14
	St>5	20	17.5										
100	St=5	26	27	17	11	M12×1.75 Thru.hole: Φ10.3	35.5	94	3/8"	20	17.5	20	17.5
	St>5	20	17.5										

# Compact cylinder

## ACQ Series

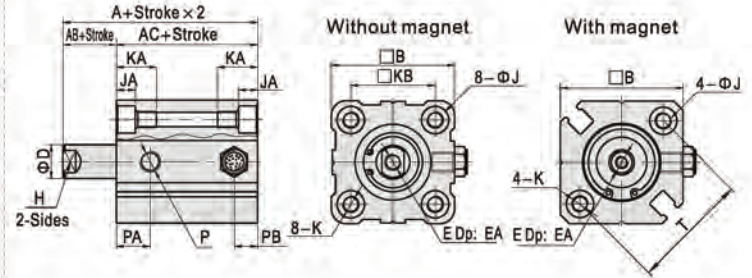
### ASQ

Φ12、Φ16

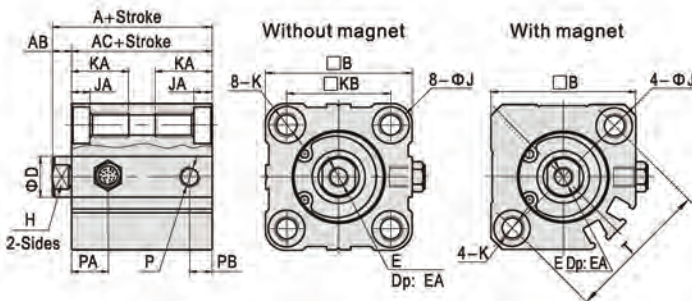


### ATQ

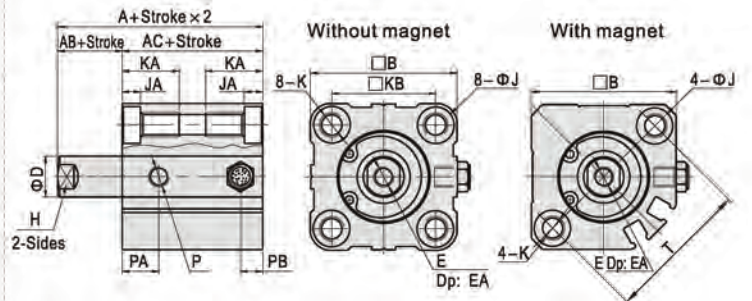
Φ12、Φ16



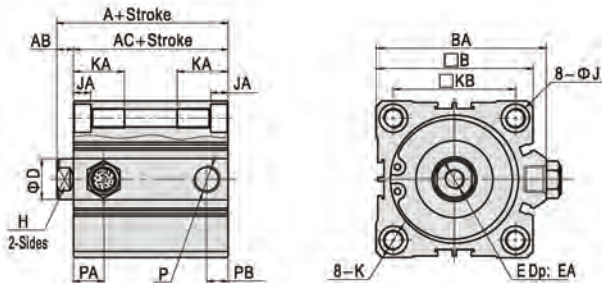
Φ20 Φ25



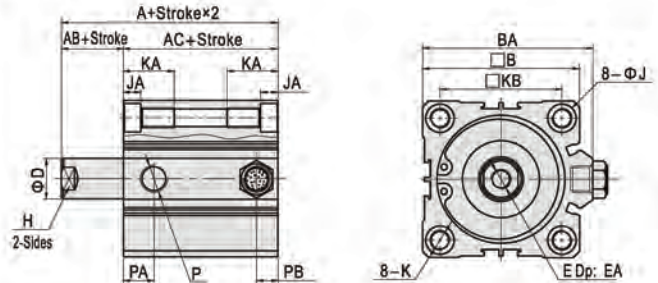
Φ20 Φ25



Φ32-Φ63



Φ32-Φ63



Bore size/Item	A(Without magnet)			A(With magnet)			AB	AC(Without magnet)			AC(With magnet)			B	BA	D	E	EA
	Stroke	5/10	15/20	25/30	5/10	15/20		25/30	5/10	15/20	25/30	5/10	15/20					
12	25.5	30.5	-	36.5	41.5	-	3.5	22	27	-	33	38	-	25	-	6	M3×0.5	6
16	27	32	-	39	44	-	3.5	23.5	28.5	-	35.5	40.5	-	29	-	8	M4×0.7	8
20	29	34	39	41	46	51	4.5	24.5	29.5	34.5	36.5	41.5	46.5	36	-	10	M5×0.8	7
25	32.5	37.5	42.5	42.5	47.5	52.5	5	27.5	32.5	37.5	37.5	42.5	47.5	40	-	12	M6×1.0	12
32	35	40	45	45	50	55	7	28	33	38	38	43	48	45	49.5	16	M8×1.25	13
40	41.5	46.5	51.5	51.5	56.5	61.5	7	34.5	39.5	44.5	44.5	49.5	54.5	53	57	16	M8×1.25	13
50	48.5	53.5	58.5	58.5	63.5	68.5	8	40.5	45.5	50.5	50.5	55.5	60.5	64	71	20	M10×1.5	15
63	54	59	64	64	69	74	8	46	51	56	56	61	66	77	84	20	M10×1.5	15

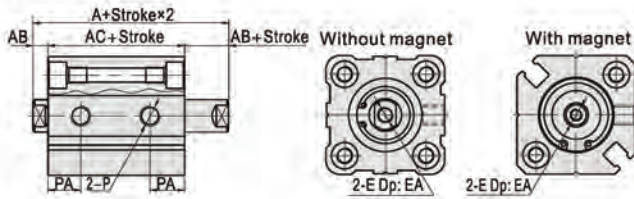
Bore size/Item	H	J	JA	K		KA	KB	P	PA(Without magnet)	PA(With magnet)	PB(Without magnet)	PB(With magnet)	T
12	5	6	3.5	M4×0.7 Thru.hole: Φ3.4		11	15.5	M5×0.8	7.5	9	5	7	22
16	6	6	3.5	M4×0.7 Thru.hole: Φ3.4		11	20	M5×0.8	8	9.5	5.5	5.5	28
20	8	9	5.5	M6×1.0 Thru.hole: Φ5.2		17	25.5	M5×0.8	9	9.5	5.5	5.5	36
25	10	9	5.5	M6×1.0 Thru.hole: Φ5.2		17	28	M5×0.8	11	11	5.5	5.5	40
32	14	9	5.5	M6×1.0 Thru.hole: Φ5.2		17	34	1/8"	10.5	10.5	7.5	7.5	-
40	14	9	5.5	M6×1.0 Thru.hole: Φ5.2		17	40	1/8"	11	11	8	8	-
50	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.8		22	50	1/4"	10.5	10.5	10.5	10.5	-
63	17	14	9	M10×1.5 Thru.hole: Φ8.5		28.5	60	1/4"	15	15	10.5	10.5	-

# Compact cylinder

## ACQ Series

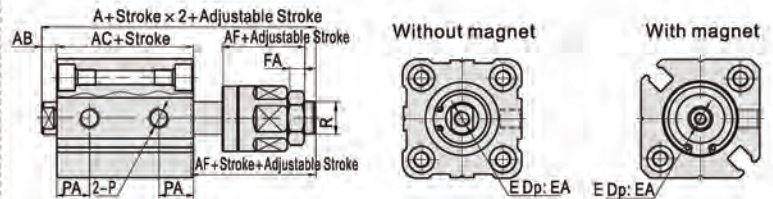
### ACQD

Φ12、Φ16

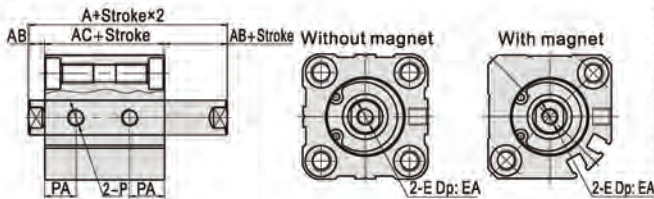


### ACQJ

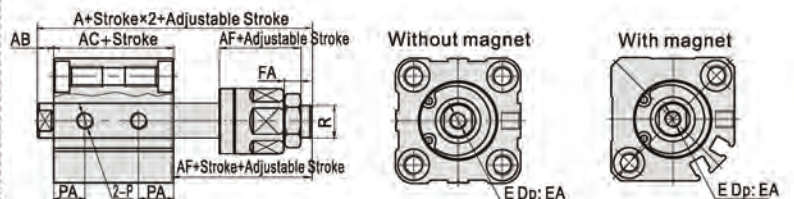
Φ12、Φ16



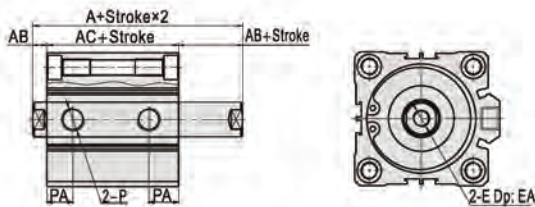
Φ20 Φ25



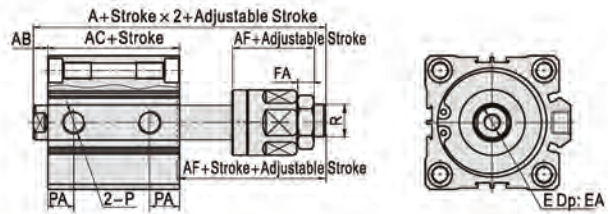
Φ20 Φ25



Φ32~Φ100



Φ32~Φ100

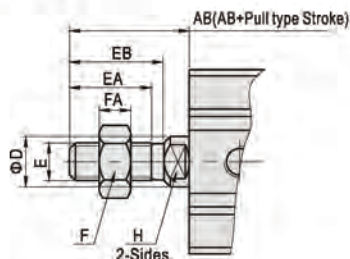


Item	A(ACQD)		A(ACQJ)		AC(ACQD)		AC(ACQJ)		AB	AF	E	EA	FA	PA	R
	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet							
Bore size															
12	32.2	39.4	45.2	52.4	25.2	32.4	25.2	32.4	3.5	17	M3 × 0.5	6	4	9	M5 × 0.8
16	33	43	50	60	26	36	26	36	3.5	21	M4 × 0.7	8	5	9.5	M6 × 1.0
20	35	47	55	67	26	38	26	38	4.5	25	M5 × 0.8	7	6	9.5	M8 × 1.25
25	39	49	60.5	70.5	29	39	29	39	5	27	M6 × 1.0	9.5(St≤5)/12(St>5)	6	11	M10 × 1.25
32	44.5	54.5	64.9	74.9	30.5	40.5	30.5	40.5	7	28	M8 × 1.25	9(St≤10)/13(St>10)	7	10	M12 × 1.25
40	54	64	74.5	84.5	40	50	40	50	7	28	M8 × 1.25	11(St≤10)/13(St>10)	7	13	M12 × 1.25
50	56.5	66.5	77	87	40.5	50.5	40.5	50.5	8	29	M10 × 1.5	12(St≤10)/15(St>10)	8	13.5	M16 × 1.5
63	58	68	78.4	88.4	42	52	42	52	8	29	M10 × 1.5	12(St≤10)/15(St>10)	8	14.5(St=5)/16(St>5)	M16 × 1.5
80	71	81	95.8	105.8	51	61	51	61	10	35.5	M16 × 2.0	14(St≤15)/20(St>15)	10	16	M20 × 1.5
100	84.5	94.5	114.3	124.3	60.5	70.5	60.5	70.5	12	42.5	M20 × 2.5	20(St≤25)/26(St>25)	13.5	21	M27 × 2.0

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

### Male thread

(Bore size: Φ12~Φ100, Strokes≤100)



Bore size\Item	AB	D	E	EA	EB	F	FA	H
12	14	6	M5 × 0.8	9	10.5	8	4	5
16	15.5	8	M6 × 1.0	10	12	10	5	6
20	18.5	10	M8 × 1.25	12	14	12	6	8
25	22.5	12	M10 × 1.25	15	17.5	17	6	10
32	28.5	16	M14 × 1.5	20.5	23.5	19	8	14
40	28.5	16	M14 × 1.5	20.5	23.5	19	8	14
50	33.5	20	M18 × 1.5	26	28.5	27	11	17
63	33.5	20	M18 × 1.5	26	28.5	27	11	17
80	43.5	25	M22 × 1.5	32.5	35.5	32	13	22
100	43.5	32	M26 × 1.5	32.5	35.5	36	13	27

# Compact cylinder

## ACQ Series—Big bore size



### Symbol



### Product feature

1. JIS standard is implemented.
2. C clip is adopted to connect the cylinder body and back cover or front cover to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.

### Specification

Bore size(mm)	125	140	160
Acting type	Double acting		
Fluid	Air(to be filtered by 40 μm filter element)		
Operating pressure	0.15~1.0MPa(22~145psi)		
Proof pressure	1.5MPa(215psi)		
Temperature °C	-20~70		
Speed range mm/s	30~500		
Stroke tolerance	Stroke≤100 $+1.0_0$ Stroke>100 $+1.5_0$		
Cushion type	Bumper		
Port size [Note1]	3/8"		

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
125		
140	10 20 30 40 50 75 100 125 150 175 200 250 300	300
160		

Note) The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 35mm stroke cylinder (bore size160) has the same dimensions of 40 std. stroke cylinder, so the value of "AC" is 131mm.

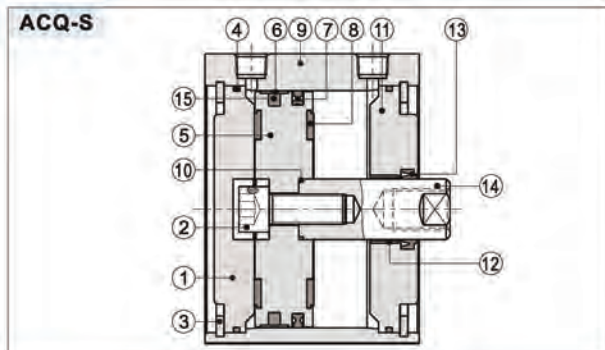
### Ordering code

ACQ 125 x 30 S B □  
 ACQD 125 x 30 S B □  
 ACQJ 125 x 30-30 S B □

① ② ③ ④ ⑤ ⑥ ⑦

①Model	②Bore size	③Stroke	④Adjustable Stroke	⑤Magnet	⑥Rod type	⑦Thread type
ACQ: Compact cylinder (Double acting)	125 140 160	Refer to stroke table for details	No this code 10 20 30 40 50 75 100	S: With magnet	Blank: Female thread B: Male thread	Blank: PT G: G T: NPT
ACQD: Compact cylinder (Double rod)						
ACQJ: Compact cylinder (Adjustable stroke)						

### Inner structure and material of major parts



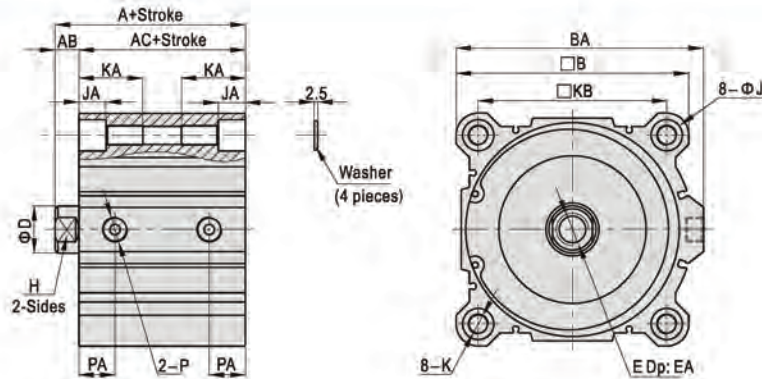
NO.	Item	Material	NO.	Item	Material
1	Back cover	Aluminum alloy	9	Body	Aluminum alloy
2	Screw	Carbon steel	10	O-ring	NBR
3	C clip	Spring steel	11	Front cover	Aluminum alloy
4	O-ring	NBR	12	Bushing	Wear resistant material
5	Piston	Aluminum alloy	13	Front cover packing	NBR
6	Wear ring	Wear resistant material	14	Piston rod	Carbon steel with 20 μm chrome plated
7	Piston seal	NBR	15	Magnet	Rubber
8	Bumper	NBR			

# Compact cylinder

## ACQ Series—Big bore size

### Dimensions

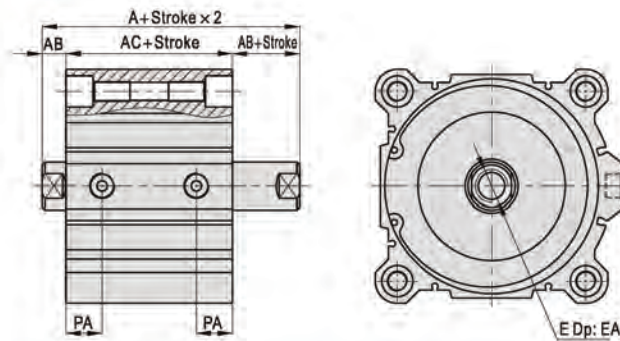
#### ACQ



Bore size\Item	A	AB	AC	B	BA	D	E	EA(St≤10)	EA(St>10)	H	J	JA	K	KA	KB	P	PA
125	99	16	83	142	153	32	M22×2.5	22.5	30	27	21.5	18.4	M14×2.0 Thru.hole: φ12.4	43.5	114	3/8"	24.5
140	99	16	83	158	168	32	M22×2.5	22.5	30	27	21.5	18.4	M14×2.0 Thru.hole: φ12.4	43.5	128	3/8"	24.5
160	108	17	91	178	188	40	M24×3.0	26.5	33	36	24.5	21.2	M16×2.0 Thru.hole: φ14.4	49	144	3/8"	27.5

Remark) Washer must be used when the cylinder be mounted by through hole. Please refer to this page for male thread dimensions.

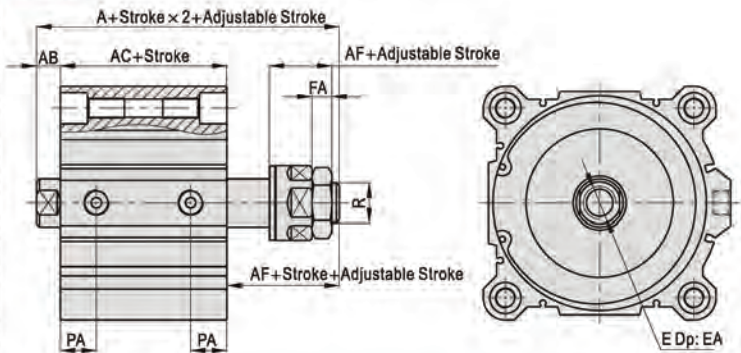
#### ACQD



Bore size\Item	A	AB	AC	E	EA		PA
					St≤10	St>10	
125	115	16	83	M22×2.5	22.5	30	24.5
140	115	16	83	M22×2.5	22.5	30	24.5
160	125	17	91	M24×3.0	26.5	33	27.5

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

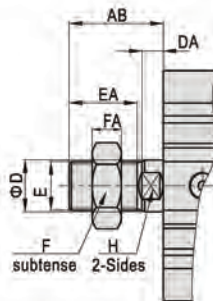
#### ACQJ



Bore size\Item	A	AB	AC	AF	E	EA		FA	PA	R
						St≤10	St>10			
125	140.8	16	83	42.5	M22×2.5	22.5	30	13.5	24.5	M27×2.0
140	140.8	16	83	42.5	M22×2.5	22.5	30	13.5	24.5	M27×2.0
160	175.3	17	91	68	M24×3.0	26.5	33	18	27.5	M36×2.0

Remark) The unmarked dimension is the same as ACQ standard type. Please refer to this page for male thread dimensions.

#### Male thread



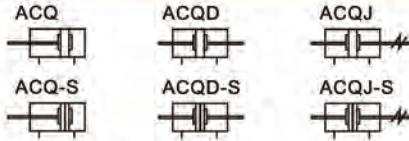
Bore size\Item	AB	D	E	EA	EB	F	FA	H
125	58	32	M30×1.5	42	45	46	18	27
140	58	32	M30×1.5	42	45	46	18	27
160	64	40	M36×1.5	47	50	55	21	36

# Compact cylinder

## ACQ Series—Longer stroke



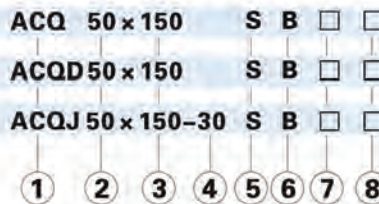
### Symbol



### Product feature

- JIS standard is implemented.
- C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of greasel reservation.
- Compact structure can effectively save installation space.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- Installing accessories with various specifications are optional.

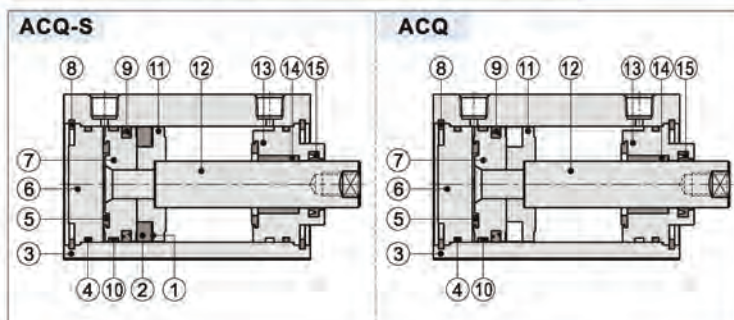
### Ordering code



①Model	②Bore size	③Stroke	④Adjustable Stroke	⑤Magnet	⑥Rod type	⑦Mounting type [Note1]	⑧Thread type
ACQ: Compact cylinder (Double acting)	32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	Blank: PT G: G T: NPT
ACQD: Compact cylinder (Double rod)							
ACQJ: Compact cylinder (Adjustable stroke)			10 20 30 40 50 75 100				

[Note1] Please refer to page 122~123 for accessory parts.

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Magnet washer	NBR	10	Wear ring	No(Φ 32)\Wear resistant material(Others)
2	Magnet	Plastic	11	Magnet holder	Aluminum alloy
3	Body	Aluminum alloy	12	Piston rod	Carbon steel with 20 μ m chrome plated
4	O-ring	NBR	13	Front cover	Aluminum alloy
5	Bumper	NBR	14	Bushing	No(Φ 32)\Wear resistant material(Others)
6	Back cover	Aluminum alloy	15	Front cover packing	NBR
7	Piston	Aluminum alloy			
8	C clip	Spring steel			
9	Piston seal	NBR			

### Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μ m filter element)					
Operating pressure	0.15~1.0MPa(22~145psi)					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	30~500					
Stroke tolerance	+1.5 0					
Cushion type	Bumper					
Port size [Note1]	1/8"		1/4"		3/8"	

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size(mm)	Standard stroke (mm)					Max.std stroke
32 40 50 63 80 100	125	150	175	200	250 300	300

Note) Within allowable stroke scope, when the stroke is larger than the maximum value, it shall be treated as non-standard one. Please contact the company for other special strokes.

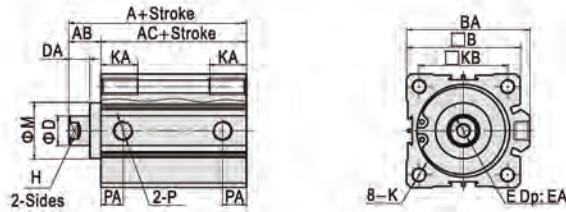
# Compact cylinder

## ACQ Series—Longer stroke

### Dimensions

#### ACQ

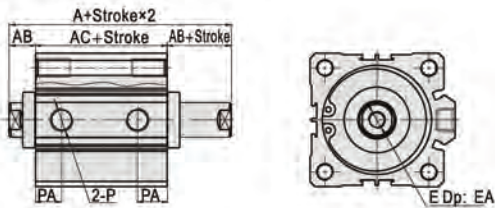
Φ32~Φ100(Stroke > 100)



Bore size\Item	A	AB	AC	B	BA	D	DA	E	EA	H	K	KA	KB	M	P	PA
32	62.5	17	45.5	45	49.5	16	12	M8 × 1.25	13	14	M6 × 1.0 Thru.hole: Φ5.2	17	34	22	1/8"	12.5
40	72	17	55	53	57	16	12	M8 × 1.25	13	14	M6 × 1.0 Thru.hole: Φ5.2	17	40	28	1/8"	14
50	73.5	18	55.5	64	71	20	13	M10 × 1.5	15	17	M8 × 1.25 Thru.hole: Φ6.7	22	50	35	1/4"	14
63	75	18	57	77	84	20	13	M10 × 1.5	15	17	M10 × 1.5 Thru.hole: Φ8.5	27	60	35	1/4"	16.5
80	86	20	66	98	104	25	15	M16 × 2.0	21	22	M12 × 1.75 Thru.hole: Φ10.4	32	77	43	3/8"	19
100	97.5	22	75.5	117	123.5	32	17	M20 × 2.5	27	27	M12 × 1.75 Thru.hole: Φ10.4	33	94	59	3/8"	23

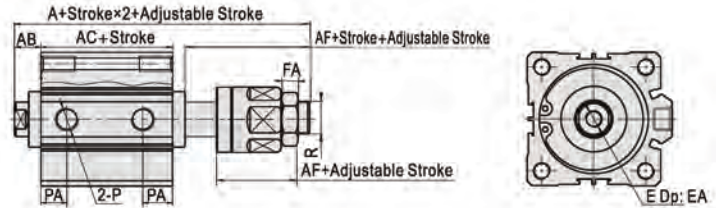
#### ACQD

Φ32~Φ100(Stroke > 100)



#### ACQJ

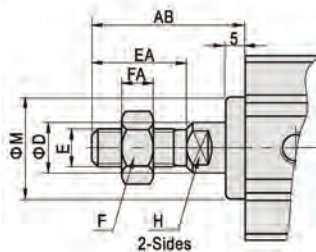
Φ32~Φ100(Stroke > 100)



Bore size\Item	A(ACQD)		A(ACQJ)		AB	AC		AF	EA	FA	PA	R
	Without magnet	With magnet	Without magnet	With magnet		Without magnet	With magnet					
32	79.5	89.5	95.5	105.5	17	45.5	55.5	28	13	7	12.5	M12 × 1.25
40	89	99	105	115	17	55	65	28	13	7	14	M12 × 1.25
50	91.5	101.5	107.5	117.5	18	55.5	65.5	29	15	8	14	M16 × 1.5
63	93	103	109	119	18	57	67	29	15	8	16.5	M16 × 1.5
80	106	116	126.5	136.5	20	66	76	35.5	21	10	19	M20 × 1.5
100	119.5	129.5	145	155	22	75.5	85.5	42.5	27	13.5	23	M27 × 2.0

Remark) The unmarked dimension is the same as ACQ standard type.

#### Male thread (Bore size: Φ32~Φ100 Stroke>100 Longer type)



Bore size\Item	AB	D	E	EA	FA	F	H	M
32	38.5	16	M14 × 1.5	23.5	8	19	14	22
40	38.5	16	M14 × 1.5	23.5	8	19	14	28
50	43.5	20	M18 × 1.5	28.5	11	27	17	35
63	43.5	20	M18 × 1.5	28.5	11	27	17	35
80	53.5	25	M22 × 1.5	35.5	13	32	22	43
100	53.5	32	M26 × 1.5	35.5	13	36	27	59

# Compact cylinder

## ACQ Series—With guider type



### Symbol



### Product feature

1. JIS standard is implemented and with guider.
2. C clip is adopted to connect the cylinder body and back cover or front cover to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of greasel reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Double rod non-rotating structure enables to bear large working load and lateral load.

### Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
Fluid	Air(to be filtered by 40 μm filter element)									
Operating pressure	0.15~1.0MPa(22~145psi)									
Proof pressure	1.5MPa(215psi)									
Temperature °C	-20~70									
Speed range mm/s	30~500									
Stroke tolerance	+1.0 0									
Cushion type	Bumper									
Port size [Note1]	M5×0.8			1/8"			1/4"		3/8"	
Non-rotating tolerance [Note2]	±0.2°					±0.1°				

[Note1] PT thread, G thread and NPT thread are available.

[Note2] Retract position.

Add) Refer to P353 for detail of sensor switch.

### Stroke

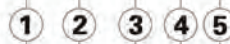
Bore size(mm)	Standard stroke (mm)										Max.std stroke (mm)	Middle stroke range(mm)					
	5	10	15	20	25	30	35	40	45	50			75	100			
12 16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	30	1~29
20 25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	50	1~49
32 40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	100	1~99
50 63 80 100	x	●	●	●	●	●	●	●	●	●	●	●	●	●	●	100	5~99

[Note] The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Please contact the company for other special strokes.

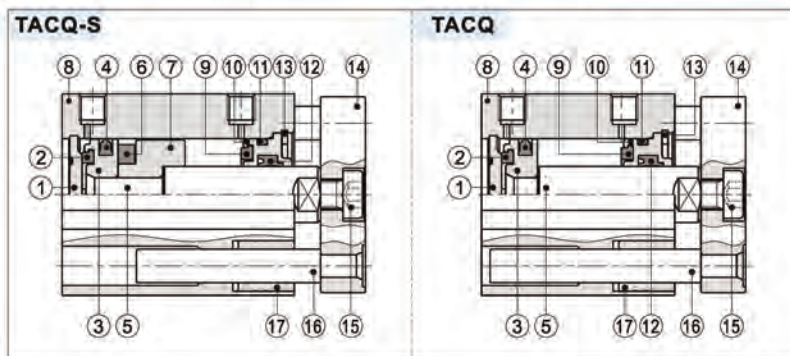
### Ordering code

TACQ 50 × 100 S □



①Model	②Bore size	③Stroke	④Magnet	⑤Thread type
TACQ: Compact cylinder (Double acting with guider)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: PT G: G T: NPT

### Inner structure and material of major parts



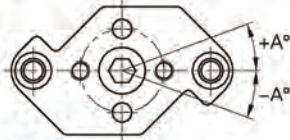
NO.	Item	Material	NO.	Item	Material
1	Back cover	Aluminum alloy	10	Front cover	Aluminum alloy
2	Bumper	NBR	11	O-ring	NBR
3	Piston	Aluminum alloy	12	Front cover packing	NBR
4	Piston seal	NBR	13	C clip	Spring steel
5	Piston rod	Carbon steel with 20 μm chrome plated	14	Fixing plate	Aluminum alloy
6	Magnet	Sintered metal (Neodymium-iron-boron)	15	Screw	Carbon steel
7	Magnet holder	Aluminum alloy	16	Leader	Stainless steel
8	Body	Aluminum alloy	17	Bushing	Brass
9	Wear ring	NBR			

# Compact cylinder

## ACQ Series—With guider type

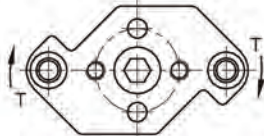
### Installation and application

1. TACQ series cylinder is designed with double guide rod which is non-rotating. Make sure the non-rotating accuracy of the fixing plate is in the allowable range.



Bore size	12,16	20,25,32,40,50,63,80,100
Non-rotating tolerance	±0.2°	±0.1°

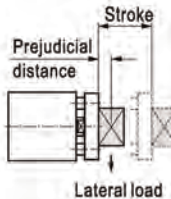
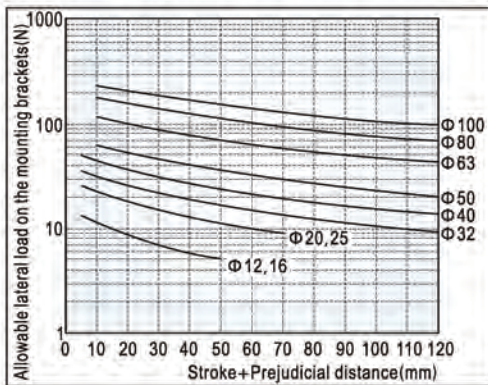
2. Do not apply reverse torque to the piston rods. The torque beyond the limits may cause malfunction or reduction of the service life.



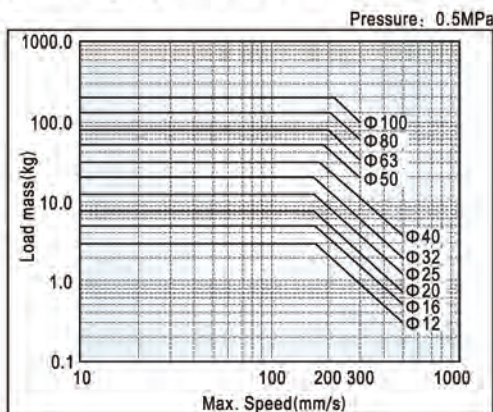
Unit: N·m

Bore size\Stroke	5	10	15	20	25	30	35	40	45	50	75	100
12	0.11	0.10	0.08	0.07	0.07	0.06	-	-	-	-	-	-
16	0.15	0.12	0.11	0.10	0.09	0.08	-	-	-	-	-	-
20	0.37	0.32	0.28	0.25	0.23	0.21	0.19	0.18	0.17	0.16	-	-
25	0.40	0.35	0.31	0.28	0.25	0.23	0.21	0.20	0.18	0.17	-	-
32	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.36	0.34	0.32	0.25	0.20
40	1.06	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.55	0.43	0.36
50	-	1.70	1.56	1.45	1.35	1.26	1.19	1.12	1.06	1.01	0.80	0.67
63	-	3.90	3.62	3.37	3.15	2.96	2.80	2.65	2.51	2.39	1.92	1.61
80	-	7.44	6.98	6.56	6.20	5.87	5.57	5.31	5.07	4.84	3.98	3.37
100	-	11.85	11.19	10.61	10.08	9.60	9.17	8.77	8.41	8.07	6.73	5.77

3. Make sure the lateral load on the mounting bracket is within the limits. Any exceeding may cause malfunction or reduction of the service life.

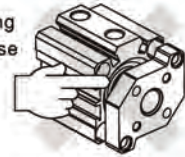


4. Make sure the load quality and the maximum speed are within the limits. Any exceeding may cause malfunction or reduction of the service life.

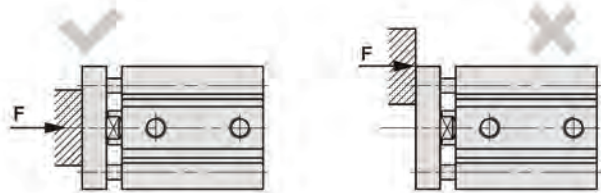


5. Caution before mounting:

- 5.1) Do not put hands between the mounting bracket and cylinder, which may cause damage to a human body when the piston rod retracts.



- 5.2) Make sure the external force against the mounting bracket is concentric with the piston rod. Any extra torque may cause damage to the cylinder.



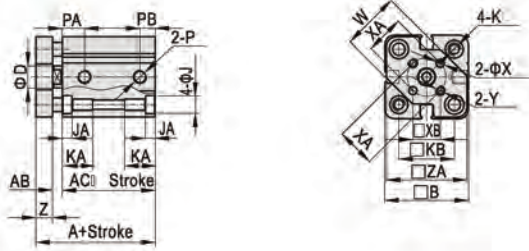
- 5.3) Install the fixture onto the mounting bracket only when the piston rod is in the retraction state. Do not apply the installation torque on the guide rod.
- 5.4) Avoid any damage on piston rod and guide rod, which may cause damage on seals and air leakage or malfunction.

# Compact cylinder

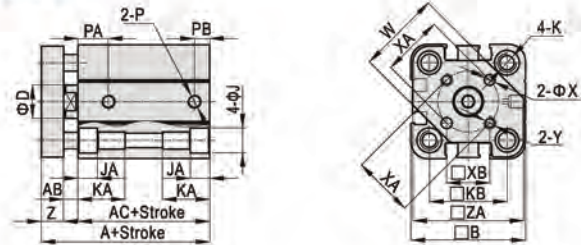
## ACQ Series—With guider type

### Dimensions

Φ12/Φ16



Φ20/Φ25

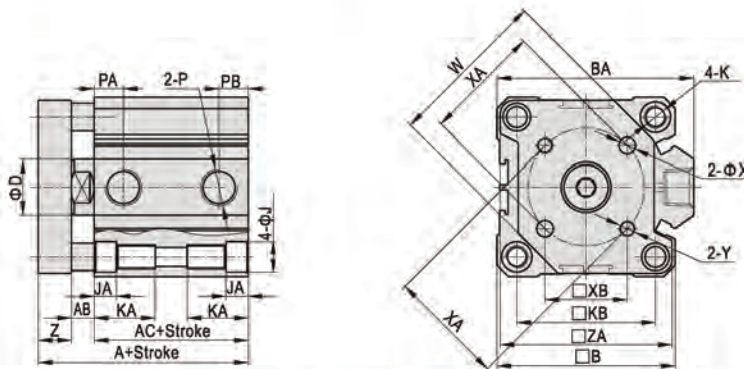


Bore size\Item	A		AC		AB	B	D	J	JA	K			
	Without magnet	With magnet	Without magnet	With magnet						M4 × 0.7 Thru.hole: Φ3.4	M4 × 0.7 Thru.hole: Φ3.4	M6 × 1.0 Thru.hole: Φ5.2	M6 × 1.0 Thru.hole: Φ5.2
12	26.5	37.5	17.3	28.3	3	26	6	6	3.5	M4 × 0.7 Thru.hole: Φ3.4	6	25	
16	28	40	19	31	3	30	8	6	3.5	M4 × 0.7 Thru.hole: Φ3.4	6	29	
20	32	44	20.5	32.5	3.5	36	10	9	5.5	M6 × 1.0 Thru.hole: Φ5.2	8	35	
25	35.5	45.5	23	33	4.5	41	12	9	5.5	M6 × 1.0 Thru.hole: Φ5.2	8	40	

Bore size\Item	KA	KB	P	PA		PB		W	X	XA	XB	Y	Z	ZA
				Without magnet	With magnet	Without magnet	With magnet							
12	11.5	15.5	M5 × 0.8	7.5	9	5	7	15	3	10	7.1	M3 × 0.5	6	25
16	11.5	20	M5 × 0.8	8	9.5	5.5	5.5	21	3	14	9.9	M3 × 0.5	6	29
20	18	25.5	M5 × 0.8	9	9.5	5.5	5.5	26	4	17	12	M4 × 0.7	8	35
25	17.5	28	M5 × 0.8	11	11	5.5	5.5	30	5	22	15.6	M5 × 0.8	8	40

Φ32~Φ100



Bore size\Item	A(Without magnet)		A (With magnet)	AB	AC(Without magnet)		AC (With magnet)	B	BA	D	J	JA	K			
	St≤50	St≥75			St≤50	St≥75							M6 × 1.0 Thru.hole: Φ5.2	M6 × 1.0 Thru.hole: Φ5.2	M8 × 1.25 Thru.hole: Φ6.7	M10 × 1.5 Thru.hole: Φ8.5
32	40		50	6.5	23.5		33.5	45	49.5	16	9	5.5	M6 × 1.0 Thru.hole: Φ5.2	6	25	
40		46.5	56.5	6.6		29.9	39.9	53	57	16	9	5.5	M6 × 1.0 Thru.hole: Φ5.2	6	29	
50	50.5	60.5	60.5	7.5	31	41	41	64	71	20	10.5	6.5	M8 × 1.25 Thru.hole: Φ6.7	10	51	
63	56	66	66	8	36	46	46	77	84	20	14	9	M10 × 1.5 Thru.hole: Φ8.5	12	62	
80	67.5	77.5	77.5	10	43.5	53.5	53.5	98	104	25	17	11	M12 × 1.75 Thru.hole: Φ10.4	14	75	
100	81	91	91	12	53	63	63	117	123.5	32	17	11	M12 × 1.75 Thru.hole: Φ10.4	16	95	

Bore size\Item	KA	KB	P	PA	PA	PB	PB	W	X	XA	XB	Y	Z	ZA
				(Without magnet)	(With magnet)	(Without magnet)	(With magnet)							
32	17.5	34	1/8"	7.5	10.5	6.5	7.5	37	5	28	19.8	M5 × 0.8	10	43
				10.5		7.5								
40	17.5	40	1/8"	11	11	8	8	46	5	33	23.3	M5 × 0.8	10	51
50	22.5	50	1/4"	10.5	10.5	10.5	10.5	58	6	42	29.7	M6 × 1.0	12	62
63	28.5	60	1/4"	15	15	10.5	10.5	69	6	50	35.4	M6 × 1.0	12	75
80	35.5	77	3/8"	16	16	14	14	90	8	65	46	M8 × 1.25	14	95
100	35.5	94	3/8"	20	20	17.5	17.5	113.5	10	80	56.6	M10 × 1.5	16	114.5

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch
	LB	FA/FB	CB	I	Y	F	U	
12	F-ACQ12LB	F-ACQ12FA	F-ACQ12CB	F-ACQ12I	F-ACQ12Y	-	F-M5X080U	CMSG DMSG(S)
16	F-ACQ16LB	F-ACQ16FA	F-ACQ16CB	F-ACQ16I	F-ACQ16Y	-	F-M6X100U	
20	F-ACQ20LB	F-ACQ20FA	F-ACQ20CB	F-ACQ20I	F-ACQ20Y	F-M8X125F	F-M8X125U	
25	F-ACQ25LB	F-ACQ25FA	F-ACQ25CB	F-ACQ25I	F-ACQ25Y	F-M10X125F	F-M10X125U	
32	F-ACQ32LB	F-ACQ32FA	F-ACQ32CB	F-ACQ32I	F-ACQ32Y	F-M14X150F	F-M14X150U	CMSJ DMSJ CMSG DMSG(S)
40	F-ACQ40LB	F-ACQ40FA	F-ACQ40CB					
50	F-ACQ50LB	F-ACQ50FA	F-ACQ50CB	F-ACQ50I	F-ACQ50Y	F-M18X150F	F-M18X150U	
63	F-ACQ63LB	F-ACQ63FA	F-ACQ63CB					
80	F-ACQ80LB	F-ACQ80FA	F-ACQ80CB					
100	F-ACQ100LB	F-ACQ100FA	F-ACQ100CB	F-ACQ100I	F-ACQ100Y	-	F-M26X150U	
125	-	-	-	-	-	-	-	CMSH\DMSH(S) CMSG\DMSG(S)
140	-	-	-	-	-	-	-	
160	-	-	-	-	-	-	-	

### Accessory selection

Cylinder model	Accessories	Mounting accessories				Knuckle[Note2]			Sensor switch[Note3]			
		LB	FA	FB	CB [1]	I	Y	U	F	C(D)MSJ	C(D)MSG(S)	C(D)MSH(S)
ACQ	Female thread	Without magnet				x	x	x	x	x	x	x
	With magnet		●	●	●	●	●	●	●	●	●	●
	Male thread	Without magnet				●	●	●	●	●	●	●
	With magnet		●	●	●	●	●	●	●	●	●	●
ASQ	Female thread	Without magnet				x	x	x	x	x	x	x
	With magnet		●	●	●	●	●	●	●	●	●	●
ATQ	Male thread	Without magnet				●	●	●	●	●	●	●
	With magnet		●	●	●	●	●	●	●	●	●	●
ACQD	Female thread	Without magnet				x	x	x	x	x	x	x
ACQJ	With magnet		●	●	x	●	●	●	●	●	●	●
	Male thread	Without magnet				●	●	●	●	●	●	●
	With magnet		●	●	x	●	●	●	●	●	●	●

### Material of accessories

Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	FB	CB	I	Y	F	U
12, 15	△	●	●	●	▲	▲	▲	▲
20, 25	△	●	●	●	▲	▲	▲	▲
32-100	△	●	●	■	▲	■	▲	▲

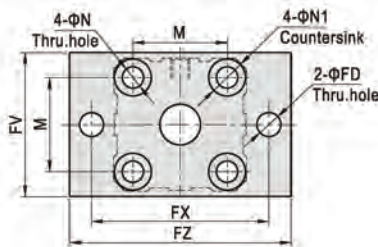
●—Aluminum alloy; ■—Carbon Steel; ▲—S45C; △—SPCC

[Note1] CB is attached with relevant PIN.  
Mounting accessories and Knuckle unavailable for bore size 125, 140, 160 cylinder.  
[Note2] Please refer to P349-352 for knuckle detail.  
[Note3] DS1-H sensor switch only available for bore size 125, 140, 160 cylinder.

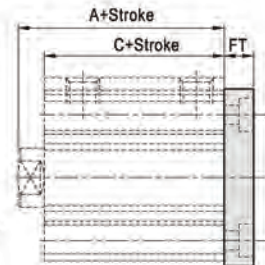
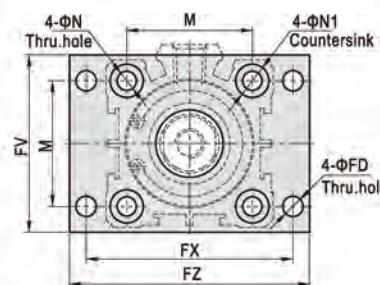
### Dimensions

#### FA/FB

Φ12~Φ25



Φ32~Φ100



Bore size/Item	A [Note1]				C				M	N	N1	FD	FT	FV	FX	FZ
	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet	Without magnet	With magnet								
Stroke	≤50	55	≥60	≥60	≤50	55	≥60	≥60								
12	20.5	-	-	31.5	17	-	-	28	15.5	4.5	7.5	4.5	5.5	25	45	55
16	22	22	-	34	18.5	18.5	-	30.5	20	4.5	7.5	4.5	5.5	30	45	55
20	24	-	34	36	19.5	-	29.5	31.5	25.5	6.5	10.5	6.5	8	39.5	48	60
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	28	6.5	10.5	6.5	8	42	52	64
32	30	-	40	40	23	-	33	33	34	6.5	10.5	5.5	8	48	56	65
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	40	6.5	10.5	5.5	8	54	62	72
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	50	8.5	13.5	6.5	9	67	76	89
63	44	-	54	54	36	-	46	46	60	10.5	16.5	9	10	80	92	108
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	77	12.5	18.5	11	12	99	116	134
100	65	-	75	75	53	-	63	63	94	12.5	18.5	11	12	117	136	154

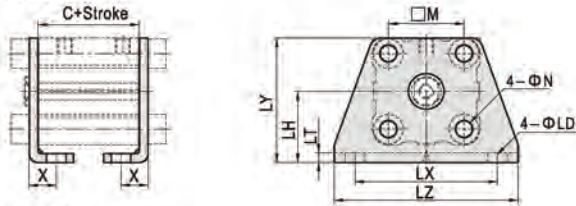
[Note] Valve A and C in the above table are only for ACQ series.  
Please refer to relevant content for valve A and C of other series.

# Compact cylinder

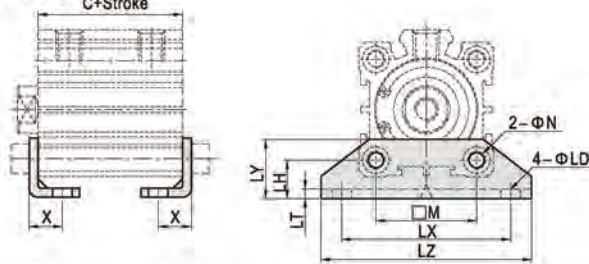
## ACQ Series—Accessories

### LB

Φ12~Φ25



Φ32~Φ100



Bore size/Item	C [Note]				M	N	X	LD	LH	LT	LX	LY	LZ
	Without magnet		With magnet										
Stroke	≤50	55	≥60										
12	17	-	-	28	15.5	4.5	8	4.5	17	2	34	29.5	44
16	18.5	18.5	-	30.5	20	4.5	8	4.5	19	2	38	33.5	48
20	19.5	-	29.5	31.5	25.5	6.5	9.2	6.5	24	3	48	42	62
25	22.5	-	32.5	32.5	28	6.5	10.7	6.5	26	3	52	46	66
32	23	-	33	33	34	6.5	11.2	6.5	13	3	57	20	71
40	29.5	-	39.5	39.5	40	6.5	11.2	6.5	13	3	64	20	78
50	30.5	-	40.5	40.5	50	8.5	12.2	8.5	14	3	79	22	95
63	36	-	46	46	60	10.5	13.7	10.5	16	3	95	26	113
80	43.5	-	53.5	53.5	77	13	16.5	13	20.5	4.5	118	32	140
100	53	-	63	63	94	13	23	13	24	6	137	36	162

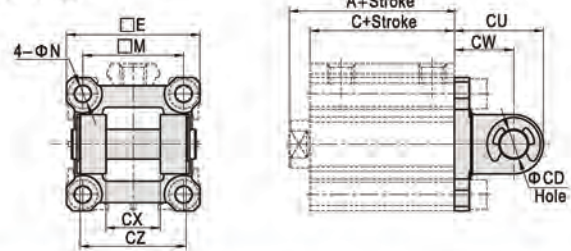
[Note] Valve C in the above table is only for ACQ series.  
Please refer to relevant content for valve C of other series.

### CB

Φ12~Φ25



Φ32~Φ100



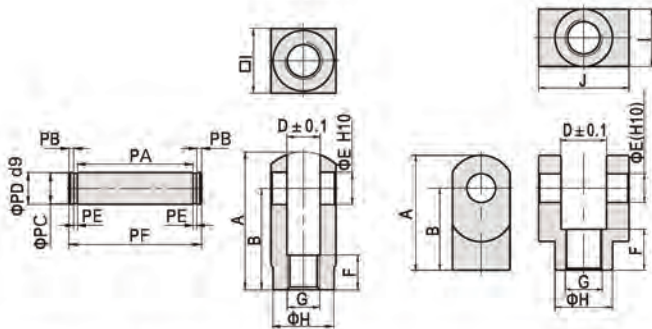
Item	A [Note]				C				E	M	N	CD	CU	CW	CX	CZ
	Without magnet		With magnet		Without magnet		With magnet									
Bore size	≤50	55	≥60		≤50	55	≥60									
Stroke																
12	20.5	-	-	31.5	17	-	-	28	25	15.5	4.5	5	20	14	5.3	9.8
16	22	22	-	34	18.5	18.5	-	30.5	29	20	4.5	5	21	15	6.8	11.8
20	24	-	34	36	19.5	-	29.5	31.5	36	25.5	6.5	8	27	18	8.3	15.8
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	40	28	6.5	10	30	20	10.3	19.8
32	30	-	40	40	23	-	33	33	45.5	34	6.5	10	30	20	18.3	35.8
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	53.5	40	6.5	10	32	22	18.3	35.8
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	64.5	50	8.5	14	42	28	22.3	43.8
63	44	-	54	54	36	-	46	46	77.5	60	10.5	14	44	30	22.3	43.8
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	98.5	77	12.5	18	56	38	28.3	55.8
100	65	-	75	75	53	-	63	63	117.5	94	12.5	22	67	45	32.3	63.8

[Note] Valve A and C in the above table are only for ACQ series.  
Please refer to relevant content for valve A and C of other series.

### Y Knuckle

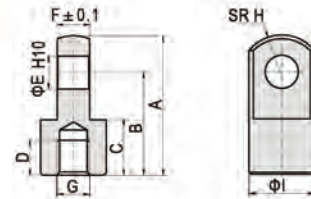
F-ACQ12Y  
F-ACQ16Y  
F-ACQ20Y  
F-ACQ25Y

F-ACQ32Y  
F-ACQ50Y  
F-ACQ80Y  
F-ACQ100Y



Type/Item	A	B	D	E	F	G	H	I	J	PA	PB	PC	PD	PE	PF
F-ACQ12Y	22	16	5.3	5	6	M5×0.8	9	10	-	10.2	1.5	4	5	0.7	14.6
F-ACQ16Y	28	21	6.6	5	11	M6×1.0	11	12	-	12.4	1.5	4	5	0.7	16.8
F-ACQ20Y	34	25	8.3	8	8.5	M8×1.25	15	16	-	16.2	1.5	7	8	0.9	21
F-ACQ25Y	41	30	10.3	10	10.5	M10×1.25	19	20	-	20.2	2	8	10	1.1	26.4
F-ACQ32Y	42	30	18.4	10	16	M14×1.5	22	22	36	36.2	2	8	10	1.1	42.4
F-ACQ50Y	56	40	22.4	14	20	M18×1.5	28	28	44	44.2	2	12	14	1.1	50.4
F-ACQ80Y	71	50	28.4	18	23	M22×1.5	38	38	56	56.2	2	15	18	1.7	63.6
F-ACQ100Y	79	55	32.4	22	24	M26×1.5	44	44	64	64.2	2.5	19	22	1.7	72.6

### I Knuckle



Type/Item	A	B	C	D	E	F	G	H	I
F-ACQ12I	21.5	16	9	6	5	4.7	M5×0.8	6.3	10
F-ACQ16I	32	25	11	8	5	6.2	M6×1.0	8.1	12
F-ACQ20I	34	25	13.5	8.5	8	7.7	M8×1.25	10.3	16
F-ACQ25I	41	30	16	11	10	9.7	M10×1.25	12.8	20
F-ACQ32I	42	30	16	14	10	17.6	M14×1.5	12	22
F-ACQ50I	56	40	20	18	14	21.6	M18×1.5	16	28
F-ACQ80I	71	50	23	21	18	27.6	M22×1.5	21	38
F-ACQ100I	79	55	24	22	22	31.6	M26×1.5	24	44



# Compact cylinder—SDA Series

## Compendium of SDA Series

**Manufactured by our enterprise**

**Magnetic switch slots around the cylinder body**  
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

**Two kinds of rod type**

Female thread      Male thread

**Ten bore size are available**  
Bore size: 12, 16, 20, 25, 32, 40, 50, 63, 80, 100

**Compact structure**  
Riveted structure is adopted to connect the cylinder body and back cover, and piston and piston rod to make it compact and reliable

**Multi-type cylinder**

SDA: Compact cylinder (Double acting)	
SSA: Compact cylinder (Single acting-push)	
STA: Compact cylinder (Single acting-pull)	
SDAD: Compact cylinder (Double rod)	
SDAJ: Compact cylinder (Adjustable stroke)	
SDAT: Compact cylinder (Duplex type)	
SDAW: Compact cylinder (Duplex-end type)	

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7					0.1	0.2	0.3	0.4	0.5	0.6	0.7	
12	6	Single Push side	113.1	-	12.6	23.9	35.2	46.5	57.9	69.2	40	16	Single acting Push side	1256.6	-	168.6	294.3	420.0	545.6	671.3	796.9	
		Single acting Pull side	84.8	-	7.0	15.4	23.9	32.4	40.9	49.4			Double acting Push side	1055.6	-	128.4	234.0	339.5	445.1	550.6	656.2	
		Double acting Push side	113.1	-	22.6	33.9	45.2	56.5	67.9	79.2			Double acting Pull side	1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6	
		Double acting Pull side	84.8	-	17.0	25.4	33.9	42.4	50.9	59.4			Single acting Push side	1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9	
16	6	Single Push side	201.1	-	20.2	40.3	60.4	80.5	100.6	120.7	50	20	Single acting Push side	1963.5	-	89.3	285.7	482.0	678.4	874.7	1071.1	1267.4
		Single acting Pull side	172.8	-	14.6	31.8	49.1	66.4	83.7	101.0			Double acting Push side	1649.3	57.9	222.9	387.8	552.7	717.7	882.6	1047.5	
		Double acting Push side	201.1	-	40.2	60.3	80.4	100.5	120.6	140.7			Double acting Pull side	1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4	
		Double acting Pull side	172.8	-	34.6	51.8	69.1	86.4	103.7	121.0			Single acting Push side	1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5	
20	8	Single Push side	314.2	-	39.8	71.2	102.7	134.1	165.5	196.9	63	20	Single acting Push side	3117.2	-	135.7	447.4	759.2	1070.9	1382.6	1694.3	2006.1
		Single acting Pull side	263.9	-	29.8	56.2	82.6	108.9	135.3	161.7			Double acting Push side	2803.1	104.3	384.6	664.9	945.2	1225.5	1505.9	1786.2	
		Double acting Push side	314.2	-	62.8	94.2	125.7	157.1	188.5	219.9			Double acting Pull side	3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1	
		Double acting Pull side	263.9	-	52.8	79.2	105.6	131.9	158.3	184.7			Single acting Push side	2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2	
25	10	Single Push side	490.9	-	69.7	118.8	167.8	216.9	266.0	315.1	80	25	Double acting Push side	5026.5	-	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
		Single acting Pull side	412.3	-	54.0	95.2	136.4	177.7	218.9	260.1			Double acting Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0	
		Double acting Push side	490.9	-	98.2	147.3	196.3	245.4	294.4	343.6			Single acting Push side	7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8	
		Double acting Pull side	412.3	-	82.5	123.7	164.9	206.2	247.4	288.6			Double acting Pull side	7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8	
32	12	Single Push side	804.2	-	105.3	185.8	266.2	346.6	427.0	507.5	100	32	Single acting Push side	691.2	-	82.7	151.8	221.0	290.1	359.2	428.3	
		Single acting Pull side	691.2	-	82.7	151.8	221.0	290.1	359.2	428.3			Double acting Push side	804.2	-	160.8	241.3	321.7	402.1	482.5	563.0	
		Double acting Push side	804.2	-	160.8	241.3	321.7	402.1	482.5	563.0			Double acting Pull side	691.2	-	138.2	207.3	276.5	345.6	414.7	483.8	
		Double acting Pull side	691.2	-	138.2	207.3	276.5	345.6	414.7	483.8												

## Installation and application



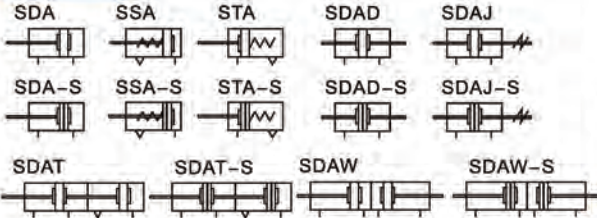
- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

# Compact cylinder

## SDA Series



### Symbol



### Product feature

1. Manufactured by our enterprise.
2. Riveted structure is adopted to connect the cylinder body and back cover, and piston and piston rod to make it compact and reliable;
3. The inner diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install sensor switch
7. Mounting accessories with various specifications are optional.

### Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
	Single acting_Push type, Single acting_Pull type									-
Fluid	Air(to be filtered by 40 μ m filter element)									
Operating pressure	Double acting 0.15~1.0MPa(22~145psi)(1.5~10.0bar)									
	Single acting 0.2~1.0MPa(28~145psi)(2.0~10.0bar)									
Proof pressure	1.5MPa(215psi)(15bar)									
Temperature °C	-20~70									
Speed range mm/s	Double acting: 30~500 Single acting: 50~500									
Stroke tolerance	Stroke≤100 <sup>+1.0</sup> <sub>0</sub> Stroke>100 <sup>+1.5</sup> <sub>0</sub>									
Cushion type	Bumper									
Port size [Note1]	M5×0.8			1/8"			1/4"		3/8"	

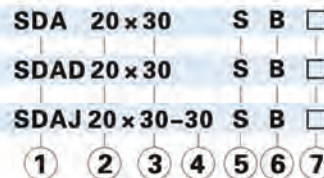
[Note1] PT thread is available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

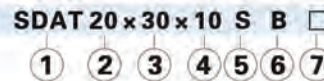
Bore size (mm)		Standard stroke (mm)										Max.std stroke												
12	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	50											
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	60									
16	Single acting		5	10	15	20	25	30						30										
		Double acting	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	90			
20	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	100		
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	100		
25	Single acting		5	10	15	20	25	30														30		
		Double acting	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120
32	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130
40	Single acting		5	10	15	20	25	30																30
		Double acting	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130
50	Double acting	With magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	120
		Without magnet	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100	110	120	130

Note) 1. Please contact the company for other special strokes.  
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

### Ordering code



①Model	②Bore size	③Stroke	④Adjustable Stroke	⑤Magnet	⑥Rod type	⑦Thread type [Note1]
SDA: Compact cylinder(Double acting)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: PT
SSA: Compact cylinder(Single acting-push)	12 16 20 25					
STA: Compact cylinder(Single acting-pull)	32 40 50 63					
SDAD: Compact cylinder(Double rod)	12 16 20 25 32 40 50 63 80 100					
SDAJ: Compact cylinder(Adjustable stroke)	40 50 63 80 100					



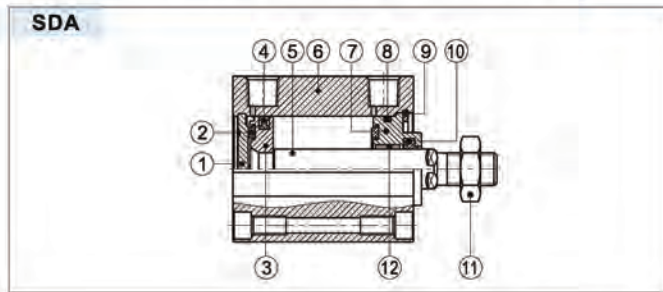
①Model	②Bore size	③Stroke 1	④Stroke 2	⑤Magnet	⑥Rod type	⑦Thread type [Note1]
SDAT: Compact cylinder (Duplex type)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: PT
SDAW: Compact cylinder(Duplex-end type)						

[Note1] Standard thread is blank here.

# Compact cylinder

## SDA Series

### Inner structure and material of major parts

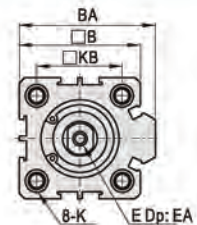
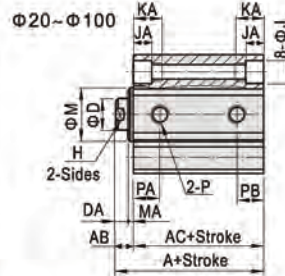
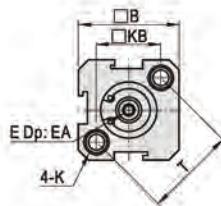
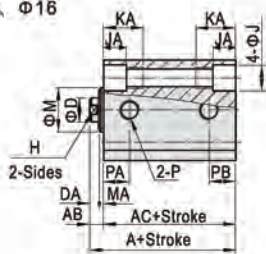


NO.	Item	Material
1	Back cover	No(Φ12, 16)/Aluminum alloy(Others)
2	Bumper	NBR
3	Piston	Brass(Φ12, 16)/Aluminum alloy(Others)
4	Piston seal	NBR
5	Piston rod	Carbon steel with 20 μm chrome plated
6	Body	Aluminum alloy
7	Front cover	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Front cover packing	NBR
11	Piston nut	Carbon steel
12	Bushing	No(Φ12~32)/Wear resistant material(Others)

### Dimensions

#### SDA

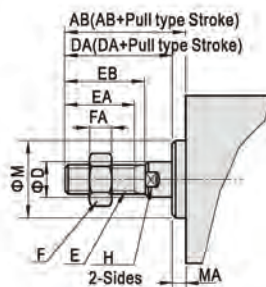
Φ12, Φ16



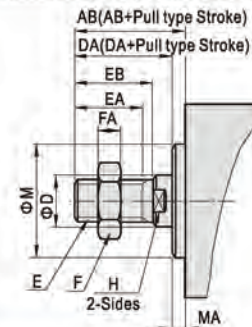
Item	A		AC		AB	B	BA	D	DA	E	EA	H	J	JA	K	KA	KB	M	MA	P	PA				PB	T
	Without magnet	With magnet	St=	St>5																	St=5	St>5				
12	22	17	32	27	5	25	-	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8Thru.hole:Φ4.2	12	16.2	10.2	1	M5×0.8	7.5	7.5	5	5	23	
16	24	18.5	34	28.5	5.5	29	-	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8Thru.hole:Φ4.2	12	19.8	11	1.5	M5×0.8	8	8	5.5	5.5	28	
20	25	19.5	35	29.5	5.5	34	36	8	4	M4×0.7	8	6	6.5	4.5	M5×0.8Thru.hole:Φ4.2	14	24	13	1.5	M5×0.8	9	9	5.5	5.5	-	
25	27	21	37	31	6	40	42	10	4	M5×0.8	10	8	8.2	5.5	M6×1.0Thru.hole:Φ5.2	15	28	17	2	M5×0.8	9	9	5.5	5.5	-	
32	31.5	24.5	41.5	34.5	7	44	50	12	4.5	M6×1.0	12	10	8.2	5.5	M6×1.0Thru.hole:Φ5.2	16	34	22	2.5	1/8"	9	9	6.5	9	-	
40	33	26	43	36	7	52	58.5	16	4	M8×1.25	12	14	10.5	6.5	M8×1.25Thru.hole:Φ6.7	20	40	28	3	1/8"	9.5	9.5	7.5	7.5	-	
50	37	28	47	38	9	62	71.5	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25Thru.hole:Φ6.7	25	48	38	4	1/4"	8	10.5	8	10.5	-	
63	41	32	51	42	9	75	84.5	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25Thru.hole:Φ6.7	25	60	40	4	1/4"	9.5	12	9.5	11	-	
80	52	41	62	51	11	94	104	25	6	M14×1.5	20	22	17	11	M12×1.75Thru.hole:Φ10.4	25	74	45	5	3/8"	11.5	14.5	11.5	14.5	-	
100	63	51	73	61	12	114	124	32	7	M18×1.5	20	27	19	13	M14×2.0Thru.hole:Φ12.4	30	90	55	5	3/8"	16	20.5	16	20.5	-	

#### Male thread

Φ12, Φ16



Φ20~Φ100



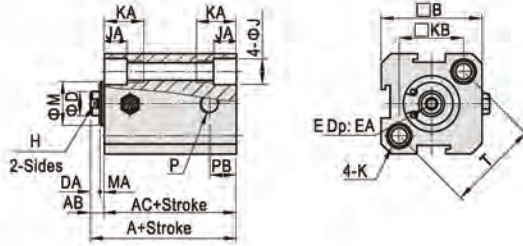
Bore size\Item	AB	D	DA	E	EA	EB	F	FA	H	M	MA		
											SDAD\SDAJ	Others	
12	17	6	16	M5×0.8	10	12	8	4	5	10.2	1		1
16	17.5	6	16	M5×0.8	10	12	8	4	5	11	1.5		1.5
20	20.5	8	19	M6×1.0	13	15	10	5	6	13	1.5		1.5
25	23	10	21	M8×1.25	15	17	12	6	8	17	2		2
32	25	12	22	M10×1.25	15	18	17	6	10	22	3		2.5
40	35	16	32	M14×1.5	25	28	19	8	14	28	3		3
50	37	20	33	M18×1.5	25	28	27	11	17	38	4		4
63	37	20	33	M18×1.5	25	28	27	11	17	40	4		4
80	44	25	39	M22×1.5	30	33	32	13	22	45	5		5
100	50	32	45	M26×1.5	35	38	36	13	27	55	5		5

# Compact cylinder

## SDA Series

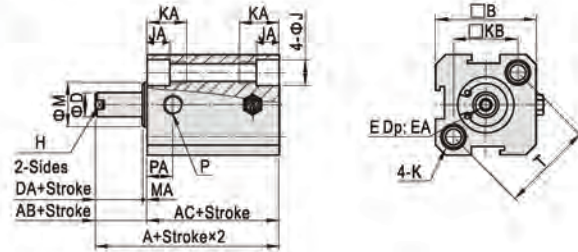
### SSA

Φ12、Φ16

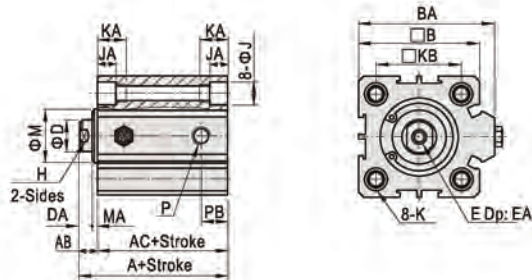


### STA

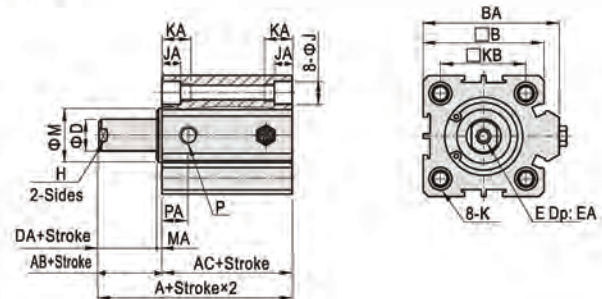
Φ12、Φ16



Φ20~Φ63



Φ20~Φ63



Bore size\Item	A(Without magnet)		A(With magnet)		AB	AC(Without magnet)		AC(With magnet)		B	BA
	St≤10	St>10	St≤10	St>10		St≤10	St>10	St≤10	St>10		
12	32	42	42	52	5	27	37	37	47	25	-
16	34	44	44	54	5.5	28.5	38.5	38.5	48.5	29	-
20	35	45	45	55	5.5	29.5	39.5	39.5	49.5	34	36
25	37	47	47	57	6	31	41	41	51	40	42
32	41.5	51.5	51.5	61.5	7	34.5	44.5	44.5	54.5	44	50
40	43	53	53	63	7	36	46	46	56	52	58.5
50	47	57	57	67	9	38	48	48	58	62	71.5
63	51	61	61	71	9	42	52	52	62	75	84.5

Bore size\Item	D	DA	E		EA	H	J	JA	K	KA	KB	M	MA	P	PA	PB	T
			M	St													
12	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	16.2	10.2	1	M5×0.8	7.5	5	23	
16	6	4	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	19.8	11	1.5	M5×0.8	8	5.5	28	
20	8	4	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	14	24	13	1.5	M5×0.8	9	5.5	-	
25	10	4	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	15	28	17	2	M5×0.8	9	5.5	-	
32	12	4	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	16	34	22	2.4	1/8"	9	9	-	
40	16	4	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	20	40	28	3	1/8"	9.5	7.5	-	
50	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	48	38	4	1/4"	10.5	10.5	-	
63	20	5	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	60	40	4	1/4"	12	11	-	

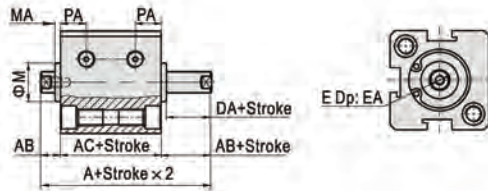
Note) Please refer to Page 126 for the dimension of male thread.

# Compact cylinder

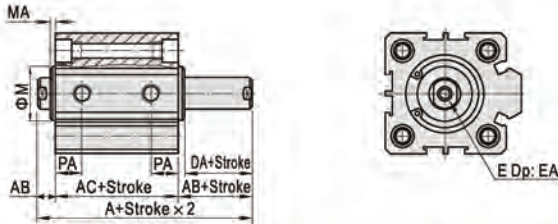
## SDA Series

### SDAD

Φ12、Φ16



Φ20~Φ100



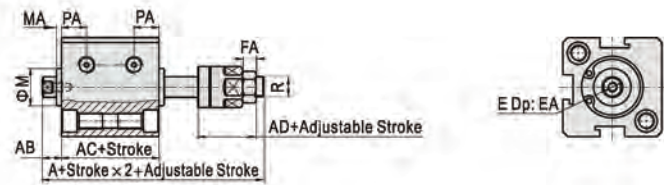
Bore size\Item	A		AC		AB	DA
	Without magnet	With magnet	Without magnet	With magnet		
12	27	17	37	27	5	4
16	29.5	18.5	39.5	28.5	5.5	4
20	30.5	19.5	40.5	29.5	5.5	4
25	33	21	43	31	6	4
32	38.5	24.5	48.5	34.5	7	4
40	40	26	50	36	7	4
50	46	28	56	38	9	5
63	50	32	60	42	9	5
80	63	41	73	51	11	6
100	75	51	85	61	12	7

Bore size\Item	E	EA		M	MA	PA	
		St≤10	St>10			St=5	St>5
12	M3×0.5	6	6	10.2	1	5.5	6.3
16	M3×0.5	6	6	11	1.5	6.5	7.3
20	M4×0.7	8(6.5 for St=5)		15	1.5	7.5	7.5
25	M5×0.8	10(7 for St=5)		17	2	8	8
32	M6×1.0	8	12	22	3	8	9
40	M8×1.25	8	12	28	3	8	10
50	M10×1.5	8	15	38	4	8	10.5
63	M10×1.5	10	15	40	4	9.5	11.8
80	M14×1.5	13	20	45	5	11.5	14.5
100	M18×1.5	18	20	55	5	16	20.5

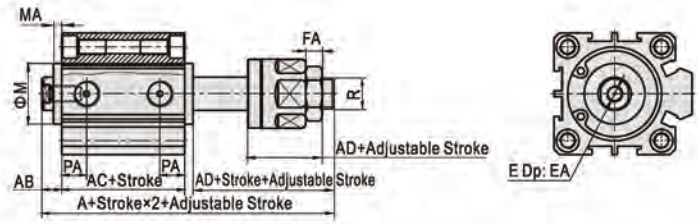
Note) The unmarked dimension is the same as SDA standard type.  
Please refer to Page 126 for the dimension of male thread.

### SDAJ

Φ12、Φ16



Φ20~Φ100



Bore size\Item	A		AC		AB	AD	E
	Without magnet	With magnet	Without magnet	With magnet			
12	40	17	50	27	5	17	M3×0.5
16	42.5	18.5	52.5	28.5	5.5	17	M3×0.5
20	47.5	19.5	57.5	29.5	5.5	21	M4×0.7
25	54	21	64	31	6	25	M5×0.8
32	61.5	24.5	71.5	34.5	7	27	M6×1.0
40	64	26	74	36	7	28	M8×1.25
50	70	28	80	38	9	29	M10×1.5
63	74	32	84	42	9	29	M10×1.5
80	92.5	41	102.5	51	11	35.5	M14×1.5
100	110.5	51	120.5	61	12	42.5	M18×1.5

Bore size\Item	EA		FA	M	MA	PA		R
	St≤10	St>10				St=5	St>5	
12	6	6	4	10.2	1	5.5	6.3	M5×0.8
16	6	6	4	11	1.5	6.5	7.3	M5×0.8
20	8(6.5 for St=5)		5	15	1.5	7.5	7.5	M6×1.0
25	10(7 for St=5)		6	17	2	8	8	M8×1.25
32	8	12	6	22	3	8	9	M10×1.25
40	8	12	7	28	3	8	10	M12×1.25
50	8	15	8	38	4	8	10.5	M16×1.5
63	10	15	8	40	4	9.5	11.8	M16×1.5
80	13	20	10	45	5	11.5	14.5	M20×1.5
100	18	20	13.5	55	5	16	20.5	M27×2.0

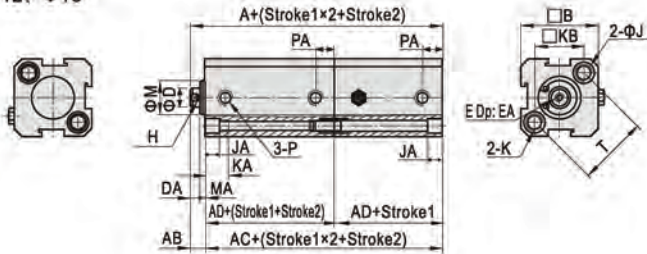
Note) The unmarked dimension is the same as SDA standard type.  
Please refer to Page 126 for the dimension of male thread.

# Compact cylinder

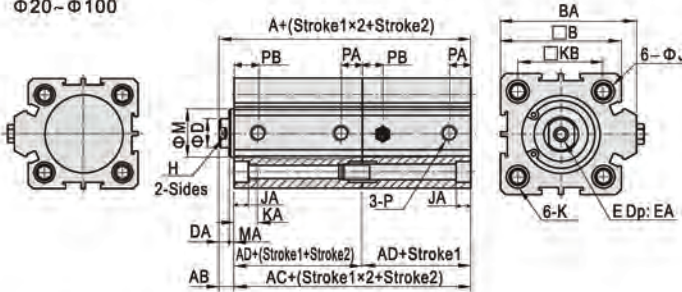
## SDA Series

### SDAT

Φ12、Φ16



Φ20~Φ100



Note) Please refer to Page 126 for the dimension of male thread.

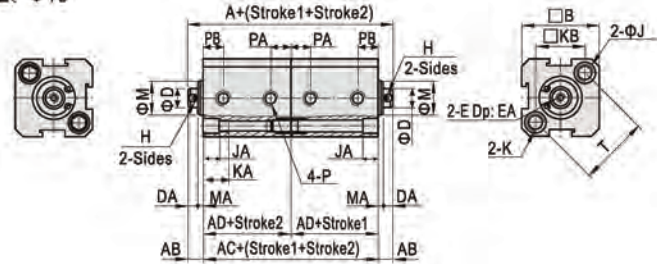
Bore size\Item	A			AC			AD	A			AC	AD	AB	B	BA	D	DA
	Without magnet	With magnet		Without magnet	With magnet												
12	39	34	17	59	54	27	5	25	-	6	4						
16	42.5	37	18.5	62.5	57	28.5	5.5	29	-	6	4						
20	44.5	39	19.5	64.5	59	29.5	5.5	34	36	8	4						
25	48	42	21	68	62	31	6	40	42	10	4						
32	56	49	24.5	76	69	34.5	7	44	50	12	4						
40	59	52	26	79	72	36	7	52	58.5	16	4						
50	65	56	28	85	76	38	9	62	71.5	20	5						
63	73	64	32	93	84	42	9	75	84.5	20	5						
80	93	82	41	113	102	51	11	94	104	25	6						
100	114	102	51	134	122	61	12	114	124	32	7						

Bore size\Item	E	EA	H	J	JA	K		KA
						M5×0.8 Thru.hole: Φ4.2	12	
12	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	12
16	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	12
20	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	14	14
25	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	15	15
32	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	16	16
40	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	20	20
50	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	25
63	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	25
80	M14×1.5	20	22	17	11	M12×1.75 Thru.hole: Φ10.4	25	25
100	M18×1.5	20	27	19	13	M14×2.0 Thru.hole: Φ12.4	30	30

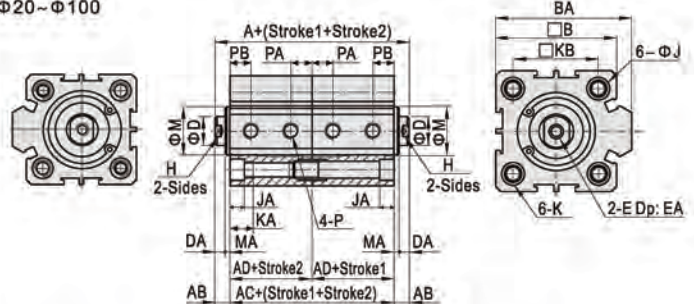
Bore size\Item	KB	M	MA	P	PA		PB	
					St=5	St>5	St=5	St>5
12	16.2	10.2	1	M5×0.8	5	5	7.5	7.5
16	19.8	11	1.5	M5×0.8	5.5	5.5	8	8
20	24	13	1.5	M5×0.8	5.5	5.5	9	9
25	28	17	2	M5×0.8	5.5	5.5	9	9
32	34	22	2.5	1/8"	6.5	9	9	9
40	40	28	3	1/8"	7.5	7.5	9.5	9.5
50	48	38	4	1/4"	8	10.5	8	10.5
63	60	40	4	1/4"	9.5	11	9.5	12
80	74	45	5	3/8"	11.5	14.5	11.5	14.5
100	90	55	5	3/8"	16	20.5	16	20.5

### SDAW

Φ12、Φ16



Φ20~Φ100



Note) Please refer to Page 126 for the dimension of male thread.

Bore size\Item	A			AC			AD	A			AC	AD	AB	B	BA	D	DA
	Without magnet	With magnet		Without magnet	With magnet												
12	44	34	17	64	54	27	5	25	-	6	4						
16	48	37	18.5	68	57	28.5	5.5	29	-	6	4						
20	50	39	19.5	70	59	29.5	5.5	34	36	8	4						
25	54	42	21	74	62	31	6	40	42	10	4						
32	63	49	24.5	83	69	34.5	7	44	50	12	4						
40	66	52	26	86	72	36	7	52	58.5	16	4						
50	74	56	28	94	76	38	9	62	71.5	20	5						
63	82	64	32	102	84	42	9	75	84.5	20	5						
80	104	82	41	124	102	51	11	94	104	25	6						
100	126	102	51	146	122	61	12	114	124	32	7						

Bore size\Item	E	EA	H	J	JA	K		KA
						M5×0.8 Thru.hole: Φ4.2	12	
12	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	12
16	M3×0.5	6	5	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	12	12
20	M4×0.7	8	6	6.5	4.5	M5×0.8 Thru.hole: Φ4.2	14	14
25	M5×0.8	10	8	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	15	15
32	M6×1.0	12	10	8.2	5.5	M6×1.0 Thru.hole: Φ5.2	16	16
40	M8×1.25	12	14	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	20	20
50	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	25
63	M10×1.5	15	17	10.5	6.5	M8×1.25 Thru.hole: Φ6.7	25	25
80	M14×1.5	20	22	17	11	M12×1.75 Thru.hole: Φ10.4	25	25
100	M18×1.5	20	27	19	13	M14×2.0 Thru.hole: Φ12.4	30	30

Bore size\Item	KB	M	MA	P	PA		PB	
					St=5	St>5	St=5	St>5
12	16.2	10.2	1	M5×0.8	5	5	7.5	7.5
16	19.8	11	1.5	M5×0.8	5.5	5.5	8	8
20	24	13	1.5	M5×0.8	5.5	5.5	9	9
25	28	17	2	M5×0.8	5.5	5.5	9	9
32	34	22	2.5	1/8"	6.5	9	9	9
40	40	28	3	1/8"	7.5	7.5	9.5	9.5
50	48	38	4	1/4"	8	10.5	8	10.5
63	60	40	4	1/4"	9.5	11	9.5	12
80	74	45	5	3/8"	11.5	14.5	11.5	14.5
100	90	55	5	3/8"	16	20.5	16	20.5



# MU Series Mini Free Mount Cylinder

## Compendium of MU Series

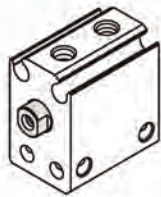
Seven bore size are available

Bore size: 4, 6, 8, 10, 12, 16, 20

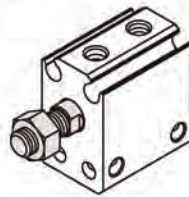
Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type



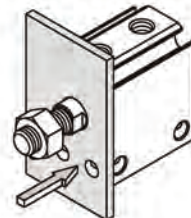
Female thread



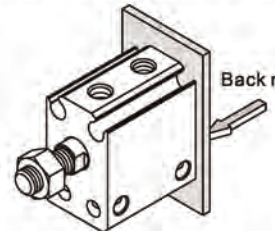
Male thread

Mounted from 4 directions

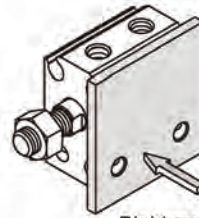
Cylinder can be mounted from 4 directions, and convenient to install and use.



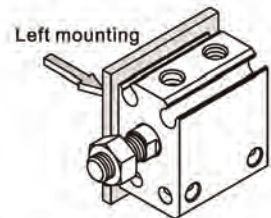
Front mounting



Back mounting



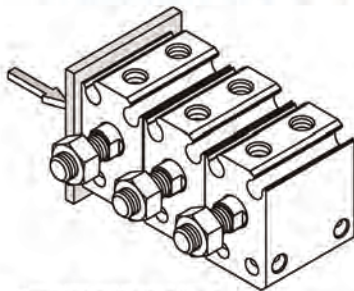
Right mounting



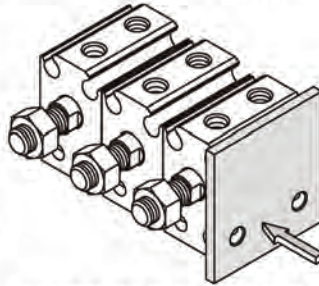
Left mounting

Mounted side by side

Multitudinous cylinder can be mounted side by side to save space.



Mounted side by side from left



Mounted side by side from right

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
4	2	Single acting_push	12.6	-	0.3	1.6	2.8	4.1	5.3	6.6	
		Double acting Push side	12.6	1.3	2.5	3.8	5.0	6.3	7.6	8.8	
		Double acting Pull side	9.4	0.9	1.9	2.8	3.8	4.7	5.6	6.6	
6	4	Single acting_push	28.3	-	-	5.1	7.9	10.7	13.5	16.4	
		Double acting Push side	28.3	-	5.7	8.5	11.3	14.2	17.0	19.8	
		Double acting Pull side	15.7	-	3.1	4.7	6.3	7.9	9.4	11.0	
8	5	Single acting_push	50.3	-	-	8.3	13.4	18.4	23.4	28.5	
		Double acting Push side	50.3	-	10.1	15.1	20.1	25.2	30.2	35.2	
		Double acting Pull side	30.6	-	6.1	9.2	12.2	15.3	18.4	21.4	
10	6	Single acting_push	78.5	-	-	8.7	16.5	24.4	32.2	40.1	47.9
		Double acting Push side	78.5	1.3	15.7	23.6	31.4	39.3	47.1	55.0	
		Double acting Pull side	50.3	0.9	10.1	15.1	20.1	25.2	30.2	35.2	
12	6	Single acting_push	113.1	-	13.6	24.9	36.2	47.5	58.9	70.2	
		Double acting Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2	
		Double acting Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4	
16	8	Single acting_push	201.1	-	27.0	47.1	67.2	87.3	107.4	127.5	
		Double acting Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7	
		Double acting Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6	
20	10	Single acting_push	314.2	-	36.8	68.2	99.7	131.1	162.5	193.9	
		Double acting Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9	
		Double acting Pull side	236.5	23.7	47.1	70.7	94.2	117.8	141.4	164.9	

## Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40µm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



## MU Series

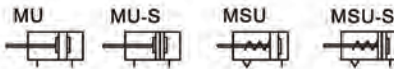


### Specification

Bore size(mm)	4	6	8	10	12	16	20
Acting type	MU: Double acting		MSU: Single acting_Pull type				
Fluid	Air(to be filtered by 40µm filter element)						
Operating pressure	Double acting		0.15~0.7MPa(22~100psi)				
	Single acting		0.3~0.7MPa(44~100psi)		0.2~0.7MPa(29~100psi)		
Proof pressure	1.2MPa(175psi)						
Temperature °C	-20~70						
Speed range mm/s	Double acting: 30~500			Single acting: 50~500			
Stroke tolerance	+1.0 0						
Cushion type	No					Bumper	
Port size	M3×0.5					M5×0.8	

Add) Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

- JIS standard is implemented.
- Cylinder can be mounted from 4 directions, and convenient to install and use.
- Multitudinous cylinder can be mounted side by side to save space.
- The front end of the cylinder is designed with boss. Centering can be done easily.
- The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
- With magnet type is of the feature of position sensing.
- There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
- The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.

### Stroke

Bore size (mm)		Standard stroke (mm)	Max.std stroke
4	Double acting	4 6 8 10 15 20	20
	Single acting	4 6	6
6	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8	8
8	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8 10	10
10	Double acting	4 6 8 10 15 20 25 30	30
	Single acting	4 6 8 10	10
12	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10
16	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10
20	Double acting	5 10 15 20 25 30 35 40 45 50	50
	Single acting	5 10	10

Note) 1. Please contact the company for other special strokes.

2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

### Ordering code

MU  12 × 10 S

MSU  12 × 10 S

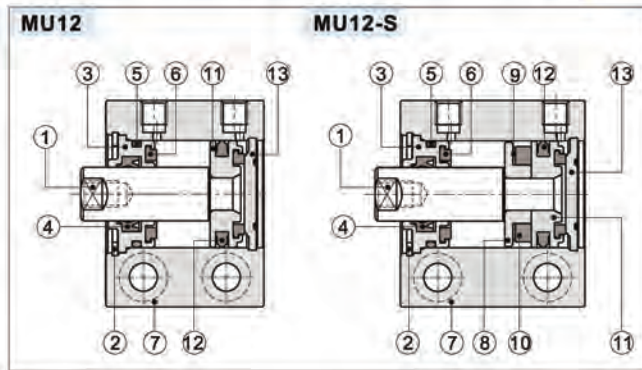
① ② ③ ④ ⑤ ⑥

① Model	② Body mounted type	③ Bore size	④ Stroke	⑤ Magnet	⑥ Rod type
MU: Mini free mount cylinder (double acting)	No this code	4 6 8 10	Refer to stroke table for details	No this code(Without magnet)	Blank: No thread; B: Male thread
MSU: Mini free mount cylinder (single acting-push)	Blank: Transverse mounting R: Axial mounting	12 16 20		Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread

# Mini free mount cylinder

## MU Series

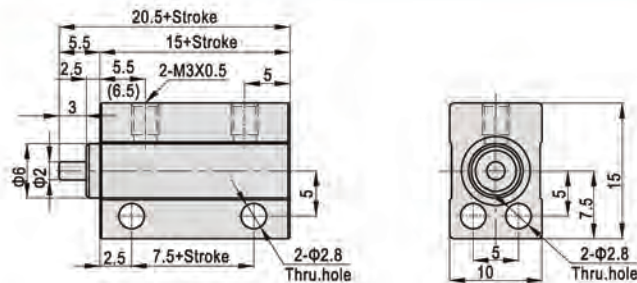
### Inner structure and material of major parts



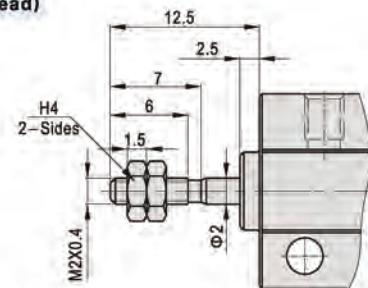
NO.	Item	Material
1	Piston rod	Stainless steel or Carbon steel with 20 μ m chrome plated
2	C clip	Spring steel
3	Front cover	Aluminum alloy
4	Front cover packing	NBR
5	O-ring	NBR
6	Bumper	TPU
7	Body	Aluminum alloy
8	Magnet holder	Brass(Φ12)/Aluminum alloy(Others)
9	Magnet washer	NBR
10	Magnet	Sintered metal (Neodymium-iron-boron)
11	Piston	Brass(Φ12,16)/Aluminum alloy(Others)
12	Piston seal	NBR
13	Back cover	No(Φ12,16)/Aluminum alloy

### Dimensions

Φ4

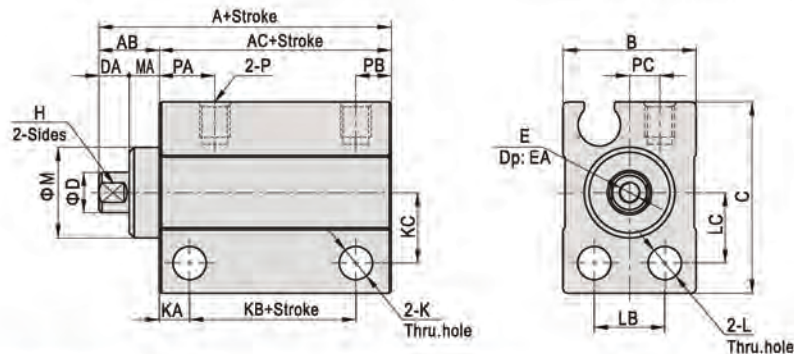


Φ4(Male thread)



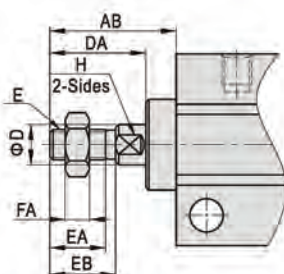
[Note] The value in the '()' is single-acting type's value.

Φ6~Φ10



Bore size/Item	A	AC	KB	A	AC	KB	AB	B	C	D		DA	E	EA	H	K	KA	KC	L	LB	LC	M	MA	P	PA	PB	PC
	With magnet	Without magnet	MU	MSU																							
6	24	18	11.5	19	13	6.5	6	13	19	4	3.5	3	M2.5×0.45	5	3.5	3.3	3	7	3.3	7	7	9	3	M3×0.5	5.5	3.5	3
8	24	18	11.5	19	13	6.5	6	13	21		5	3	M3×0.5	6	4	3.3	3	8	3.3	7	8	11	3	M3×0.5	5.5	3.5	3
10	24	18	11.5	19	13	6.5	6	13.5	22		6	3	M3×0.5	6	5	3.3	3	8.5	3.3	7	8.5	12	3	M3×0.5	5.5	3.5	3.5

Φ6~Φ10(Male thread)



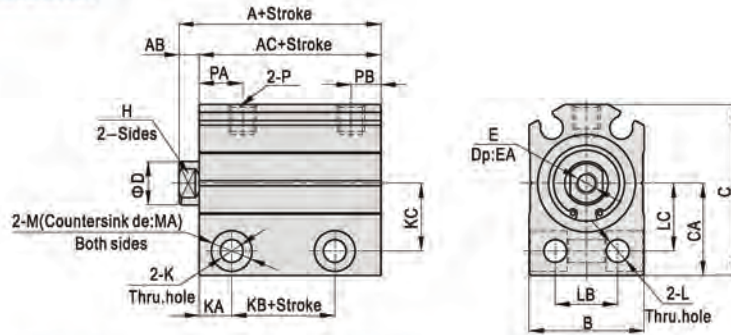
Bore size/Item	AB	D(MU)	D(MSU)	DA	E	EA	EB	FA	H
6	12.5	4	3.5	9.5	M3×0.5	5.5	6.5	2.4	3.5
8	14.5	5	5	11.5	M4×0.7	7	8.5	3	4
10	16.5	6	6	13.5	M5×0.8	9	10.5	4	5

[Note] The unmarked dimensions are the same as Female type.

# Mini free mount cylinder

## MU Series

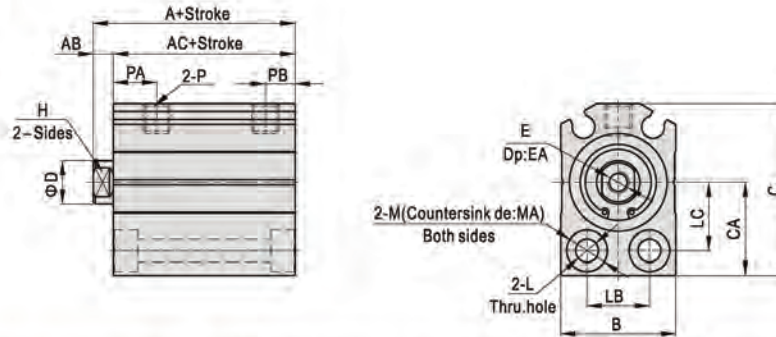
### Φ 12~Φ 20(Transverse mounted)



Bore size/Item	A		AC		KB		AB	B	C	CA	D	E	EA	H	K	KA	KC	L	LB	LC	M	MA	P	PA	PB
	With magnet	Without magnet	With magnet	Without magnet																					
12	25.5(30.5)	22(27)	8.5(13.5)	20.5(25.5)	17(22)	3.5(8.5)	3.5	17	28.5	15.5	6	M3×0.5	6	5	4.3	6	11	4.3	8	11	7.5	7	M5×0.8	7.5	5
16	27(32)	23.5(28.5)	9(14)	22(27)	18.5(23.5)	4(9)	3.5	21	31.5	17	8	M4×0.7	8	6	4.3	6	12.5	4.3	11.5	12.5	7.5	7	M5×0.8	8	5.5
20	29(34)	24.5(29.5)	10.5(15.5)	24(29)	19.5(24.5)	5.5(10.5)	4.5	25	38.5	21	10	M5×0.8	7	8	5.5	7	15.5	5.5	13.5	15.5	9	9	M5×0.8	9	5.5

[Note] The value in the "( )" are single-acting type's value.

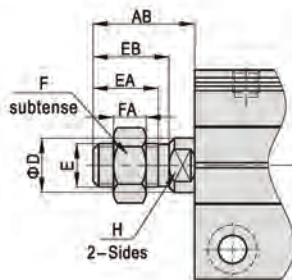
### Φ 12~Φ 20(Axial mounted)



Bore size/Item	A		AC		AB	B	C	D	CA	E	EA	H	L	LB	LC	M	MA	P	PA	PB
	With magnet	Without magnet	With magnet	Without magnet																
12	25.5(30.5)	22(27)	20.5(25.5)	17(22)	3.5	17	28.5	6	15.5	M3×0.5	6	5	4.3	8	11	7.5	4.5	M5×0.8	7.5	5
16	27(32)	23.5(28.5)	22(27)	18.5(23.5)	3.5	21	31.5	8	17	M4×0.7	8	6	4.3	11.5	12.5	7.5	4.5	M5×0.8	8	5.5
20	29(34)	24.5(29.5)	24(29)	19.5(24.5)	4.5	25	38.5	10	21	M5×0.8	7	8	5.5	13.5	15.5	9	5.5	M5×0.8	9	5.5

[Note] The value in the "( )" are single-acting type's value.

### Φ 12~Φ 20(Male thread)



Bore size/Item	AB	D	E	EA	EB	F	FA	H
12	14	6	M5×0.8	9	10.5	8	4	5
16	15.5	8	M6×1.0	10	12	10	5	6
20	18.5	10	M8×1.25	12	14	12	6	8

[Note] The unmarked dimensions are the same as Female type.



# Multi-mount cylinder—MD, MK Series

## Compendium of MD\MK Series

**Six bore size are available**  
Bore size: 6, 10, 16, 20, 25, 32

**Mounted from 6 directions**  
Cylinder can be mounted from 6 directions, and convenient to install and use.

Front mounting    Back mounting  
Left mounting    Right mounting  
Bottom mounting    Up mounting

**Magnetic switch slots around the cylinder body**  
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

**Mounted side by side**  
Multitudinous cylinder can be mounted side by side to save space.

Mounted side by side from left    Mounted side by side from right

**Multi-type cylinder**

MD: Multi-mount cylinder (Double acting type)	
MSD: Multi-mount cylinder (Single acting-push type)	
MTD: Multi-mount cylinder (Single acting-pull type)	
MDD: Multi-mount cylinder (Double rod type)	
MDJ: Multi-mount cylinder (Adjustable stroke type)	
MK: Multi-mount cylinder (Double acting no-rotating type)	
MSK: Multi-mount cylinder (Single acting-push no-rotating type)	
MTK: Multi-mount cylinder (Single acting-pull no-rotating type)	
MKD: Multi-mount cylinder (Double rod no-rotating type)	
MKJ: Multi-mount cylinder (Adjustable stroke no-rotating type)	

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
6	3	Single acting	Push side	28.3	-	1.5	2.9	4.3	5.7	7.2	8.6
			Pull side	21.2	-	-	0.8	1.5	2.2	2.9	3.6
		Double acting	Push side	28.3	2.8	5.7	8.5	11.3	14.1	17.0	19.8
			Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
10	4	Single acting	Push side	78.5	-	3.9	7.9	11.8	15.8	19.7	23.7
			Pull side	66.0	-	1.4	4.1	6.8	9.5	12.2	14.9
		Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull side	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
16	6	Single acting	Push side	201.1	-	10.1	30.2	50.3	70.4	90.5	110.6
			Pull side	172.8	-	8.7	25.9	43.2	60.5	77.8	95.1
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	172.8	17.3	34.6	51.8	69.1	86.4	103.7	121.0
20	8	Single acting	Push side	314.2	-	15.7	47.1	78.6	110.0	141.4	172.8
			Pull side	263.9	-	13.2	39.6	66.0	92.3	118.7	145.1
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9
			Pull side	263.9	26.4	52.8	79.2	105.6	131.9	158.3	184.7
25	10	Single acting	Push side	490.9	-	24.7	73.8	122.8	179.1	221.0	270.1
			Pull side	412.3	-	20.7	61.9	103.1	144.4	185.6	226.8
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6
			Pull side	412.3	41.2	82.5	123.7	164.9	206.2	247.4	288.6
32	12	Single acting	Push side	804.2	-	40.2	120.7	201.1	281.5	361.9	442.4
			Pull side	691.2	-	34.7	103.8	173.0	242.1	311.2	380.3
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0
			Pull side	691.2	69.1	138.2	207.3	276.5	345.6	414.7	483.8

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion;
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



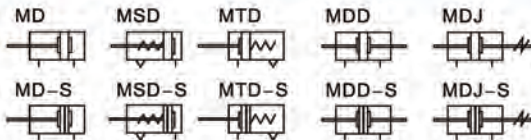


### Specification

Bore size(mm)	6	10	16	20	25	32
Acting type	MD/MDD/MDJ		Double acting			
	MSD/MTD		Single acting			
Fluid	Air(to be filtered by 40 μm filter element)					
Operating pressure	Double acting		0.15~1.0MPa(22~145psi)			
	Single acting		0.2~1.0MPa(28~145psi)			
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	Double acting: 30~500		Single acting: 50~500			
Stroke tolerance	+1.0 0					
Cushion type	Bumper					
Port size [Note]	M5×0.8					1/8"

[Note1] PT thread, G thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

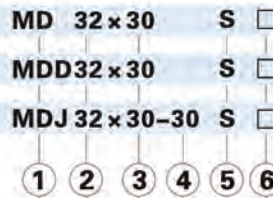
1. Manufactured by our enterprise.
2. There are several ways to fix the cylinder and it is convenient to install and use.
3. Several cylinders can be assembled together to effectively save the installation space.
4. The guide precision of piston rod is high and no additional lubricant is needed.
5. Cylinders of various specifications are optional.
6. The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C(Option).

### Stroke

Bore size (mm)		Standard stroke (mm)						Max.std stroke			
6	Double acting	5	10	15	20	25	30	35	35		
	Single acting	5	10	15	20				20		
10	Double acting	5	10	15	20	25	30	35	35		
	Single acting	5	10	15	20				20		
16	Double acting	5	10	15	20	25	30	40	50	50	
	Single acting	5	10	15	20				20		
20	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		
25	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		
32	Double acting	5	10	15	20	25	30	40	50	60	60
	Single acting	5	10	15	20				20		

Note) 1. Please contact the company for other special strokes.  
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

### Ordering code



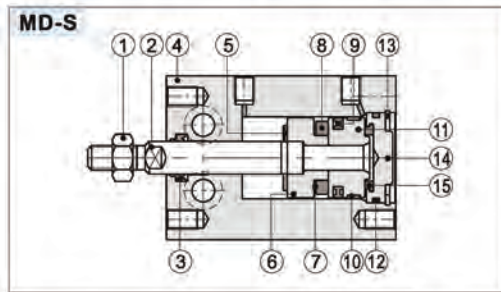
①Model	②Bore size	③Stroke	④Adjustable stroke	⑤Magnet	⑥Thread type [Note1]
MD: Multi-mount cylinder(Double acting type)	6 10 16 20 25 32	Refer to stroke table for details	No this code	Blank: Without magnet	Blank: PT G: G
MSD: Multi-mount cylinder(Single acting-push type)				S: With magnet	
MTD: Multi-mount cylinder(Single acting-pull type)					
MDD: Multi-mount cylinder(Double rod type)					
MDJ: Multi-mount cylinder(Adjustable stroke type)		10 20 30			

[Note1] Standard thread is blank here.

# Multi-mount cylinder

## MD Series

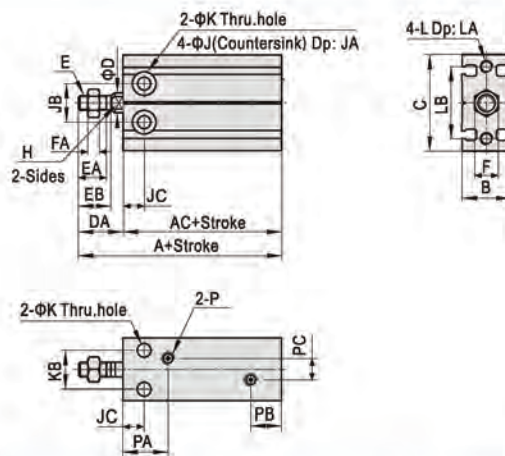
### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	9	Piston seal	NBR
2	Piston rod	Stainless steel	10	Wear ring	Wear resistant material
3	Rod packing	NBR	11	Piston	Aluminum alloy
4	Body	Aluminum alloy	12	O-ring	NBR
5	Bumper	TPU	13	C-clip	Spring steel
6	Magnet holder	Aluminum alloy	14	Back cover	Aluminum alloy
7	Magnet washer	NBR	15	Bumper	TPU
8	Magnet	Sintered metal(Neodymium-iron-boron)			

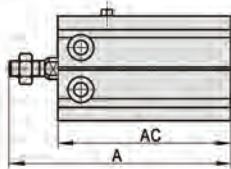
### Dimensions

#### MD

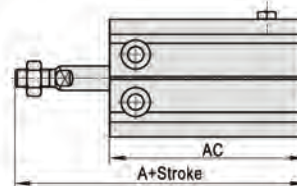


Bore size\Item	Without magnet		With magnet		B	C	D	DA	E	EA	EB	F	FA	H	J	JA	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
	A	AC	A	AC																							
6	46	33	46	33	16.5	22	3	13	M3×0.5	7	8	5.5	2.5	-	6	5	10	7	3.3	7	M3×0.5	5	17	M5×0.8	14	10	-
10	52	36	52	36	16.5	24	4	16	M4×0.7	10	11	7	2	-	6	5.5	11	7	3.3	9	M3×0.5	5	18	M5×0.8	15.5	10	-
16	46	30	56	40	20	32	6	16	M5×0.8	11	12.5	8	4	5	7.5	6.5	14	7	4.5	12	M4×0.7	5	25	M5×0.8	14.5	10	3
20	55	36	65	46	26	40	8	19	M6×1.0	12	14	10	5	6	9.5	8	16	9	5.5	16	M5×0.8	7.5	30	M5×0.8	19	11	9
25	63	40	73	50	32	50	10	23	M8×1.25	15.5	18	12	6	8	9.5	9	20	10	5.5	20	M5×0.8	8	38	M5×0.8	21.5	8.5	12
32	69	42	79	52	40	62	12	27	M10×1.25	19.5	22	17	6	10	11	11.5	24	11	6.5	24	M6×1.0	9	48	1/8"	23	12.5	13

#### MSD



#### MTD



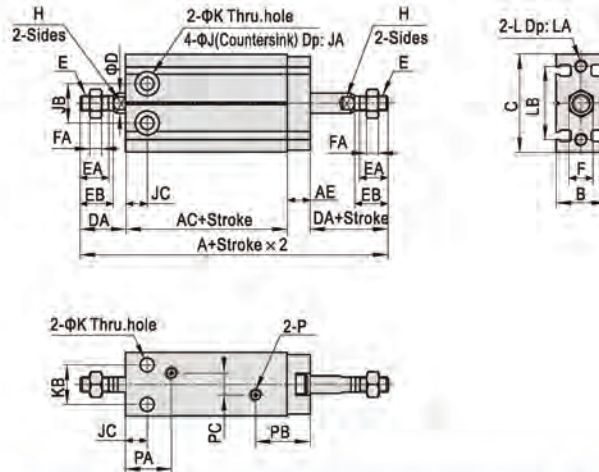
Item	A(Without magnet)				A(With magnet)				AC(Without magnet)				AC(With magnet)			
	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St
6	56	61	71	76	56	61	71	76	43	48	58	63	43	48	58	63
10	62	67	77	82	62	67	77	82	46	51	61	66	46	51	61	66
16	61	66	81	86	71	76	91	96	45	50	65	70	55	60	75	80
20	70	75	90	95	80	85	100	105	51	56	71	76	61	66	81	86
25	78	83	98	103	88	93	108	113	55	60	75	80	65	70	85	90
32	84	89	104	109	94	99	114	119	57	62	77	82	67	72	87	92

Remark) The unmarked dimension is the same as MD standard type.

# Multi-mount cylinder

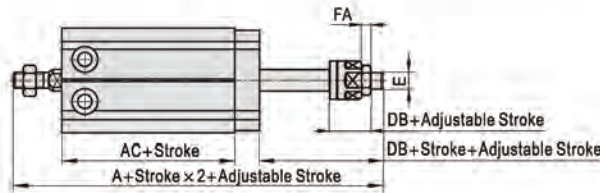
## MD Series

### MDD



Bore size\Item	Without magnet		With magnet		AE	B	C	D	DA	E	EA	EB	F	FA	H	J	JA	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
	A	AC	A	AC																								
6	70	38	70	38	6	16.5	22	3	13	M3×0.5	7	8	5.5	2.5	-	6	5	10	7	3.3	7	M3×0.5	5	17	M5×0.8	14	16	-
10	74	36	74	36	6	16.5	24	4	16	M4×0.7	10	11	7	2	-	6	5.5	11	7	3.3	9	M3×0.5	5	18	M5×0.8	15.5	16	-
16	69.5	30	79.5	40	7.5	20	32	6	16	M5×0.8	11	12.5	8	4	5	7.5	6.5	14	7	4.5	12	M4×0.7	5	25	M5×0.8	14.5	17.5	3
20	83	36	93	46	9	26	40	8	19	M6×1.0	12	14	10	5	6	9.5	8	16	9	5.5	16	M5×0.8	7.5	30	M5×0.8	19	20	9
25	95	40	105	50	9	32	50	10	23	M8×1.25	15.5	18	12	6	8	9.5	9	20	10	5.5	20	M5×0.8	8	38	M5×0.8	21.5	17.5	12
32	106	42	116	52	10	40	62	12	27	M10×1.25	19.5	22	17	6	10	11	11.5	24	11	6.5	24	M6×1.0	9	48	1/8"	23	22.5	13

### MDJ



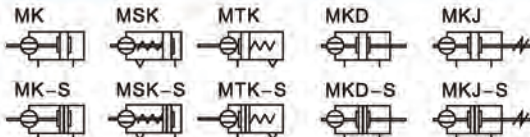
Bore size\Item	A(Without magnet)	A(With magnet)	AC(Without magnet)	AC(With magnet)	DB	E	FA
6	70	70	38	38	13	M3×0.5	2.5
10	73	73	36	36	15	M4×0.7	2
16	70.5	80.5	30	40	17	M5×0.8	4
20	85	95	36	46	21	M6×1.0	5
25	97	107	40	50	25	M8×1.25	6
32	106	116	42	52	27	M10×1.25	6

Remark) The unmarked dimension is the same as MD standard type.

## MK Series



### Symbol



### Product feature

1. Manufactured by our enterprise.
2. There are several fixation ways for the cylinder, and also convenient to install and use.
3. Several cylinders can be assembled together to effectively save the installation space.
4. The guide precision of piston rod is high and no additional lubricant is needed.
5. Fixated block is attached to piston rod, which prevents it from rotating.
6. Various cylinders are available for your choice.
7. The seal material with high temperature resistance is adopted to guarantee the normal operation of cylinder at 150°C (Option).

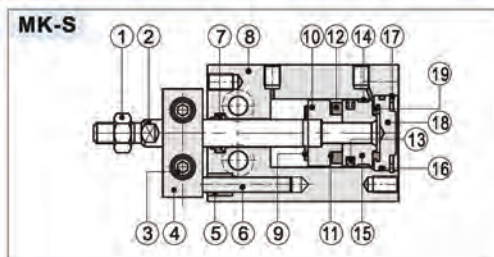
### Ordering code

**MK 32 × 30 S**   
**MKD 32 × 30 S**   
**MKJ 32 × 30-30 S**   
 ① ② ③ ④ ⑤ ⑥

① Model	② Bore size	③ Stroke	④ Adjustable stroke	⑤ Magnet	⑥ Thread type [Note 1]
MK: Multi-mount cylinder (Double acting no-rotating type)	6 10 16 20 25 32	Refer to stroke table for details	No this code  10 20 30	Blank: Without magnet S: With magnet	Blank: PT G: G
MSK: Multi-mount cylinder (Single acting-push no-rotating type)					
MTK: Multi-mount cylinder (Single acting-pull no-rotating type)					
MKD: Multi-mount cylinder (Double rod no-rotating type)					
MKJ: Multi-mount cylinder (Adjustable stroke no-rotating type)					

[Note 1] Standard thread is blank here.

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Rod nut	Carbon steel	11	Magnet washer	NBR
2	Piston rod	Stainless steel	12	Magnet	Sintered metal (Neodymium-iron-boron)
3	Screw	Carbon steel	13	Piston seal	NBR
4	No-rotating plate	Aluminum alloy	14	Wear ring	Wear resistant material
5	Bushing	Brass	15	Piston	Aluminum alloy
6	Fixed rod	Stainless steel	16	O-ring	NBR
7	Rod packing	NBR	17	C-clip	Spring steel
8	Body	Aluminum alloy	18	Back cover	Aluminum alloy
9	Bumper	TPU	19	Bumper	TPU
10	Magnet holder	Aluminum alloy			

### Specification

Bore size (mm)	6	10	16	20	25	32
Acting type	MK/MKD/MKJ		Double acting			
	MSK/MTK		Single acting			
Fluid	Air (to be filtered by 40 μm filter element)					
Operating pressure	Double acting		0.15~1.0MPa (22~145psi)			
	Single acting		0.2~1.0MPa (28~145psi)			
Proof pressure	1.5MPa (215psi)					
Temperature °C	-20~70					
Speed range mm/s	Double acting: 30~500		Single acting: 50~500			
Stroke tolerance	+1.0 0					
Cushion type	Bumper					
Port size [Note]	M5 × 0.8					1/8"

[Note 1] PT thread, G thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)		Standard stroke (mm)						Max. std stroke		
6	Double acting	5	10	15	20	25	30	35		
	Single acting	5	10	15	20			20		
10	Double acting	5	10	15	20	25	30	35		
	Single acting	5	10	15	20			20		
16	Double acting	5	10	15	20	25	30	40	50	
	Single acting	5	10	15	20			20		
20	Double acting	5	10	15	20	25	30	40	50	60
	Single acting	5	10	15	20			20		
25	Double acting	5	10	15	20	25	30	40	50	60
	Single acting	5	10	15	20			20		
32	Double acting	5	10	15	20	25	30	40	50	60
	Single acting	5	10	15	20			20		

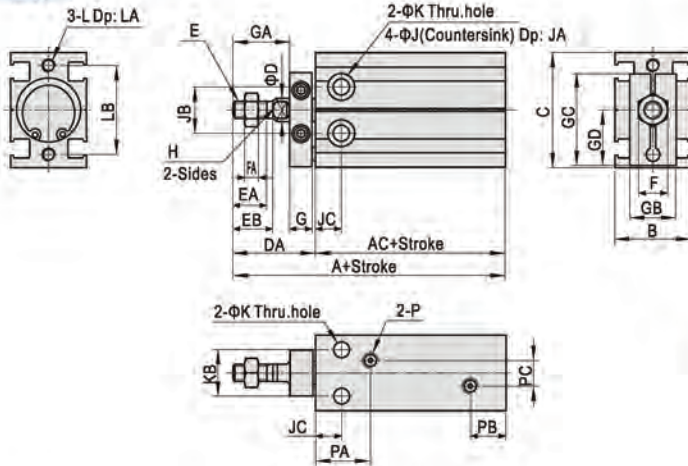
- Note) 1. Please contact the company for other special strokes.  
2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

# Multi-mount cylinder

## MK Series

### Dimensions

#### MK



Bore size\Item	Without magnet		With magnet		B	C	D	DA	E
	A	AC	A	AC					
6	51	33	51	33	16.5	22	3	18	M3×0.5
10	57	36	57	36	16.5	24	4	21	M4×0.7
16	56	30	66	40	20	32	6	26	M5×0.8
20	65	36	75	46	26	40	8	29	M6×1.0
25	73	40	83	50	32	50	10	33	M8×1.25
32	84	42	94	52	40	62	12	42	M10×1.25

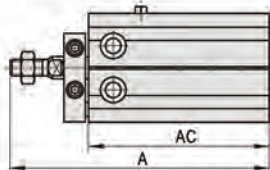
  

Bore size\Item	EA	EB	F	FA	G	GA	GB	GC	GD	H	J	JA
	6	7	8	5.5	2.5	8	9	11	19	10.9	-	6
10	10	11	7	2	8	12	13	20.5	11.9	-	6	5.5
16	11	12.5	8	4	8	17	13	26.5	15.9	5	7.5	6.5
20	12	14	10	5	8	20	16	32	19.8	6	9.5	8
25	15.5	18	12	6	10	22	19	40	24.8	8	9.5	9
32	19.5	22	17	6	12	29	24	49	30.8	10	11	11.5

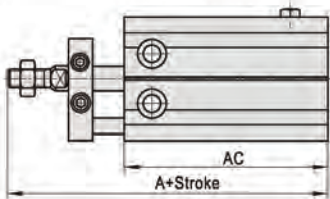
Bore size\Item	JB	JC	K	KB	L	LA	LB	P	PA	PB	PC
	6	10	7	3.3	7	M3×0.5	5	17	M5×0.8	14	10
10	11	7	3.3	9	M3×0.5	5	18	M5×0.8	15.5	10	-
16	14	7	4.5	12	M4×0.7	5	25	M5×0.8	14.5	10	3
20	16	9	5.5	16	M5×0.8	7.5	30	M5×0.8	19	11	9
25	20	10	5.5	20	M5×0.8	8	38	M5×0.8	21.5	8.5	12
32	24	11	6.5	24	M6×1.0	9	48	1/8"	23	12.5	13

#### MSK



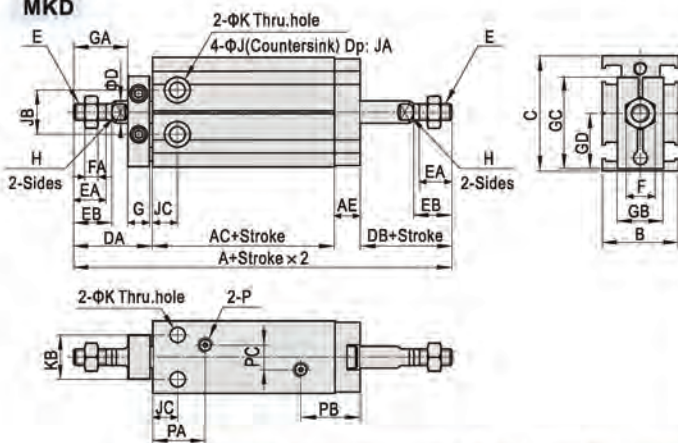
Item	A(Without magnet)				A(With magnet)				AC(Without magnet)				AC(With magnet)			
	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St	5St	10St	15St	20St
6	61	66	76	81	61	66	76	81	43	48	58	63	43	48	58	63
10	67	72	82	87	67	72	82	87	46	51	61	66	46	51	61	66
16	71	76	91	96	81	86	101	106	45	50	65	70	55	60	75	80
20	80	85	100	105	90	95	110	115	51	56	71	76	61	66	81	86
25	88	93	108	113	98	103	118	123	55	60	75	80	65	70	85	90
32	99	104	119	124	109	114	129	134	57	62	77	82	67	72	87	92

#### MTK

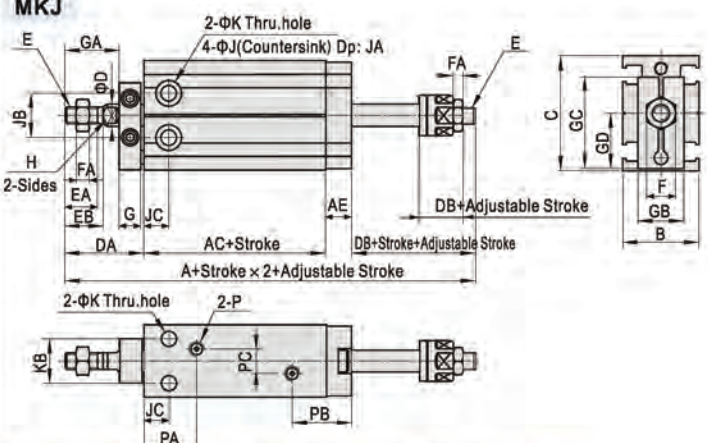


Remark) The unmarked dimension is the same as MK standard type.

#### MKD



#### MKJ



Bore size\Item	A(Without magnet)		A(With magnet)		AC		AC		AE	B	C	D	DA	DB		E
	MKD	MKJ	MKD	MKJ	(Without magnet)	(With magnet)	MKD	MKJ								
6	75	75	75	75	38	38	6	16.5	22	3	18	13	13	M3×0.5		
10	79	78	79	78	36	36	6	16.5	24	4	21	16	14.7	M4×0.7		
16	79.5	80.5	89.5	90.5	30	40	7.5	20	32	6	26	16	17	M5×0.8		
20	93	95	103	105	36	46	9	26	40	8	29	19	21	M6×1.0		
25	105	107	115	117	40	50	9	32	50	10	33	23	25	M8×1.25		
32	121	121	131	131	42	52	10	40	62	12	42	27	27	M10×1.25		

Bore size\Item	EA	EB	F	FA	G	GA	GB	GC	GD	H	J	JA	JB	JC	K	KB	P	PA	PB	PC
	6	7	8	5.5	2.5	8	9	11	19	10.9	-	6	5	10	7	3.3	7	M5×0.8	14	16
10	10	11	7	2	8	12	13	20.5	11.9	-	6	5.5	11	7	3.3	9	M5×0.8	15.5	16	-
16	11	12.5	8	4	8	17	13	26.5	15.9	5	7.5	6.5	14	7	4.5	12	M5×0.8	14.5	17.5	3
20	12	14	10	5	8	20	16	32	19.8	6	9.5	8	16	9	5.5	16	M5×0.8	19	20	9
25	15.5	18	12	6	10	22	19	40	24.8	8	9.5	9	20	10	5.5	20	M5×0.8	21.5	17.5	12
32	19.5	22	17	6	12	29	24	49	30.8	10	11	11.5	24	11	6.5	24	1/8"	23	22.5	13



# MPG Series Plate Cylinder

## Compendium of MPG Series

**Five bore size are available**  
Bore size: 6, 8, 10, 12, 16

**Magnetic switch slots around the cylinder body**  
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

**Multi-type cylinder**

MPG: Standard plate cylinder (double acting)	
MPGH: Hinge mounting type cylinder (double acting)	

**Two kinds of rod type**

Male thread No thread

**Three kinds of mounting type**

LB Type FA Type SDB Type

**Four kinds of cylinder joints**

I Knuckle Y Knuckle FC Rubber bumper (flat head) RC Rubber bumper (ball head)

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Model	Bore size	Rod size	Acting type		Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)						
						0.1	0.2	0.3	0.4	0.5	0.6	0.7
MPG MPGH	6	3	Double acting	Push side	28.3	2.8	5.7	8.5	11.3	14.2	17.0	19.8
				Pull side	21.2	2.1	4.2	6.4	8.5	10.6	12.7	14.8
	8	4	Double acting	Push side	50.3	5.0	10.1	15.1	20.1	25.2	30.2	35.2
				Pull side	37.7	3.8	7.5	11.3	15.1	18.9	22.6	26.4
	10	4	Double acting	Push side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
				Pull side	65.9	6.6	13.2	19.8	26.4	33.0	39.5	46.1
	12	6	Double acting	Push side	113.0	11.3	22.6	33.9	45.2	56.5	67.8	79.1
				Pull side	84.7	8.5	17.0	25.4	33.9	42.4	50.8	59.3
	16	6	Double acting	Push side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
				Pull side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



## MPG Series



### Specification

Bore size(mm)	6	8	10	12	16
Acting type	Double acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	0.15~0.7MPa(22~100psi)				
Proof pressure	1.2MPa(175psi)				
Mounting type	Basic, FA, LB, SDB				
Temperature °C	-20~70				
Speed range mm/s	30~500				
Stroke tolerance	+1.0 0				
Cushion type	Bumper				
Port size	M3×0.5			M5×0.8	

Add) Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

1. It is compact, small size and light weight. It is easy to install and dismantle.
2. The guide precision of piston rod is high and no additional lubricant is needed.
3. Advanced rubber coating process is applied to the back cover.
4. Mounting accessories with various specifications are optional.
5. With magnet type is of the feature of position sensing.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Cylinders of various specifications are optional.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20 25	25
8	5 10 15 20 25 30 35 40	40
10	5 10 15 20 25 30 35 40	40
12	5 10 15 20 25 30 35 40	40
16	5 10 15 20 25 30 35 40	40

[Note] Please contact the company for other special strokes.

### Ordering code

MPG 10×30 S N □

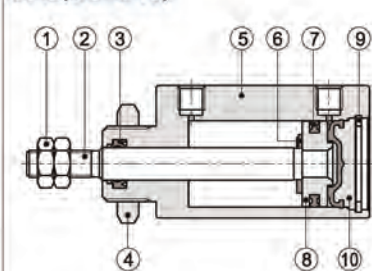
MPGH 10×30 S N □

① ② ③ ④ ⑤ ⑥

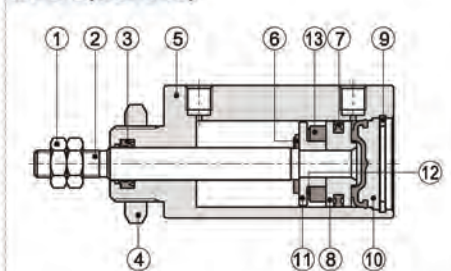
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Rod type	⑥ Mounting type
MPG: Standard plate cylinder (double acting)	6 8 10 12 16	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: Male thread N: No thread	Blank: No accessories
MPGH: Hinge mounting type cylinder (double acting)					LB: LB type FA: FA type Blank: No accessories SDB: SDB type

### Inner structure and material of major parts

MPG(Φ8~Φ16)



MPG-S(Φ8~Φ16)

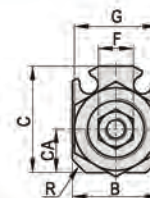
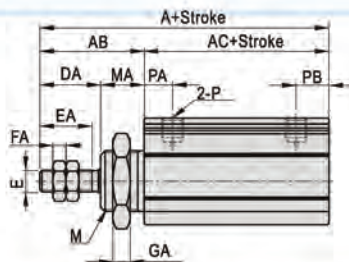


NO.	Item	Material
1	Rod nut	Stainless steel
2	Piston rod	Stainless steel
3	Front cover packing	NBR
4	Front cover nut	Carbon steel
5	Body	Aluminum alloy
6	Bumper	TPU
7	Piston	Aluminum alloy(Φ 16) Brass(Others)
8	Piston seal	NBR
9	clip	Spring steel
10	Back cover	Aluminum alloy & Rubber
11	Magnet holder	Stainless steel(Φ 6)/Brass(Φ 8~Φ 12) Aluminum alloy(Φ 16)
12	Magnet washer	NBR
13	Magnet	Sintered metal (Neodymium-iron-boron)

## MPG Series

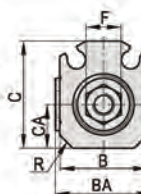
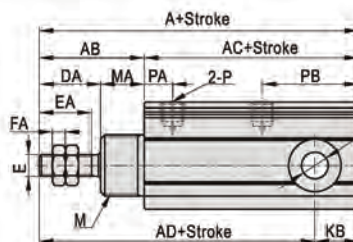
### Dimensions

#### MPG/MPG-S



Bore size\Item	A	AC	A	AC	AB	B	C	CA	D	DA	E	EA	F	FA	G	GA	M	MA	P	PA	PB	R
	Without magnet	With magnet	Without magnet	With magnet																		
6	33	16	38	21	17	14	16.5	6	3	9	M3×0.5	7	5.5	2.4	13	3	M10×1.0	8	M3×0.5	5.5	6.5	2
8	38	18	43	23	20	14.5	17.5	7	4	12	M4×0.7	10	7	2.2	17	3	M12×1.0	8	M3×0.5	6	7	2
10	39.5	19.5	44.5	24.5	20	15	19	7	4	12	M4×0.7	10	7	2.2	17	3	M12×1.0	8	M3×0.5	6	7	2.5
12	43.5	19.5	48.5	24.5	24	17	21.5	8.5	6	14	M5×0.8	12	8	3	19	4	M14×1.0	10	M5×0.8	6.5	7.5	2.5
16	43.5	19.5	48.5	24.5	24	20	24.5	10	6	14	M5×0.8	12	8	3	19	4	M14×1.0	10	M5×0.8	6.5	7.5	3

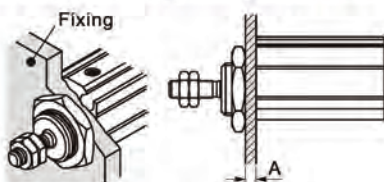
#### MPGH/MPGH-S



Bore size\Item	A	AC	AD	A	AC	AD	AB	B	BA	C	CA	D	DA	E	EA	F	FA	K	KB	M	MA	P	PA	PB	R
	Without magnet	With magnet	Without magnet	With magnet																					
6	38	21	34	43	26	39	17	14	-	16.5	6	3	9	M3×0.5	7	5.5	2.4	$3^{+0.05}_0$	4	M10×1.0	8	M3×0.5	5.5	11.5	2
8	46	26	41	51	31	46	20	14.5	-	17.5	7	4	12	M4×0.7	10	7	3	$4^{+0.05}_0$	5	M12×1.0	8	M3×0.5	6	15	2
10	50.5	30.5	44	55.5	35.5	49	20	15	17	19	7	4	12	M4×0.7	10	7	3	$5^{+0.065}_0$	6.5	M12×1.0	8	M3×0.5	6	18	2.5
12	58	34	48	63	39	53	24	17	19	21.5	8.5	6	14	M5×0.8	12	8	3	$6^{+0.065}_0$	10	M14×1.0	10	M5×0.8	6.5	22	2.5
16	58	34	48	63	39	53	24	20	22	24.5	10	6	14	M5×0.8	12	8	3	$6^{+0.065}_0$	10	M14×1.0	10	M5×0.8	6.5	22	3

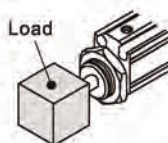
### Installation and application

1. Select the plate width and tightening torque of the front cover thread according to the table below:



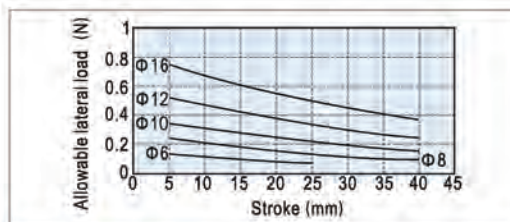
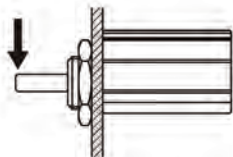
Bore size	Front cover thread	Maximum allowable torque(N.m)	Maximum width(A)
6	M10×1.0	12.5	4
8	M12×1.0	21.0	4
10	M12×1.0	21.0	4
12	M14×1.0	34.0	5
16	M14×1.0	34.0	5

2. The extra torque produced by the load at the piston rod end cannot exceed the allowable value specified in the table below. Otherwise may cause damage to the cylinder or reduce the service life.



Bore size	Piston rod thread	Maximum allowable torque(N.m)
6	M3×0.5	0.3
8	M4×0.7	0.8
10	M4×0.7	0.8
12	M5×0.8	1.6
16	M5×0.8	1.6

3. Allowable Rod End Lateral Load



## MPG Series

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	SDB	FC	RC	I	Y	CMSH	DMSH(S)
6	F-MPG6LB	F-MPG6FA	F-MPG6SDB	F-MPG6FC	F-MPG6RC	F-M3×050I	F-M3×050Y	CMSH	DMSH(S)
8	F-MPG10LB	F-MPG10FA	F-MPG8SDB	F-MPG10FC	F-MPG10RC	F-M4×070I	F-M4×070Y		
10			F-MPG10SDB						
12			F-MPG12SDB						
16	F-MPG16LB	F-MPG16FA	F-MPG16SDB	F-MPG16FC	F-MPG16RC	F-M5×080I	F-M5×080Y		

### Accessory selection

Cylinder model	Accessories	Mounting accessories [Note1]			Knuckle [Note2]				Sensor switch	
		LB	FA	SDB	I	Y	FC	RC	CMSH	DMSH(S)
MPG	No magnet	●	●	×	●	●	●	●	×	×
	With magnet	●	●	×	●	●	●	●	●	●
MPGH	No magnet	×	×	●	●	●	●	●	×	×
	With magnet	×	×	●	●	●	●	●	●	●

### Material of accessories

Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	FC	RC
6-16	△	△	△	◇	◇	□	□

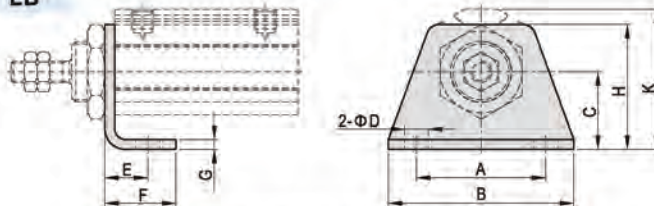
△—SPCC; □—POM; ◇—Carbon steel

[Note1] SDB is attached with relevant PIN.

[Note2] Please refer to P349-352 for knuckle detail.

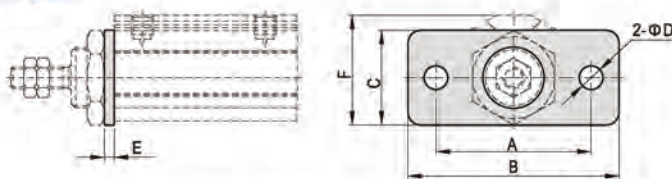
### Dimensions

#### LB



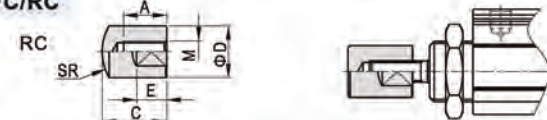
Bore size\Item	A	B	C	D	E	F	G	H	K
6	20	28	11	3.4	6.5	10.5	1.5	19	21.5
8	24	33	13	4.5	7	12	1.5	22	23.5
10	24	33	13	4.5	7	12	1.5	22	25
12	30	43	18	5.5	10	16.5	2.5	29	31
16	30	43	18	5.5	10	16.5	2.5	29	32.5

#### FA



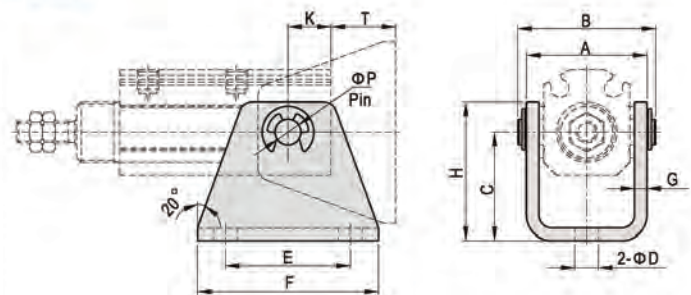
Bore size\Item	A	B	C	D	E	F
6	24	32	16	3.4	1.5	18.5
8	28	37	18	4.5	1.5	19.5
10	28	37	18	4.5	1.5	21
12	36	49	22	5.5	2.5	24
16	36	49	22	5.5	2.5	25.5

#### FC/RC



Bore size\Item	A	B	C	D	E	M	SR
6	6	6	11	8	5	M3×0.5	8
8	8	8	13	10	6	M4×0.7	10
10	8	8	13	10	6	M4×0.7	10
12	10	10	15	12	7	M5×0.8	12
16	10	10	15	12	7	M5×0.8	12

#### SDB



Bore size\Item	A	AA*	B	BB*	C	D	E	F	G	H	K	T	P
6	18.5	55°	21.5	110°	16	3.4	18	26	1.5	20	4	12	3
8	19	55°	23	110°	18	4.5	21	30	1.5	23	5	13	4
10	20.5	65°	24.1	110°	20	4.5	24	33	1.5	25.5	6.5	13.5	5
12	25	55°	29	110°	25	5.5	26	39	3	32	10	15	6
16	28	55°	32	110°	25	5.5	29	42	3	32	10	15	6

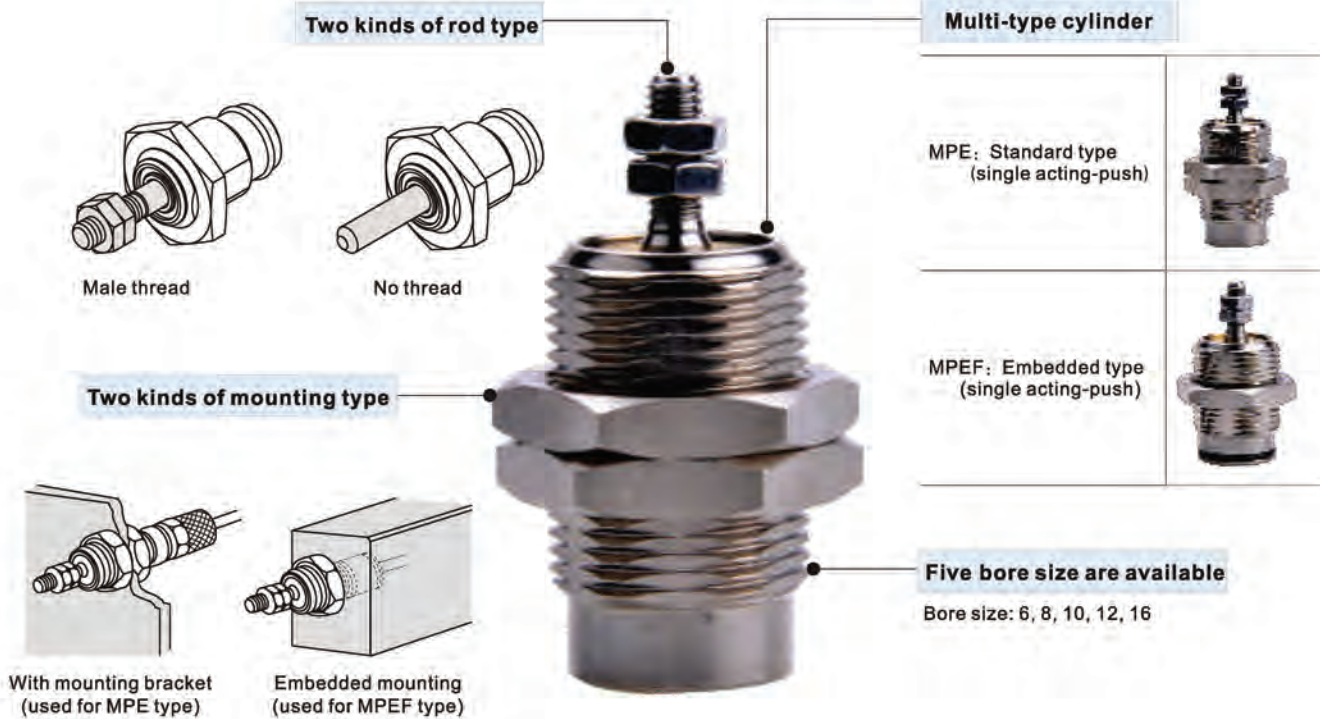
\*Note: AA and BB are for reference only.

Specific value depends on the actual situation.



# MPE Series Threaded Cylinder

## Compendium of MPE Series



### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Model	Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	
MPE MPEF	6	3	Single acting	Push side	28.3	-	1.8	4.6	7.4	10.3	13.1	15.9
			Pull side	21.2			1.6					
	8	4	Single acting	Push side	50.3	-	4.8	9.8	14.8	19.9	24.9	29.9
			Pull side	37.7			2.7					
	10	5	Single acting	Push side	78.5	-	9.4	17.3	25.1	33.0	40.8	48.7
			Pull side	58.9			2.8					
	12	6	Single acting	Push side	113.0	-	13.3	24.6	35.9	47.2	58.5	69.8
			Pull side	84.7			3.45					
	16	6	Single acting	Push side	201.0	-	29.4	49.5	69.6	89.7	109.8	129.9
			Pull side	172.7			4.8					

### Installation and application



1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40 μm or below.
6. As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
9. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

## MPE Series



### Specification

Bore size(mm)	6	8	10	12	16
Acting type	Single acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	0.2~0.7MPa(28~100psi)		0.15~0.7MPa(22~100psi)		
Proof pressure	1.2MPa(175psi)				
Mounting type	Embedded type, End inlet type				
Temperature °C	-20~70				
Speed range mm/s	50~500				
Stroke tolerance	+1.0 0				
Cushion type	No cushion				
Port size	M5×0.8				

### Symbol



### Product feature

1. It is compact, small and light.
2. Multi cylinders can be integrated to save room.
3. Mounting accessories are not necessary.
4. Cylinders of various specifications are optional.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15	15
8	5 10 15	15
10	5 10 15	15
12	5 10 15	15
16	5 10 15	15

[Note] Please contact the company for other special strokes.

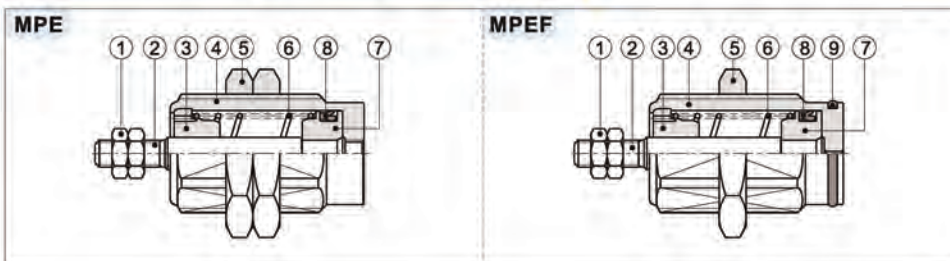
### Ordering code

MPE 16 × 15 N  
MPEF 16 × 15 N

① ② ③ ④

① Model	② Bore size	③ Stroke	④ Rod type
MPE: Standard type (single acting-push) MPEF: Embedded type (single acting-push)	6 8 10 12 16	Refer to stroke table for details	Blank: Male thread N: No thread

### Inner structure and material of major parts



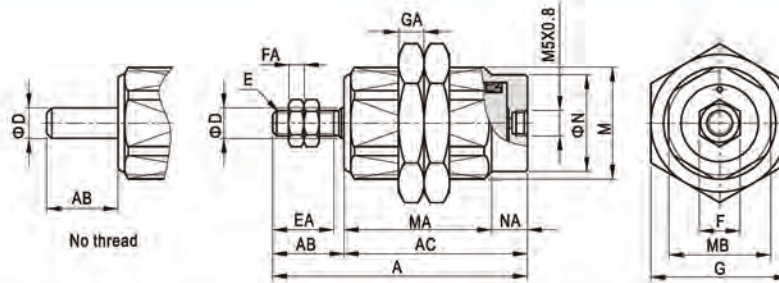
NO.	Item	Material
1	Rod nut	Stainless steel
2	Piston rod	Stainless steel
3	Front cover	Brass
4	Body	Brass (nickel-plated)
5	Body nut	Carbon steel
6	Spring	Spring steel
7	Piston	Stainless steel
8	Piston seal	NBR
9	O-ring	NBR

# Threaded cylinder

## MPE Series

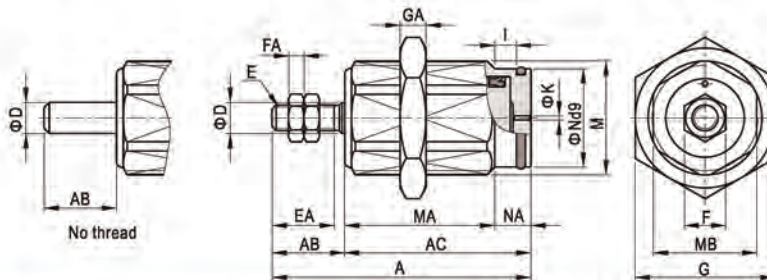
### Dimensions

#### MPE

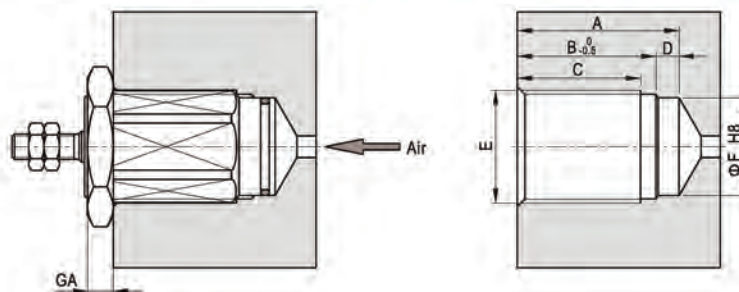


Bore size\Item Stroke	A			AB	AC			MA			D	E	EA	F	FA	G	GA	M	MB	N	NA
	5St	10St	15St		5St	10St	15St	5St	10St	15St											
6	30.5	37.5	44.5	9	21.5	28.5	35.5	15.5	22.5	29.5	3	M3×0.5	7	5.5	2.4	14	4	M10×1.0	9	8.5	6
8	34.5	41.5	48.5	12	22.5	29.5	36.5	16.5	23.5	30.5	4	M4×0.7	10	7	3	17	4	M12×1.0	11	10	6
10	35	42	49	12	23	30	37	17	24	31	5	M4×0.7	10	7	3	19	4	M16×1.5	14	12	6
12	37.5	43.5	49.5	12	25.5	31.5	37.5	19.5	25.5	31.5	6	M5×0.8	10	8	3	24	5	M18×1.5	16	15	6
16	40.5	46.5	52.5	14	26.5	32.5	38.5	19.5	25.5	31.5	6	M5×0.8	12	8	3	27	5	M22×1.5	20	19	7

#### MPEF



Bore size\Item Stroke	A			AB	AC			MA			D	E	EA	F	FA	G	GA	I	M	MB	N	NA	K
	5St	10St	15St		5St	10St	15St	5St	10St	15St													
6	28	35	42	9	19	26	33	13	20	27	3	M3×0.5	7	5.5	2.4	14	4	2.5	M10×1.0	9	8.5	6	0.8
8	32	39	46	12	20	27	34	14	21	28	4	M4×0.7	10	7	3	17	4	2.5	M12×1.0	11	10	6	0.8
10	32.5	39.5	46.5	12	20.5	27.5	34.5	14	21	28	5	M4×0.7	10	7	3	19	4	2.5	M16×1.5	14	12	6.5	1
12	35	41	47	12	23	29	35	16.5	22.5	28.5	6	M5×0.8	10	8	3	24	5	2.7	M18×1.5	16	15	6.5	1.3
16	38	44	50	14	24	30	36	17	23	29	6	M5×0.8	12	8	3	27	5	2.7	M22×1.5	20	19	7	1.7



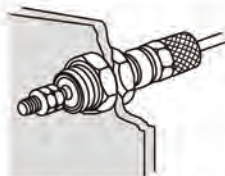
Bore size\Item Stroke	A			B			C			D	E	F	GA
	5St	10St	15St	5St	10St	15St	5St	10St	15St				
6	14.5	21.5	28.5	11	18	25	8.5	15.5	22.5	3.5	M10×1.0	8.5	4
8	15	22	29	11.5	18.5	25.5	9	16	23	3.5	M12×1.0	10	4
10	15.5	22.5	29.5	12	19	26	9	16	23	3.5	M16×1.5	12	4
12	17	23	29	13.5	19.5	25.5	10.5	16.5	22.5	3.5	M18×1.5	15	5
16	18	24	30	14	20	26	11	17	23	4	M22×1.5	19	5

[Note] Size E and F must be concentric.

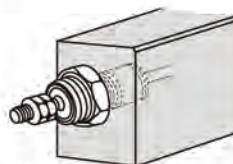
## MPE Series

### Mounting and use

1. Select applicable cylinder model and mounting method according to actual situation:



With mounting bracket (used for MPE type)

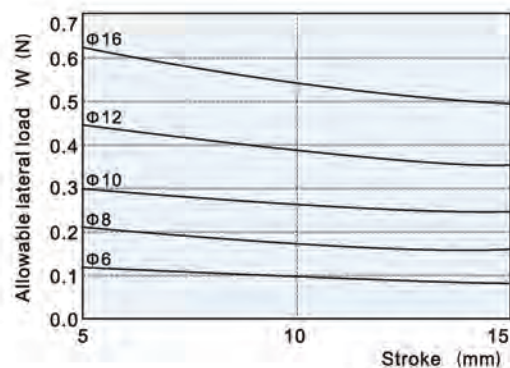


Embedded mounting (used for MPEF type)

2. MPE series are single acting cylinders. No load is allowed at the piston rod when it is on the retraction state.

3. The force of the spring of the cylinder is for retraction of the piston rod only. The piston rod may not retract to the bottom end if there's any load.

4. Make sure the rod end lateral load is allowable. Otherwise may cause damage to the cylinder or reduce the service life.





# Twin-rod cylinder—TN, TR Series

## Compendium of TN/TR Series

TN series is enterprises standard, TR series is JIS standard

Multi-type cylinder

TN: Twin-rod cylinder (Double acting type)



TR: Twin-rod cylinder (Double acting type)



**Bumper in front of the barrel**

Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.

**Twin-rod cylinder**

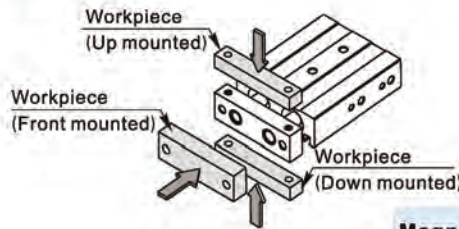
It is good resistance to bending and twisting moments.

**Five or six bore size are available**

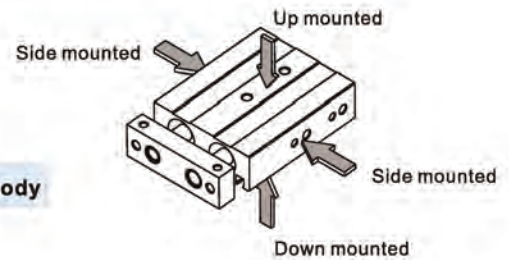
TN series bore size: 10, 16, 20, 25, 32

TR series bore size: 6, 10, 16, 20, 25, 32

**Be mounted the workpiece from three directions**



**Be mounted cylinder from four directions**



**Magnetic switch slots around the cylinder body**

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	4	Double acting Push side	56.5	5.7	113.	17.0	22.6	28.3	33.9	39.6
		Pull side	31.4	3.1	6.3	9.4	12.6	15.7	18.8	22.0
10	6	Double acting Push side	157.1	15.7	31.4	47.1	62.8	78.6	94.3	110.0
		Pull side	100.5	10.1	20.1	30.2	40.2	50.3	60.3	70.4
16	8	Double acting Push side	402.1	40.2	80.4	120.6	160.8	201.1	241.3	281.5
		Pull side	301.6	30.2	60.3	90.5	120.6	150.8	181.0	211.1
20	10	Double acting Push side	628.3	62.8	125.7	188.5	251.3	314.2	377.0	439.8
		Pull side	471.2	47.1	94.2	141.4	188.5	235.6	282.7	329.8
25	12	Double acting Push side	981.7	98.2	196.4	294.5	392.7	490.9	589.0	687.2
		Pull side	755.6	75.6	151.1	226.7	302.2	377.8	453.4	528.9
32	16	Double acting Push side	1608.5	160.9	321.7	482.6	643.4	804.3	965.1	1126.0
		Pull side	1206.4	120.6	241.3	361.9	482.6	603.2	723.8	844.5

## Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion;
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder;
- The medium used by cylinder shall be filtered to 40 μm or below.
- As both the front cover and piston are short, too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid radial load in operation to maintain the normal and extend service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust cap shall be inserted into the inlet and outlet ports. As the precision of the manufacture and guide is high, Please do not dismantle the fixed block or cylinder cover.



## TN Series



### Symbol



### Product feature

1. Enterprises standard is implemented.
2. Embedded installation and fixation mode saves the installation space.
3. It is good resistance to bending and twisting moments.
4. Mounting holes on three sides facilitates multi-position mounting.
5. Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.
6. Standard configuration of this series has magnet and the type without magnet is not available.

### Ordering code

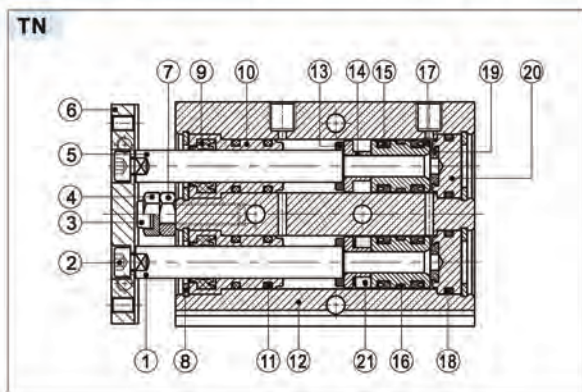
TN 20 × 50 S □



①Model	②Bore size	③Stroke	④Magnet [Note1]	⑤Thread type [Note 2]
TN: Twin-rod cylinder (Double acting type)	10 16 20 25 32	Refer to stroke table for details	S: With magnet	Blank: PT

[Note1] TN Series are all with magnet. [Note2] When the thread is standard, the code is blank.

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Piston rod B	Φ32 S45C	12	Body	Aluminum alloy
		Other SUS304	13	Bumper	TPU
2	Screw	Carbon steel	14	Magnet holder	Φ10 SUS303
3	Bumper	POM			Other
4	Adjustable nut	Carbon steel	15	Piston seal	NBR
5	Piston rod A	S45C	16	Wear ring	Wear resistant material
6	Fixing plate	Free cutting steel	17	Piston	Φ10 SUS303
7	Screw	Carbon steel			Other
8	C clip	Spring steel	18	Seal ring	NBR
9	Wiper seal	NBR	19	Bumper	TPU
10	Front cover	Aluminum alloy	20	Back cover	Aluminum alloy
11	O-ring	NBR	21	Magnet	Sintered metal(Neodymium-iron-boron)

### Specification

Bore size(mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	0.15~1.0MPa(22~145psi)				
Proof pressure	1.5MPa(215psi)				
Temperature °C	-20~70				
Speed range mm/s	30~500				
Adjustable stroke mm	-10~0				
Stroke tolerance	≤100 $^{+1.0}_0$ > 100 $^{+1.5}_0$				
Cushion type	Bumper				
Non-rotating tolerance [Note1]	±0.4°				±0.3°
Port size [Note2]	M5×0.8				1/8"

[Note1] Retract position.

[Note2]PT thread is available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)													Max.std stroke	
10	10	20	30	40	50	60	70	80	90	100				100	
16	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
20	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
25	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200
32	10	20	30	40	50	60	70	80	90	100	125	150	175	200	200

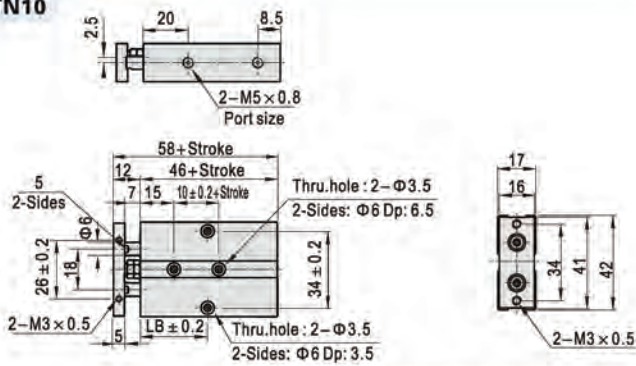
[Note] When the stroke less then or equal to 100mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 35mm stroke cylinder has the same dimensions of 40 std. stroke cylinder.

# Twin-rod cylinder

## TN Series

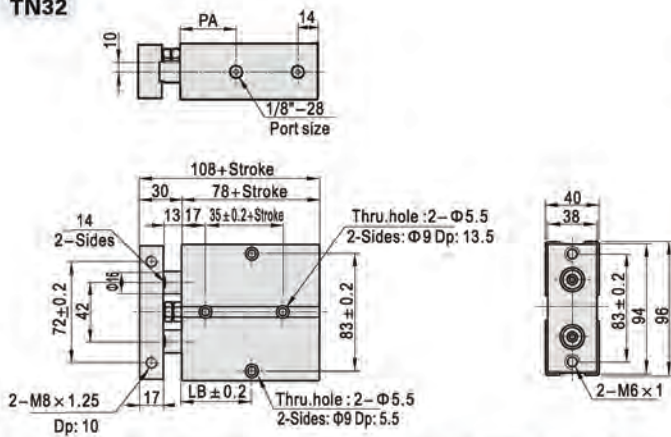
### Dimensions

#### TN10



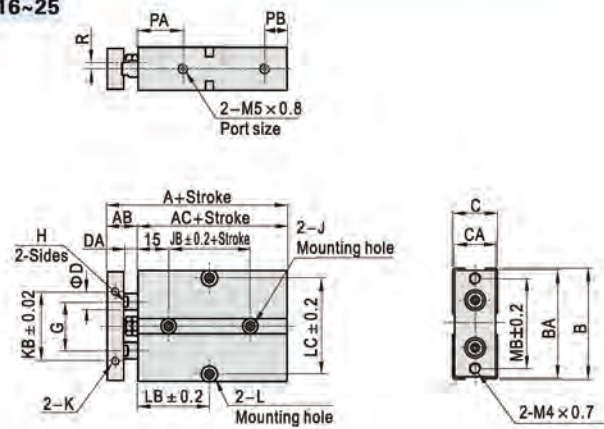
Item\Stroke	10	20	30	40	50	60	70	80	90	100
LB	30	30	35	40	45	50	55	60	65	70

#### TN32



Item\Stroke	10	20	30	40	50	60	70	80	90	100	125	150	175	200
LB	45	50	55	60	65	70	75	80	85	90	102.5	115	127.5	140
PA	35									40				

#### TN16~25



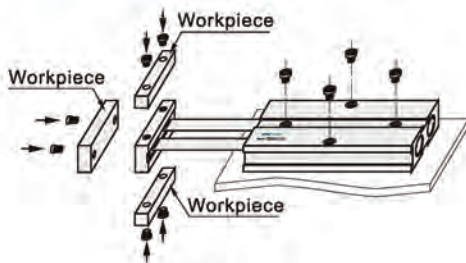
Bore size\Item	A	AB	AC	B	BA	C	CA	D	DA	G	H	J
16	68	15	53	54	53	21	20	8	7	24	6	Both sides: Φ7.5Dp:7.5Thru.hole: Φ4.5
20	78	20	58	62	61	25	24	10	10	28	8	Both sides: Φ7.5Dp:7.5Thru.hole: Φ4.5
25	81	19	62	73	72	30	29	12	9	34	10	Both sides: Φ7.5Dp:7.5Thru.hole: Φ4.5

Bore size\Item	JB	K	KB	PA	PB	L	LC	MB	R
16	20	M4x0.7Dp:5	34	22	11	Both sides: Φ8Dp:4.5Thru.hole: Φ4.5	47	47	3
20	20	M4x0.7Dp:5	44	25	12	Both sides: Φ8Dp:4.5Thru.hole: Φ4.5	55	55	3.5
25	30	M4x0.7Dp:6	56	27	12	Both sides: Φ8Dp:4.5Thru.hole: Φ4.5	66	66	6

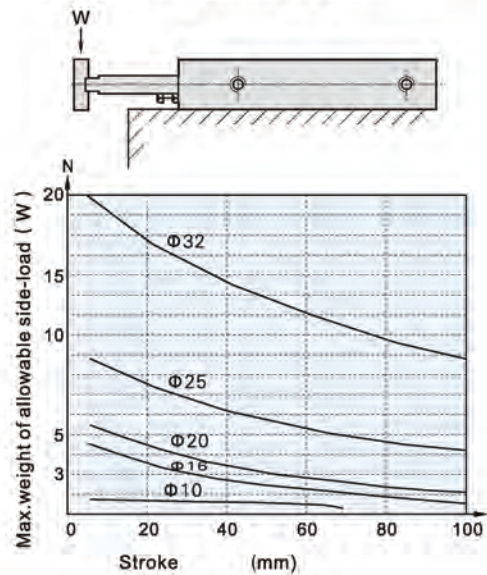
Bore size\Item	LB													
Stroke ≤	10	20	30	40	50	60	70	80	90	100	125	150	175	200
16	30	35	40	45	50	55	60	65	70	75	87.5	100	112.5	125
20	35	35	40	45	50	55	60	65	70	75	87.5	100	112.5	125
25	40	40	45	50	55	60	65	70	75	80	92.5	105	117.5	130

### Installation and application

#### 1. How to mount workpiece:



#### 2. Max. weight of allowable side-load



# Twin-rod cylinder

## TR Series



### Symbol



### Product feature

1. JIS standard is implemented.
2. The non-rotating precision is high and deflection of the end of piston rod is low, which is suitable for precise guide.
3. It adopts lengthening type sliding supporting guide. No additional lubricant is needed and it has good performance of guide.
4. Mounting holes on three sides facilitates multi-position mounting.
5. It is good resistance to bending and twisting moments.
6. Except for the axial, each side of the cylinder has installation orifices to provide several installation and fixation ways for the customers.
7. There are two groups of air intake and outlet at two sides of the cylinder for the actual selection.
8. Bumper in front of the barrel can adjust the stroke of cylinder and relieve impact.
9. Standard configuration of this series has magnet and the type without magnet is not available.

### Ordering code

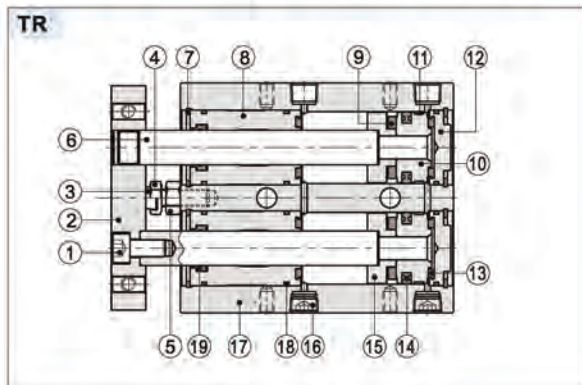
TR 20 × 50 S □



① Model	② Bore size	③ Stroke	④ Magnet [Note1]	⑤ Thread type [Note 2]
TR: Twin-rod cylinder (Double acting type)	6 10 16 20 25 32	Refer to stroke table for details	S: With magnet	Blank: PT G: G T: NPT

[Note1] TR Series are all with magnet. [Note2] When the thread is standard, the code is blank.

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Screw	Carbon steel	10	Piston	Φ6,10 SUS304
2	Fixing plate	Aluminum alloy		Other	Aluminum alloy
3	Bumper	POM	11	Wear ring	Nylon 6
4	Screw	Free cutting steel	12	Back cover	Aluminum alloy
5	Nut	Carbon steel	13	Bumper	TPU
6	Piston rod	Φ25,32 Carbon steel	14	Piston seal	NBR
	Other	SUS304	15	Magnet holder	Φ6,10 SUS304
7	C clip	Spring steel		Other	Aluminum alloy
8	Front cover	Aluminum alloy	16	Screw	Carbon steel
9	Magnet	Φ32 Plastic	17	Body	Aluminum alloy
	Other	Sintered metal (Neodymium-iron-boron)	18	Back cover O-ring	NBR
			19	Wiper seal	NBR

### Specification

Bore size(mm)	6	10	16	20	25	32
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Operating pressure	0.15~1.0MPa(22~145psi)					
Proof pressure	1.5MPa(215psi)					
Temperature °C	-20~70					
Speed range mm/s	30~500					
Adjustable stroke mm	-5~0					
Stroke tolerance	≤100 $^{+1.0}_0$ >100 $^{+1.5}_0$					
Cushion type	Bumper					
Non-rotating tolerance [Note1]	±0.2°	±0.15°			±0.1°	
Port size [Note2]	M5×0.8				1/8"	

[Note1] Retract position.

[Note2]PT thread, G thread and NPT thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
10	10 20 30 40 50 60 70 80 90 100	100
16	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
20	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
25	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
32	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200

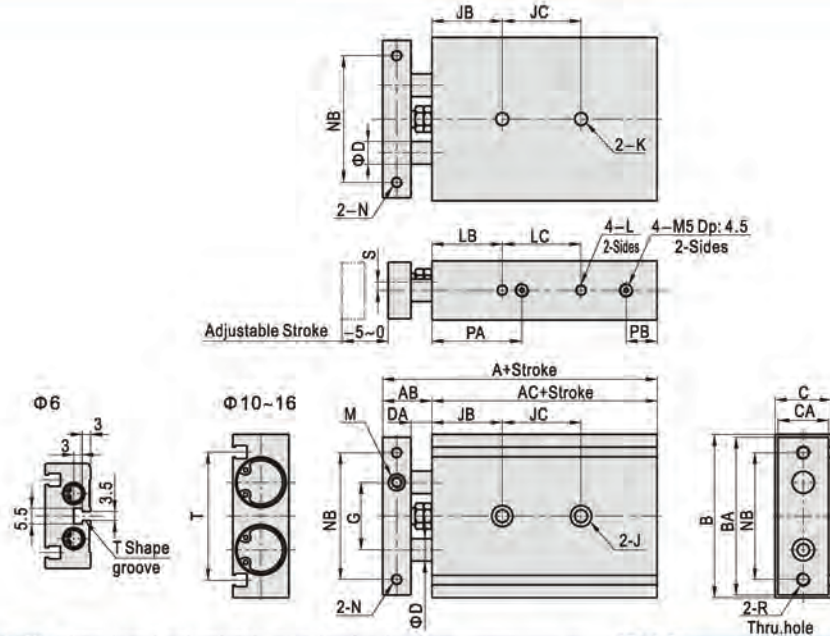
[Note] When the stroke less then or equal to 100mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 35mm stroke cylinder has the same dimensions of 40 std. stroke cylinder.

# Twin-rod cylinder

## TR Series

### Dimensions

#### TR6~16

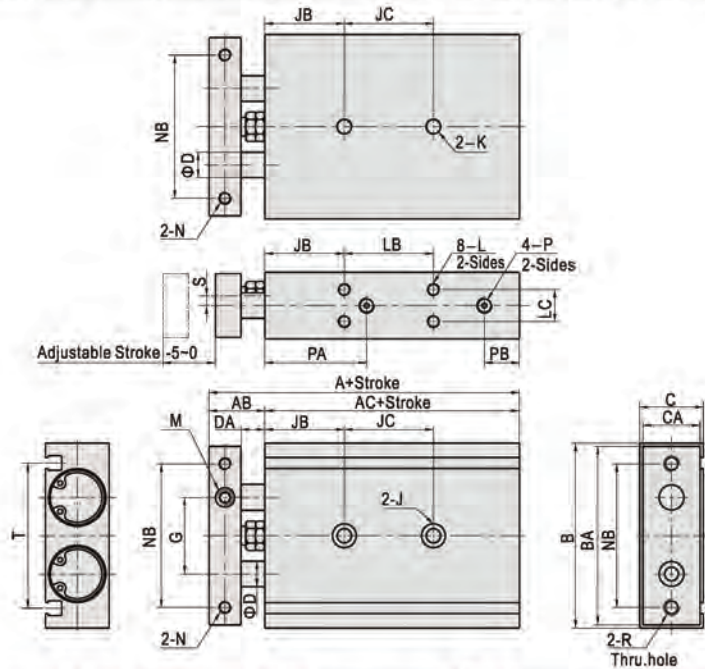


Bore size\Item Stroke	A	AB	AC	B	BA	C	CA	D	DA	G	JC LC						T		
											10-25	30-50	60-80	90-100	125	150		175	200
6	58.5	13.5	45	37	35	16	14	4	8	16	$JC=10+Stroke/2$ $LC=13+Stroke$						23		
10	72	17	55	46	44	17	15	6	9	20	30	40	50	60	-	-	-	-	36.5
16	79	19	60	58	56	20	18	8	9	25	25	35	45	55	65	75	145	145	46.5

Bore size\Item	J	JB	K	L	LB	M	N	NB	PA	PB	R	S
6	One side: $\Phi 6.5Dp:3.5$ Thru.hole: $\Phi 3.5$	13	-	$M3 \times 0.5Dp:4.5$	10	$M3 \times 0.5$	$M3 \times 0.5$ Thru.hole	28	24.5	6.5	$M3 \times 0.5$	4.5
10	One side: $\Phi 6.5Dp:3.5$ Thru.hole: $\Phi 3.5$	20	$M4 \times 0.7Dp:7$	$M3 \times 0.5Dp:5$	20	$M5 \times 0.8$	$M3 \times 0.5Dp:7.5$	35	30	8	$M4 \times 0.7$	3.5
16	One side: $\Phi 8.0Dp:4.5$ Thru.hole: $\Phi 4.5$	30	$M5 \times 0.8Dp:8$	$M4 \times 0.7Dp:5$	30	$M6 \times 1.0$	$M4 \times 0.7$ Thru.hole	45	38	8	$M5 \times 0.8$	5

#### TR20~32



Bore size\Item Stroke	A	AB	AC	B	BA	C	CA	D	DA	G	JB	JC LB						P	PA	PB	
												10-25	30-50	60-100	125	150	175				200
20	94	24	70	64	62	25	23	10	12	28	30	30	40	60	80	80	100	100	$M5 \times 0.8$	46	9
25	96	24	72	80	78	30	28	12	12	35	30	30	40	60	80	80	100	100	1/8"	43	9
32	112	30	82	98	96	38	36	16	14	44	30	40	50	70	90	90	110	110	1/8"	53	10

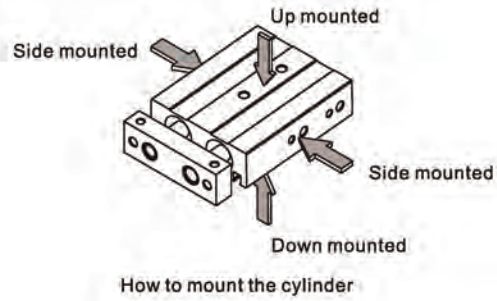
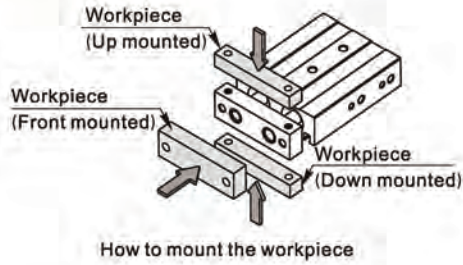
  

Bore size\Item	J	K	L	LC	M	N	NB	R	S	T
20	One side: $\Phi 9.5Dp:5.5$ Thru.hole: $\Phi 5.5$	$M6 \times 1.0$	$M4 \times 0.7Dp:5.5$	9.5	$M8 \times 1.25$	$M4 \times 0.7Dp:6$	50	$M5 \times 0.8$	6.5	52
25	One side: $\Phi 11Dp:6.5$ Thru.hole: $\Phi 7$	$M8 \times 1.25$	$M5 \times 0.8Dp:7$	13	$M8 \times 1.25$	$M5 \times 0.8Dp:7.5$	60	$M6 \times 1.0$	9	61
32	One side: $\Phi 11Dp:6.5$ Thru.hole: $\Phi 7$	$M8 \times 1.25$	$M5 \times 0.8Dp:7$	20	$M10 \times 1.5$	$M5 \times 0.8Dp:8$	75	$M6 \times 1.0$	11.5	73

## TR Series

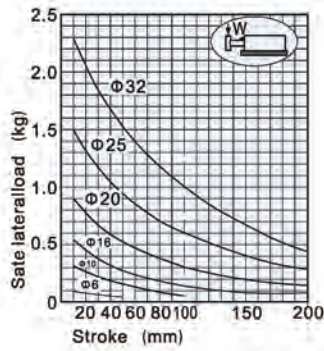
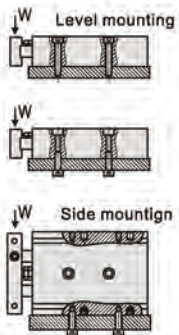
### Installation and application

#### 1. How to mount workpiece:

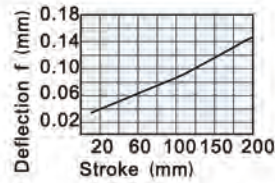


#### 2. Max. weight of allowable side-load

##### Mounting type



#### 3. Safe deflection

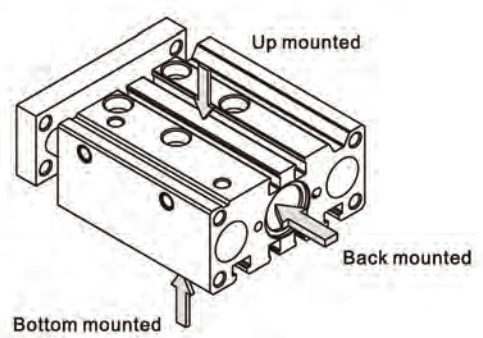
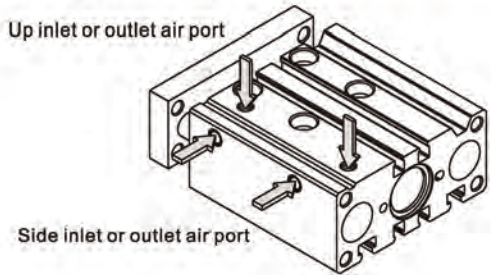
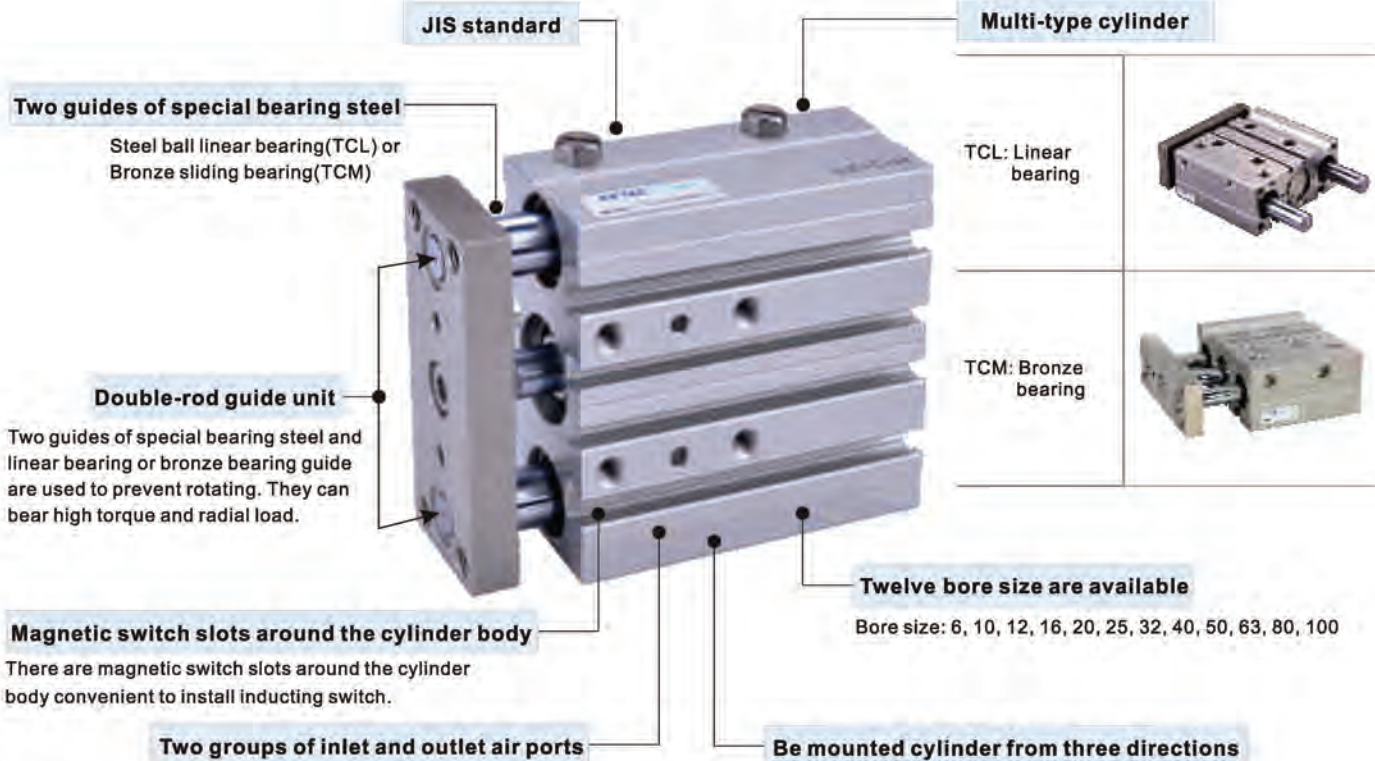


The average value of deflection of rod end of the whole series basically stays in the line showed in the chart on the right.



# Tri-rod cylinder—TCL, TCM Series

## Compendium of TCL/TCM Series



## Installation and application

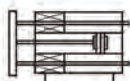


1. When load changes in the work, the cylinder with abundant output capacity shall be selected.
2. Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
3. Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
4. Dirty substances in the pipe must be cleared away before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
5. The medium used by cylinder shall be filtered to 40 μm or below.
6. The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
7. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
8. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust cap shall be inserted into the inlet and outlet ports. As the precision of the manufacture and guide is high, never dismantle the fixed block or cylinder cover without permission.





### Symbol



### Product feature

- JIS standard is implemented.
- Two guides of special bearing steel and linear bearing or bronze bearing guide are used to prevent rotating. They can bear high torque and radial load.
  - ★Note: Steel ball linear bearing: It is suitable for elevation action of cylinder or the situation requiring high precision and high bearing ability, especially for the situation requiring low friction action process.
  - Bronze sliding bearing: It is suitable for the action that has radial load resistance. Compared with normal cylinder of same use, the horizontal impact resistance is doubled and it has stronger torsion rigidity.
- Drive unit and guide unit are in the same barrel that no additional accessories are needed with minimal space required. The air intake is optional and it is convenient to install.
- The bottom, back side and fixing plate of main body respectively has two exact orientation orifices (See  $\Phi PA$  orifice and the orifice in XX point), which can provide orientation installation with high precision for the special situation.
- Options of switch mounting with provision 4 mounting slots.
- Special design of main body provides multi-mount;

### Ordering code

① Model	② Bearing type	③ Bore size	④ Stroke	⑤ Magnet [Note 1]	⑥ Thread type [Note 2]
TC: Tri-rod cylinder (Double acting type)	M: Bronze bearing	6	Refer to stroke table for details	S: With magnet	Blank: PT G: G T: NPT
		10			
		12			
		16			
		20			
		25			
	L: Linear bearing M: Bronze bearing	32			
		40			
		50			
		63			
		80			
		100			

[Note1] TC Series are all with magnet. [Note2] When the thread is standard, the code is blank.

### Specification

Bore size (mm)	6	10	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting											
Fluid	Air (to be filtered by 40 $\mu$ m filter element)											
Operating pressure	0.15~0.7MPa(22~100psi)						0.15~1.0MPa(22~145psi)					
Proof pressure	1.2MPa(175psi)						1.5MPa(215psi)					
Temperature $^{\circ}C$	-20~70											
Speed range mm/s	50~500						30~500			50~400		
Stroke tolerance	$\leq 100^{+1.0}_0$						$> 100^{+1.5}_0$					
Cushion type	Bumper											
Non-rotating tolerance [Note1]	TCL	-		$\pm 0.08^{\circ}$	$\pm 0.07^{\circ}$	$\pm 0.06^{\circ}$	$\pm 0.05^{\circ}$	$\pm 0.04^{\circ}$				
	TCM	$\pm 0.1^{\circ}$		$\pm 0.10^{\circ}$	$\pm 0.09^{\circ}$	$\pm 0.08^{\circ}$	$\pm 0.06^{\circ}$	$\pm 0.05^{\circ}$				
Port size [Note2]	M3 $\times$ 0.5			M5 $\times$ 0.8			1/8"		1/4"		3/8"	

[Note1] Retract position.

[Note2] PT thread, G thread and NPT thread are available.

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max. std. stroke
6	5 10 15 20	20
10	5 10 15 20 25 30	30
12	10 20 25 30 40 50 60 70 75 80 90 100 125 150	150
16	10 20 25 30 40 50 60 70 75 80 90 100 125 150 175 200	200
20 25	20 25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250
32 40 50 63	25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250
80 100	25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250

[Note] When the discrepancy between non-standard stroke and standard stroke is 1~5mm,

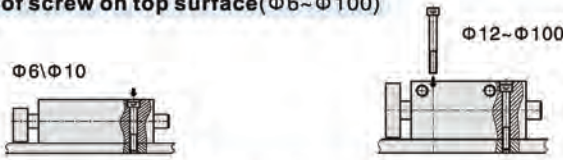
The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 86mm stroke cylinder has the same dimensions of 90 std. stroke cylinder. But 84mm stroke cylinder should be ordered by non-standard stroke.

# Tri-rod cylinder

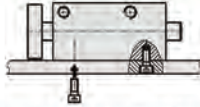
## TCL, TCM Series

### How to mount

#### Fixation of screw on top surface( $\Phi 6\sim\Phi 100$ )



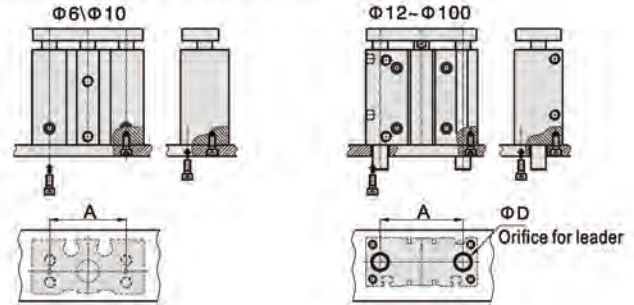
#### Fixation of screw at bottom surface( $\Phi 12\sim\Phi 100$ )



#### Fixation of T slot at bottom( $\Phi 12\sim\Phi 100$ )



#### Fixation of screw at back side( $\Phi 6\sim\Phi 100$ )



Bore size\Item	6	10	12	16	20	25	32	40	50	63	80	100
A	20.5	23	41	46	54	64	78	86	110	124	156	188
D (Min)	TCM	X	X	10	12	13	20	20	20	20	30	-
	TCL	-	-	8	10	10	13	20	20	-	-	30

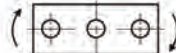
### Safe load and torque

Bore size	Type	Stroke(mm)																			
		5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
<b>Max. safe load</b>		<b>Unit: Newton(N)</b>																			



12	TCM	-	44	-	33	29	26	41	36	30	28	26	25	24	22	19	17	-	-	-	-
	TCL	-	37	-	27	25	22	35	30	27	24	23	21	19	18	15	12	-	-	-	-
16	TCM	-	67	-	51	42	37	63	58	49	41	37	35	32	27	24	22	20	-	-	
	TCL	-	54	-	40	37	32	54	47	42	38	35	32	30	28	23	20	17	15	-	-
20	TCM	-	-	-	78	61	57	123	112	99	91	67	84	79	75	66	59	54	49	45	42
	TCL	-	-	-	58	52	48	101	90	83	74	70	69	63	58	62	54	48	43	39	35
25	TCM	-	-	-	93	89	76	142	131	119	107	101	97	90	85	68	79	71	65	61	55
	TCL	-	-	-	82	79	68	132	118	109	99	93	88	81	77	80	70	62	55	50	45
32	TCM	-	-	-	203	190	179	164	221	197	182	172	163	157	142	127	116	106	98	91	
	TCL	-	-	-	191	182	166	157	207	178	164	156	150	144	203	186	171	158	146	137	
40	TCM	-	-	-	203	190	179	164	221	197	182	172	163	159	142	127	116	106	97	91	
	TCL	-	-	-	190	182	166	157	210	179	163	156	150	144	203	185	171	158	146	137	
50	TCM	-	-	-	296	283	268	245	303	288	273	266	253	241	216	195	179	164	155	142	
	TCL	-	-	-	208	196	185	173	259	232	223	212	207	199	264	242	224	207	195	181	
63	TCM	-	-	-	296	283	268	245	303	288	273	266	253	241	216	195	179	164	153	142	
	TCL	-	-	-	206	196	180	171	259	232	221	212	205	196	262	240	221	205	191	178	

**Max. safe torque** **Unit: Newton · Meter(N · m)**

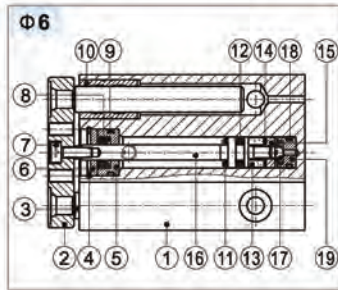


12	TCM	-	0.90	-	0.79	0.71	0.65	0.77	0.72	0.65	0.53	0.50	0.47	0.41	0.36	0.31	0.27	-	-	-	-
	TCL	-	0.61	-	0.45	0.40	0.35	0.58	0.50	0.44	0.39	0.37	0.35	0.32	0.29	0.24	0.20	-	-	-	-
16	TCM	-	1.21	-	1.04	0.94	0.88	1.23	1.11	0.99	0.72	0.69	0.65	0.61	0.58	0.50	0.44	0.40	0.36	-	-
	TCL	-	0.99	-	0.74	0.66	0.59	0.99	0.86	0.77	0.69	0.65	0.61	0.57	0.52	0.43	0.37	0.32	0.28	-	-
20	TCM	-	-	-	1.57	1.42	1.31	2.39	2.15	1.97	1.90	1.88	1.86	1.72	1.63	1.44	1.28	1.16	1.06	1.01	0.90
	TCL	-	-	-	1.26	1.14	1.03	2.17	1.94	1.79	1.59	1.52	1.46	1.33	1.25	1.34	1.17	1.03	0.93	0.88	0.76
25	TCM	-	-	-	2.40	2.22	2.01	3.66	3.35	3.17	3.06	2.96	2.91	2.77	2.57	2.26	2.02	1.83	1.67	1.57	1.42
	TCL	-	-	-	2.11	1.96	1.75	3.37	3.02	2.71	2.42	2.38	2.33	2.19	1.97	2.05	1.78	1.58	1.41	1.22	1.16
32	TCM	-	-	-	6.35	6.00	5.73	5.13	5.98	5.74	5.69	5.62	5.11	4.97	4.42	3.98	3.61	3.31	2.97	2.84	
	TCL	-	-	-	5.95	5.73	5.44	4.89	5.43	5.15	5.11	5.02	4.70	4.51	6.34	5.79	5.33	4.93	4.33	4.29	
40	TCM	-	-	-	7.00	6.60	6.11	5.66	6.66	6.31	6.27	6.23	5.86	5.48	4.78	4.38	3.98	3.65	3.34	3.13	
	TCL	-	-	-	6.55	6.21	5.77	5.39	6.17	5.67	5.62	5.58	5.33	4.96	6.98	6.38	5.87	5.43	5.00	4.72	
50	TCM	-	-	-	13.00	12.60	11.00	10.80	13.70	12.70	12.00	11.80	11.10	10.80	9.50	8.60	7.86	7.24	6.80	6.24	
	TCL	-	-	-	9.17	8.75	8.30	7.62	10.30	9.94	9.83	9.77	8.82	8.74	11.60	10.70	9.83	9.12	8.95	7.95	
63	TCM	-	-	-	14.70	13.60	12.90	12.10	19.40	16.20	13.50	12.70	12.10	11.90	10.70	9.69	8.86	8.16	7.52	7.04	
	TCL	-	-	-	10.20	9.74	9.20	8.48	17.50	14.00	11.00	10.60	10.20	9.74	13.00	11.90	11.00	10.20	9.63	8.84	
80	TCM	-	-	-	21.9	20.8	19.7	18.6	15.8	24	22.9	21.7	21	20.5	18.6	17	15.6	14.5	13.5	12.6	
	TCL	-	-	-	15.1	14.3	13.6	12.9	12.2	23.8	22.7	21.6	21	20.6	18.9	17.3	16	14.8	13.5	12.9	
100	TCM	-	-	-	38.8	36.8	35.0	33.5	28.5	39.4	37.5	35.6	34.5	33.8	30.9	28.4	26.2	24.4	22.5	21.4	
	TCL	-	-	-	27.1	25.7	24.4	23.6	26	39.8	37.9	36	35.2	34.6	31.8	29.3	27.2	25.3	23.5	22.1	

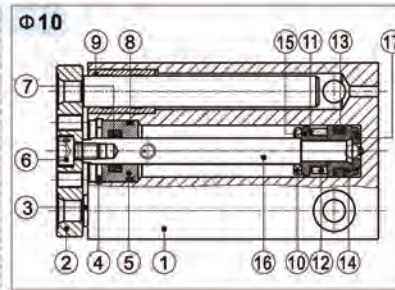
# Tri-rod cylinder

TCL, TCM Series

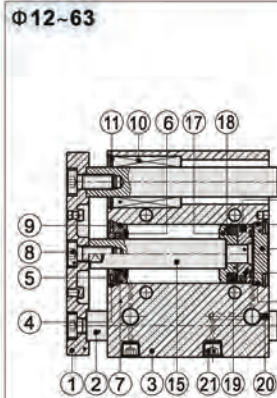
## Inner structure and material of major parts



NO.	Item	NO.	Item
1	Body	11	Bumper
2	Fixing plate	12	Piston seal
3	Leader	13	Magnet
4	C clip	14	Magnet washer
5	Front cover	15	Piston
6	O-ring stop block	16	Piston rod
7	Screw	17	Bumper
8	Piston rod O-ring	18	O-ring
9	O-ring	19	Washer
10	Bearing		stop block



NO.	Item	NO.	Item
1	Body	10	Bumper
2	Fixing plate	11	Magnet washer
3	Leader	12	Magnet
4	C clip	13	Piston seal
5	Front cover	14	Piston
6	Screw	15	Magnet holder
7	Piston rod O-ring	16	Piston rod
8	O-ring	17	Bumper
9	Bearing		



**TCL**

Bore size Φ12、Φ16mm  
Stroke ≤ 30mm

Bore size Φ20~Φ63mm  
Stroke ≤ 50mm

Bore size Φ12、Φ16mm  
30 < Stroke ≤ 100mm

Bore size Φ20~Φ63mm  
50 < Stroke ≤ 100mm

Bore size Φ12、Φ16mm  
Stroke > 100mm

Bore size Φ20~Φ63mm  
Stroke > 100mm

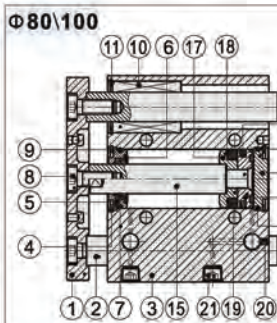
**TCM**

Bore size Φ12~Φ25mm  
Stroke ≤ 50mm

Bore size Φ12~Φ63mm  
50 < Stroke ≤ 100mm

Bore size Φ12~Φ63mm  
Stroke > 100mm

NO.	Item	NO.	Item
1	Fixing plate	12	Piston seal
2	Leader	13	O-ring
3	Body	14	Back cover
4	C clip	15	Piston rod
5	Front cover	16	Piston
6	Bumper	17	Magnet holder
7	Piston rod O-ring	18	Magnet washer
8	Screw	19	Magnet
9	O-ring	20	Screw
10	Bearing	21	Screw
11	C clip	22	Spacer



**TCL**

Stroke S=25-60mm

Stroke S=70-150mm

Stroke S=175-250mm

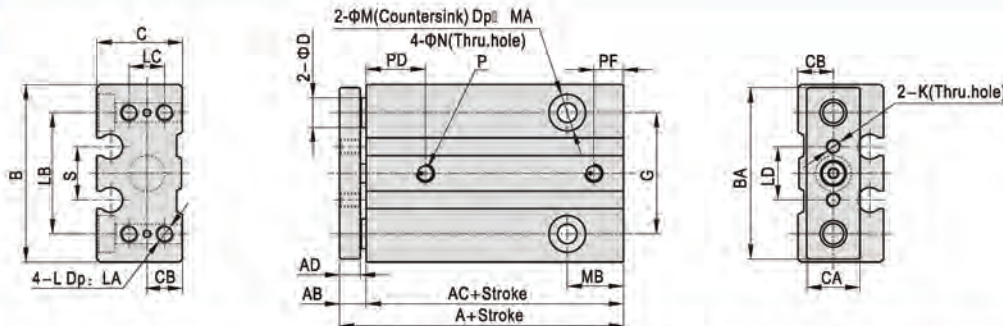
**TCM**

Stroke S=25-250mm

NO.	Item	NO.	Item
1	Fixing plate	12	Piston seal
2	Leader	13	O-ring
3	Body	14	Back cover
4	C clip	15	Piston rod
5	Front cover	16	Piston
6	Bumper	17	Magnet holder
7	Piston rod O-ring	18	Magnet washer
8	Screw	19	Magnet
9	O-ring	20	Screw
10	Bearing	21	Screw
11	C clip	22	Spacer

## Dimensions

TCM6\TCM10

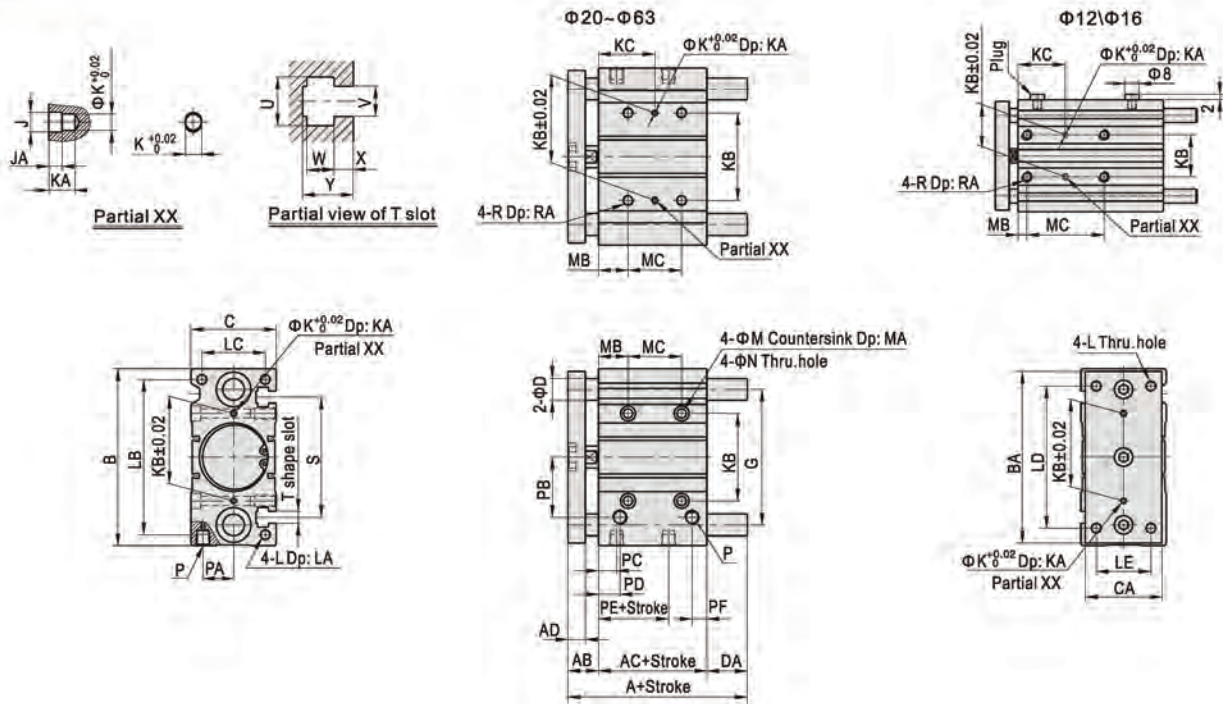


Bore size\Item	A	AB	AC	AD	B	BA	C	CA	CB	D	G	K	L	LA	LB	LC	LD	M	MA	MB	N	P	PD	PF
6	29.5	6	23.5	5	30	29	14.5	9	6	5	20.5	M2.5X0.45	M3X0.5	5	20.5	6	9	6	3	9.5	3.5	M3X0.5	9.5	5.5
10	32	6	26	5	34	33	18	10	7.5	6	23	M3X0.5	M4X0.7	5	23	8	11	8	4	8.5	4.5	M3X0.5	11.5	5

# Tri-rod cylinder

## TCL, TCM Series

TCL/TCM12-63

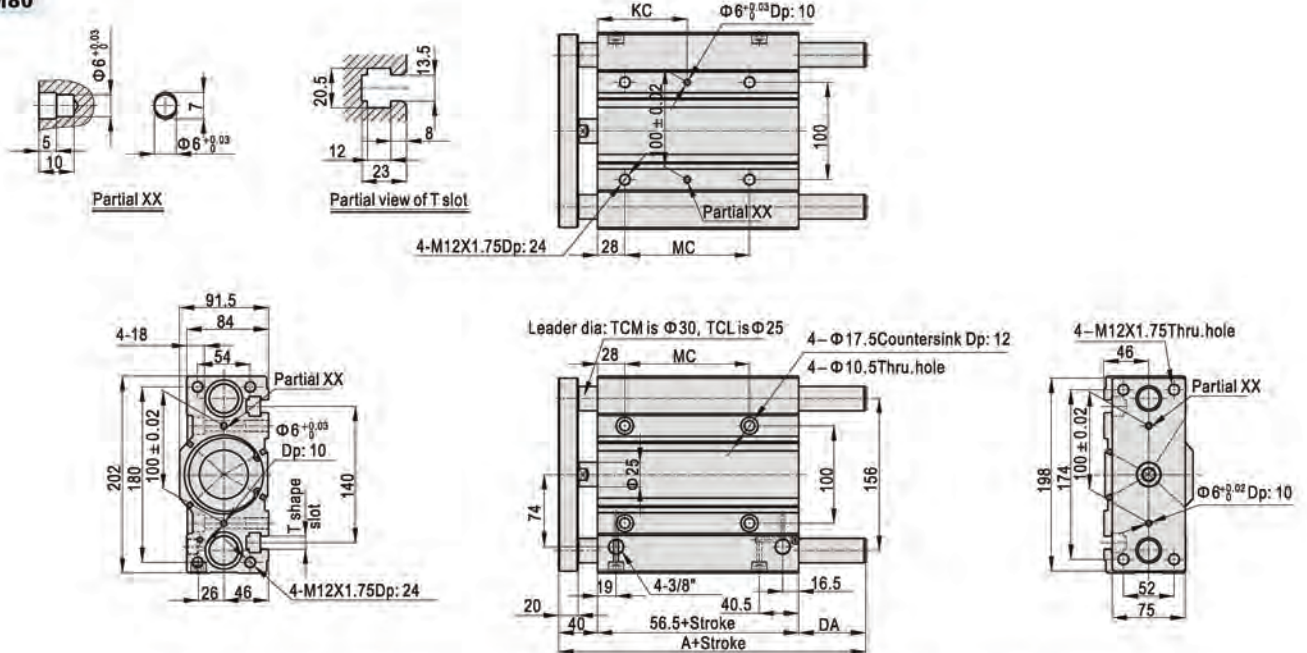


Bore size/Item	A					DA					MC			KC							
	TCL	TCM	TCL	TCM		TCL	TCM														
Stroke	≤30	≤50	31-100	101-200	>200	≤30	31-100	101-200	>200	≤50	51-100	101-200	>200	≤30	31-100	101-200	>200	≤30	31-100	101-200	>200
12	42	55	85	-	0	13	43	-	0	13	43	-	20	40	110	-	15	25	60	-	
16	46	65	95	-	0	19	49	-	0	19	49	-	24	44	110	-	17	27	60	-	
20	53	80	104	122	0	27	51	69	0	27	51	69	24	44	120	200	29	39	77	117	
25	53.5	82	104.5	122	0	28.5	51	68.5	0	28.5	51	68.5	24	44	120	200	29	39	77	117	
Stroke	≤50	≤50	51-100	101-200	>200	≤50	51-100	101-200	>200	≤50	51-100	101-200	>200	≤40	41-100	101-200	>200	≤40	41-100	101-200	>200
32	65	78	102	118	140	5.5	42.5	58.5	80.5	18.5	42.5	58.5	80.5	24	48	124	200	33	45	83	121
40	66	78	102	118	140	0	36	52	74	12	36	52	74	24	48	124	200	34	46	84	122
50	76	89	118	134	161	4	46	62	89	17	46	62	89	24	48	124	200	36	48	86	124
63	77	89	118	134	161	0	41	57	84	12	41	57	84	28	52	128	200	38	50	88	124
Bore size/Item	AB	AC	AD	B	BA	C	CA	D(TCL)	D(TCM)	G	J	JA	K	KA	KB	L	LA	LB	LC	LD	
12	13	29	8	58	56	26	22	6	8	41	3.5	3	3	6	23	M4×0.7	10	50	18	48	
16	13	33	8	64	62	30	25	8	10	46	3.5	3	3	6	24	M5×0.8	12	56	22	54	
20	16	37	10	83	81	36	30	10	12	54	3.5	3	3	6	28	M5×0.8	13	72	24	70	
25	16	37.5	10	93	91	42	38	12	16	64	4.5	3	4	6	34	M6×1.0	15	82	30	78	
32	22	37.5	12	112	110	48	44	16	20	78	4.5	3	4	6	42	M8×1.25	20	98	34	96	
40	22	44	12	120	118	54	44	16	20	86	4.5	3	4	6	50	M8×1.25	20	106	40	104	
50	28	44	16	148	146	64	60	20	20	110	6	4	5	8	66	M10×1.5	22	130	46	130	
63	28	49	16	162	158	78	70	20	20	124	6	4	5	8	80	M10×1.5	22	142	58	130	
Bore size/Item	LE	M	MA	MB	N	P	PA	PB	PC	PD	PE	PF	R	RA	S	U	V	W	X	Y	
12	14	8	4.5	5	4.5	M5×0.8	8	18	11	11	13	7.5	M5×0.8	12	37	7.5	4.5	4	2	6.5	
16	16	8	4.5	5	4.5	M5×0.8	10	19	11	11	15	8	M5×0.8	10	38	7.5	4.5	4	2.5	7	
20	18	9.5	5.5	17	5.5	1/8"	10.5	25	10.5	10.5	12.5	9	M6×1.0	12	44	8.5	5.5	4.5	3	8	
25	26	9.5	5.5	17	5.5	1/8"	13.5	28.5	11.5	11.5	12.5	9	M6×1.0	12	50	8.5	5.5	4.5	3	8.5	
32	30	11	7.5	21	6.5	1/8"	16	34	12.5	12.5	7	9	M8×1.25	16	63	10.5	6.5	5.5	3.5	9.5	
40	30	11	7.5	22	6.5	1/8"	18	38	14	14	13	10	M8×1.25	16	72	10.5	6.5	5.5	4	11	
50	40	14	9	24	8.5	1/4"	21.5	47	12	14	9	11	M10×1.5	20	92	13.5	8.5	7.5	4.5	13.5	
63	50	14	9	24	8.5	1/4"	28	55	16.5	16.5	14	13.5	M10×1.5	20	110	18	11	10	7	18.5	

# Tri-rod cylinder

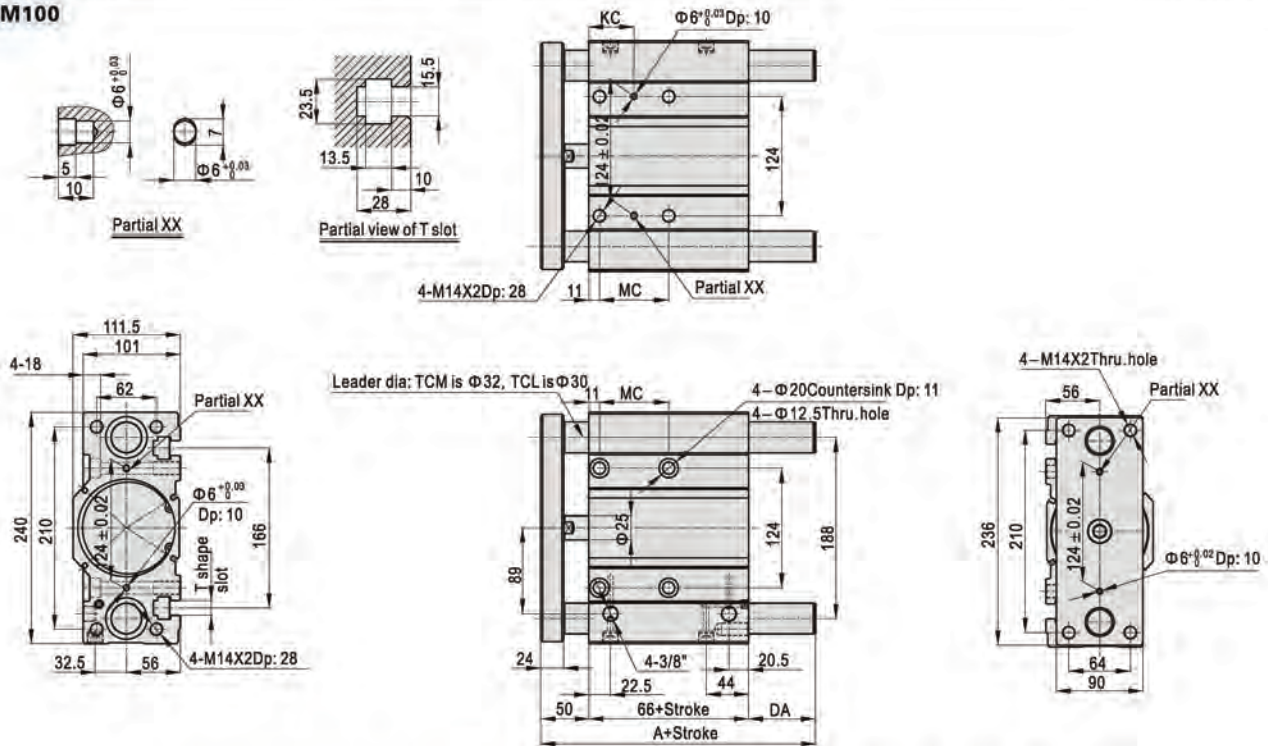
## TCL, TCM Series

### TCL/TCM80



Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=112.5/TCL=106.5					165.5					187.5				
DA	TCM=16/TCL=10					69					91				
KC	42					54					92				
MC	28					52					128				

### TCL/TCM100

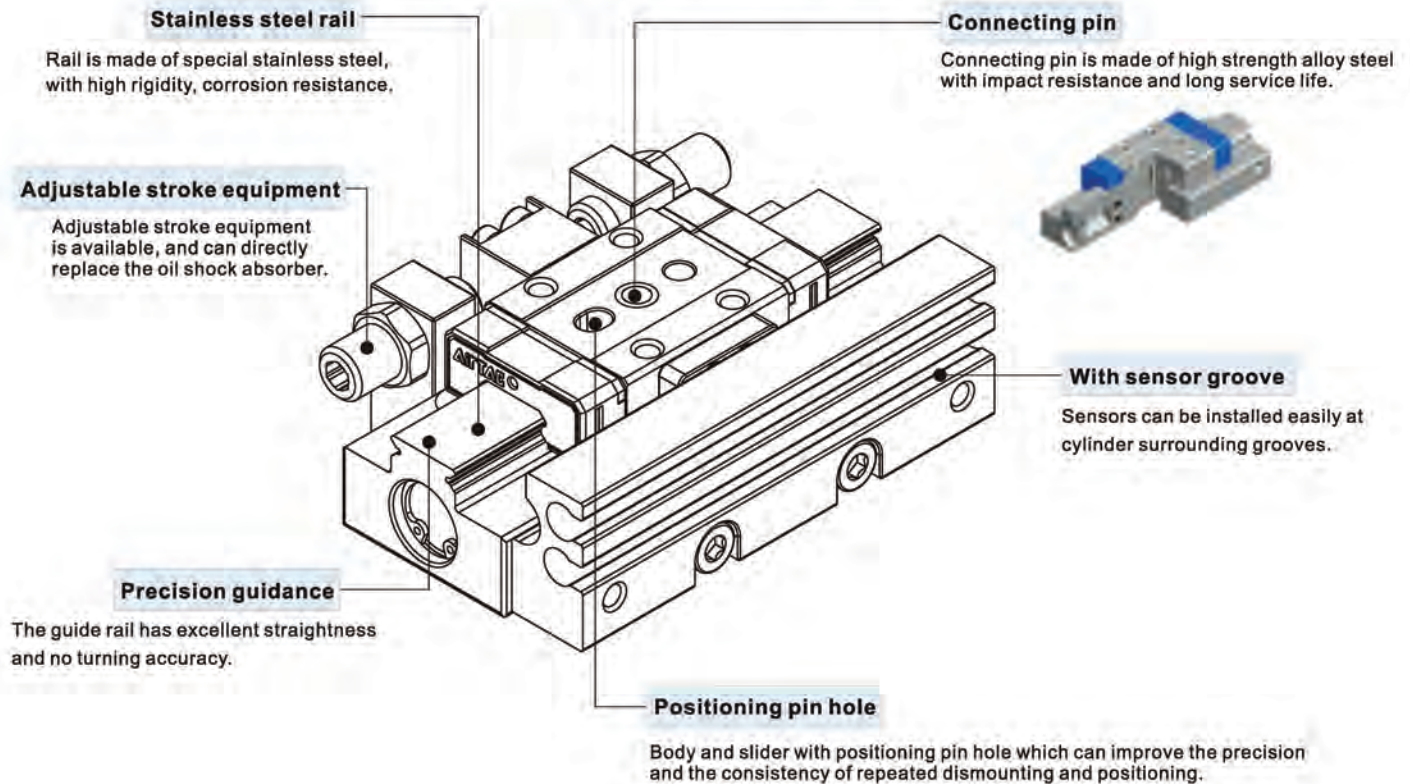


Item\Stroke	25	30	40	50	60	70	75	80	100	125	150	175	200	225	250
A	TCM=128/TCL=122					186					208				
DA	TCM=12/TCL=6					70					92				
KC	35					47					85				
MC	48					72					148				



# Compact slide cylinder—HGS Series

## Compendium of HGS Series



## Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40 $\mu$ m or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.  
Anti-dust caps shall be added in air inlet and outlet ports.



# Compact slide cylinders

## HGS Series



### Symbol



### Product feature

1. Rail is made of special stainless steel, with high rigidity, corrosion resistance.
2. Connecting pin is made of high strength alloy steel with impact resistance and long service life.
3. Adjustable stroke equipment is available, and can directly replace the oil shock absorber.
4. The guide rail has excellent straightness and no turning accuracy.
5. Sensors can be installed easily at cylinder surrounding grooves.
6. Body and slider with positioning pin hole which can improve the precision and the consistency of repeated dismounting and positioning.

### Specification

Bore size(mm)	6	8	10	12
Acting type	Double acting			
Fluid	Air(to be filtered by 40µm filter element)			
Operating pressure	22~100psi(0.15~0.7MPa)			
Proof pressure	175psi(1.2MPa)			
Cushion type	Bumper		Bumper or shock absorber	
Temperature	-20~70°C			
Lubrication	Not required			
Speed range mm/s	50~500			
Stroke tolerance	+0.5 0			
Sensor switches [Note1]	DMSH(S)			
Port size	M3×0.5		M5×0.8	

Note) Refer to P353 for detail of sensor switch.

### Stroke



Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10	10
8	5 10 15 20	20
10	5 10 15 20	20
12	5 10 15 20 25	25

[Note] Consult us for non-standard stroke.

### Ordering code

HGS 10 x 15 S J

① ② ③ ④ ⑤



① Model	② Bore size	③ Stroke	④ Magnet	⑤ Stroke adjustment device
HGS: Compact slide cylinder	6	5 10	Blank: Without magnet	Blank: Without stroke adjustment device
	8	5 10 15 20	S: With magnet 	J: With stroke adjustment device [Note] 
	10	5 10 15 20		
	12	5 10 15 20 25		

[Note] Stroke adjustment device of Φ10\Φ12 can be replaced by shock absorber.

### Ordering code of accessories

F - HGS 10 x 15 H

① ② ③ ④

① Model	② Bore size	③ Stroke	④ Accessories type
HGS: Compact slide cylinder	6	5 10	H: Sensor fixed seat package 
	8	5 10 15 20	
	10	5 10 15 20	J: Stroke adjusting screw package 
	12	5 10 15 20 25	

### Matching table

		Sensor				
Ordering code		Stroke (mm)				
		5	10	15	20	25
Bore size	6	F-HGS6X5H	F-HGS6X10H			
	8	F-HGS8X5H	F-HGS8X10H	F-HGS8X15H	F-HGS8X20H	
	10	F-HGS10X5H	F-HGS10X10H	F-HGS10X15H	F-HGS10X20H	
	12	F-HGS12X5H		F-HGS12X15H	F-HGS12X20H	F-HGS12X25H
		Stroke adjusting screw				
Ordering code		Stroke (mm)				
		5	10	15	20	25
Bore size	6	F-HGS6X5J	F-HGS6X10J			
	8	F-HGS8X5J	F-HGS8X10J	F-HGS8X15J		
	10	F-HGS10X5J	F-HGS10X10J	F-HGS10X15J		
	12	F-HGS10X10J				F-HGS10X15J

# Compact slide cylinders

## HGS Series

### Production weight table

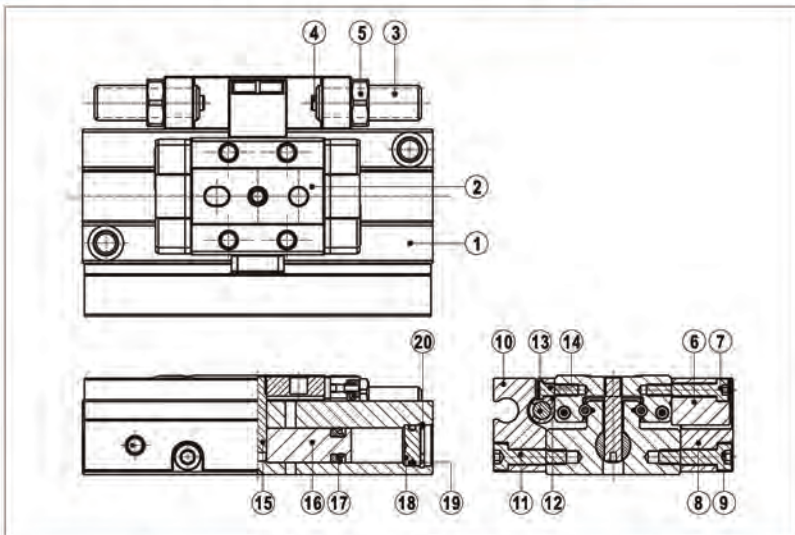
Unit: g

Model	Body weight	Sensor fixed seat package weight	Stroke adjusting screw package weight		
			Single adjusting screw	Single shock absorber	Other accessories
HGS6X5	116.1	14.25	2.4	-	11.61
HGS10X5	152.3	19.05	2.4	-	11.61
HGS8X5	133.01	14.05	2.4	-	10.34
HGS8X10	167.46	18.54	2.4	-	10.34
HGS8X15	207.07	23.35	2.4	-	10.34
HGS8X20	239.37	28.16	2.4	-	10.34
HGS10X5	194.26	15.91	6.8	16	27.36
HGS10X10	248.98	19.12	6.8	16	26.2
HGS10X15	303.39	24	6.8	16	21.8
HGS10X20	352.05	28.93	6.8	16	21.8
HGS12X5	291.01	21.64	6.8	16	27.36
HGS12X10	318.12	21.64	6.8	16	26.2
HGS12X15	356.79	27.63	6.8	16	21.8
HGS12X20	445.92	33.25	6.8	16	21.8
HGS12X25	491.34	38.87	6.8	16	21.8

Example:

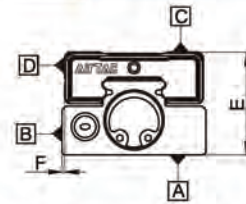
HGS10X15SJ=Body weight+Sensor fixed seat package weight+Single adjusting screw weightX2+Other accessories weight =303.39+24+6.8X2+21.8=362.79(g)

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Body	Stainless steel	11	Hexagon socket head screws	Alloy steel
2	Slide table	Stainless steel	12	Magnet holder	Plastic
3	Adjustable screw	Stainless steel	13	Magnet	Rare earths
4	Bumper	NBR	14	Screw	Alloy steel
5	Hex nut	Stainless steel	15	Pin	Stainless steel
6	Middle stopping block	Cutting steel	16	Piston	Stainless steel
7	Hexagon socket head screws	Alloy steel	17	Piston packing	NBR
8	End stopping block	Aluminum alloy	18	End cover	TPU
9	Hexagon socket head screws	Alloy steel	19	O ring	NBR
10	Sensor fixed rail	Aluminum alloy	20	C clip	Spring steel

### Table precision



[Unit: mm]

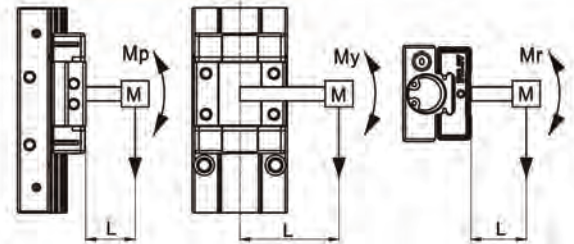
Model		HGS6	HGS8	HGS10	HGS12
Parallelism	C surface to A surface	0.02			
	D surface to B surface	0.02			
Parallelism of walking	C surface to A surface	0.004			
	D surface to B surface	0.004			
Dimensional tolerance of E		±0.05			
Dimensional tolerance of F		±0.05			

### Max. allowable load

[Unit: kg]

Model	HGS6	HGS8	HGS10	HGS12
No stroke adjustment device	0.3	0.3	0.8	1.2
With stroke adjustment device	0.2	0.5	0.8	1.2
With shock absorber	-	-	1.6	2.0

### Max. allowable torque

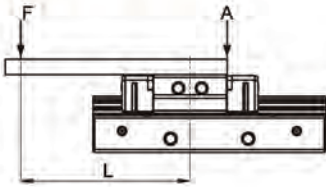


Model	Max. Allowable torque (N.m)		
	Pitch moment Mp	Yaw moment My	Roll moment Mr
HGS6X5	0.42	0.42	0.87
HGS10X5			
HGS8X5	0.42	0.42	0.87
HGS8X10			
HGS8X15	1.7	1.7	1.8
HGS8X20			
HGS10X5	1.2	1.4	2.3
HGS10X10			
HGS10X15	2.8	3.1	3.3
HGS10X20			
HGS12X5	2.4	2.9	4.7
HGS12X10			
HGS12X15	6.5	7.7	7.3
HGS12X20			
HGS12X25			

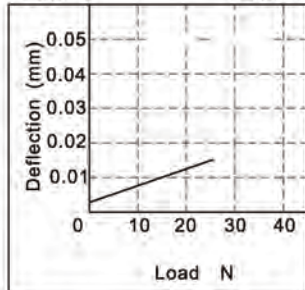
## HGS Series

### Table deflection

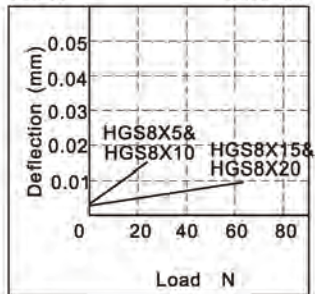
Table deflection due to pitch moment



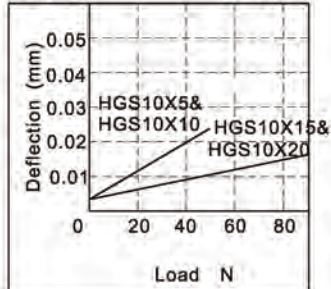
HGS6 L=80mm



HGS8 L=80mm



HGS10 L=100mm



HGS12 L=100mm

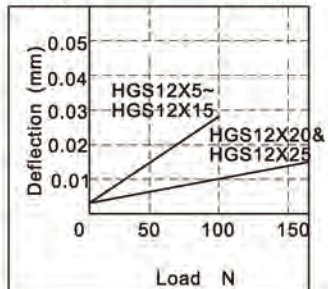
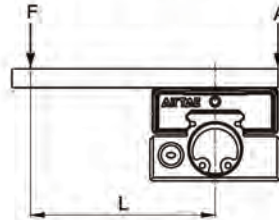
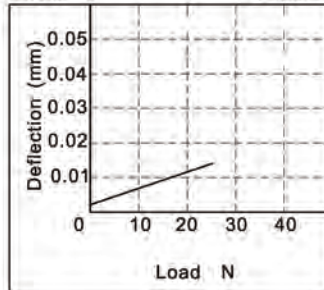


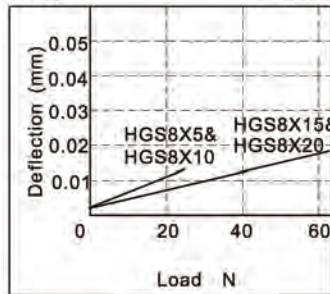
Table deflection due to yaw moment



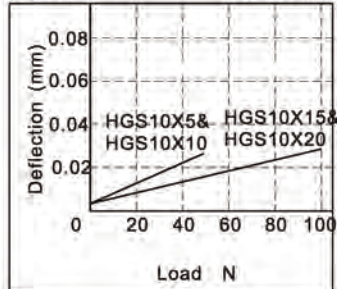
HGS6 L=80mm



HGS8 L=80mm



HGS10 L=100mm



HGS12 L=100mm

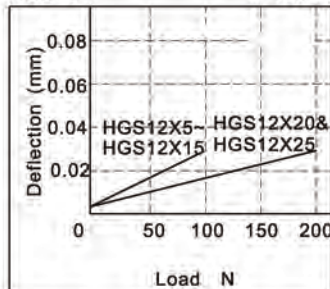
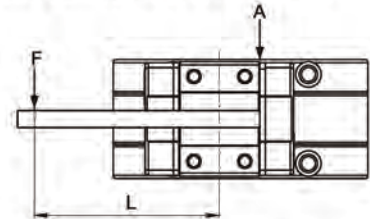
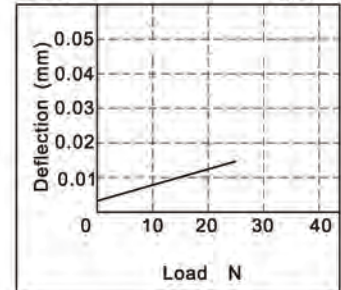


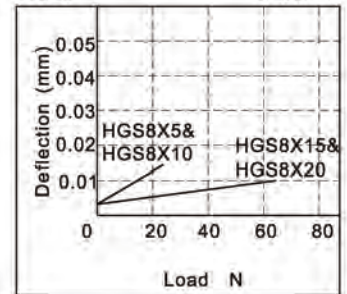
Table deflection due to roll moment



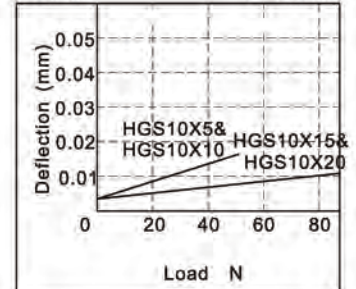
HGS6 L=80mm



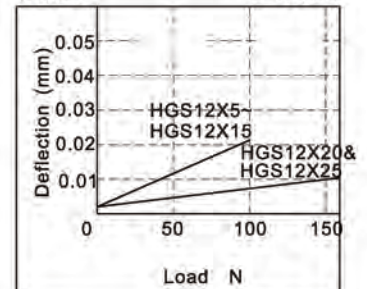
HGS8 L=80mm



HGS10 L=100mm



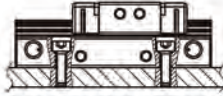
HGS12 L=100mm



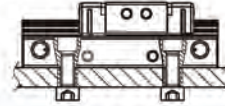
## HGS Series

### Installation and application

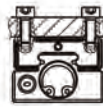
1. Cylinder can be mounted from 4 directions
2. When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.  
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HGS6	M3×0.5	1.1	4.5
HGS8	M3×0.5	1.1	5
HGS10	M3×0.5	1.1	5
HGS12	M4×0.7	2.5	4.5



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HGS6	M4×0.7	2.5	4.5
HGS8	M4×0.7	2.5	5
HGS10	M4×0.7	2.5	5
HGS12	M5×0.8	5.1	4.5



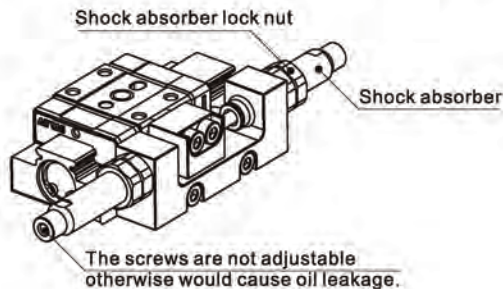
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HGS6	M3×0.5	1.1	3
HGS8	M3×0.5	1.1	3
HGS10	M3×0.5	1.1	3
HGS12	M3×0.5	1.1	4



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HGS6	M2×0.4	0.26	4
HGS8	M2×0.4	0.26	4
HGS10	M3×0.5	1.1	3
HGS12	M3×0.5	1.1	4

### About shock absorber

1. Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.
2. Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.
3. Follow the table for tightening torque of shock absorber to lock nuts.



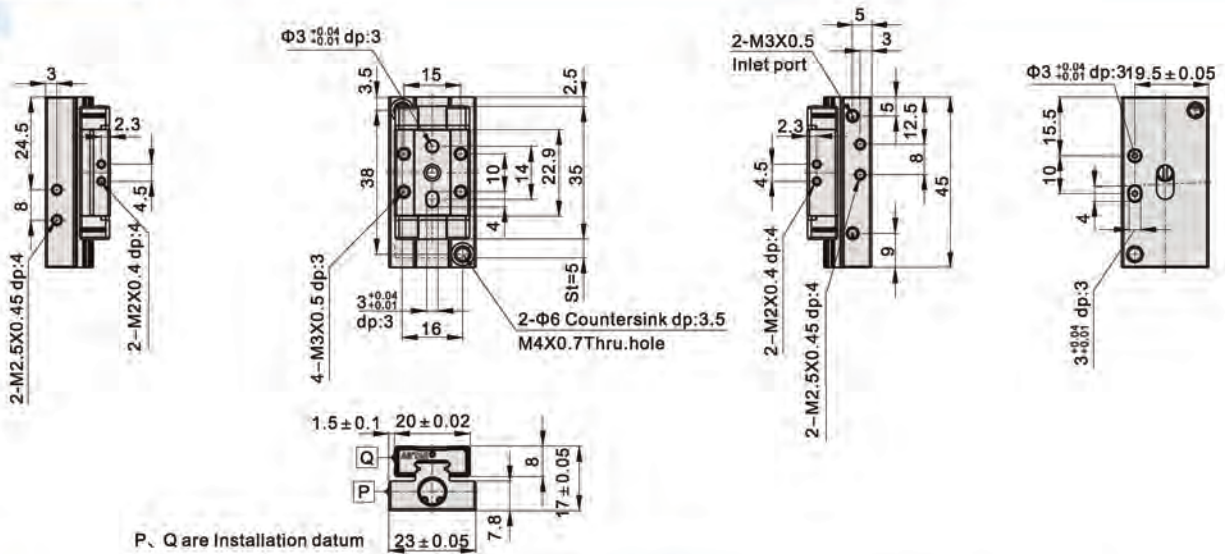
Model	Shock absorber	Tightening torque
HGS6	Without shock absorber	
HGS8	Without shock absorber	
HGS10	ACA0806-1N	1.67(N.m)
HGS12	ACA0806-1N	1.67(N.m)

# Compact slide cylinders

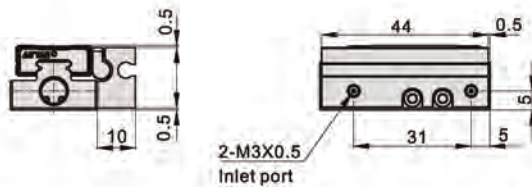
## HGS Series

### Dimensions(HGS6)

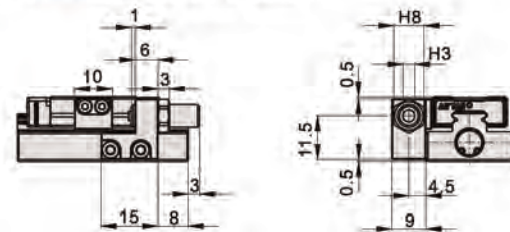
#### HGS6X5



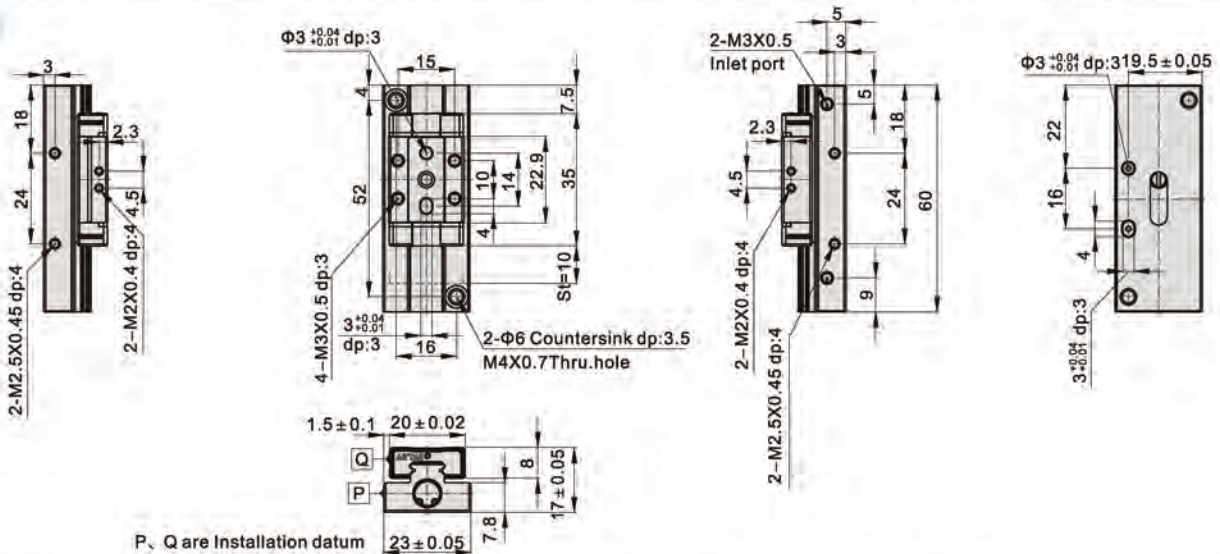
#### HGS6X5S



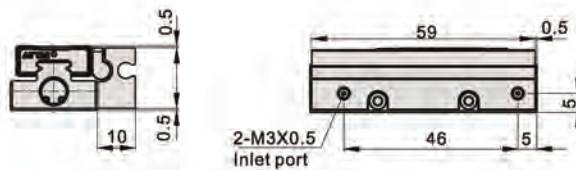
#### HGS6X5J Adjustable range: 5mm



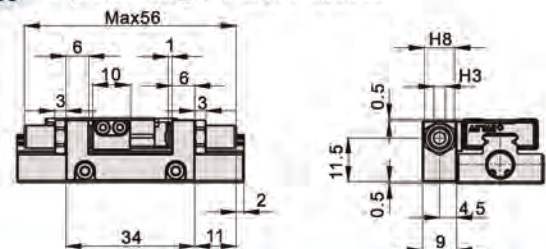
#### HGS6X10



#### HGS6X10S



#### HGS6X10J Adjustable range: 5mm of each sides.

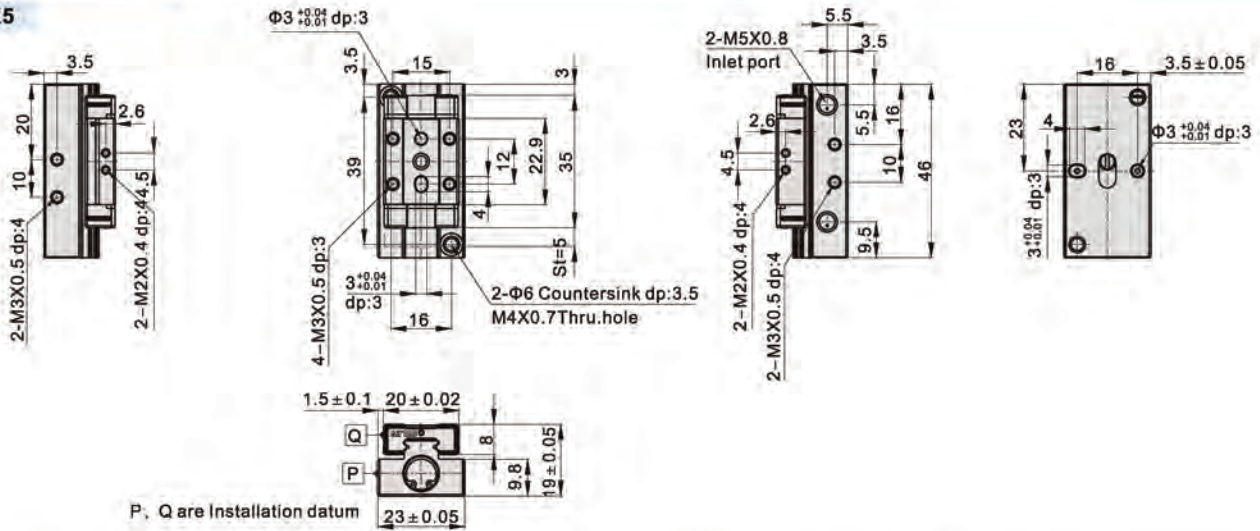


# Compact slide cylinders

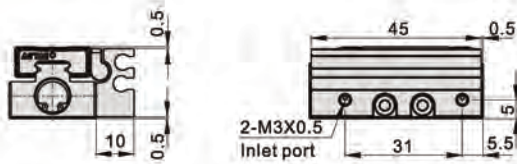
## HGS Series

### Dimensions(HGS8)

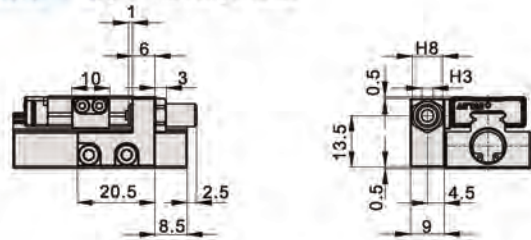
#### HGS8X5



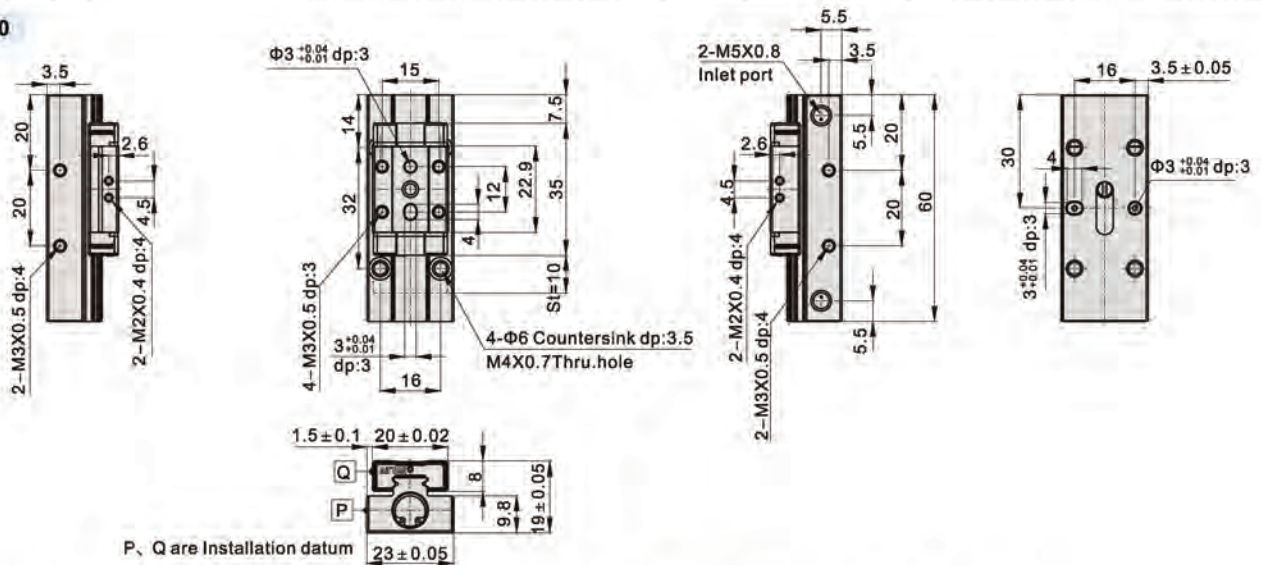
#### HGS8X5S



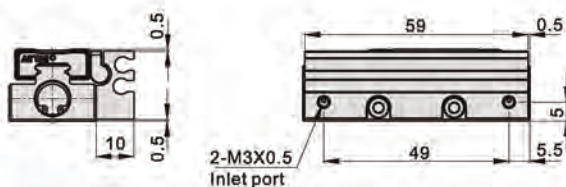
#### HGS8X5J Adjustable range: 5mm



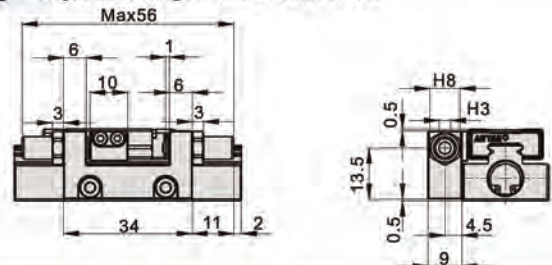
#### HGS8X10



#### HGS8X10S



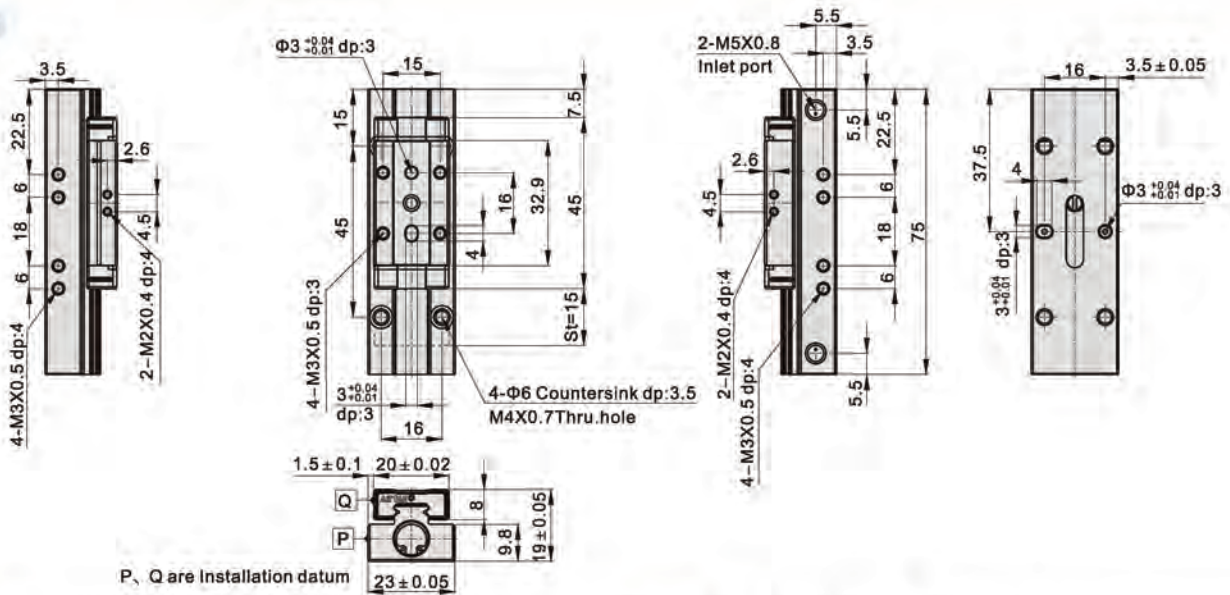
#### HGS8X10J Adjustable range: 5mm of each sides.



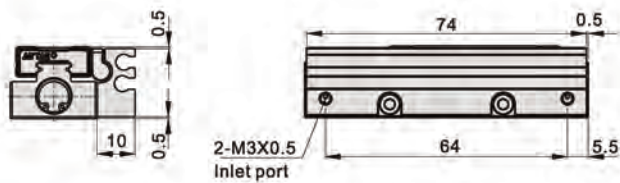
# Compact slide cylinders

## HGS Series

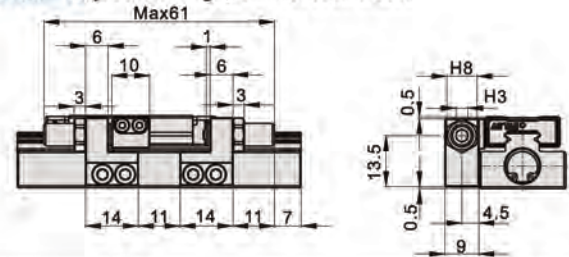
### HGS8X15



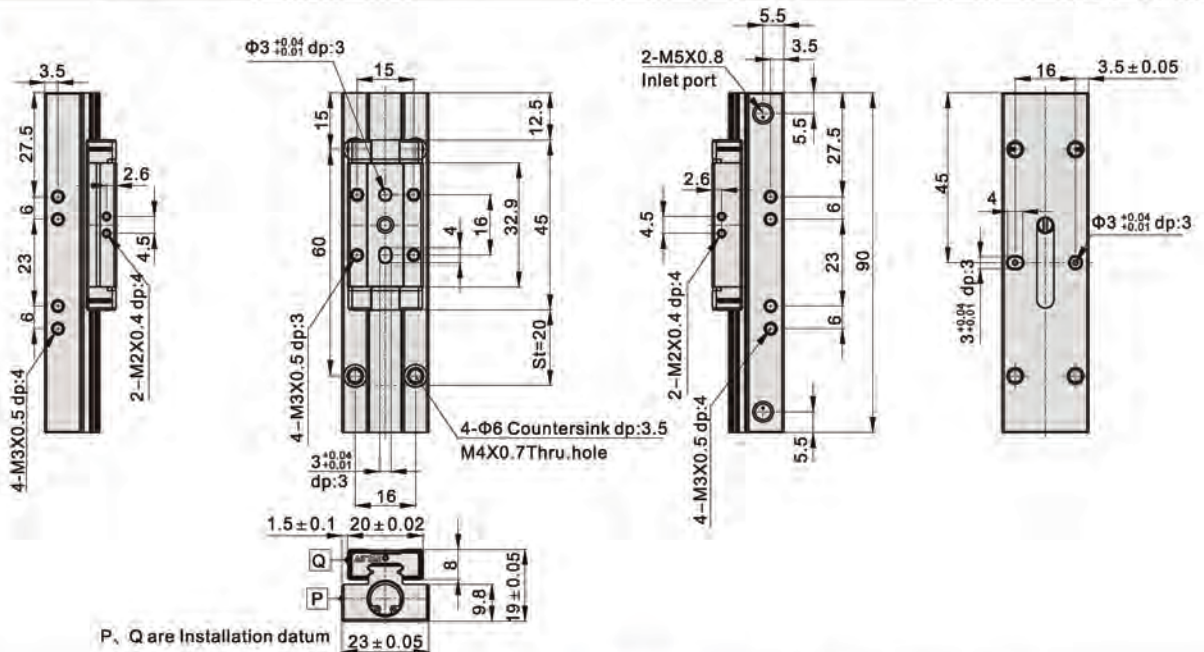
### HGS8X15S



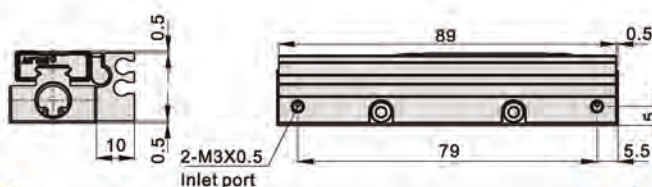
### HGS8X15J Adjustable range: 5mm of each sides.



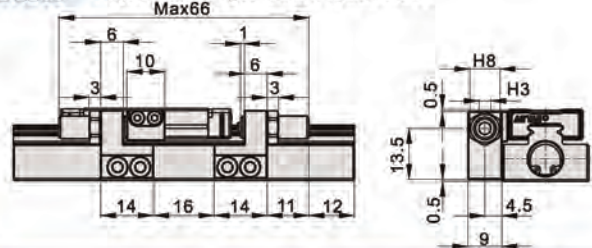
### HGS8X20



### HGS8X20S



### HGS8X20J Adjustable range: 5mm of each sides.

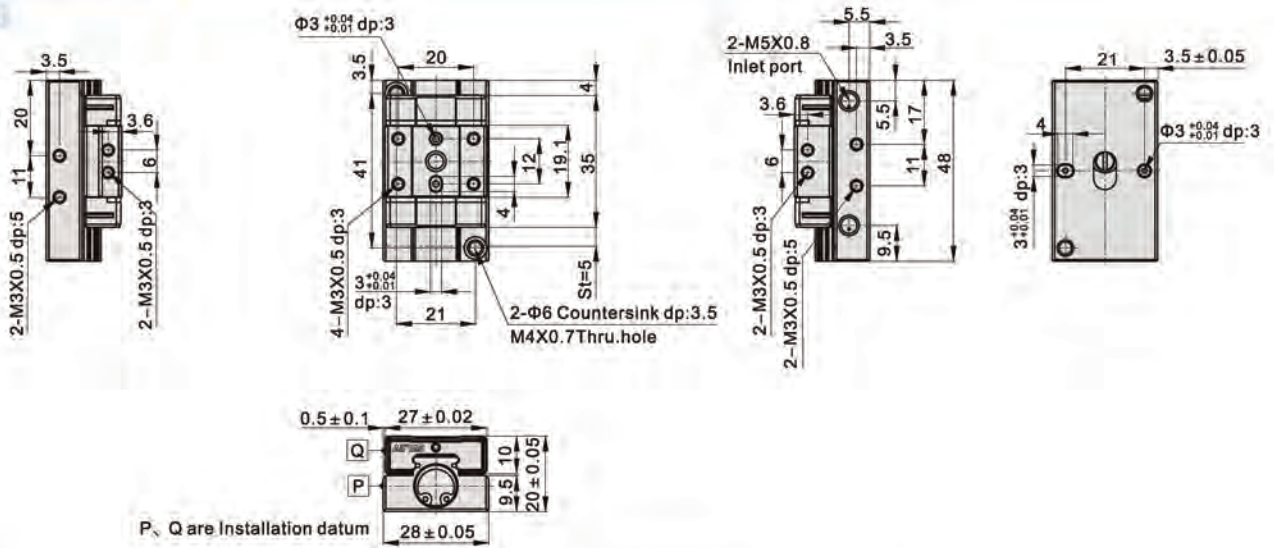


# Compact slide cylinders

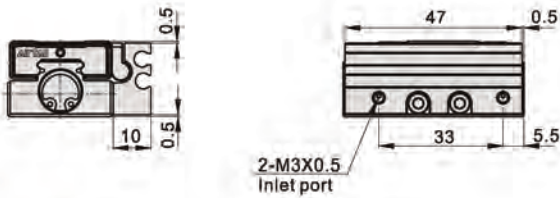
## HGS Series

### Dimensions(HGS10)

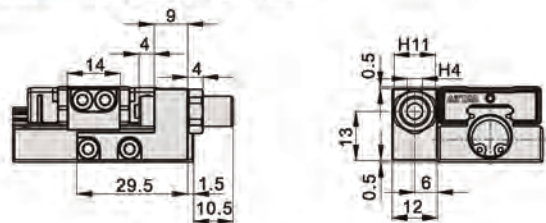
#### HGS10X5



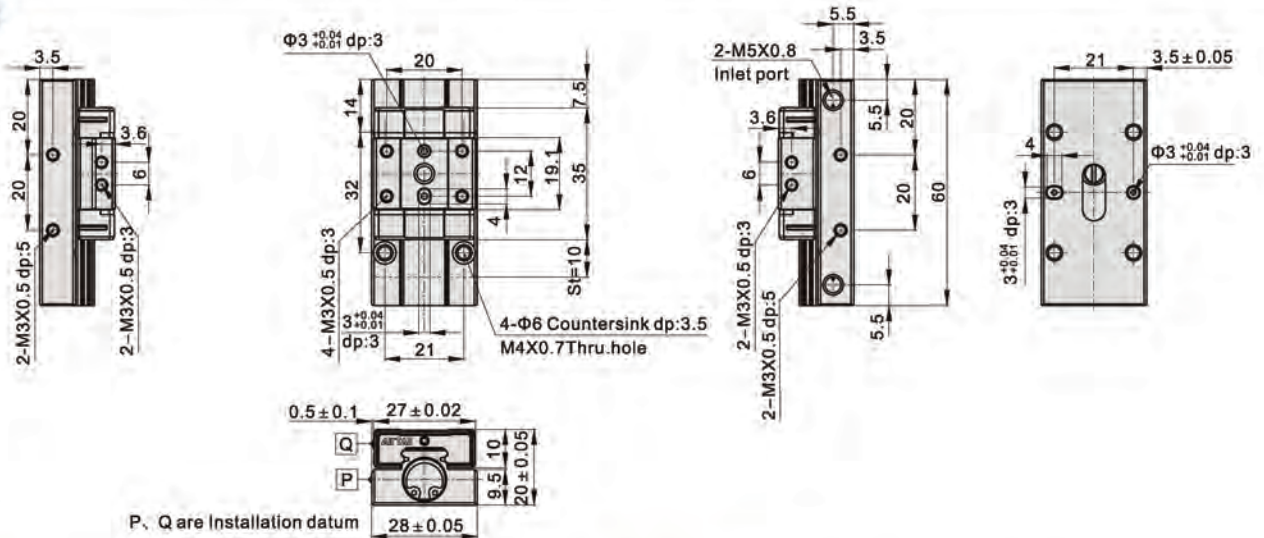
#### HGS10X5S



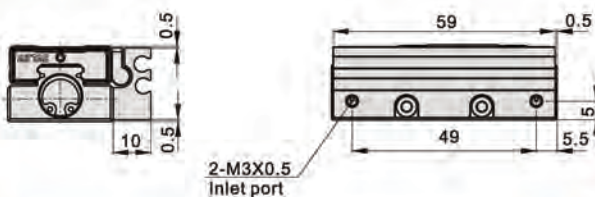
#### HGS10X5J Adjustable range: 5mm



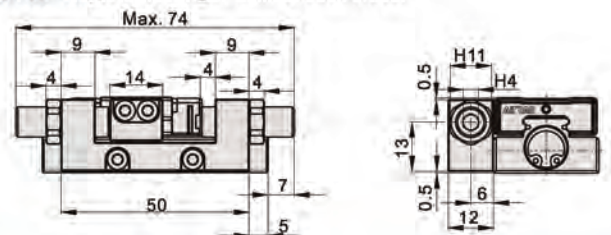
#### HGS10X10



#### HGS10X10S



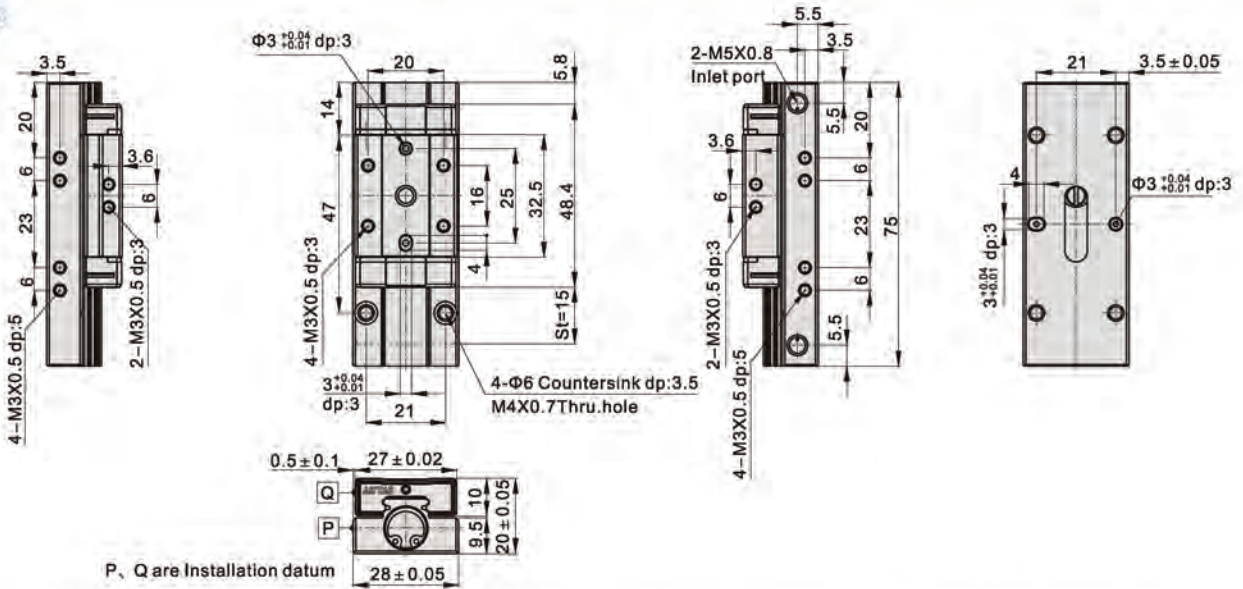
#### HGS10X10J Adjustable range: 5mm of each sides.



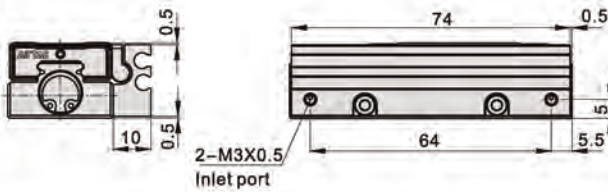
# Compact slide cylinders

## HGS Series

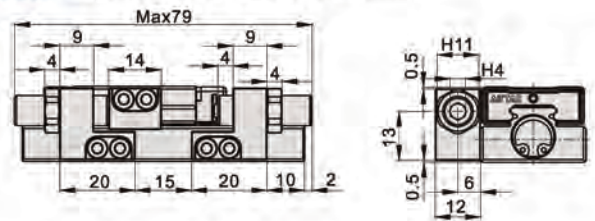
### HGS10X15



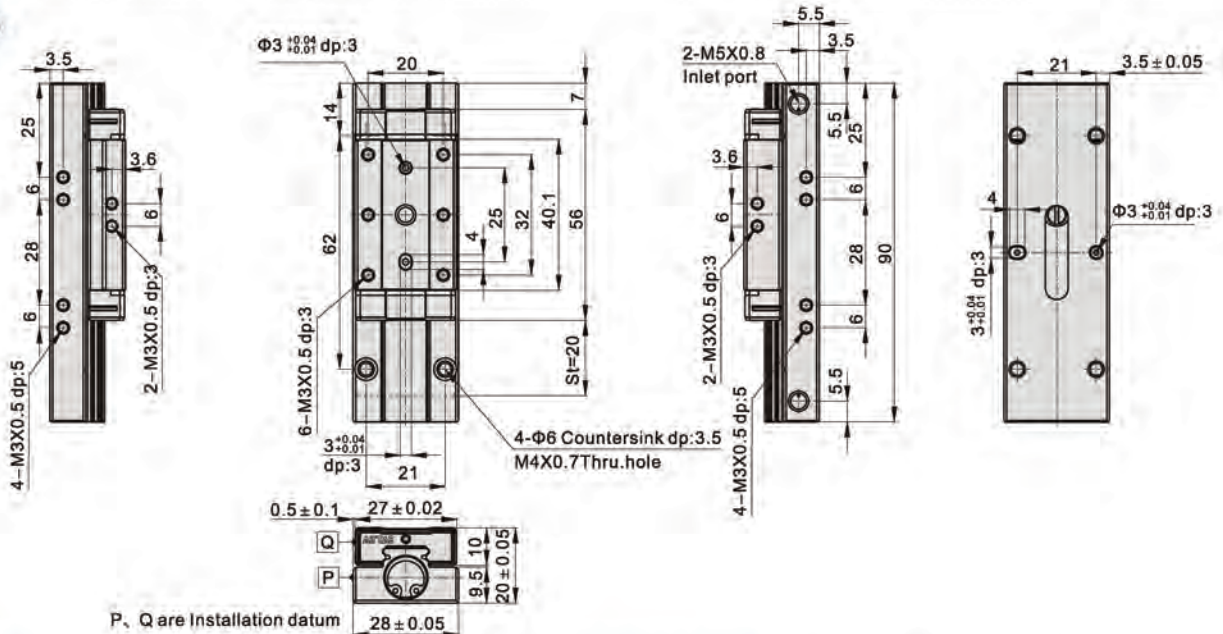
### HGS10X15S



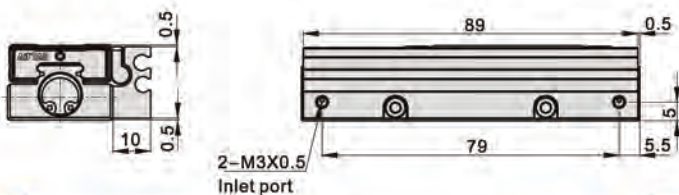
### HGS10X15J Adjustable range: 5mm of each sides.



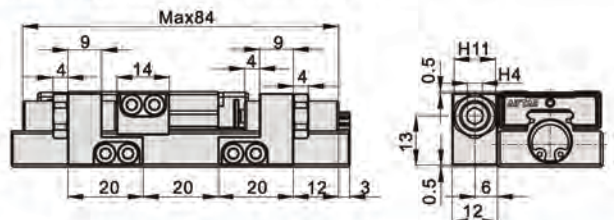
### HGS10X20



### HGS10X20S



### HGS10X20J Adjustable range: 5mm of each sides.

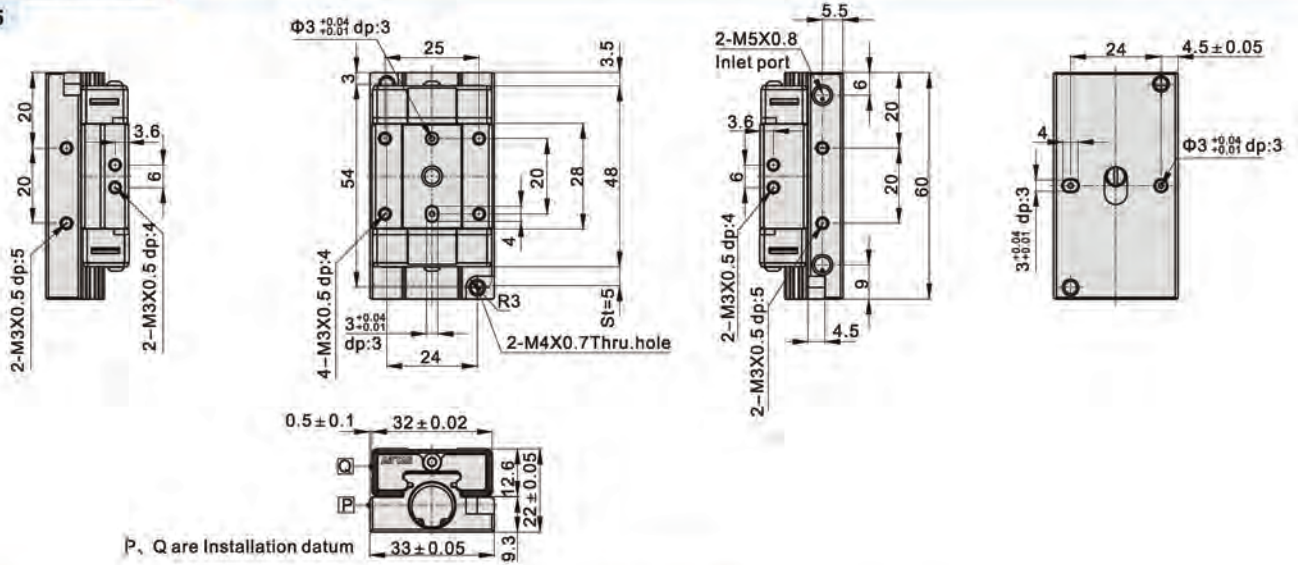


# Compact slide cylinders

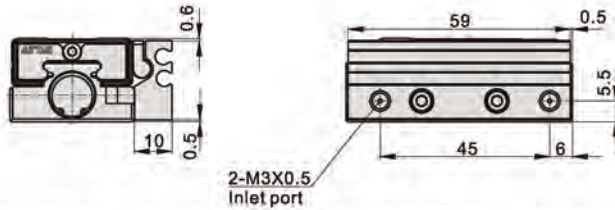
## HGS Series

### Dimensions(HGS12)

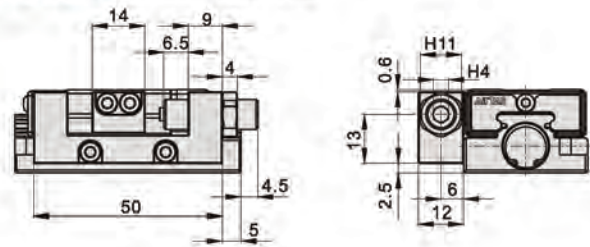
#### HGS12X5



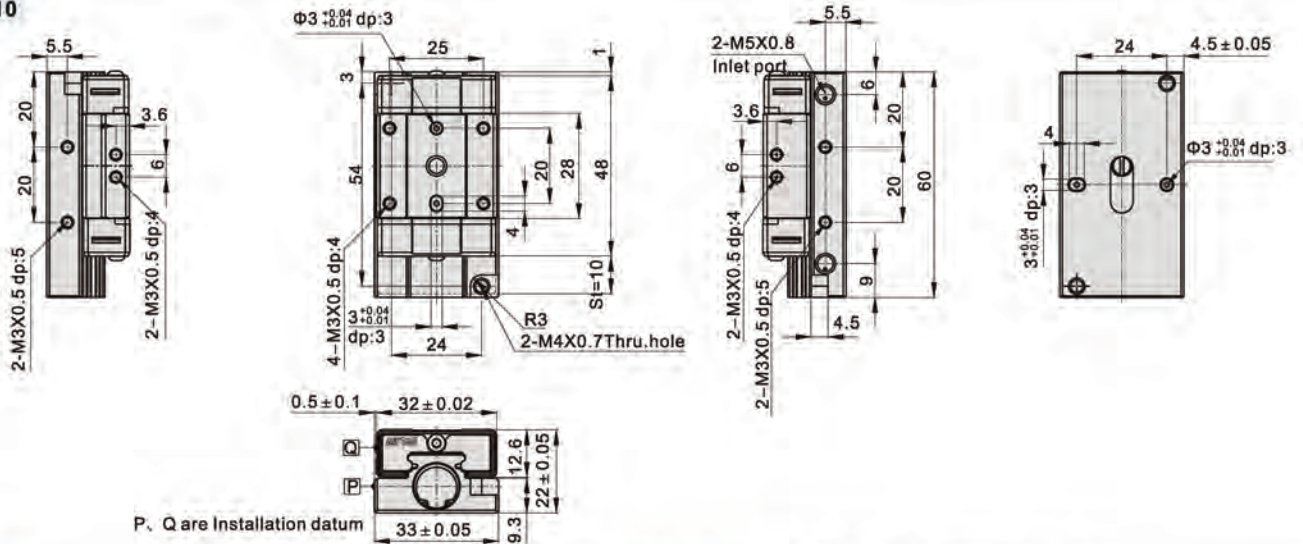
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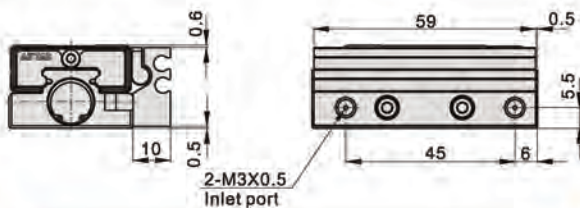
#### HGS12X5J Adjustable range: 5mm



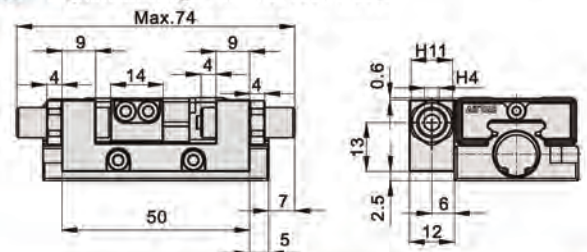
#### HGS12X10



#### HGS12X10S



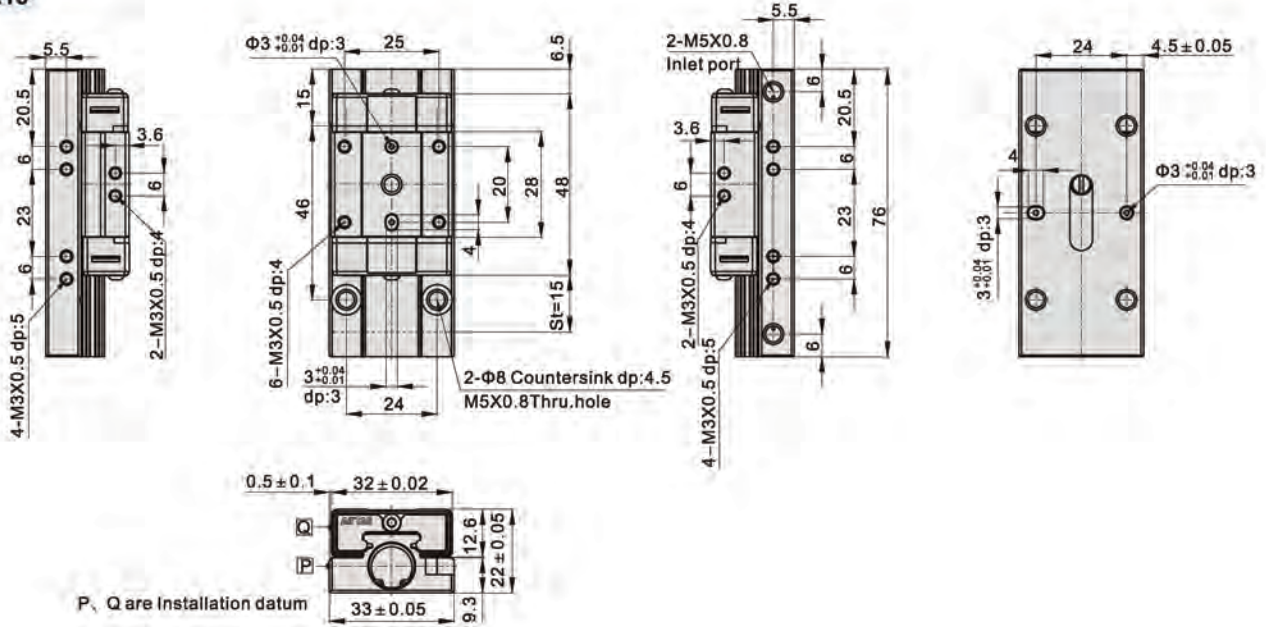
#### HGS12X10J Adjustable range: 5mm of each sides.



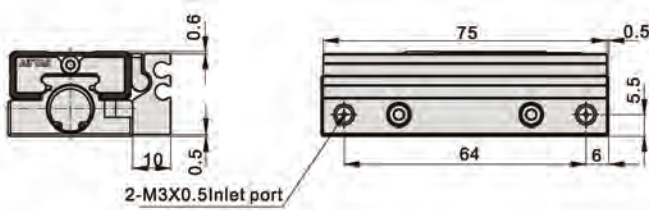
# Compact slide cylinders

## HGS Series

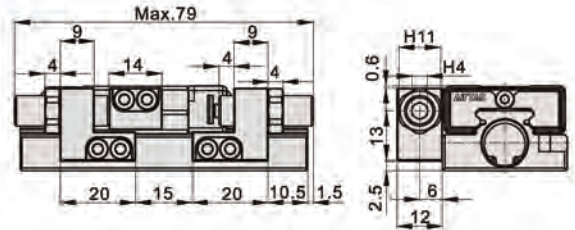
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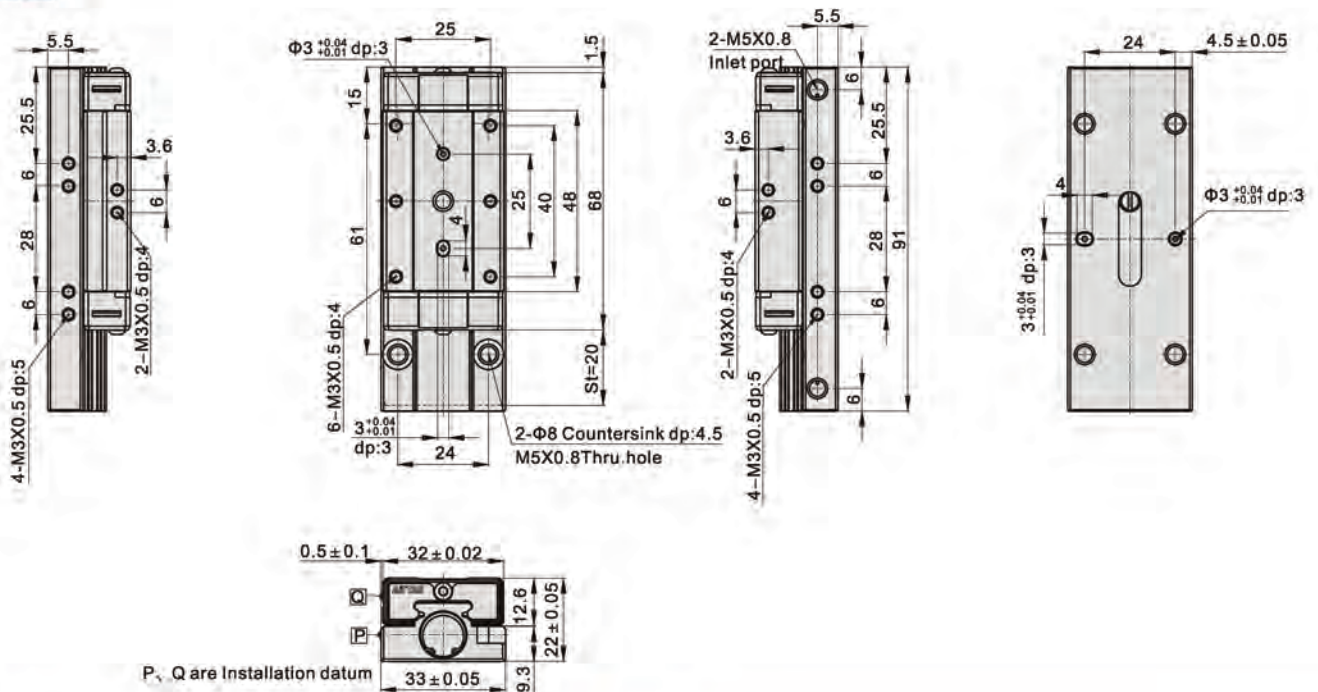
### HGS12X15S



### HGS12X15J Adjustable range: 5mm of each sides.



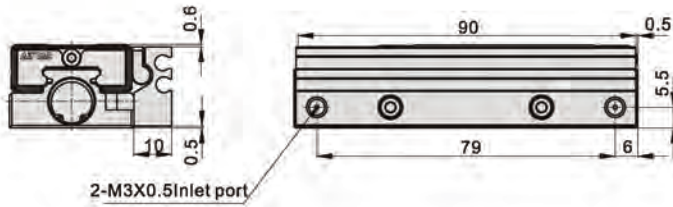
### HGS12X20



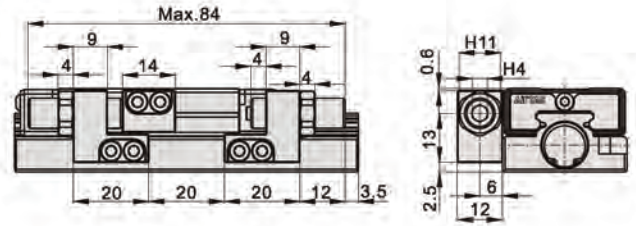
# Compact slide cylinders

## HGS Series

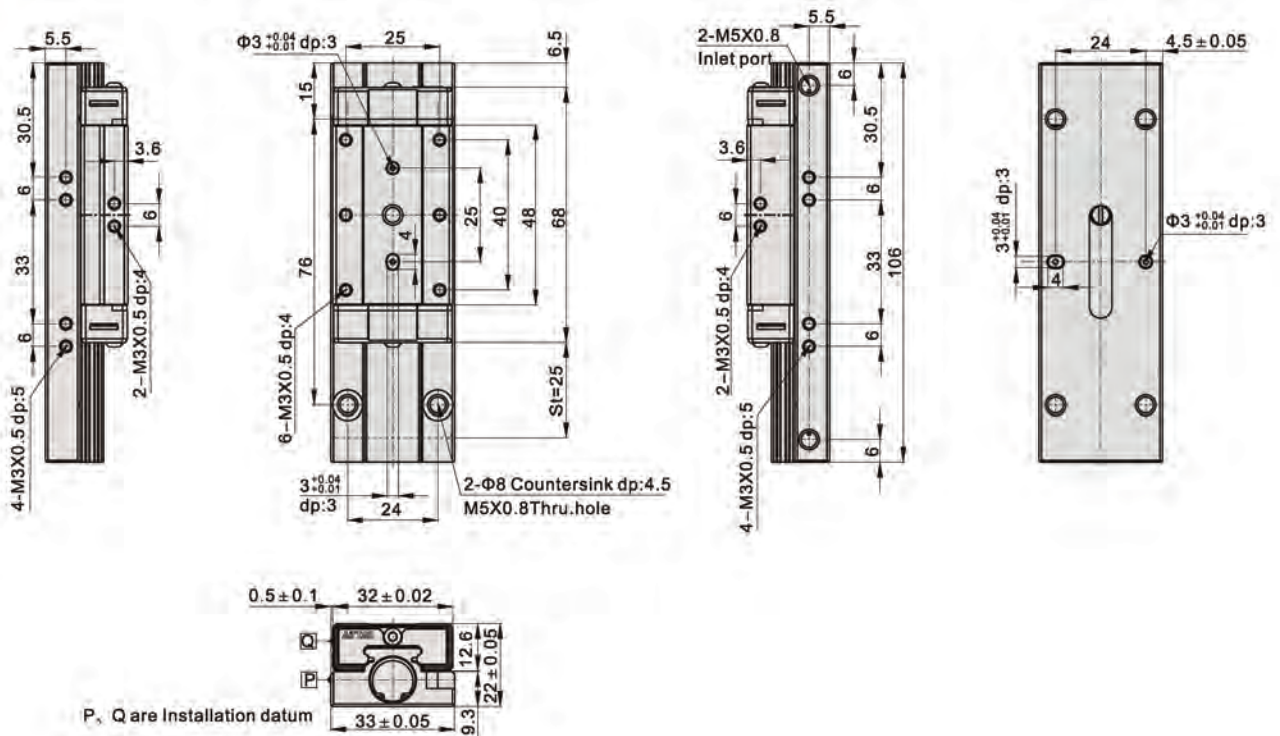
### HGS12X20S



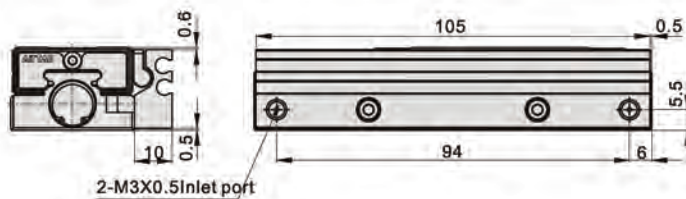
### HGS12X20J Adjustable range: 5mm of each sides.



### HGS12X25

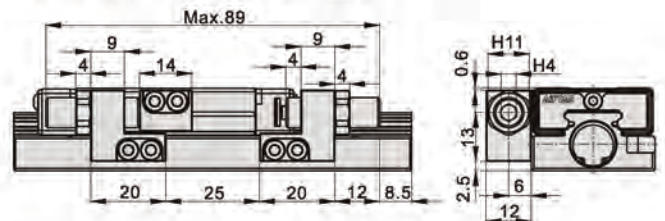


### HGS12X25S



### HGS12X25J

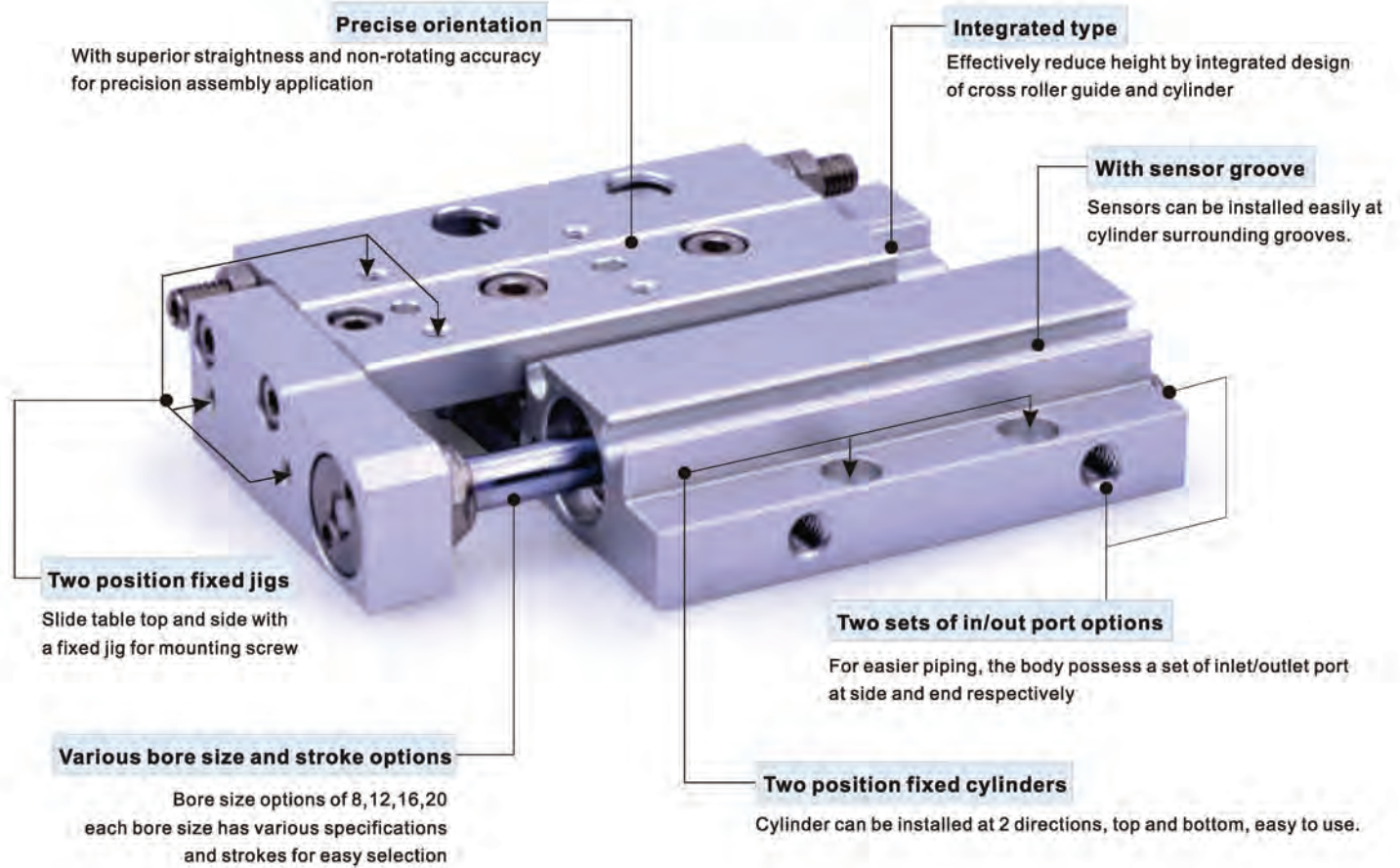
Adjustable range: 5mm of each sides.





# Low profile precision slide table cylinder—HLF Series

## Compendium of HLF Series



### Criteria for selection: Cylinder thrust

Unit : Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)							
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	
8	3	Double acting	Push-side	50.3	5.0	10.1	15.1	20.1	25.1	30.2	35.2
			Pull-side	43.2	4.3	8.6	13.0	17.3	21.6	25.9	30.2
12	4	Double acting	Push-side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2
			Pull-side	100.5	10.1	20.1	30.2	40.2	50.3	60.3	70.4
16	6	Double acting	Push-side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull-side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push-side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull-side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7

### Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Low profile precision slide table cylinders

## HLF Series



### Symbol

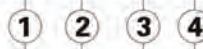


### Product feature

1. cross roller linear guide and cylinder integrated type design, effectively reducing cylinder thickness.
2. With superior straightness and non-rotating accuracy for precision assembly application.
3. cylinder can be installed from 2 directions.
4. Piping is possible from 2 directions.

### Ordering code

**HLF 20 x 30 S**



① Model	② Bore size	③ Stroke	④ Magnet
HLF: Low profile precision slide table cylinder (Roller type)	8 12 16 20	Refer to stroke table for details	S: With magnet

### Specification

Bore size(mm)	8	12	16	20
Acting type	Double acting			
Fluid	Air(to be filtered by 40 μ m filter element)			
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature °C	-20~70			
Speed range mm/s	50~500			
Stroke tolerance	+1.0 0			
Cushion type	Bumper			
Sensor switches [Note1]	DMSH(S), CMSH			
Port size	M3×0.5	M5×0.8		

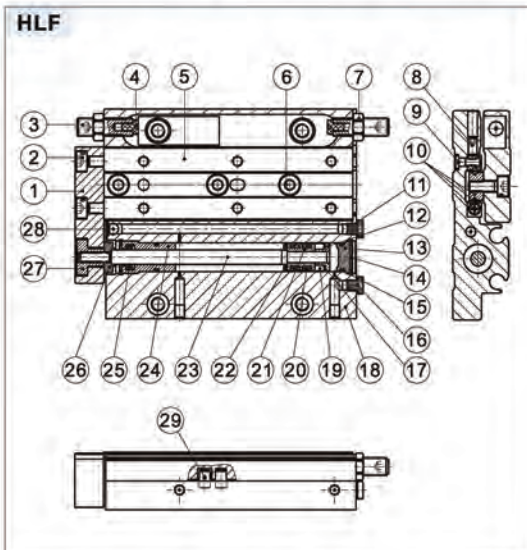
[Note1] Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
8	10 20 30	30
12	10 20 30 40 50	50
16	10 20 30 40 50 75 100	100
20	10 20 30 40 50 75 100	100

[Note] Consult us for non-standard stroke.

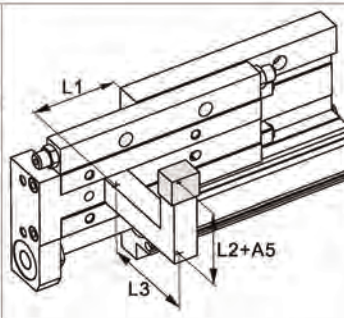
### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Fixed plate	Aluminum alloy	16	Plug screw	carbon steel
2	Hexagon socket head screws	Alloy steel	17	Magnet pad	NBR
3	Adjustable screw	Alloy steel	18	Body	Aluminum alloy
4	Bumper	TPU	19	Magnet	Sintered NdFeB
5	Slide table	Aluminum alloy	20	Piston packing	NBR
6	Hexagon socket head screws	Alloy steel	21	Piston	brass
7	Hex nut	Carbon steel	22	Bumper	TPU
8	Socket set screws	Alloy steel	23	Rod	Stainless steel
9	Hexagon socket head screws	Alloy steel	24	Front cover	Aluminum alloy
10	Roller assembly		25	Spool O ring	NBR
11	Seal	Wear resistant material	26	Floating joint 2	Cutting steel
12	Magnet holder	brass	27	Floating joint 1	Cutting steel
13	Back cover	Aluminum alloy	28	Φ3 steel ball	Stainless steel
14	C clip	Spring steel	29	Pin	Stainless steel
15	O ring	NBR			

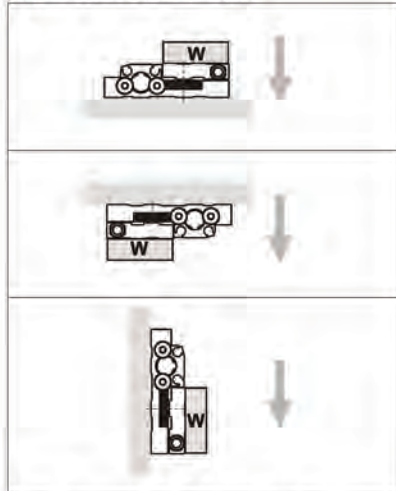
### Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

Steps	Calculation formula, data	Example	
<b>1、Conditions of Use:</b> Consider installation, the shape of the workpiece, the conditions of use.	1. Model used(Bore size, Stroke) 2. Type of cushion(Bumper, Shock absorber) 3. Mounting position of work(Top, front) 4. Mounting direction(Axial, Vertical) 5. Average speed Va(mm/s) 6. Applied load W(kg) <b>Fig. 1</b> 7. Overhang Ln(mm) <b>Fig. 2</b>	 1. Model used: HLF20X50 2. Type of cushion: Bumper 3. Mounting position of work: Table top mounting 4. Mounting direction: Horizontal arm installation 5. Average speed Va=300(mm/s) 6. Applied load W=0.5(kg) 7. Overhang L1=10mm L2=30mm L3=30mm	
<b>2、Kinetic energy check</b> 1. Calculate kinetic energy of load E(J) 2. Calculate allowable kinetic energy Ea(J) 3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: $E \leq E_a$	$E = W \times (V/1000)^2 / 2$ Impact speed $V = 1.4$ (Correction factor (reference value)) $\times V_a$ $E_a = K \times E_{max}$ Mounting work coefficient K: <b>Fig 3</b> Maximum allowable kinetic energy: <b>Table 1</b> Kinetic energy of load ( $E$ ) $\leq$ Allowable kinetic energy ( $E_a$ )	$E = 0.5 \times (420/1000)^2 / 2 = 0.044$ $V = 1.4 \times 300 = 420$ $E_a = 1 \times 0.16 = 0.16$ $E = 0.044 \leq E_a = 0.16$ Can be used	
<b>3、Load rate check</b> 3-1、Concentrated load rate 1. Calculate allowable applied load Wa (kg) Note) In the case of vertical use, there is no need to discuss this load rate. ( $\alpha = 1 = 0$ ) 2. Calculate load rate $\alpha_1$ .	$W_a = K \times \beta \times W_{max}$ Mounting work coefficient K: <b>Fig 3</b> Applied load coefficient $\beta$ : <b>Map 1</b> Maximum allowable applied load $W_{max}$ : <b>Table 2</b> $\alpha_1 = W/W_a$	$W_a = 1 \times 1 \times 4 = 4$ $K = 1$ $\beta = 1$ $W_{max} = 4$ $\alpha_1 = 0.5/4 = 0.125$	
3-2、Static moment rate 1. Calculate static moment M(N.m) 2. Calculate allowable static moment Ma(N.m) 3. Calculate static moment rate $\alpha_2$	$M = W \times 9.8(L_n + A_n) / 1000$ Correction value for center position distance of moment An: <b>Table 3</b> $M_a = K \times \gamma \times M_{max}$ Mounting work coefficient K: <b>Fig 3</b> Allowable moment coefficient $\gamma$ : <b>Map 2</b> Maximum allowable moment $M_{max}$ : <b>Table 4</b> $\alpha_2 = M/M_a$	<b>Yaw moment My</b> $M_y = 0.5 \times 9.8(10+11)/1000 = 0.11$ $A_3 = 11$ $M_{ay} = 1 \times 1 \times 9.14 = 9.14$ $M_{y_{max}} = 9.14$ $K = 1$ $\gamma = 1$ $\alpha_2 = 0.11/9.14 = 0.012$	<b>Roll moment Mr</b> $M_r = 0.5 \times 9.8(30+17)/1000 = 0.23$ $A_6 = 17$ $M_{ar} = 9.14$ (Same as $M_{ay}$ ) $\alpha_2 = 0.23/9.14 = 0.025$
3-3、Dynamic moment rate 1. Calculate dynamic moment Me(N.m) 2. Calculate allowable dynamic moment Mea(N.m) 3. Calculate dynamic moment rate $\alpha_3$ .	$M_e = (W_e \times 9.8(L_n + A_n) / 1000) / 3$ Impact equivalent mass $W_e = \delta \times W \times V$ $\delta$ : Cushion factor With polyurethane bumper (standard) = 4/100 Correction value for center position distance of moment An: <b>Table 3</b> $M_{ea} = K \times \gamma \times M_{max}$ Mounting work coefficient K: <b>Fig 3</b> Allowable moment coefficient $\gamma$ : <b>Map 2</b> Maximum allowable moment $M_{max}$ : <b>Table 4</b> $\alpha_3 = M_e/M_{ea}$	<b>Pitch moment Mep</b> $M_{ep} = (8.4 \times 9.8(30+17)/1000) / 3 = 1.3$ $W_e = 4/100 \times 0.5 \times 420 = 8.4$ $A_2 = 17$ $M_{eap} = 1 \times 0.7 \times 9.14 = 6.40$ $K = 1$ $\gamma = 0.7$ $M_{p_{max}} = 9.14$ $\alpha_3 = 1.3/6.40 = 0.20$	<b>Yaw moment Mey</b> $M_{ey} = (8.4 \times 9.8(30+34)/1000) / 3 = 1.8$ $W_e = 8.4$ $A_4 = 34$ $M_{eay} = 6.4$ (Same as $M_{eap}$ ) $\alpha_3 = 1.8/6.4 = 0.28$
3-4、Sum of load ratio The total load rate does not exceed 1, can be used.	$\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$	Depent on: $\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_2' + \alpha_3 + \alpha_3'$ $= 0.125 + 0.012 + 0.025 + 0.20 + 0.28 = 0.642 \leq 1$ Can be used.	

## HLF Series

Fig. 1 Applied load : W(kg)



Note: The state of vertical use does not need to consider this load rate.

Fig 3 Mounting work coefficient: K

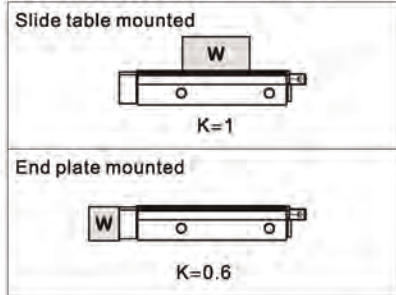


Table 2 Maximum allowable applied load: Wmax(kg)

Model	Wmax
HLF8	0.6
HLF12	1
HLF16	2
HLF20	4

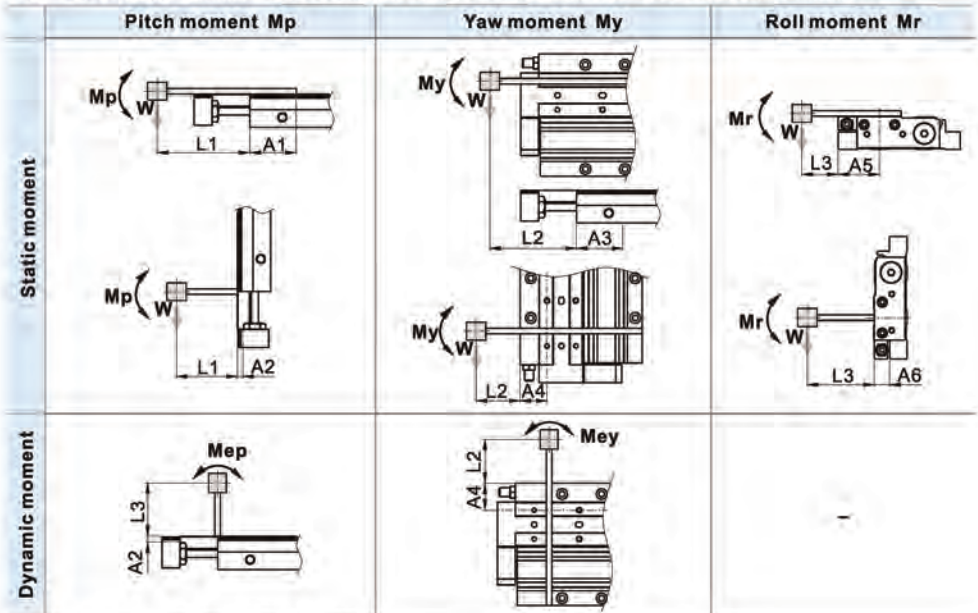
Table 4 Maximum allowable moment : Mmax(N.m)

Type	Stroke (mm)					
	10	20	30	50	70	100
HLF8	0.56	0.78	0.98	-	-	-
HLF12	-	1.65	2.22	3.34	-	-
HLF16	-	-	3.41	5.69	7.96	-
HLF20	-	-	6.66	9.14	13.70	18.27

### Symbol and Unit

Symbol	Item	Unit	Symbol	Item	Unit
An(n=1~6)	Correction value for center position distance of moment	mm	Va	Average speed	mm/s
E	Kinetic energy	J	W	Applied load	kg
Ea	Allowable kinetic energy	J	Wa	Allowable applied load	kg
Emax	Maximum allowable kinetic energy	J	We	Impact equivalent load	kg
Ln(n=1~3)	Overhang	mm	Wmax	Maximum allowable applied load	kg
M(Mp, My, Mr)	Static moment(Pitch, Yaw, Roll)	N.m	α	Load rate	-
Ma(Map, May, Mar)	Allowable static moment(Pitch, Yaw, Roll)	N.m	β	Applied load coefficient	-
Me(Mep, Mey)	Dynamic moment(Pitch, Yaw)	N.m	γ	Allowable moment coefficient	-
Mea(Meap, Meay)	Allowable dynamic moment(Pitch, Yaw)	N.m	δ	Bumper	-
Mmax(Mpmax, Mymax, Mrmax)	Maximum allowable static moment(Pitch, Yaw, Roll)	N.m	K	Mounting work coefficient	-
V	Impact speed	mm/s			

Fig. 2 Overhang: Ln(mm), Correction value for center position distance of moment: An(mm)



Note: Static moment: Generated by gravity.  
Dynamic moment: Generated by the impact when the limiter is impacted.

Table 1 Maximum allowable kinetic energy : Emax(J)

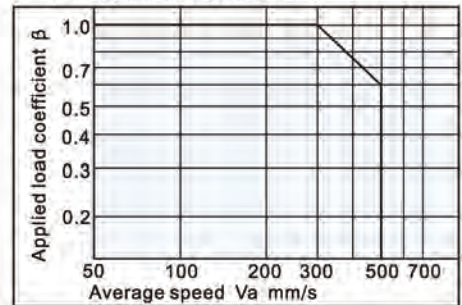
Type	Emax(Bumper)
HLF8	0.027
HLF12	0.055
HLF16	0.11
HLF20	0.16

Table 3 Correction value for center position distance of moment: An(mm)

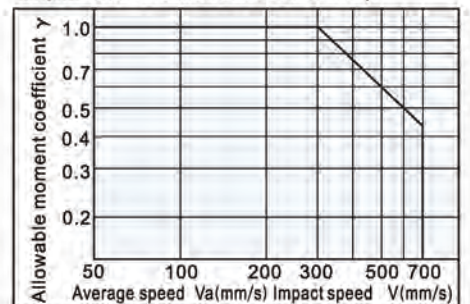
Model	An					
	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>
HLF8	6 <sup>Note1</sup>	10	6 <sup>Note1</sup>	21	21	10
HLF12	10	11	10	23	23	11
HLF16	10	12	10	28	28	12
HLF20	11	17	11	34	34	17

Note1: Only HLF8X10 is 16mm.

Map 1 Applied load coefficient : β



Map 2 Allowable moment coefficient: γ



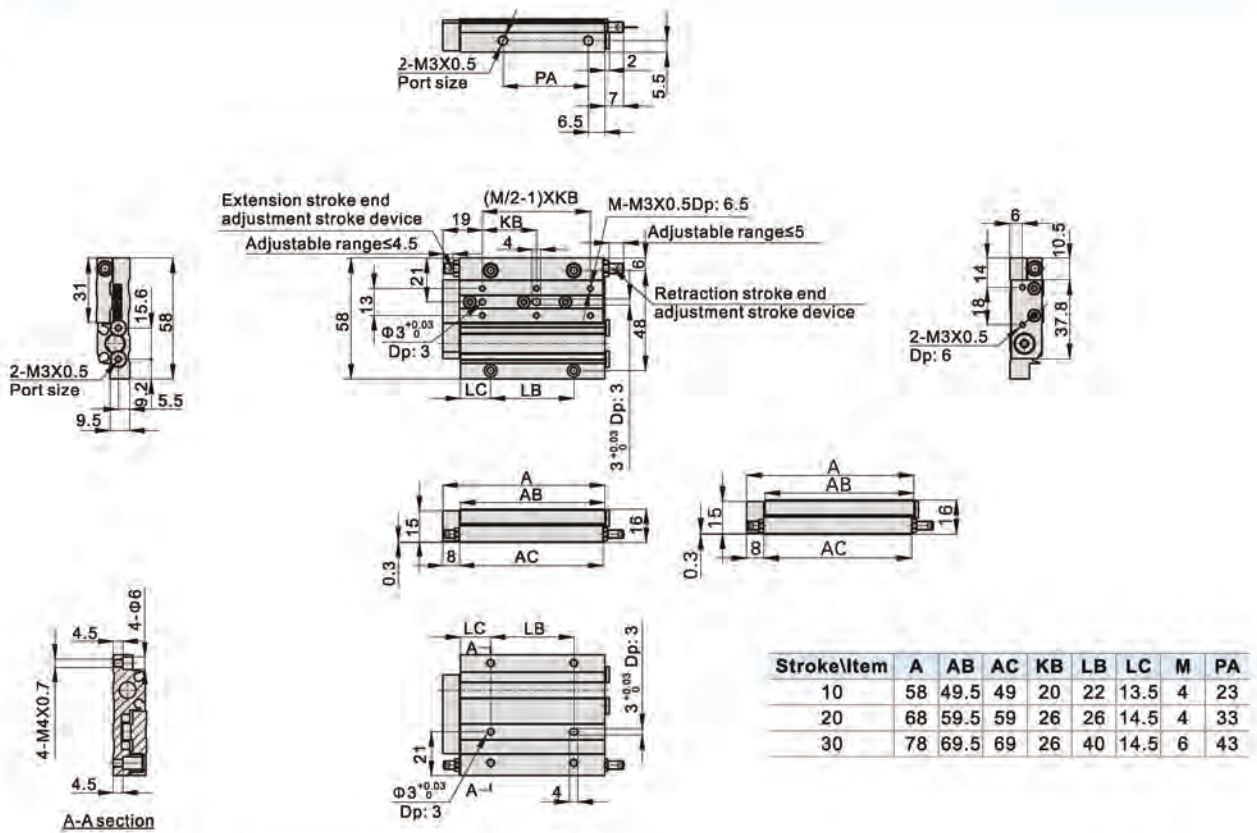
Note: Calculate static moment using average speed  
Calculate dynamic moment using impact speed

# Low profile precision slide table cylinders

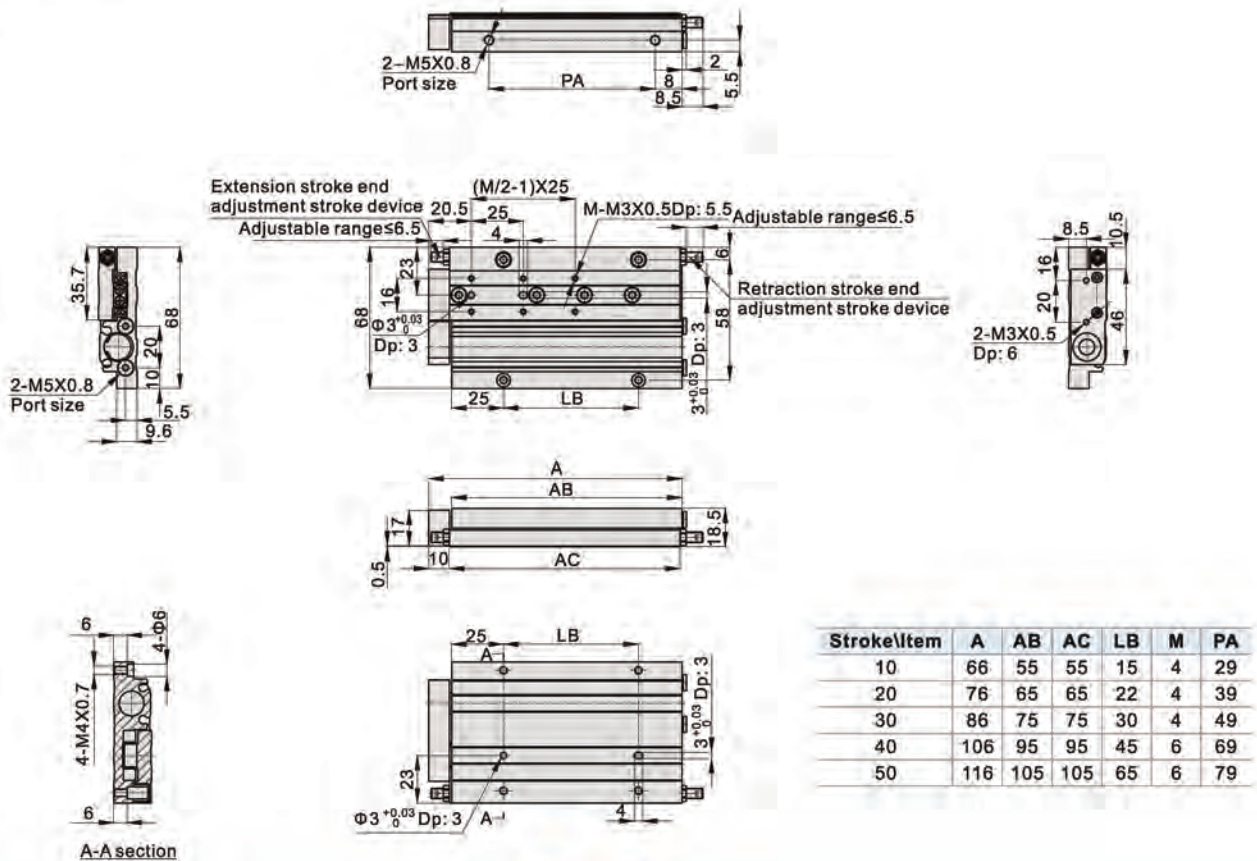
## HLF Series

### Dimensions

#### HLF8



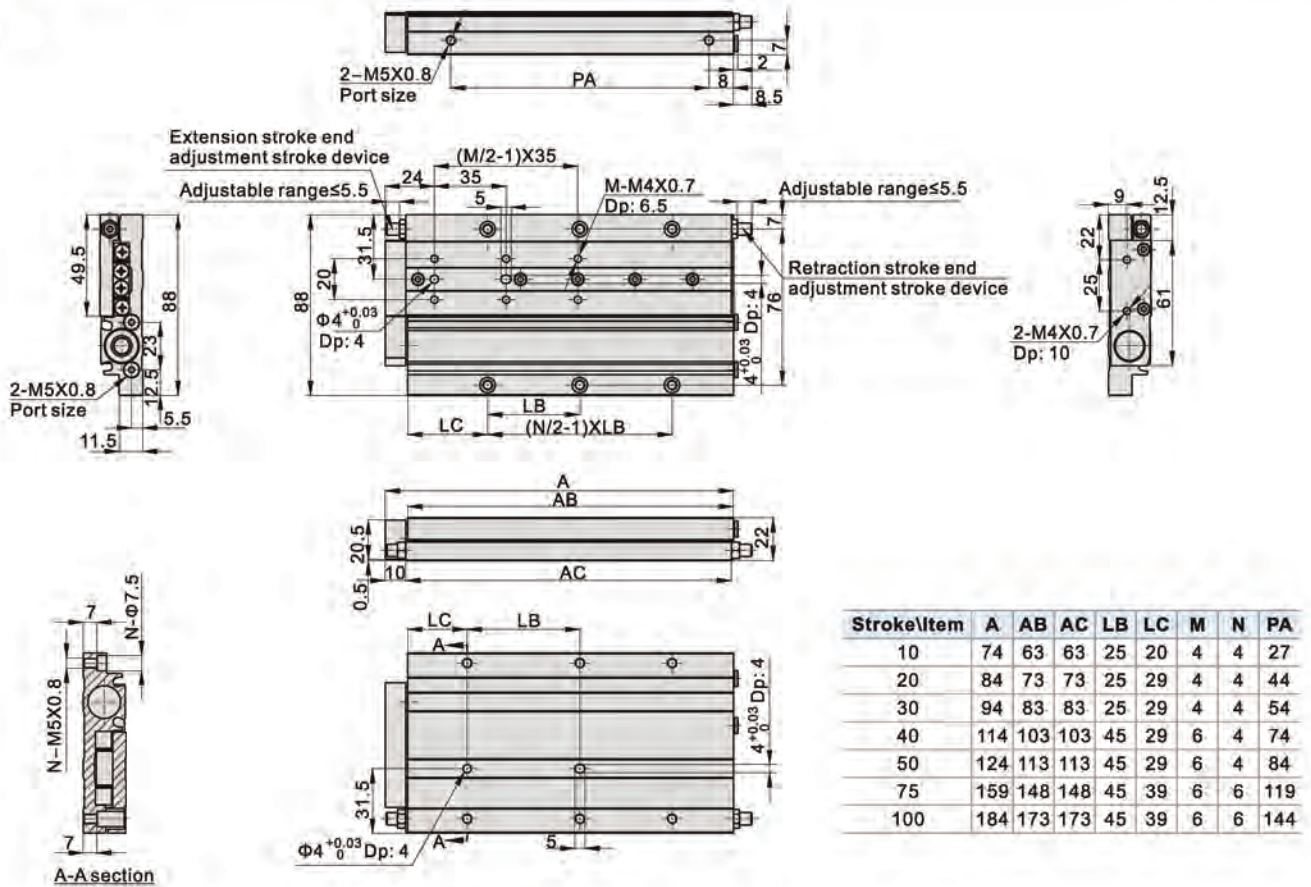
#### HLF12



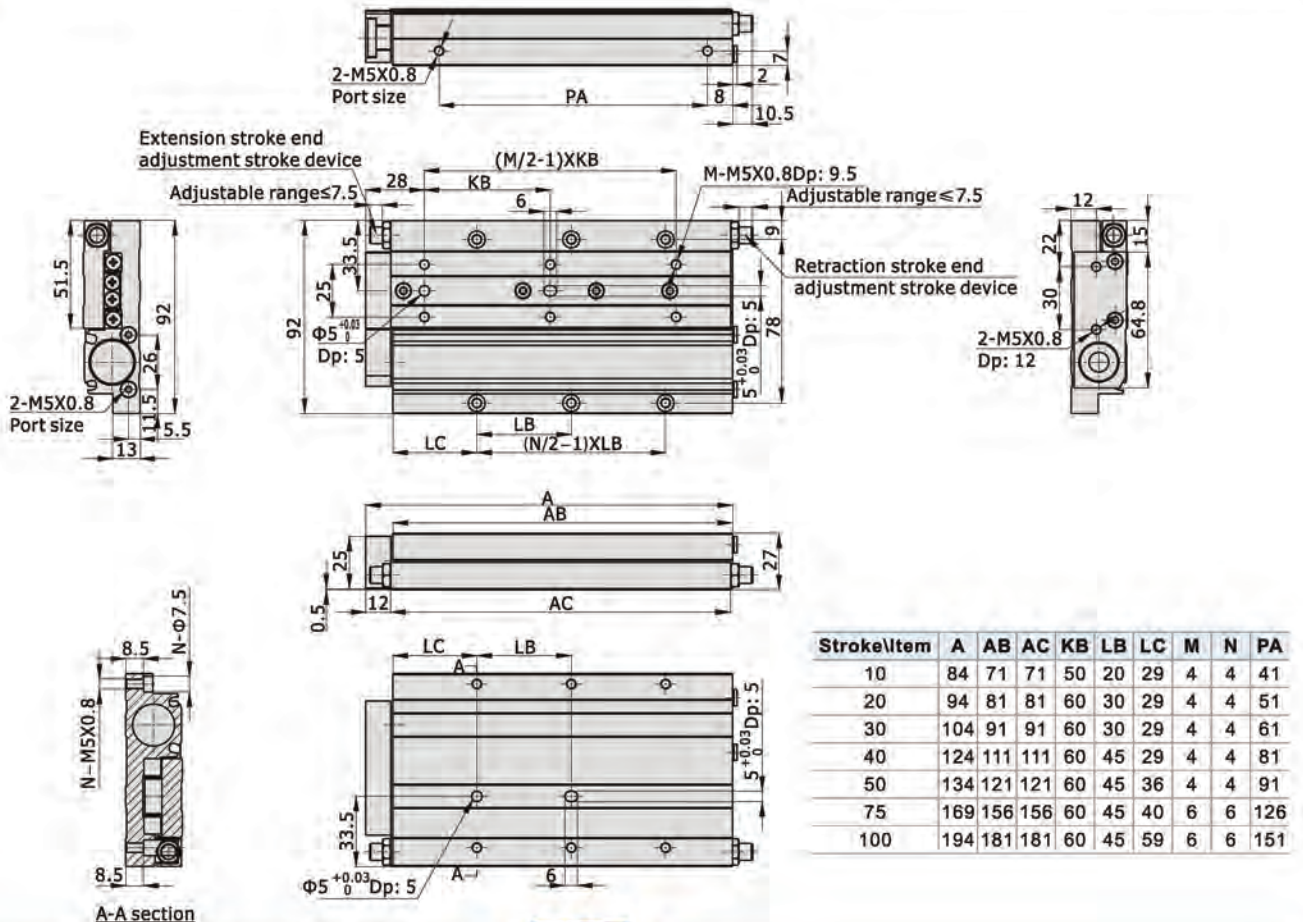
# Low profile precision slide table cylinders

## HLF Series

### HLF16



### HLF20





# Compact slide cylinder——HLH Series

## Compendium of HLH Series

**Exactitude pilot**  
With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.

**Integrative design**  
Miniature linear roller ball bearing integrated wise cylinder.

**With magnetic switch slots**  
There are magnetic switch slots both sides of the cylinder body convenient to install inducing switch.

**Three groups of inlet and outlet air ports**

**Four bore size are available**  
Bore size: 6, 10, 16, 20

**Mounting workpiece from 2 directions**

**Mounting cylinder from 4 directions**

Be mounted from side  
Be mounted from side  
Be mounted from back  
Be mounted from bottom

Workpiece  
Slide table  
Workpiece

Outlet ports  
Side ports  
Back ports  
Side ports  
Inlet ports

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)						
					0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting	Push-side	28.3	-	5.7	8.5	11.3	14.2	17.0	19.8
			Pull-side	21.2	-	4.2	6.4	8.5	10.6	12.7	14.8
10	4	Double acting	Push-side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull-side	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
16	6	Double acting	Push-side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull-side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push-side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull-side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7

### Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Compact slide cylinder

## HLH Series



### Specification

Bore size(mm)	6	10	16	20
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature ℃	-20~70			
Speed range mm/s	50~500			
Allowable kinetic energy J	0.008	0.025	0.05	0.1
Stroke tolerance	+1.0 0			
Cushion type	Bumper			
Sensor switches [Note1]	CMSH, DMSH(S)			
Port size	M5×0.8			

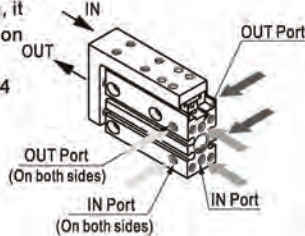
[Note1] Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

1. Miniature linear roller ball bearing integrated wise cylinder.
2. With the excellent straightness and non-rotation precision, it is more suitable for precision assembly.
3. Mounting is possible from 4 directions.
4. Piping is possible from 3 directions.



### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke	
6	5	10	15	20	25	30						30
10	5	10	15	20	25	30	40	50				50
16	5	10	15	20	25	30	40	50	60			60
20	5	10	15	20	25	30	40	50	60			60

[Note] Consult us for non-standard stroke.

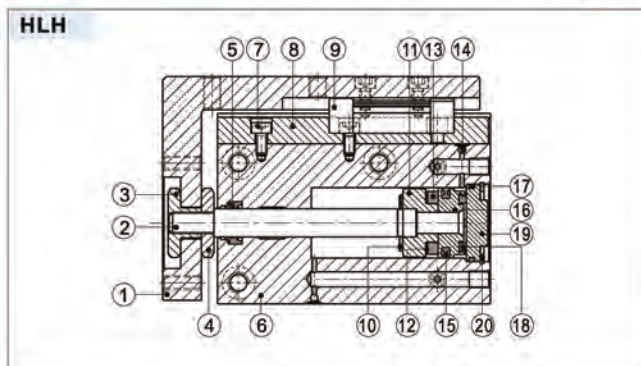
### Ordering code

**HLH 20 x 30 S**



① Model	② Bore size	③ Stroke	④ Magnet
HLH: Compact slide cylinder(Double acting type)	6 10 16 20	Refer to stroke table for details	S: With magnet

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Slide table	Aluminum alloy	12	Magnet washer	NBR
2	Piston rod	Stainless steel	13	Magnet	Sintered metal (Neodymium-iron-boron)
3	Hexagon nut	Carbon steel			
4	Hexagon nut	Carbon steel	14	Steel ball	SUS304
5	Rod seal	NBR	15	Piston seal	NBR
6	Body	Aluminum alloy	16	Piston	Aluminum alloy
7	Screw	Carbon steel	17	O-ring	NBR
8	Linear guide	Stainless steel	18	Bumper	TPU
9	Slide block		19	Back cover	Aluminum alloy
10	Bumper	TPU	20	C clip	Spring steel
11	Magnet holder	Aluminum alloy			

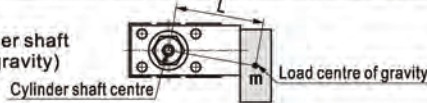
## HLH Series

### Model Selection Method

1. Select the bore size according to the thrust and practicality. Refer to the table on page 187.
2. Determine the selection conditions in order, starting from the upper row in the table below, and choose one of the selection graphs to be used.

Mounting position	Vertical			Horizontal								
Maximum speed(mm/s)	≤100	≤300	≤500	≤100	≤300	≤500	≤100	≤300	≤500	≤100	≤300	≤500
Load offset l(mm)	-	-	-	50	100	200	50	100	200	50	100	200
Selection graph	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

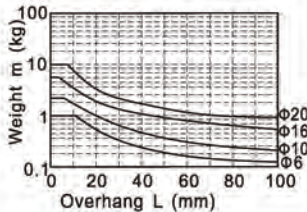
L: Overhang  
(the distance from the cylinder shaft centre to the load centre of gravity)



#### 2.1) The relation between loading and overhang(Selection graphs)

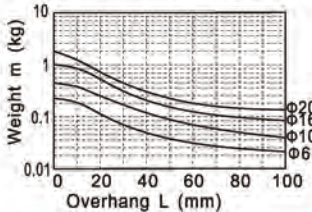
##### Selection Graphs(1)

Maximum speed 100(mm/s) or less



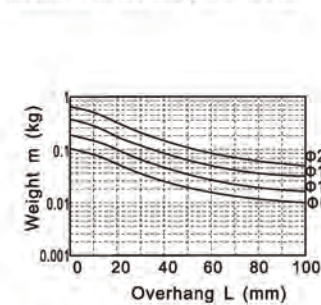
##### Selection Graphs(2)

Maximum speed 300(mm/s) or less



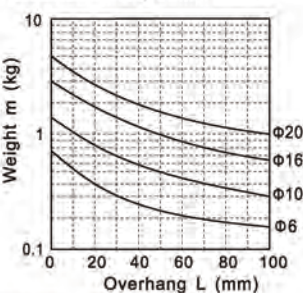
##### Selection Graphs(3)

Maximum speed 500(mm/s) or less



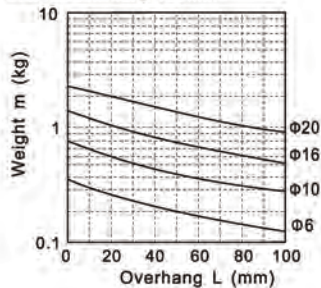
##### Selection Graphs(4)

Maximum speed 100(mm/s) or less  
Load eccentricity 50mm



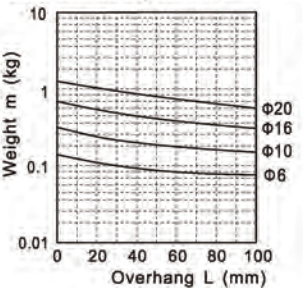
##### Selection Graphs(5)

Maximum speed 100(mm/s) or less  
Load eccentricity 100mm



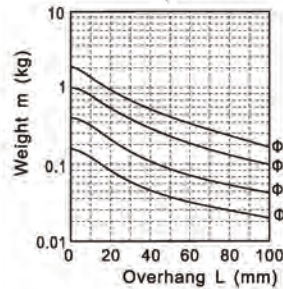
##### Selection Graphs(6)

Maximum speed 100(mm/s) or less  
Load eccentricity 200mm



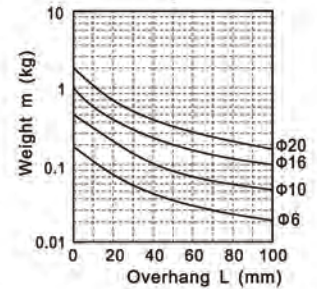
##### Selection Graphs(7)

Maximum speed 300(mm/s) or less  
Load eccentricity 50mm



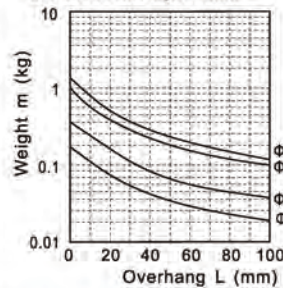
##### Selection Graphs(8)

Maximum speed 300(mm/s) or less  
Load eccentricity 100mm



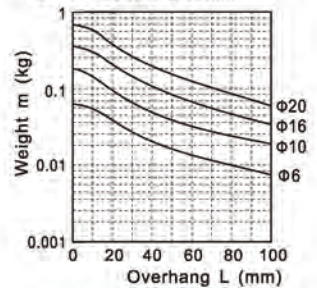
##### Selection Graphs(9)

Maximum speed 300(mm/s) or less  
Load eccentricity 200mm



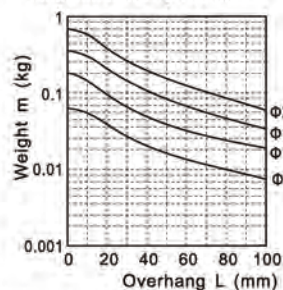
##### Selection Graphs(10)

Maximum speed 500(mm/s) or less  
Load eccentricity 50mm



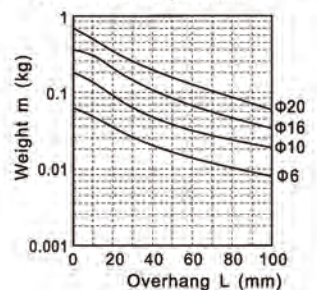
##### Selection Graphs(11)

Maximum speed 500(mm/s) or less  
Load eccentricity 100mm



##### Selection Graphs(12)

Maximum speed 500(mm/s) or less  
Load eccentricity 200mm



#### 2.2) Selection Examples

Example ①: Mounting: Vertical  
Maximum speed: 500mm/s  
Overhang: 40mm  
Load weight: 0.1Kg

Refer to Graph based on vertical mounting and a speed of 500mm/s. In Graph, find the intersection of a 40mm overhang and load weight of 0.1Kg, which results in a selection of φ20.

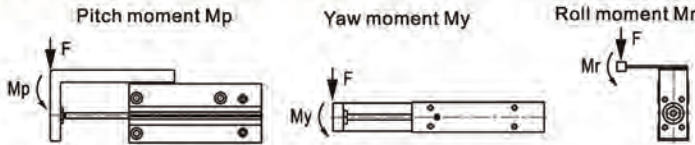
Example ②: Mounting: Horizontal  
Maximum speed: 500mm/s  
Load eccentricity: 50mm  
Overhang: 30mm  
Load weight: 0.1Kg

Refer to Graph based on horizontal mounting, a speed of 500mm/s and load eccentricity of 50mm. In Graph, find the intersection of a 30mm overhang and load weight of 0.1Kg, which results in a selection of φ16.

## HLH Series

### Installation and application

- The actual loading and moment of cylinder must be less than its allowable loading and moment;
  - The allowable moment of cylinder

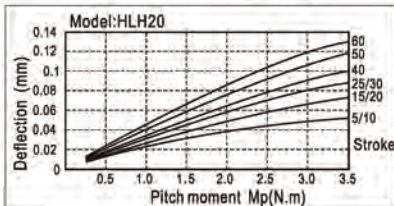
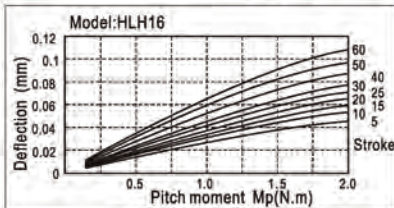
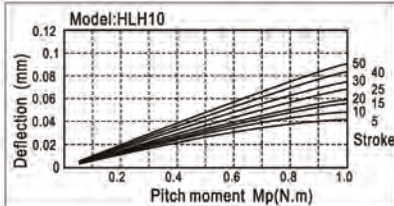
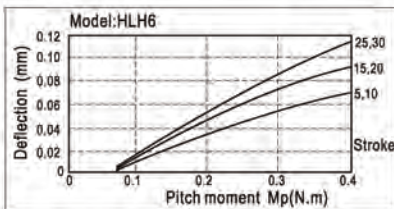
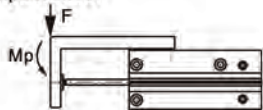


Model/Allowable torque (Nm)	Pitch moment Mp	Yaw moment My	Roll moment Mr
HLH6	0.25	0.25	0.41
HLH10	0.95	0.95	1.49
HLH16	3.28	3.28	3.45
HLH20	6.29	6.29	6.61

- When the cylinder is subjected to different type of moment, there will be different degree of shift in performance, please refer to the following table for details.

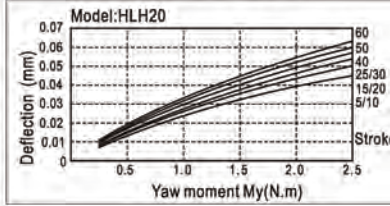
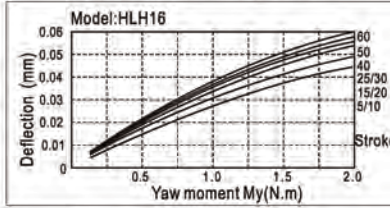
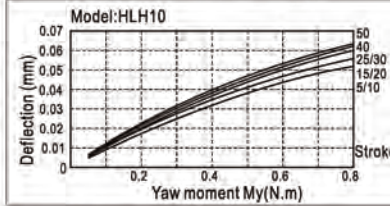
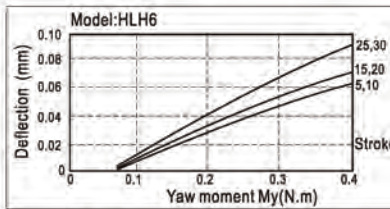
#### Table deflection due to pitch moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



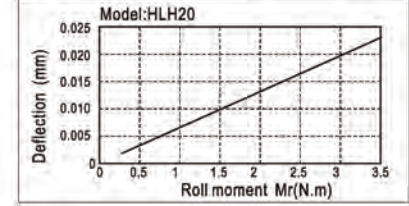
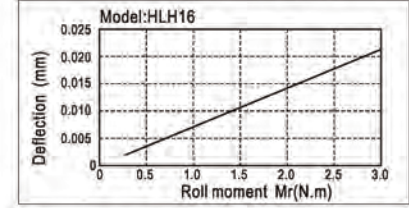
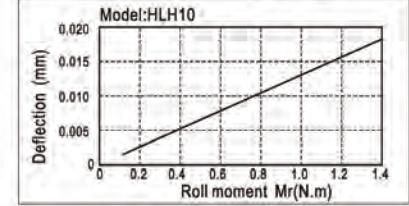
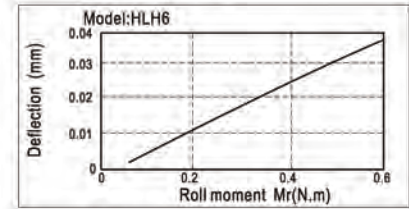
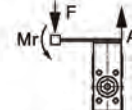
#### Table deflection due to yaw moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



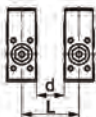
#### Table deflection due to roll moment

Table deflection (at A) when a load acts upon section F at the full stroke of the compact slide.

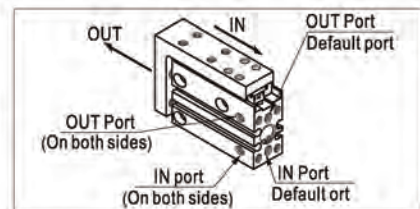


- The compact slide can be piped from 3 directions. Confirm the pressure ports and operating direction. (See drawing right)

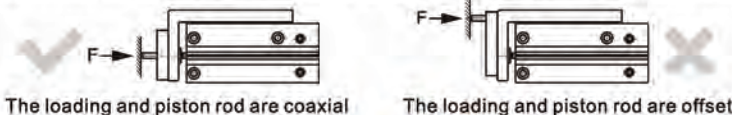
- In compact slides with sensor switch, there is a danger of sensor switch malfunction if the mounting pitch is less than the dimensions shown in Table right. Be sure to allow at least the indicated interval.



At least indicated interval (mm)/Model	HLH6	HLH10	HLH16	HLH20
d	5	5	10	15
L	21	25	35	47



- When the output of the compact slide will be directly applied to the table, it should be applied along the rod axis. (See drawing below.)



The loading and piston rod are coaxial

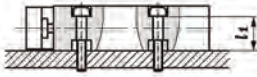
The loading and piston rod are offset

# Compact slide cylinder

## HLH Series

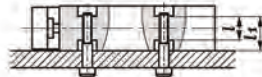
- Be sure to use a flow control value, and adjust the speed to 500mm/s or less.
- A compact slide can be mounted from 4 directions. Don't exceed the max. fastening torque then tightening the mounting bolts.

### Lateral Mounting(Through Holes)



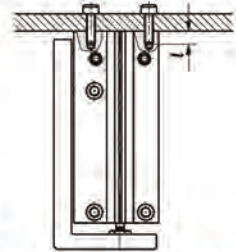
Model	Bolts	Max. fastening torque	L1
HLH6	M3×0.5	1.1(Nm)	12.7
HLH10	M4×0.7	2.5(Nm)	15.6
HLH16	M4×0.7	2.5(Nm)	20.6
HLH20	M5×0.8	5.1(Nm)	24.0

### Lateral Mounting(Tapped Holes)

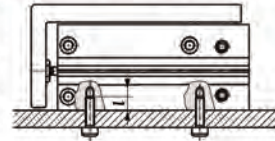


Model	Bolts	Max. fastening torque	L1	L
HLH6	M4×0.7	2.5(Nm)	12.7	9.4
HLH10	M5×0.8	5.1(Nm)	15.6	11.2
HLH16	M5×0.8	5.1(Nm)	20.6	16.2
HLH20	M6×1.0	8.1(Nm)	24.0	16.0

### Axial Mounting(Tapped Holes)



### Vertical Mounting(Tapped Holes)

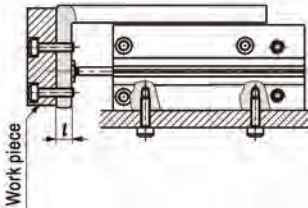


Model	Bolts	Max. fastening torque	L
HLH6	M3×0.5	1.1(Nm)	5
HLH10	M4×0.7	2.5(Nm)	6
HLH16	M4×0.7	2.5(Nm)	6
HLH20	M5×0.8	5.1(Nm)	8

## 7. Work Piece Mounting

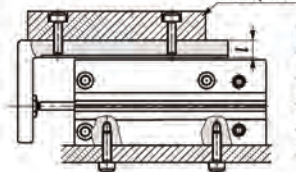
- Work pieces can be mounted on 2 surfaces of the compact slide. When mounting a work piece, tighten the bolts properly at a torque value within the limiting range.

### Front Mounting



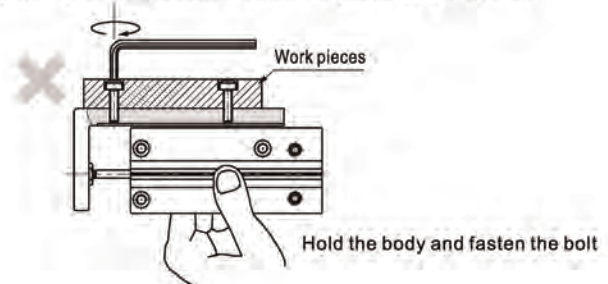
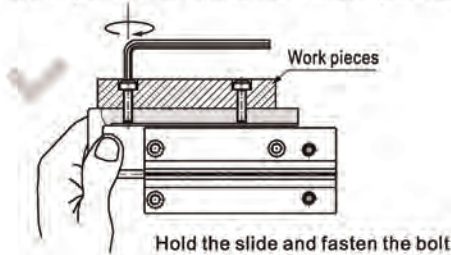
Model	Bolts	Max. fastening torque	L
HLH6	M3×0.5	1.1(Nm)	5.5
HLH10	M4×0.7	2.5(Nm)	7.5
HLH16	M4×0.7	2.5(Nm)	10
HLH20	M5×0.8	5.1(Nm)	11

### Top Mounting



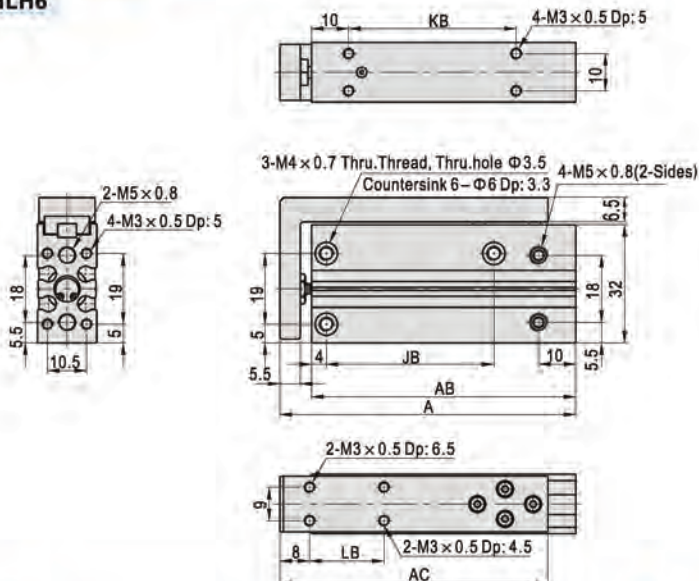
Model	Bolts	Max. fastening torque	L
HLH6	M3×0.5	1.1(Nm)	6.5
HLH10	M4×0.7	2.5(Nm)	8
HLH16	M4×0.7	2.5(Nm)	9
HLH20	M5×0.8	5.1(Nm)	9.5

- Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.
- Hold the slide when fastening work pieces with bolts. If the body is held while tightening bolts, excessive moment may damage guide section.



## Dimensions

### HLH6

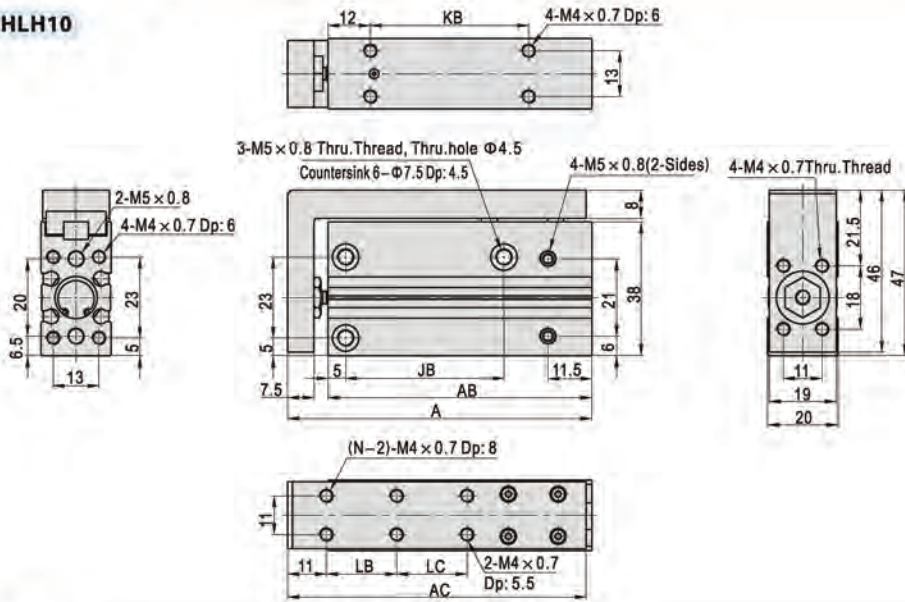


Stroke/Item	A	AB	AC	JB	KB	LB
5	44.5	36	42	14	10	10
10	49.5	41	42	14	15	10
15	54.5	46	52	24	20	20
20	59.5	51	52	24	25	20
25	64.5	56	62	30	30	30
30	69.5	61	62	30	35	30

# Compact slide cylinder

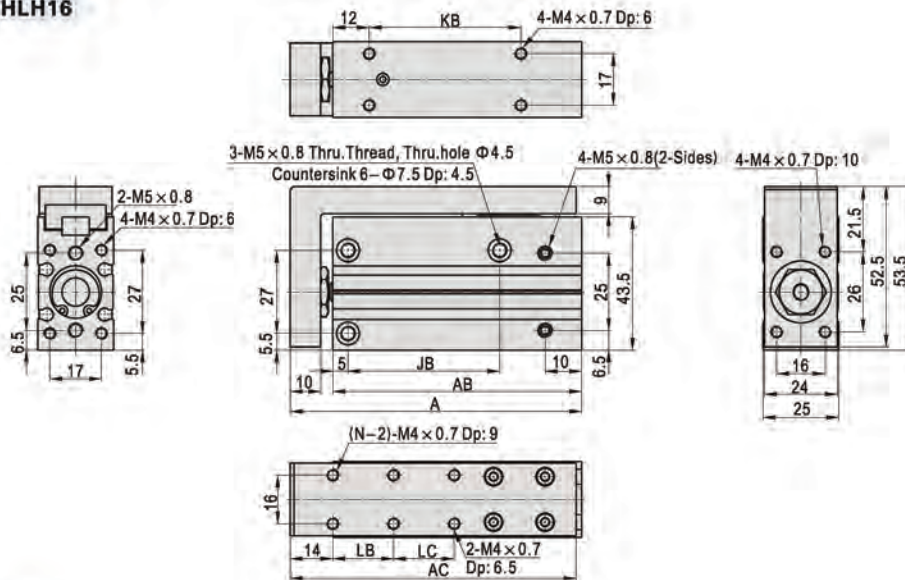
## HLH Series

### HLH10



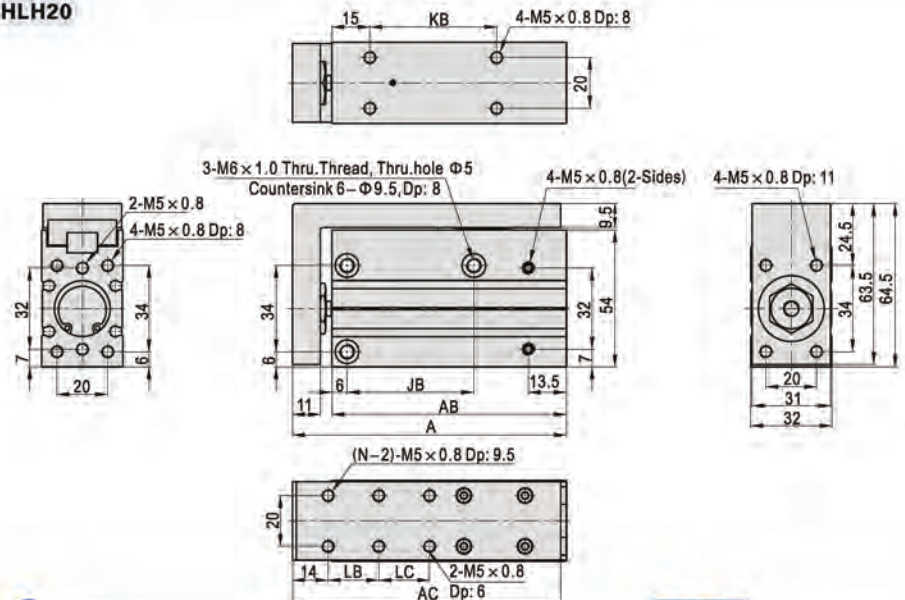
Stroke/Item	A	AB	AC	JB	KB	LB	LC	N
5	51.5	40	50	14	10	10	-	4
10	56.5	45	55	14	15	10	-	4
15	61.5	50	60.5	24	20	20	-	4
20	66.5	55	63	24	25	20	-	4
25	71.5	60	70.5	30	30	30	-	4
30	76.5	65	75.5	30	35	30	-	4
40	86.5	75	85.5	45	45	20	20	6
50	96.5	85	93	55	55	25	25	6

### HLH16



Stroke/Item	A	AB	AC	JB	KB	LB	LC	N
5	61	47	60	20	15	10	-	4
10	66	52	64.5	20	20	10	-	4
15	71	57	69.5	30	25	20	-	4
20	76	62	75	30	30	20	-	4
25	81	67	80	40	35	30	-	4
30	86	72	84.5	40	40	30	-	4
40	96	82	95	50	50	20	20	6
50	106	92	104.5	60	60	25	25	6
60	116	102	114.5	60	70	30	30	6

### HLH20



Stroke/Item	A	AB	AC	JB	KB	LB	LC	N
5	73	57.5	72	20	15	10	-	4
10	78	62.5	72	20	20	10	-	4
15	83	67.5	82	25	25	20	-	4
20	88	72.5	82	25	30	20	-	4
25	93	77.5	92	40	35	30	-	4
30	98	82.5	92	40	40	30	-	4
40	108	92.5	101.5	50	50	20	20	6
50	118	102.5	113.5	70	60	25	25	6
60	128	112.5	122.5	70	70	30	30	6



# Compact slide cylinder(Recirculating linear ball bearing)——HLQ Series

## Compendium of HLQ\HLQL Series

**Multi-adjuster option**

**Recirculating linear ball bearing**  
Recirculating linear ball bearing, it achieves high precision, high rigidity, with antirust and dustproof function.

**Mounting cylinder from 3 directions**  
Through hole for body mounting. Body mounting holes provide 3 mounting positions. Pin holes for positioning.

**Dual rod structure**  
Dual rod-doubles the output thrust

**Floating joint design**  
Piston rod needn't endure additional torque

**Mounting workpiece from 2 directions**

**With magnetic switch slots**  
There are magnetic switch slots side of the cylinder body convenient to install inducting switch.

**Two models (HLQ/HLQL) are available**

Standard: HLQ      Symmetrical: HLQL

**Six bore size are available**  
Bore size: 6, 8, 12, 16, 20, 25

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)					
					0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting	Push-side	42	8	13	17	21	25	29
			Pull-side	57	11	17	23	29	34	40
8	4	Double acting	Push-side	75	15	23	30	38	45	53
			Pull-side	101	20	30	40	51	61	71
12	6	Double acting	Push-side	170	34	51	68	85	102	119
			Pull-side	226	45	68	90	113	136	158
16	8	Double acting	Push-side	302	60	91	121	151	181	211
			Pull-side	402	80	121	161	201	241	281
20	10	Double acting	Push-side	471	94	141	188	236	283	330
			Pull-side	628	126	188	251	314	377	440
25	12	Double acting	Push-side	756	151	227	302	378	454	529
			Pull-side	982	186	295	393	491	589	687

### Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40 μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

HLQ、HLQL Series

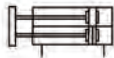


## Specification

Bore size(mm)	6	8	12	16	20	25
Number of guide rail	Single guide rail		Double guide rail			
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500					
Stroke tolerance	Stroke ≤ 100 <sup>+1.0</sup> <sub>0</sub>			Stroke > 100 <sup>+1.5</sup> <sub>0</sub>		
Cushion type	Bumper(Both ends)、Shock absorber					
Sensor switches	CMSH、DMSH(S)					
Port size [Note1]	M5×0.8				1/8"	

[Note1] PT thread, G thread, NPT thread are available.  
Refer to P353 for detail of sensor switch.

## Symbol



## Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
8	10 20 30 40 50 75	75
12	10 20 30 40 50 75 100	100
16	10 20 30 40 50 75 100 125	125
20	10 20 30 40 50 75 100 125 150	150
25	10 20 30 40 50 75 100 125 150	150

[Note] Consult us for non-standard stroke.

## Ordering code

HLQ 20 x 30 S AS □

① ② ③ ④ ⑤ ⑥

① Model	② Bore Size	③ Stroke	④ Magnet	⑤ Adjuster option [Note1]	⑥ Thread type [Note2]	
HLQ: Compact slide cylinder (Double acting type) (Recirculating linear ball bearing)  HLQL: Symmetrical Compact slide cylinder (Double acting type) (Recirculating linear ball bearing)	6 8 12 16 20 25	Refer to stroke table for details	S: With magnet	Blank: Without adjuster(Basic type) 	Blank: PT G: G T: NPT	
				A: Adjustable rubber stopper(Both ends) 		B: Shock absorber(Both ends) 
				AS: Adjustable rubber stopper(Extension) 		BS: Shock absorber(Extension) 
				AF: Adjustable rubber stopper(Retraction) 		BF: Shock absorber(Retraction) 

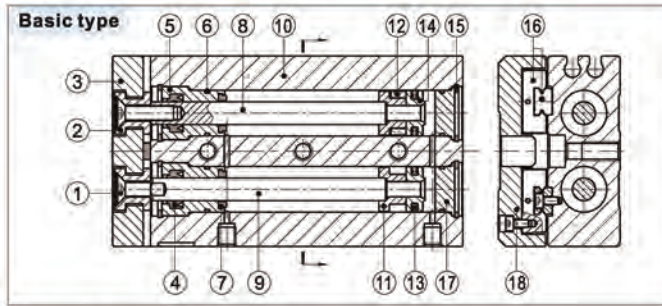
[Note1] B type, BS type, BF type are unavailable for bore size of Φ6. [Note2] When the thread is standard, the code is blank.



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

## HLQ, HLQL Series

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Screw	Carbon steel	11	Magnet holder	Brass
2	Floating joint	Carbon steel	12	Magnet	Sintered metal (Neodymium-iron-boron)
3	Fixing plate	Aluminum alloy	13	Piston seal	NBR
4	Rod seal	NBR	14	Piston	Brass
5	Front cover	Aluminum alloy	15	C clip	Spring steel
6	O-ring	NBR	16	Linear guide combination	
7	Bumper	TPU	17	Back cover	Brass
8	Piston rod A	Stainless steel	18	Slide table	Aluminum alloy
9	Piston rod B	Carbon steel			
10	Body	Aluminum alloy			

### Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

#### A) Operating conditions(According to mounting position and work form)

1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed  $V_a$ (mm/s)
6. Applied load  $W$ (N)
7. Overhang  $L_1, L_2, L_3$ (mm)

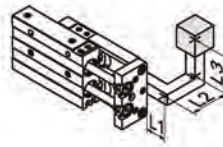
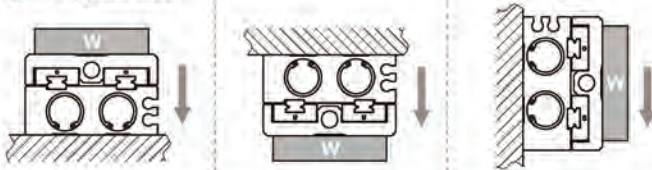


Fig. 1

Explain:  $L_1$  is the distance of load's center beyond the end plank's plane. If load's center is not beyond the end plank's plane,  $L_1$  is negative.

Fig. 1: Applied load



#### B) Kinetic energy check

1. Calculate kinetic energy of load  $E$ (J)
 
$$E = \frac{1}{2} \times \frac{W}{g} \times \left( \frac{1.4 \times V_a}{1000} \right)^2$$
2. Calculate allowable kinetic energy  $E_a$ (J)
 
$$E_a = K \times E_{max}$$

$K$ : Mounting work coefficient (Fig 2)  
 $E_{max}$ : Maximum allowable kinetic energy (Table 1)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy:  $E \leq E_a$

#### C) Load check

1. Calculate allowable applied load  $W_a$ (N)
 
$$W_a = K \times \beta \times W_{max}$$

$K$ : Mounting work coefficient (Fig 2)  
 $W_{max}$ : Maximum allowable applied load (Table 1)  
 $\beta$ : Applied load coefficient (Fig 3)
2. Check that load( $W$ ) doesn't exceed allowable applied load( $W_a$ ):  $W \leq W_a$

Fig 2: Mounting work coefficient (K)

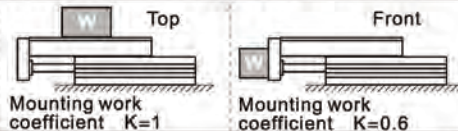
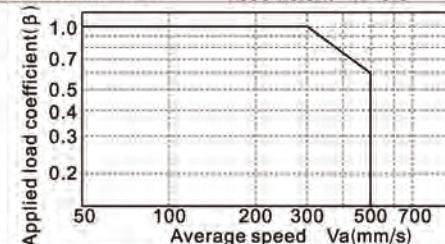


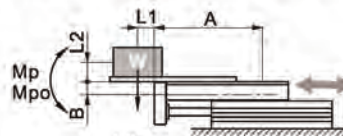
Fig 3: Applied load coefficient ( $\beta$ )



#### D) Moment check

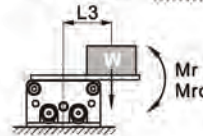
##### Horizontal

1. Calculate actual moment:  $M_p, M_{p0}, M_y, M_{y0}, M_r, M_{r0}$  (Nm)



Dynamic moment:  
 $M_p = W \times (L_1 + A) / 1000$

Static moment:  
 $M_{p0} = \frac{W \times (L_1 + A)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$



Dynamic moment:  
 $M_r = W \times L_3 / 1000$

Static moment:  
 $M_{r0} = (W \times a \times L_3) / 1000g$



Dynamic moment:  
 $M_y = 0$

Static moment:  
 $M_{y0} = (W \times a \times L_3) / 1000g$

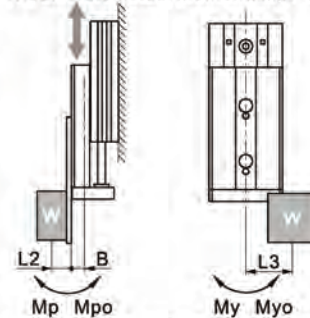
2. Check

Dynamic moment:  $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$

Static moment:  $\frac{M_{p0}}{M_{p0_{max}}} + \frac{M_{y0}}{M_{y0_{max}}} + \frac{M_{r0}}{M_{r0_{max}}} \leq 1$

##### Vertical

1. Calculate actual moment:  $M_p, M_{p0}, M_y, M_{y0}$ (Nm)



Dynamic moment:  
 $M_p = W \times (L_2 + B) / 1000$

Static moment:  
 $M_{p0} = \frac{W \times (L_2 + B)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$

Dynamic moment:  
 $M_y = W \times L_3 / 1000$

Static moment:  
 $M_{y0} = \frac{W \times a \times L_3}{1000g} + \frac{W \times L_3}{1000}$

2. Check

Dynamic moment:  $\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$

Static moment:  $\frac{M_{p0}}{M_{p0_{max}}} + \frac{M_{y0}}{M_{y0_{max}}} \leq 1$

Explain:

$L_1/L_2/L_3$ : The distance of load center to mount plane(Determined by actuality).  
 $A/B$ : Correction value for center position distance of moment(Refer to table 2).  
 $M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{p0_{max}}/M_{y0_{max}}/M_{r0_{max}}$ : Maximum allowable moment(Refer to table 2).  
 $g$ : Acceleration of gravity( $g=9.81m/s^2$ ).  
 $a$ : Acceleration of inertia  
 (Bumper:  $a=1600 \times (V_a/1000)^2$ , Shock absorber:  $a=400 \times (V_a/1000)^2$ )  
 $W$ : Load weight(Determined by actuality).

# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

## HLQ, HLQL Series

**Table 1:** Maximum allowable kinetic energy(Emax)  
Maximum allowable applied load(Wmax)

Model	Max. allowable kinetic energy			Max. allowable applied load Wmax(N)
	Basic type	Rubber stopper type	Shock absorber type	
HLQ6	0.01	0.01	-	4
HLQ8	0.024	0.024	0.048	8
HLQ12	0.05	0.05	0.1	15
HLQ16	0.1	0.1	0.2	30
HLQ20	0.13	0.13	0.26	40
HLQ25	0.22	0.22	0.44	70

Note: Symbol and unit

Symbol	Item	Unit
A, B	Correction value for center position distance of moment	mm
a	Acceleration of inertia	-
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
Emax	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s <sup>2</sup>
K	Mounting work coefficient	-
L1, L2, L3	Overhang	mm
Mp, My, Mr	Dynamic moment(Pitch, Yaw, Roll)	Nm
Mp <sub>max</sub> , My <sub>max</sub> , Mr <sub>max</sub>	Maximum allowable dynamic moment (Pitch, Yaw, Roll)	Nm
Mpo, Myo, Mro	Static moment(Pitch, Yaw, Roll)	Nm
Mpo <sub>max</sub> , Myo <sub>max</sub> , Mro <sub>max</sub>	Maximum allowable static moment (Pitch, Yaw, Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
Wmax	Maximum allowable applied load	N
β	Applied load coefficient	-

**Table 2:** Maximum allowable moment(Nm).  
Correction value for center position distance of moment(mm)

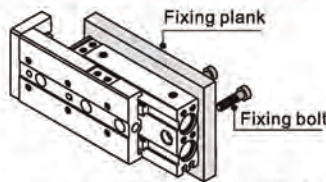
Bore size	Stroke	Static moment			Dynamic moment			Correction value	
		Mp <sub>max</sub>	My <sub>max</sub>	Mr <sub>max</sub>	Mp <sub>max</sub>	My <sub>max</sub>	Mr <sub>max</sub>	A	B
6	10	3.3	3.8	2.6	0.7	0.7	0.6	30	7
	20	3.3	3.8	2.6	0.7	0.8	0.6	40	
	30	3.3	3.8	2.6	0.7	0.8	0.6	50	
	40	7.2	7.9	3.6	1.3	1.3	0.6	60	
	50	12.4	12.7	4.7	1.8	1.8	0.6	70	
8	10	10.1	9.1	8.8	2.5	2.5	2.0	30	7
	20	10.1	9.1	8.8	2.6	2.6	2.0	40	
	30	10.1	9.1	8.8	2.8	2.8	2.0	50	
	40	12.4	10.8	10.1	3.4	3.4	2.3	60	
	50	23.6	24.8	13.9	4.4	4.4	2.1	70	
12	75	32.8	35.3	16.4	4.6	4.6	1.8	95	11
	10	8.5	8.5	13.6	2.5	2.5	4	32	
	20	8.5	8.5	13.6	2.5	2.5	4	44	
	30	8.5	8.5	13.6	2.5	2.5	4	54	
	40	8.5	8.5	13.6	2.5	2.5	4	62	
16	50	8.5	8.5	13.6	2.5	2.5	4	72	12
	75	52.3	52.3	85.6	18.9	18.9	13	115	
	100	53.9	53.9	86.9	19.5	19.5	13	142	
	10	33.6	33.6	35.2	8.4	8.4	8.8	49	
	20	33.6	33.6	35.2	8.4	8.4	8.8	49	
20	30	33.6	33.6	35.2	8.4	8.4	8.8	59	14
	40	33.6	33.6	35.2	8.4	8.4	8.8	69	
	50	33.6	33.6	35.2	8.4	8.4	8.8	79	
	75	70.2	70.2	62.5	28.1	28.1	25	120	
	100	76.6	76.6	62.5	38.3	38.3	25	150	
25	125	78	78	62.5	39	39	25	175	17
	10	34.8	34.8	36.8	8.7	8.7	9.2	53	
	20	34.8	34.8	36.8	8.7	8.7	9.2	53	
	30	34.8	34.8	36.8	8.7	8.7	9.2	63	
	40	34.8	34.8	36.8	8.7	8.7	9.2	73	
30	50	34.8	34.8	36.8	8.7	8.7	9.2	83	14
	75	70.2	70.2	74.5	28.1	28.1	29.7	123	
	100	76.6	76.6	74.5	38.3	38.3	29.7	157	
	125	78	78	74.5	39	39	29.7	178	
	150	98.4	98.4	74.5	49.2	49.2	29.7	210	
40	10	56.7	56.7	51	16.2	16.2	17	60	17
	20	56.7	56.7	51	16.2	16.2	17	60	
	30	56.7	56.7	51	16.2	16.2	17	70	
	40	56.7	56.7	51	16.2	16.2	17	80	
	50	56.7	56.7	51	16.2	16.2	17	90	
50	75	122.5	122.5	138.5	49	49	55.4	130	17
	100	173.8	173.8	138.5	79	79	55.4	168	
	125	217	217	138.5	108.6	108.6	55.4	205	
	150	221.8	221.8	138.5	110.9	110.9	55.4	230	

## Installation and application

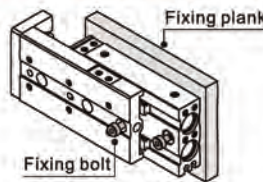
1. How to mount cylinder:

1.1) Cylinder can be mounted from 3 directions

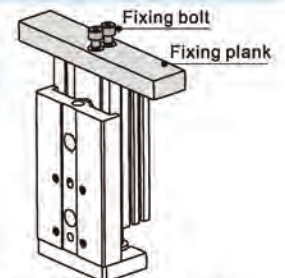
**Vertical Mounting(Body thread holes)**



**Vertical Mounting(Body through holes)**



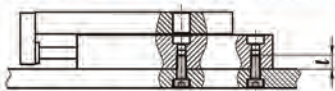
**Axial Mounting (Body thread holes)**



1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.

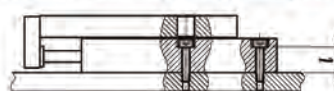
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

**Vertical Mounting(Body thread holes)**



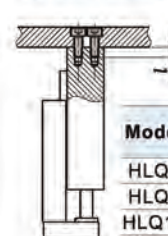
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M4 × 0.7	2.1	8
HLQ8	M4 × 0.7	2.1	8
HLQ12	M5 × 0.8	4.4	10
HLQ16	M6 × 1.0	4.4	10
HLQ20	M6 × 1.0	7.4	12
HLQ25	M8 × 1.25	18.0	16

**Vertical Mounting(Body through holes)**



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3 × 0.5	1.2	8.0
HLQ8	M3 × 0.5	1.2	9.6
HLQ12	M4 × 0.7	2.8	13.4
HLQ16	M5 × 0.8	5.7	16.7
HLQ20	M5 × 0.8	5.7	22.0
HLQ25	M6 × 1.0	10.0	27.0

**Axial Mounting(Body thread holes)**



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M2.5 × 0.45	0.5	3.5
HLQ8	M3 × 0.5	0.9	4.0
HLQ12	M4 × 0.7	2.1	6.0
HLQ16	M5 × 0.8	4.4	7.0
HLQ20	M5 × 0.8	4.4	8.0
HLQ25	M6 × 1.0	7.4	10.0

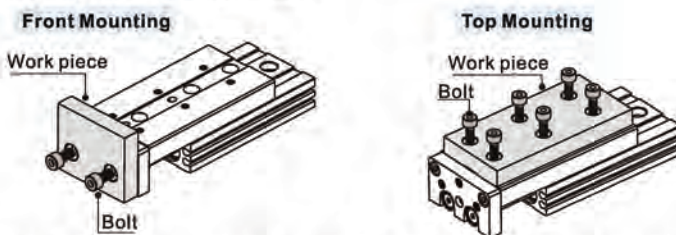


# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

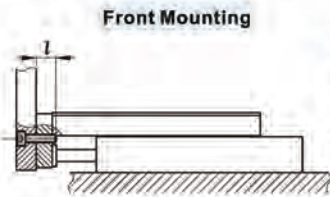
## HLQ, HLQL Series

### 2. Work Piece Mounting:

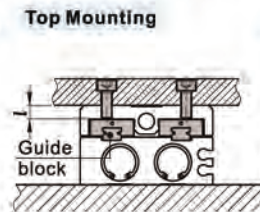
2.1) Work pieces can be mounted on 2 surfaces of the compact slide.



2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.



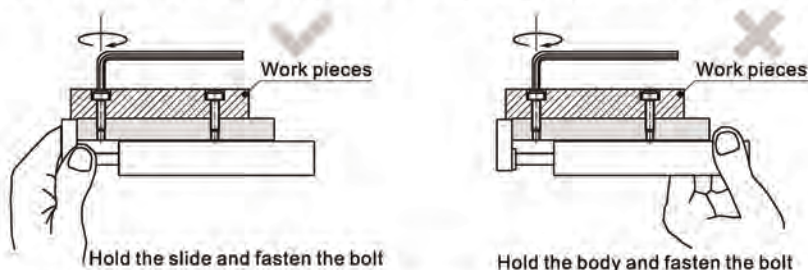
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3 × 0.4	0.9	5
HLQ8	M4 × 0.7	2.1	6
HLQ12	M5 × 0.8	4.4	8
HLQ16	M6 × 1.0	7.4	10
HLQ20	M6 × 1.0	7.4	13
HLQ25	M8 × 1.25	18.0	15



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3 × 0.5	0.9	4.7
HLQ8	M3 × 0.5	0.9	4.7
HLQ12	M4 × 0.7	2.1	5.0
HLQ16	M5 × 0.8	4.4	5.0
HLQ20	M5 × 0.8	4.4	8.0
HLQ25	M6 × 1.0	7.4	9.0

2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.

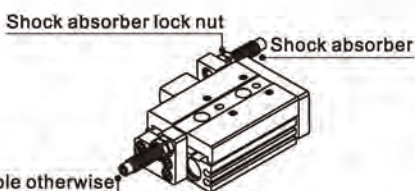


### 3. About shock absorber:

3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.

3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.

3.3) Follow the table for tightening torque of shock absorber to lock nuts.



The screws are not adjustable otherwise would cause oil leakage.

Model	Shock absorber	Tightening torque
HLQ6	Without shock absorber	
HLQ8	ACA0806-1N	1.67(Nm)
HLQ12	ACA0806-1N	1.67(Nm)
HLQ16	ACA1007-1N	3.14(Nm)
HLQ20	ACA1210-1N	3.14(Nm)
HLQ25	ACA1412-1N	10.8(Nm)

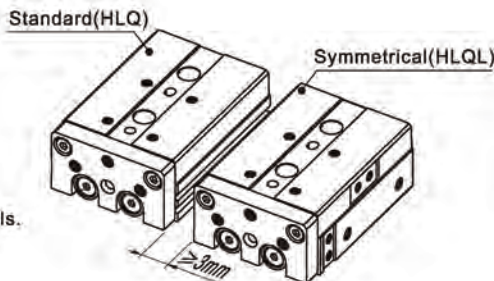
### 4. How to mount sensor switch:

4.1) HLQ Series are all with magnet. The matching sensor switches are CSMH, DMSH(S) series.

4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.

5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

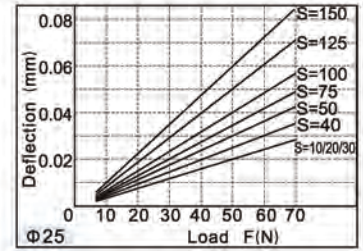
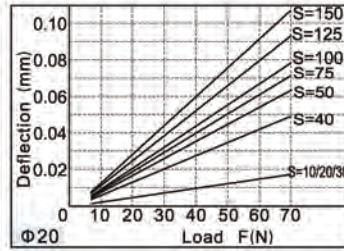
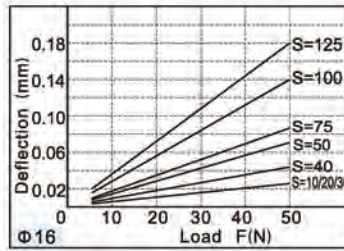
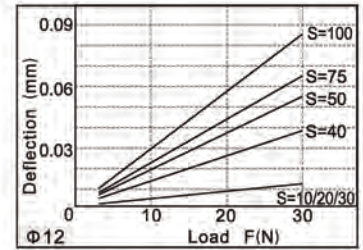
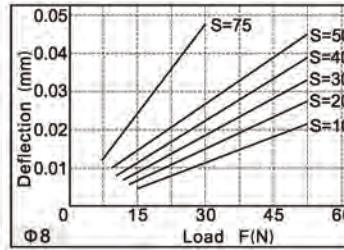
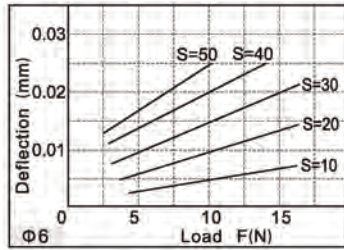
6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.



## HLQ, HLQL Series

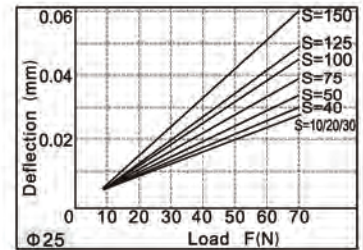
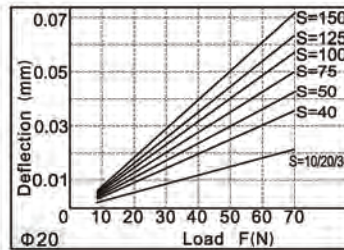
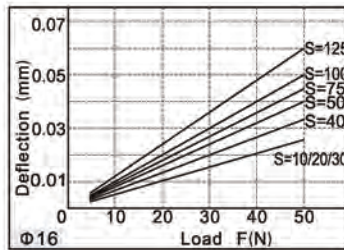
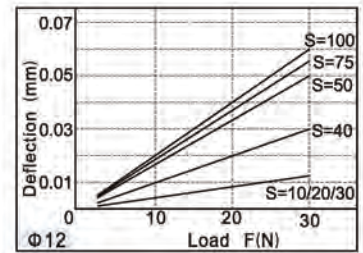
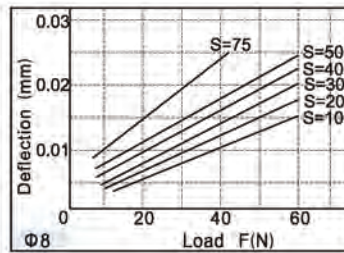
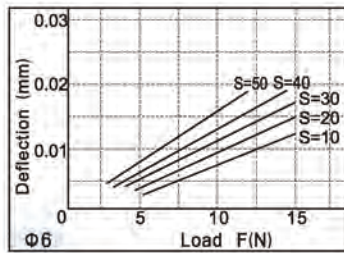
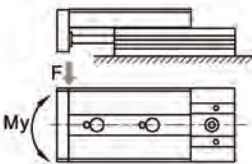
### 6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



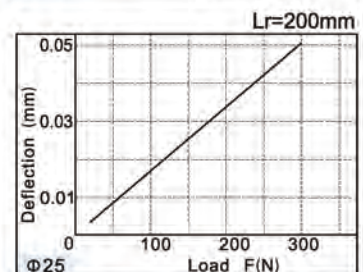
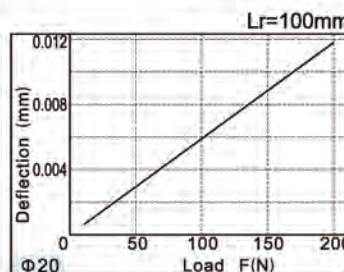
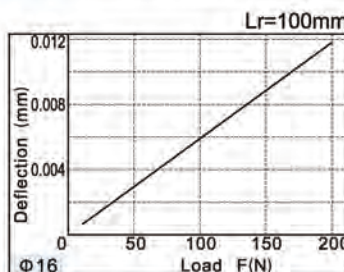
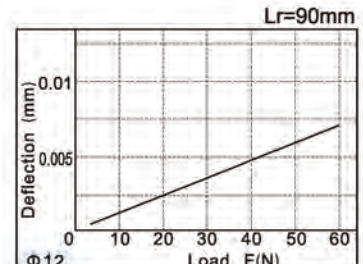
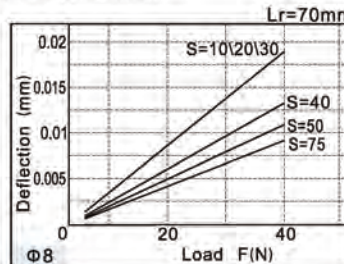
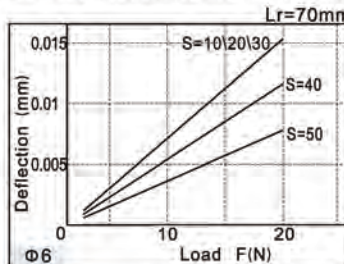
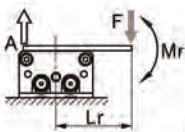
### 6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



### 6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.

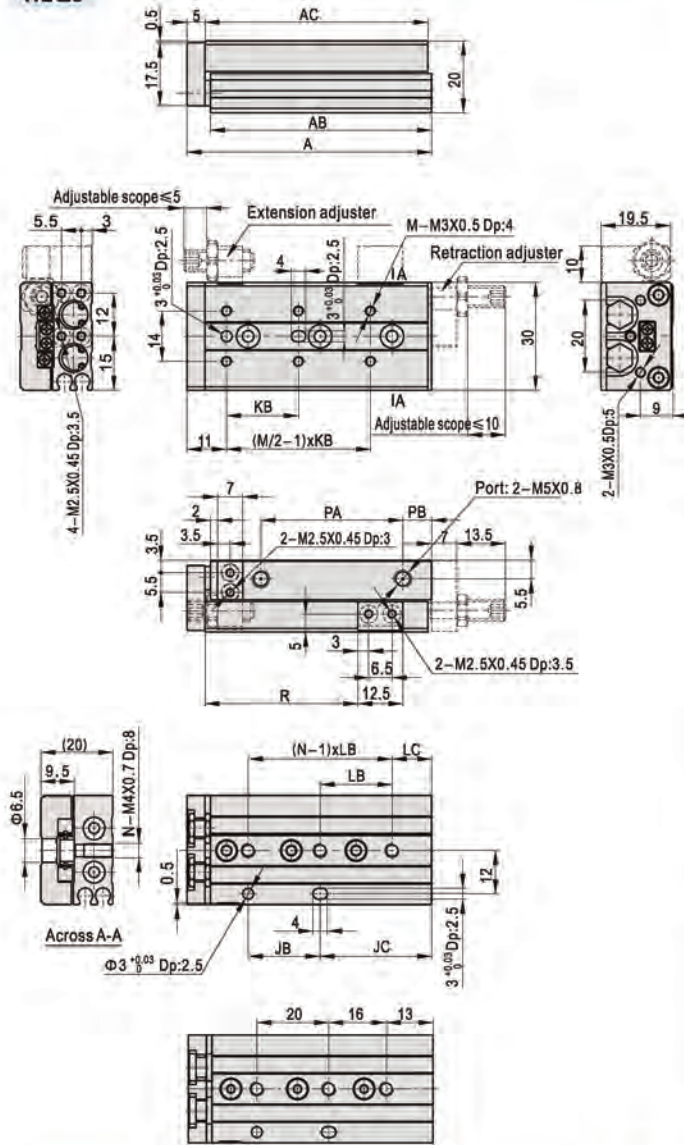


# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

## HLQ、HLQL Series

### Dimensions

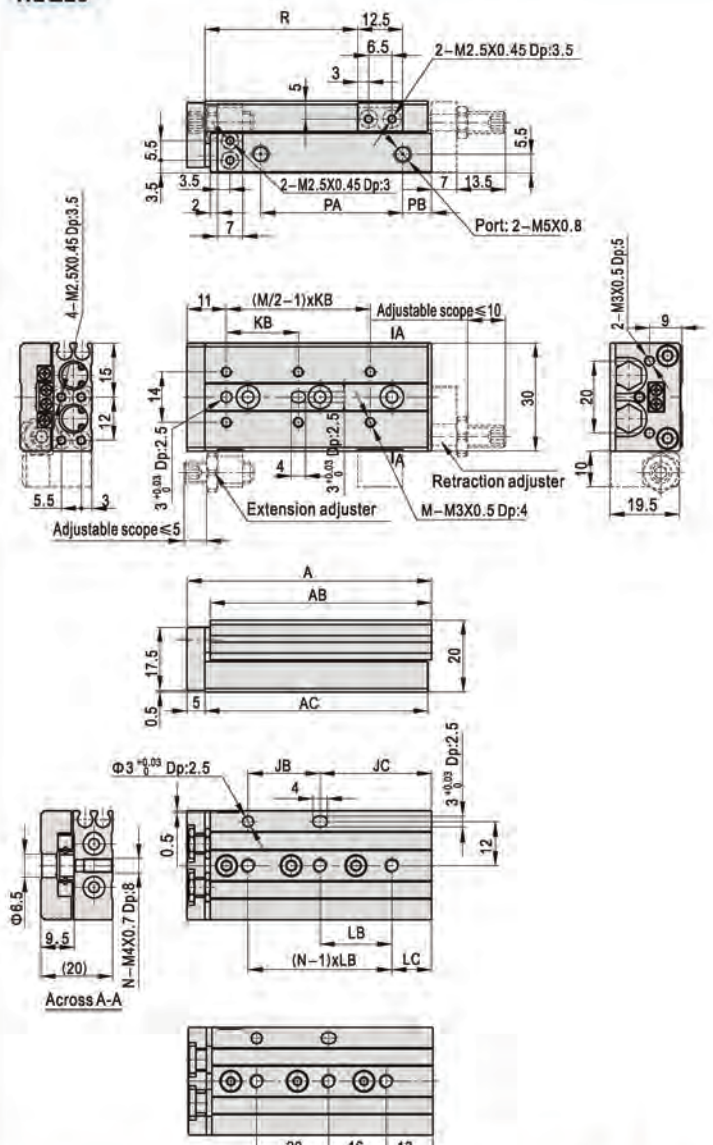
#### HLQ6



HLQ6 × 30

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

#### HLQL6



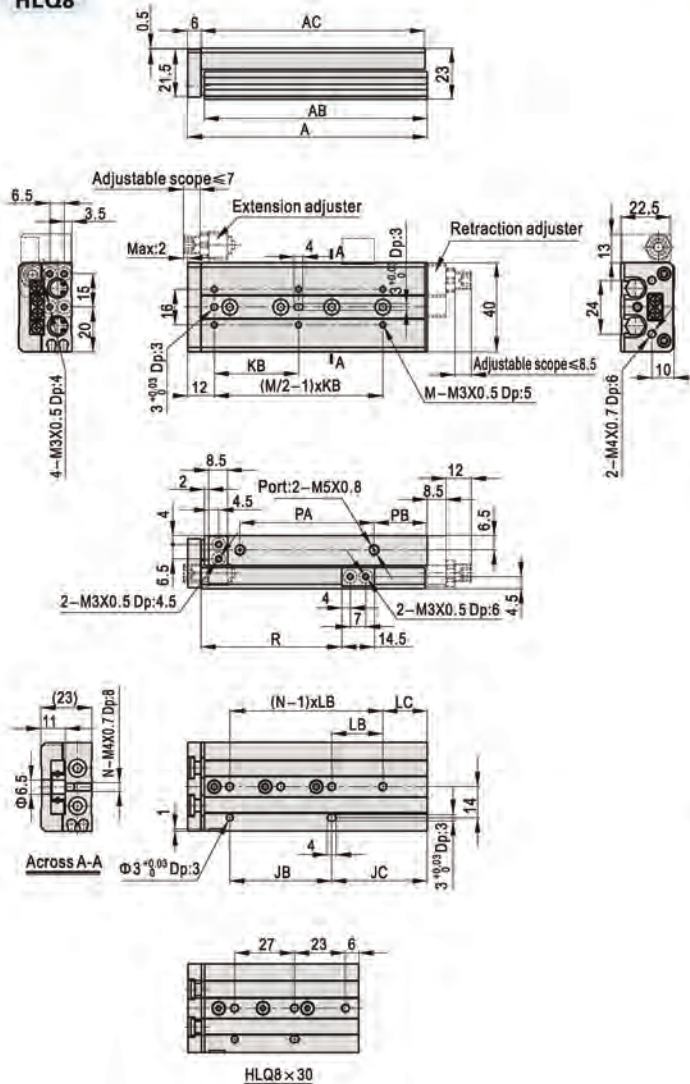
HLQL6 × 30

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

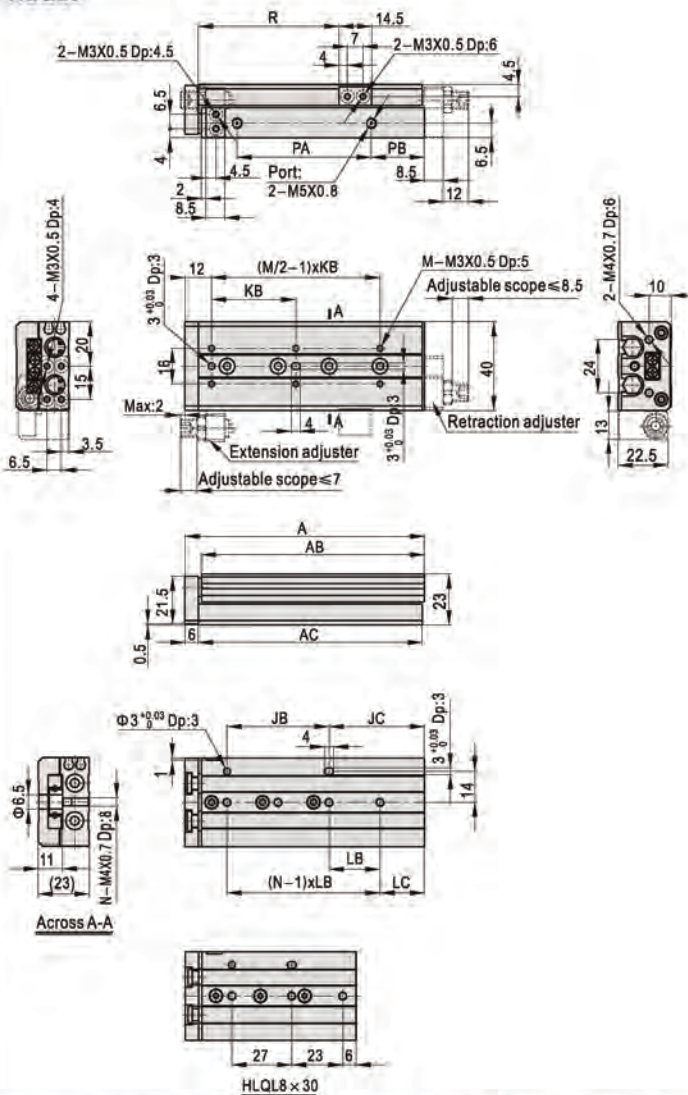
## HLQ、HLQL Series

### HLQ8



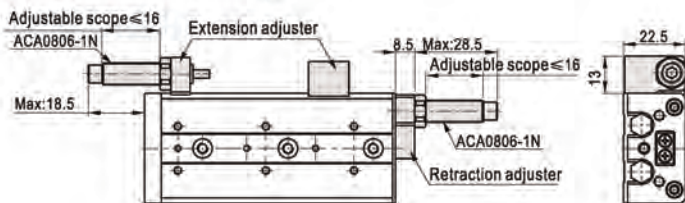
Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	17.5	10.5	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	63	50	30	33	6	4	109	10	88.5

### HLQL8

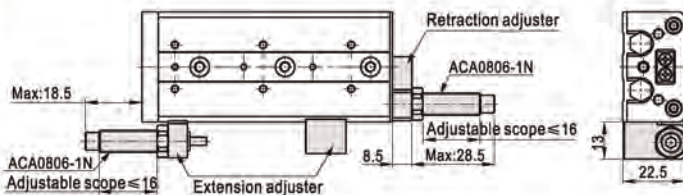


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	17.5	10.5	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	63	50	30	33	6	4	109	10	88.5

### HLQ8(With shock absorber)



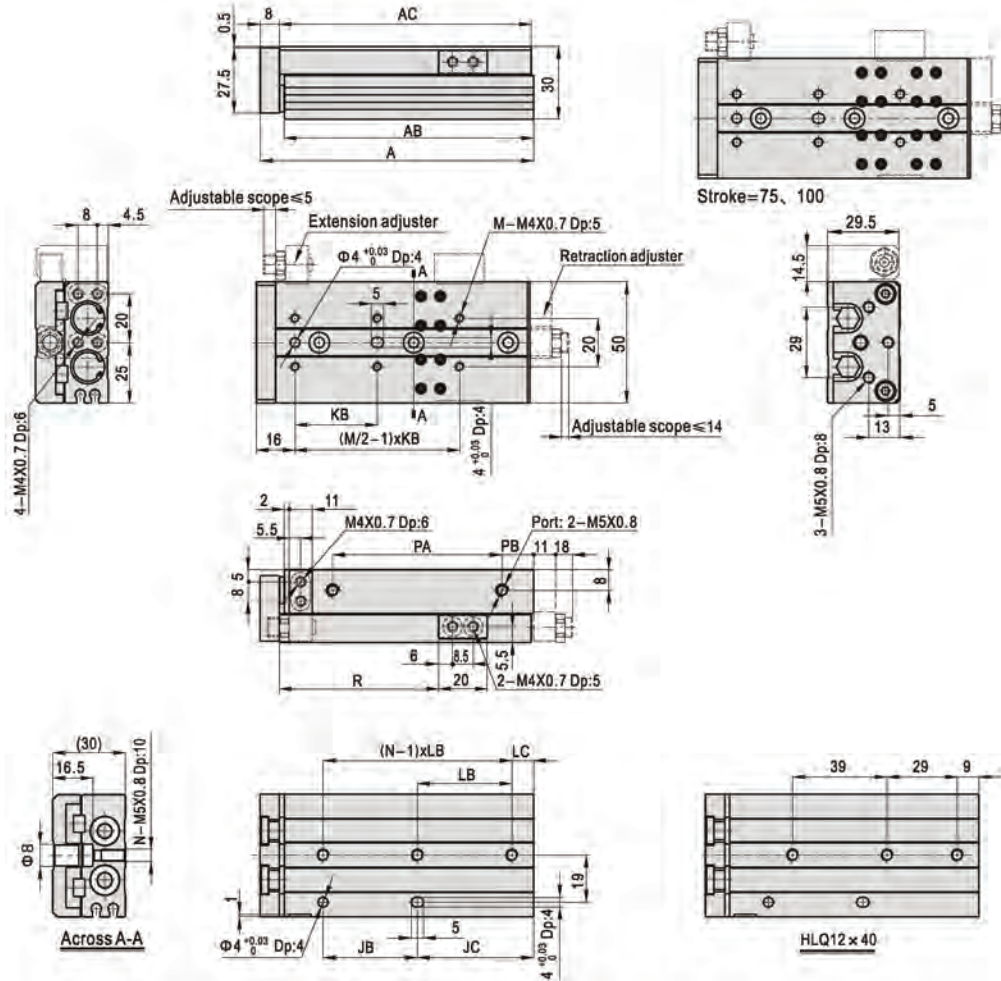
### HLQL8(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

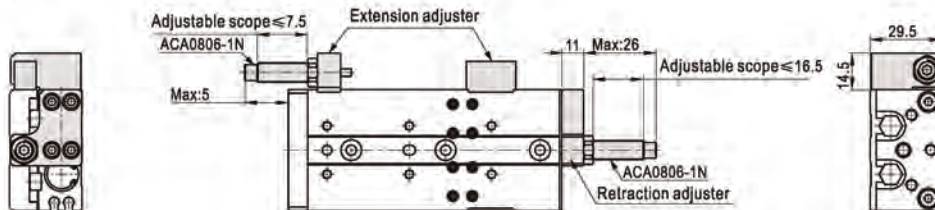
## HLQ、HLQL Series

### HLQ12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

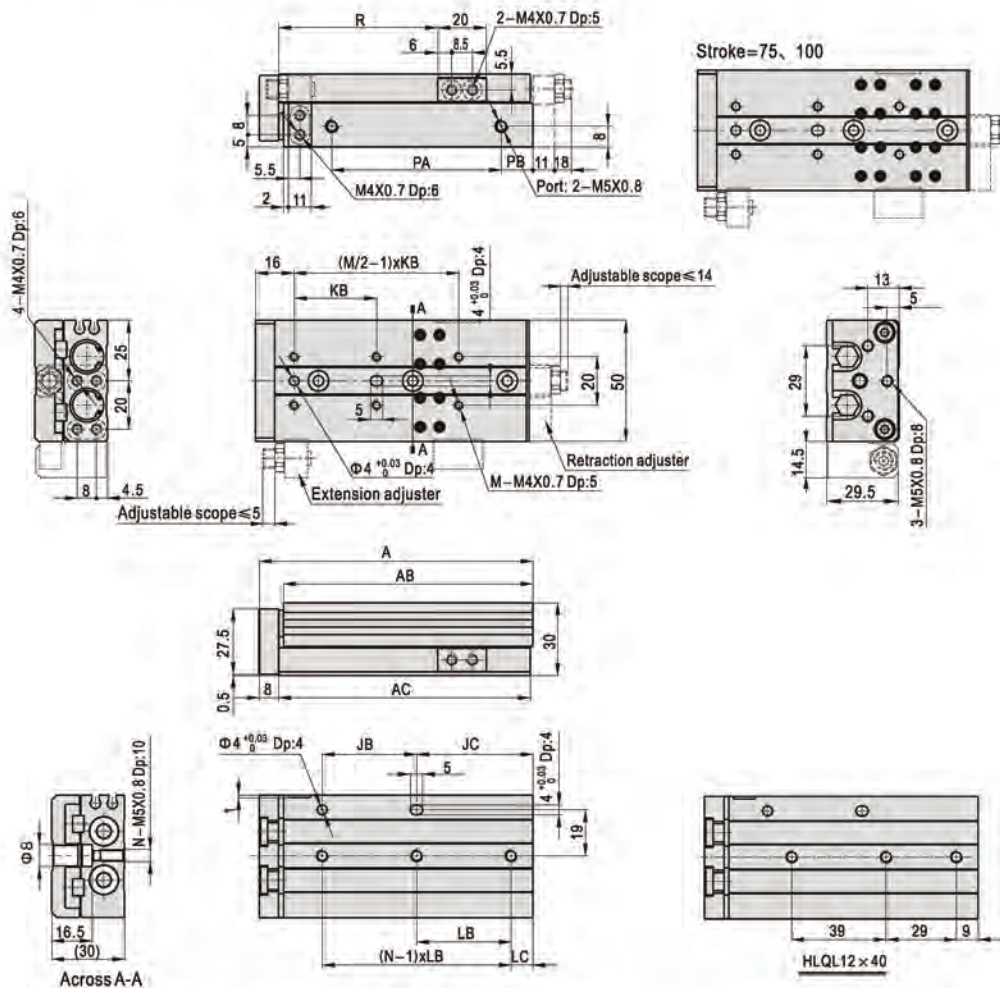
### HLQ12(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

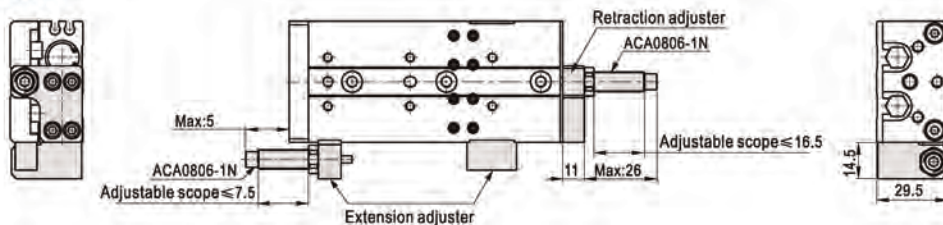
## HLQ、HLQL Series

HLQL12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

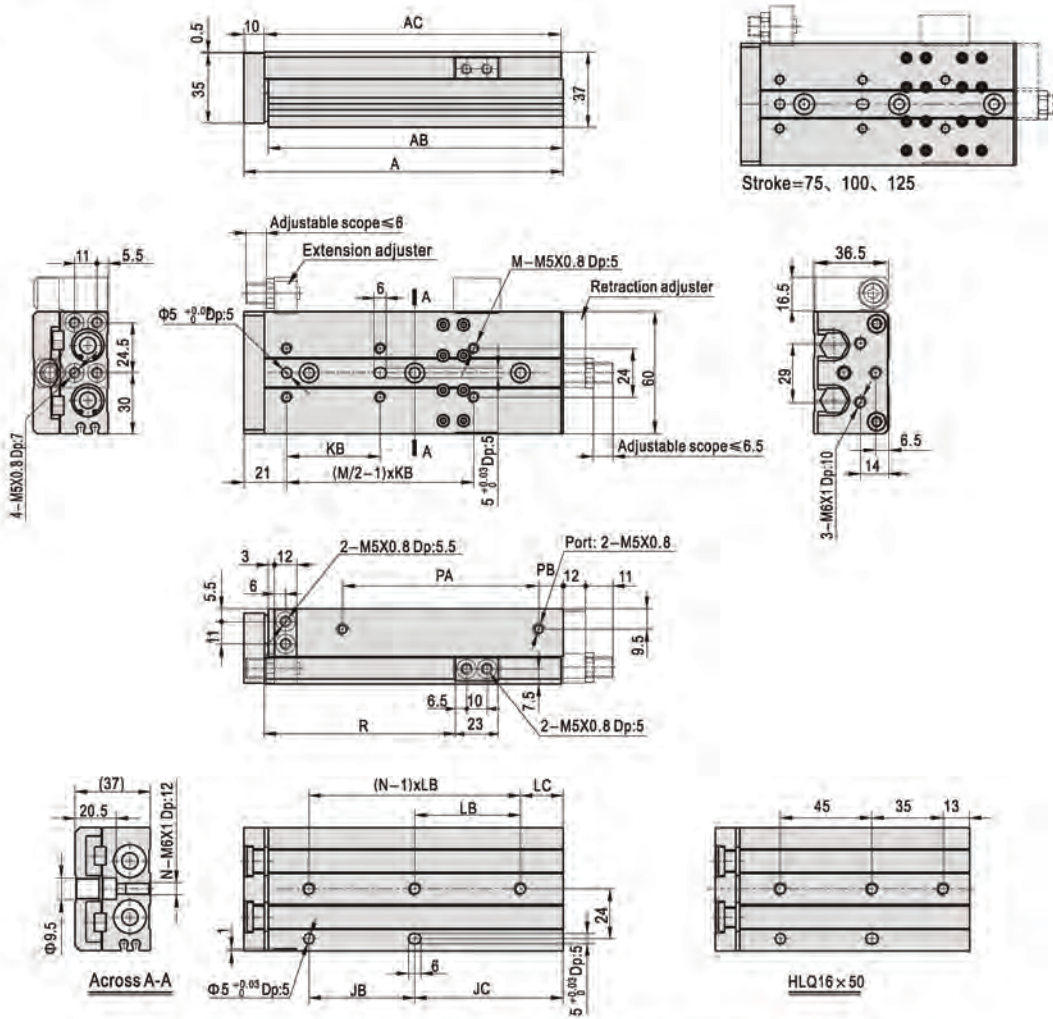
### HLQL12(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

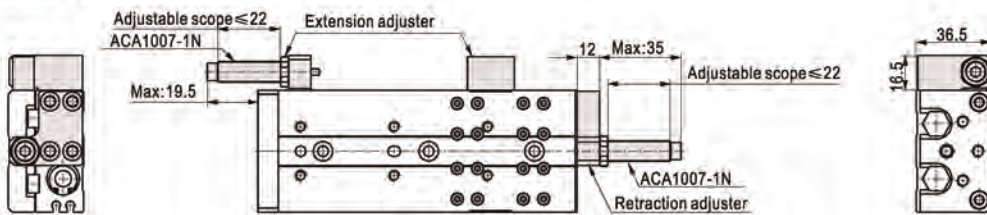
## HLQ、HLQL Series

HLQ16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40.5	12	28.5
20	89	77	78	39	18	38	39	18	4	2	40.5	12	38.5
30	99	87	88	48	19	48	48	19	4	2	50.5	12	48.5
40	109	97	98	58	19	58	58	19	4	2	60.5	12	58.5
50	125	113	114	45	48	40	-	-	6	3	70.5	18	68.5
75	157	145	146	52	73	46	52	21	6	3	108.5	12	93.5
100	200	188	189	88	80	44	44	36	8	4	151.5	12	118.5
125	225	213	214	88	105	44	44	17	10	5	176.5	12	143.5

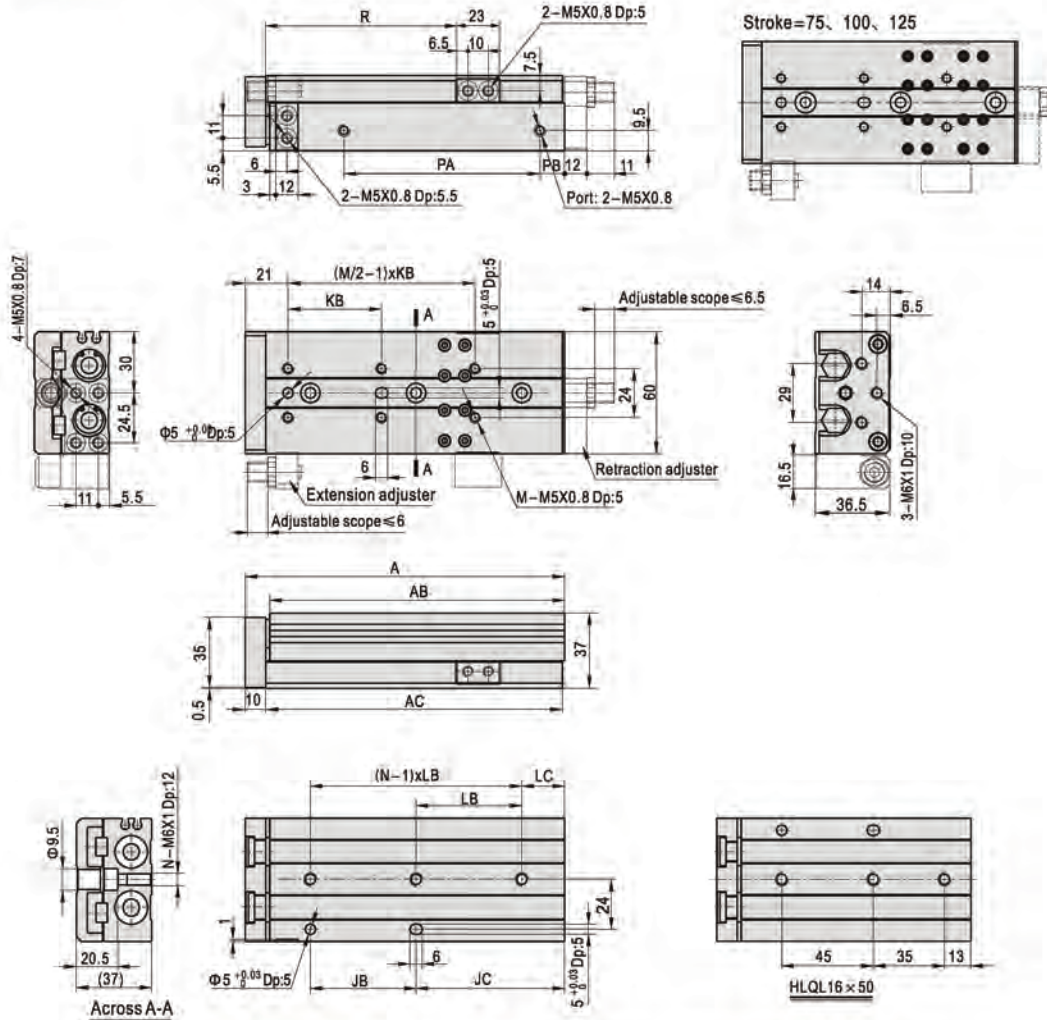
### HLQ16(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

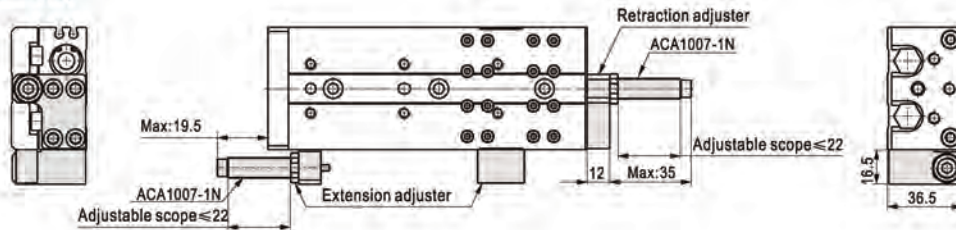
## HLQ、HLQL Series

HLQL16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40.5	12	28.5
20	89	77	78	39	18	38	39	18	4	2	40.5	12	38.5
30	99	87	88	48	19	48	48	19	4	2	50.5	12	48.5
40	109	97	98	58	19	58	58	19	4	2	60.5	12	58.5
50	125	113	114	45	48	40	-	-	6	3	70.5	18	68.5
75	157	145	146	52	73	46	52	21	6	3	108.5	12	93.5
100	200	188	189	88	80	44	44	36	8	4	151.5	12	118.5
125	225	213	214	88	105	44	44	17	10	5	176.5	12	143.5

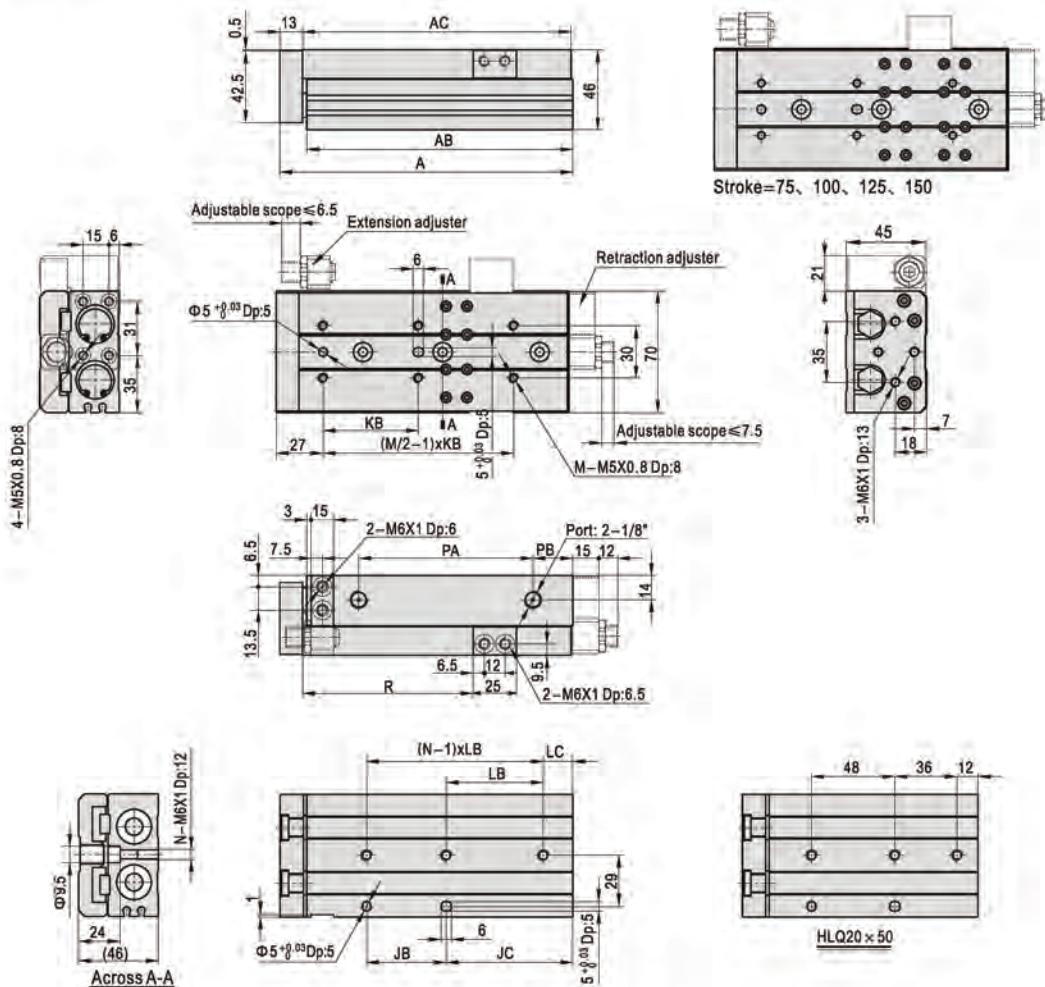
### HLQL16(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

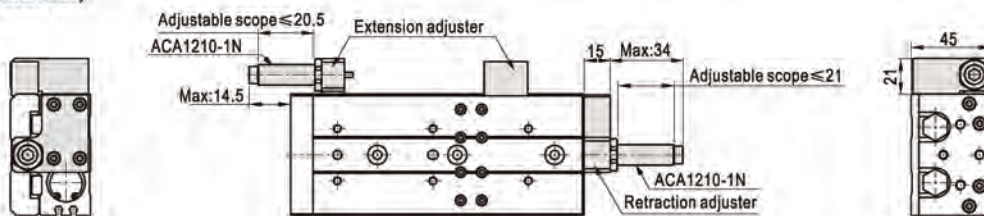
## HLQ、HLQL Series

### HLQ20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20	108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30	108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40	118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50	136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75	169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100	226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125	254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150	282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

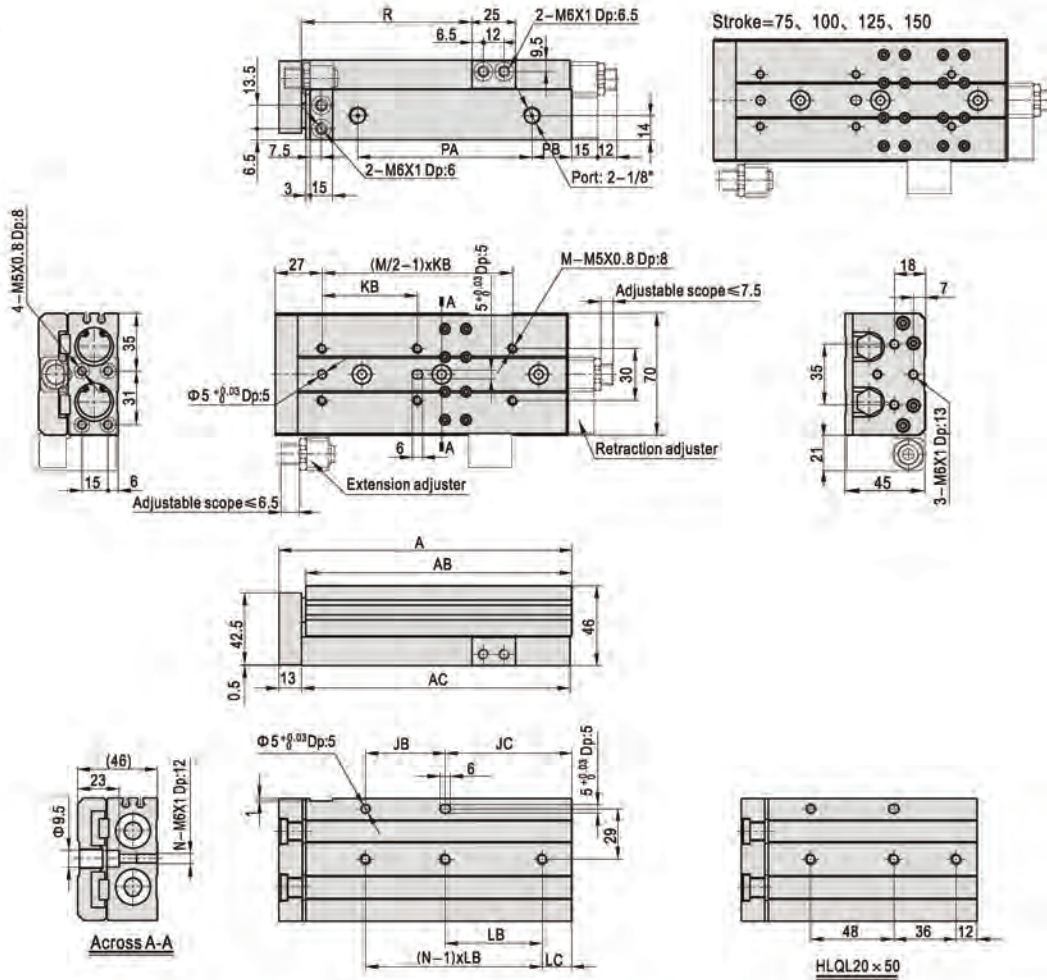
### HLQ20(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

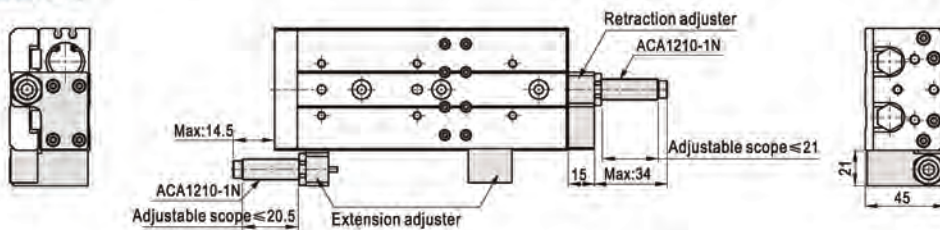
## HLQ、HLQL Series

### HLQL20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20	108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30	108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40	118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50	136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75	169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100	226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125	254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150	282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

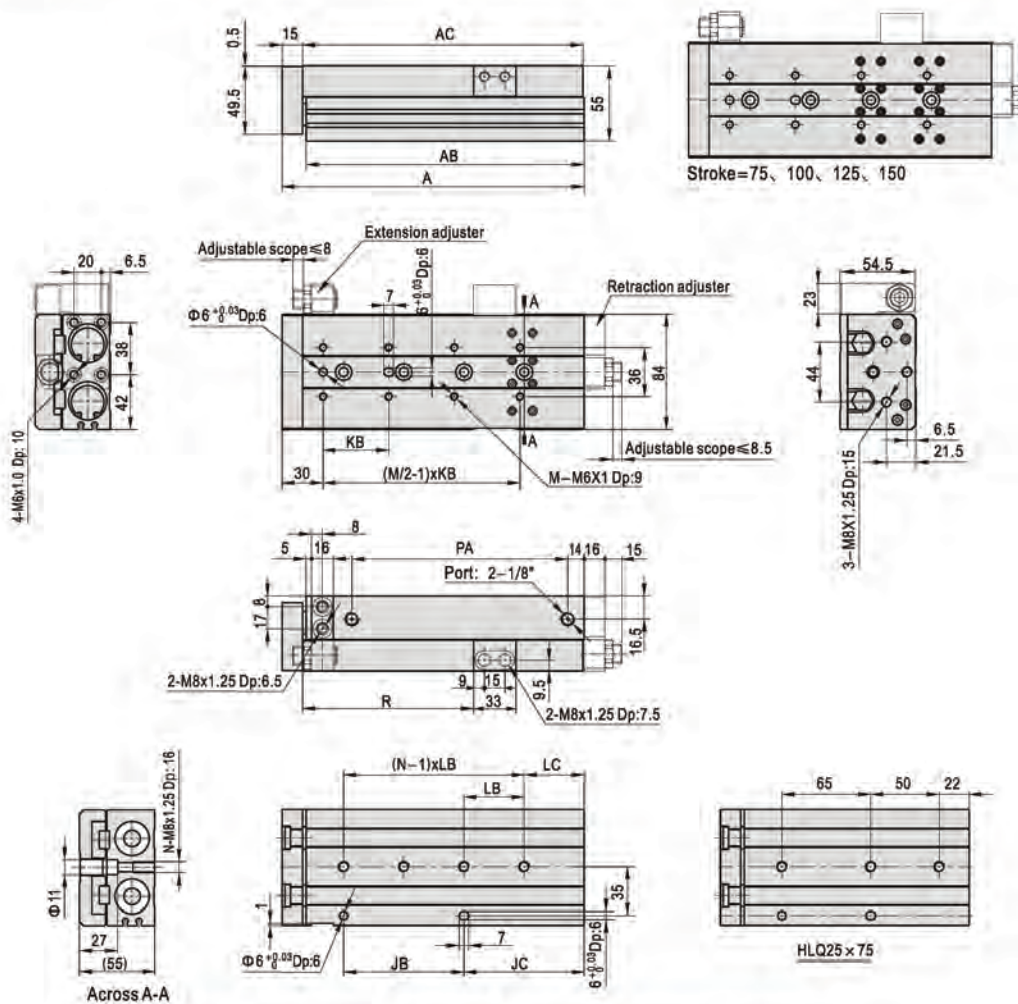
### HLQL20(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

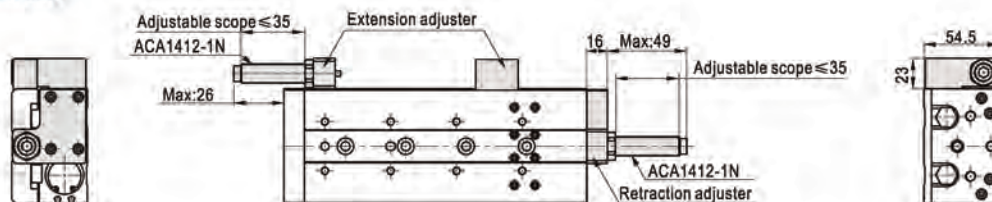
## HLQ、HLQL Series

HLQ25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	R
10	123	105.5	107	55	23	55	55	23	4	2	58	35
20	123	105.5	107	55	23	46	55	23	4	2	58	45
30	123	105.5	107	55	23	55	55	23	4	2	58	55
40	133	115.5	117	65	23	65	65	23	4	2	68	65
50	157	139.5	141	80	32	75	80	32	4	2	92	75
75	182	164.5	166	65	72	60	-	-	6	3	117	100
100	221	203.5	205	88	88	48	44	44	8	4	156	125
125	274	256.5	258	132	97	60	66	31	8	4	209	150
150	299	281.5	283	132	122	65	66	56	8	4	234	175

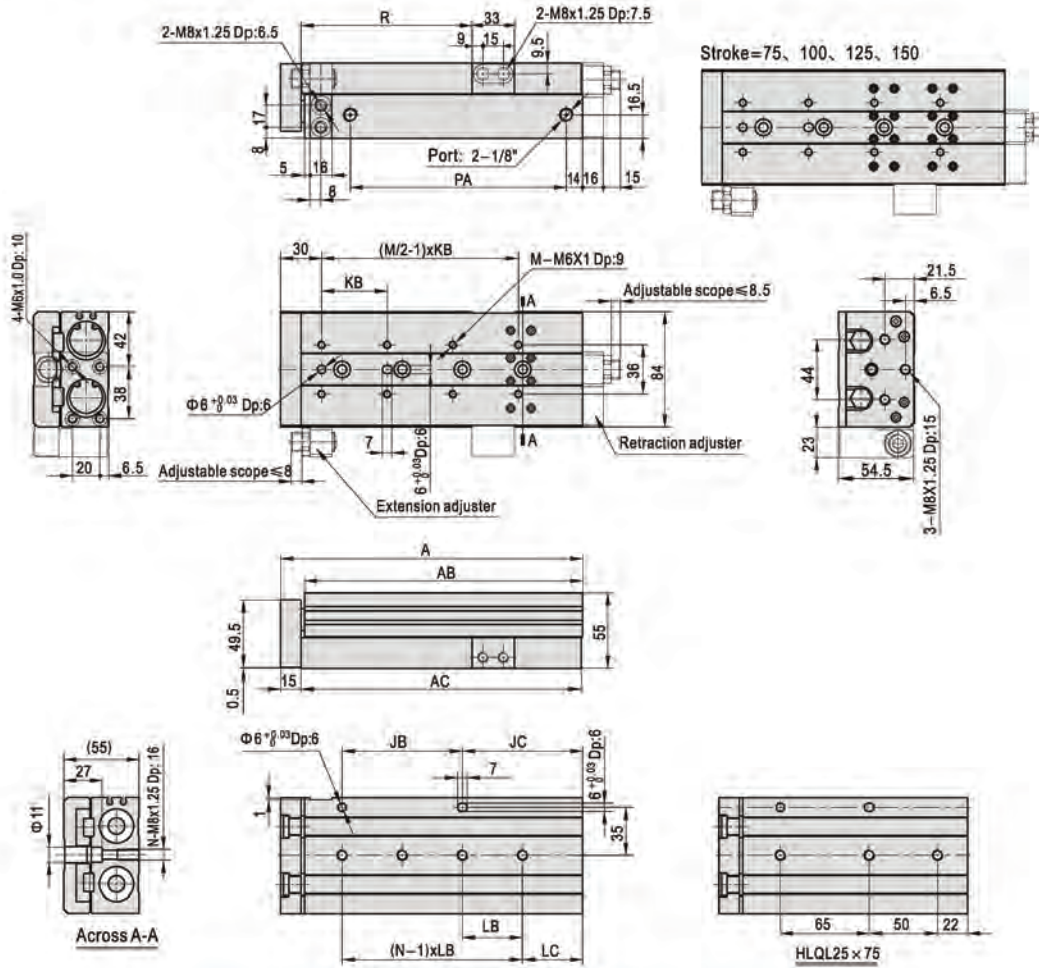
### HLQ25(With shock absorber)



# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

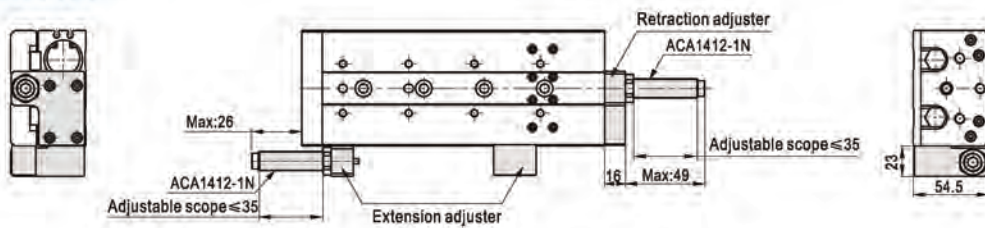
## HLQ、HLQL Series

### HLQL25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	R
10	123	105.5	107	55	23	55	55	23	4	2	58	35
20	123	105.5	107	55	23	46	55	23	4	2	58	45
30	123	105.5	107	55	23	55	55	23	4	2	58	55
40	133	115.5	117	65	23	65	65	23	4	2	68	65
50	157	139.5	141	80	32	75	80	32	4	2	92	75
75	182	164.5	166	65	72	60	-	-	6	3	117	100
100	221	203.5	205	88	88	48	44	44	8	4	156	125
125	274	256.5	258	132	97	60	66	31	8	4	209	150
150	299	281.5	283	132	122	65	66	56	8	4	234	175

### HLQL25(With shock absorber)



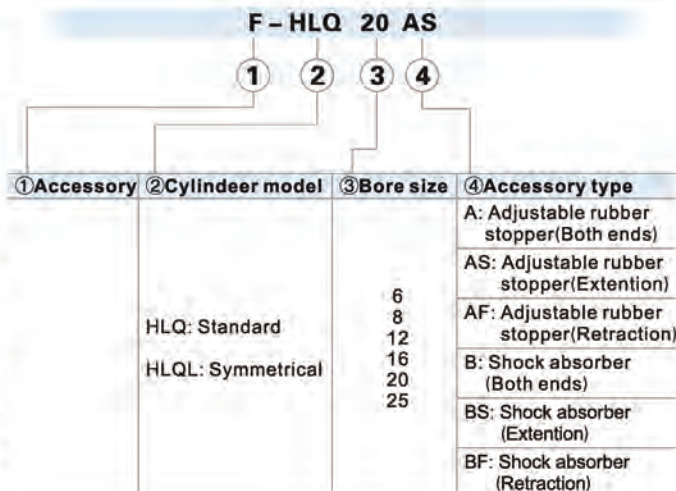
# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

## HLQ、HLQL Series—Accessories

### Accessory selection

		Accessories\Bore size			
		6	8	12	
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLQ8A	F-HLQ12A
		B(Shock absorber)	×	F-HLQ8B	F-HLQ12B
	Extension	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLQ8AF	F-HLQ12AF
		BF(Shock absorber)	×	F-HLQ8BF	F-HLQ12BF
		Accessories\Bore size			
		16	20	25	
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ16A	F-HLQ20A	F-HLQ25A
		B(Shock absorber)	F-HLQ16B	F-HLQ20B	F-HLQ25B
	Extension	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ16AF	F-HLQ20AF	F-HLQ25AF
		BF(Shock absorber)	F-HLQ16BF	F-HLQ20BF	F-HLQ25BF
		Accessories\Bore size			
		6	8	12	
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLQL8A	F-HLQL12A
		B(Shock absorber)	×	F-HLQL8B	F-HLQL12B
	Extension	AS(Adjustable rubber stopper)	F-HLQL6AS	F-HLQL8AS	F-HLQL12AS
		BS(Shock absorber)	×	F-HLQL8BS	F-HLQL12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLQL8AF	F-HLQL12AF
		BF(Shock absorber)	×	F-HLQL8BF	F-HLQL12BF
		Accessories\Bore size			
		16	20	25	
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL16A	F-HLQL20A	F-HLQL25A
		B(Shock absorber)	F-HLQL16B	F-HLQL20B	F-HLQL25B
	Extension	AS(Adjustable rubber stopper)	F-HLQL16AS	F-HLQL20AS	F-HLQL25AS
		BS(Shock absorber)	F-HLQL16BS	F-HLQL20BS	F-HLQL25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL16AF	F-HLQL20AF	F-HLQL25AF
		BF(Shock absorber)	F-HLQL16BF	F-HLQL20BF	F-HLQL25BF

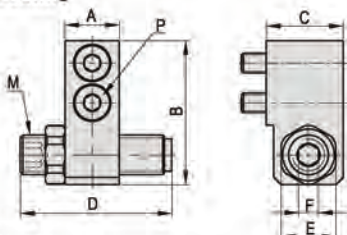
Note): A=AS+AF; B=BS+BF.



### Dimensions

AS: Adjustable rubber stopper(Extension)

#### Body Mounting



#### Table Mounting

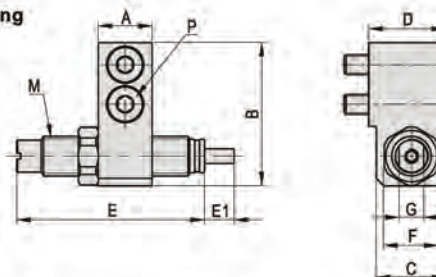


Bore size\Item	Adjusting stroke range	A	B	C	D	E	F
6	5	7	19	10.5	16.5	8	3
8	5	8.5	21.5	14	21.5	11	4
12	5	11	29	15.5	31.5	11	4
16	5	12	36	17.5	24	14	5
20	5	15	44.5	22	28	17	6
25	5	16	53.5	24	32	19	6

Bore size\Item	M	P	H	I	J	Q
6	M6 × 1.0	M2.5Length:10	12.5	6.5	10.5	M2.5Length:10
8	M8 × 1.0	M3Length:14	14.5	8	12	M3Length:14
12	M8 × 1.0	M4Length:16	20	9	13.5	M4Length:12
16	M10 × 1.0	M5Length:16	23	10.5	17	M5Length:16
20	M12 × 1.0	M6Length:20	25	12.5	21	M6Length:20
25	M14 × 1.5	M8Length:20	33	16.5	23	M8Length:20

BS: Shock absorber(Extension)

#### Body Mounting



#### Table Mounting

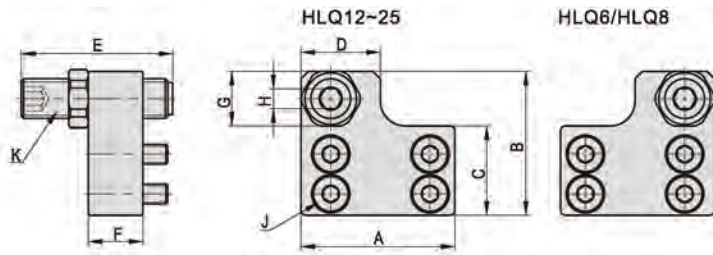


Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	21.5	12.5	14	40	6	11	7	M8 × 1.0	M3Length:14	14.5	8	12	M3Length:14
12	11	29	14	15.5	40	6	11	7	M8 × 1.0	M4Length:16	20	9	13.5	M4Length:12
16	12	36	16	17.5	49	7	14	9	M10 × 1.0	M5Length:16	23	10.5	17	M5Length:16
20	15	44.5	20	22	53.5	10	17	11	M12 × 1.0	M6Length:20	25	12.5	21	M6Length:20
25	16	53.5	22	24	68.5	12	19	12	M14 × 1.5	M8Length:20	33	16.5	23	M8Length:20

# Compact slide cylinder(Recirculating linear ball bearing) **AIRTAC**

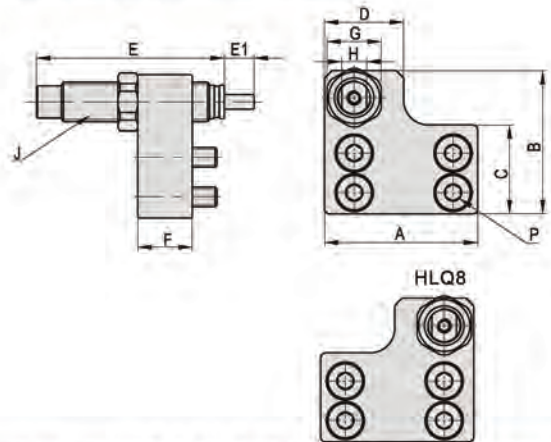
## HLQ、HLQL Series—Accessories

AF: Adjustable rubber stopper(Retraction, for standard)



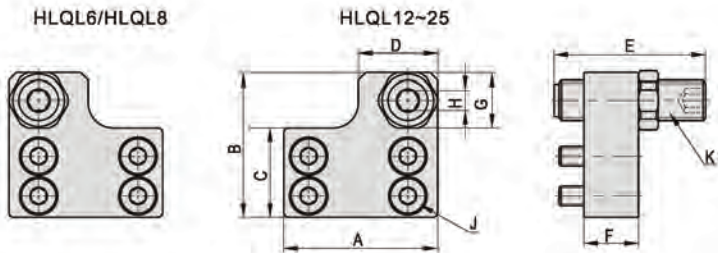
Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21.5	7	8	3	M2.5Length:6	M6×1.0
8	5	24	22	13	14	21.5	8.5	11	4	M3Length:8	M8×1.0
12	5	31	29	18	16	31.5	11	11	4	M4Length:12	M8×1.0
16	5	37	36	21.5	18	24	12	14	5	M5Length:12	M10×1.0
20	5	45.5	44	25.5	23	28	15	17	6	M5Length:16	M12×1.0
25	5	54	53.6	31.6	28	32	16	19	6	M6Length:18	M14×1.5

BF: Shock absorber(Retraction, for standard)



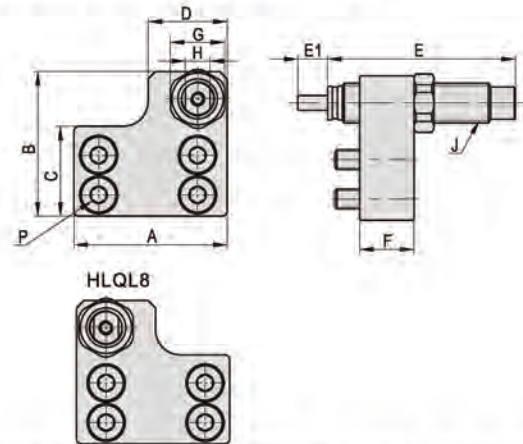
Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22	13	14	40	6	8.5	11	7	M8×1.0	M3Length:8
12	31	29	18	16	40	6	11	11	7	M8×1.0	M4Length:12
16	37	36	21.5	18	49	7	12	14	9	M10×1.0	M5Length:12
20	45.5	44	25.5	23	53.5	10	15	17	11	M12×1.0	M5Length:16
25	54	53.6	31.6	28	68.5	12	16	19	12	M14×1.5	M6Length:18

AF: Adjustable rubber stopper(Retraction, for symmetrical)



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21.5	7	8	3	M2.5Length:6	M6×1.0
8	5	24	22	13	14	21.5	8.5	11	4	M3Length:8	M8×1.0
12	5	31	29	18	16	31.5	11	11	4	M4Length:12	M8×1.0
16	5	37	36	21.5	18	24	12	14	5	M5Length:12	M10×1.0
20	5	45.5	44	25.5	23	28	15	17	6	M5Length:16	M12×1.0
25	5	54	53.6	31.6	28	32	16	19	6	M6Length:18	M14×1.5

BF: Shock absorber(Retraction, for symmetrical)



Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22	13	14	40	6	8.5	11	7	M8×1.0	M3Length:8
12	31	29	18	16	40	6	11	11	7	M8×1.0	M4Length:12
16	37	36	21.5	18	49	7	12	14	9	M10×1.0	M5Length:12
20	45.5	44	25.5	23	53.5	10	15	17	11	M12×1.0	M5Length:16
25	54	53.6	31.6	28	68.5	12	16	19	12	M14×1.5	M6Length:18



# Compact slide cylinder(Roller bearing)——HLS Series

## Compendium of HLS\HLSL Series

**Multi-adjuster option**

**Floating joint design**  
Piston rod needn't endure additional torque

**Roller bearing**  
Roller bearing incorporating the cylinder, it achieves high precision, high rigidity, high load, excellent linearity and non-rotate tolerance.

**Mounting workpiece from 2 directions**

**Mounting cylinder from 3 directions**  
Through hole for body mounting.  
Body mounting holes provide 3 mounting positions.  
Pin holes for positioning.

**With magnetic switch slots**  
There are magnetic switch slots side of the cylinder body convenient to install inducting switch.

**Two models (HLS/HLSL) are available**

**Dual rod structure**  
Dual rod-doubles the output thrust

**Standard: HLS**

**Symmetrical: HLSL**

**Six bore size are available**  
Bore size: 6, 8, 12, 16, 20, 25

### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
6	3	Double acting Push-side	42	8	13	17	21	25	29
		Pull-side	57	11	17	23	29	34	40
8	4	Double acting Push-side	75	15	23	30	38	45	53
		Pull-side	101	20	30	40	51	61	71
12	6	Double acting Push-side	170	34	51	68	85	102	119
		Pull-side	226	45	68	90	113	136	158
16	8	Double acting Push-side	302	60	91	121	151	181	211
		Pull-side	402	80	121	161	201	241	281
20	10	Double acting Push-side	471	94	141	188	236	283	330
		Pull-side	628	126	188	251	314	377	440
25	12	Double acting Push-side	756	151	227	302	378	454	529
		Pull-side	982	186	295	393	491	589	687

### Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder should be filtered to 40 μm or below .
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Compact slide cylinder(Roller bearing)

HLS, HLSL Series



## Specification

Bore size(mm)	6	8	12	16	20	25
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μ m filter element)					
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature °C	-20~70					
Speed range mm/s	50~500					
Stroke tolerance	Stroke ≤ 100 $^{+1.0}_0$			Stroke > 100 $^{+1.5}_0$		
Cushion type	Bumper(Both ends), Shock absorber					
Sensor switches	CMSH, DMSH(S)					
Port size [Note1]	M5 × 0.8					1/8"

[Note1] PT thread, G thread, NPT thread are available.  
Refer to P353 for detail of sensor switch.

## Symbol



## Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
8	10 20 30 40 50 75	75
12	10 20 30 40 50 75 100	100
16	10 20 30 40 50 75 100 125	125
20	10 20 30 40 50 75 100 125 150	150
25	10 20 30 40 50 75 100 125 150	150

[Note] Consult us for non-standard stroke.

## Ordering code

HLS 20 x 30 S AS □

① ② ③ ④ ⑤ ⑥

① Model	② Bore Size	③ Stroke	④ Magnet	⑤ Adjuster option [Note1]	⑥ Thread type [Note2]	
HLS: Compact slide cylinder (Double acting type) (Roller bearing)  HLSL: Symmetrical Compact slide cylinder (Double acting type) (Roller bearing)	6 8 12 16 20 25	Refer to stroke table for details	S: With magnet	Blank: Without adjuster(Basic type) 	Blank: PT G: G T: NPT	
				A: Adjustable rubber stopper(Both ends) 		B: Shock absorber(Both ends) 
				AS: Adjustable rubber stopper(Extension) 		BS: Shock absorber(Extension) 
				AF: Adjustable rubber stopper(Retractio) 		BF: Shock absorber(Retractio) 

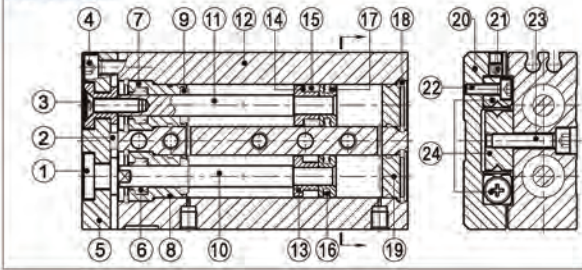
[Note1] B type, BS type, BF type are unavailable for bore size of Φ6. [Note2] When the thread is standard, the code is blank.

# Compact slide cylinder(Roller bearing)

## HLS, HLSSL Series

### Inner structure and material of major parts

#### Basic type



NO.	Item	Material	NO.	Item	Material
1	Floating joint	Carbon steel	13	Magnet holder	Brass
2	Bumper	TPU	14	Magnet washer	NBR
3	Screw	Carbon steel	15	Magnet	Sintered metal (Neodymium-iron-boron)
4	Screw	Carbon steel	16	Piston seal	NBR
5	Fixing plate	Aluminum alloy	17	Piston	Brass
6	Rod seal	NBR	18	C clip	Spring steel
7	Front cover	Aluminum alloy	19	Back cover	Aluminum alloy
8	O-ring	NBR	20	Slide table	Aluminum alloy
9	Bumper	TPU	21	Nut	Carbon steel
10	Piston rod A	Carbon steel	22	Screw	Carbon steel
11	Piston rod B	Stainless steel	23	Screw	Carbon steel
12	Body	Aluminum alloy	24	Slide guidecombination	subassembly

### Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

#### A) Operating conditions(According to mounting position and work form)

1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed  $V_a$ (mm/s)
6. Applied load  $W$ (N)
7. Overhang  $L_1, L_2, L_3$ (mm)

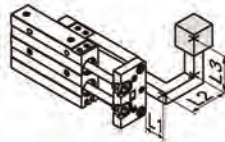
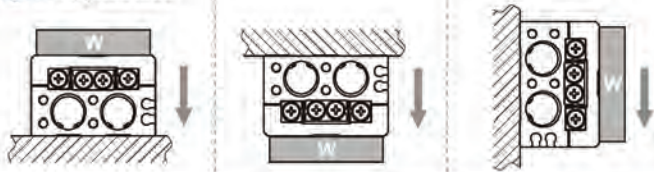


Fig. 1

Explain:  $L_1$  is the distance of load's center beyond the end plank's plane.  
If load's center is not beyond the end plank's plane,  $L_1$  is negative.

Fig. 1: Applied load



#### B) Kinetic energy check

1. Calculate kinetic energy of load  $E$ (J)  

$$E = \frac{1}{2} \times \frac{W}{g} \times \left( \frac{1.4 \times V_a}{1000} \right)^2$$
2. Calculate allowable kinetic energy  $E_a$ (J)  

$$E_a = K \times E_{max}$$

$K$ : Mounting work coefficient (Fig 2)  
 $E_{max}$ : Maximum allowable kinetic energy (Table 1)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy:  $E \leq E_a$

#### C) Load check

1. Calculate allowable applied load  $W_a$ (N)  

$$W_a = K \times \beta \times W_{max}$$

$K$ : Mounting work coefficient (Fig 2)  
 $W_{max}$ : Maximum allowable applied load (Table 1)  
 $\beta$ : Applied load coefficient (Fig 3)
2. Check that load( $W$ ) doesn't exceed allowable applied load( $W_a$ ):  $W \leq W_a$

Fig 2: Mounting work coefficient (K)

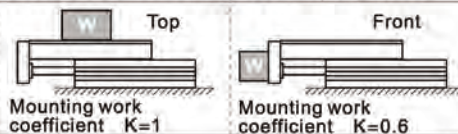
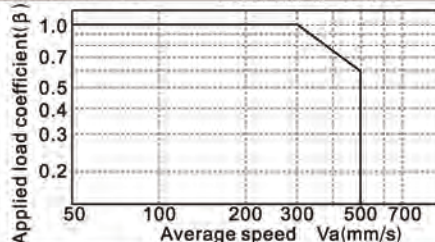


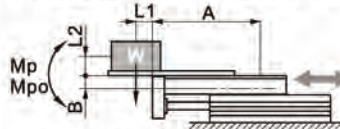
Fig 3: Applied load coefficient ( $\beta$ )



#### D) Moment check

##### Horizontal

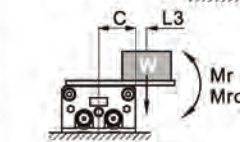
1. Calculate actual moment:  $M_p, M_{po}, M_y, M_{yo}, M_r, M_{ro}$  (Nm)



Dynamic moment:  

$$M_p = W \times (L_1 + A) / 1000$$
 Static moment:  

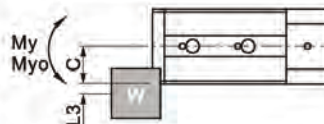
$$M_{po} = \frac{W \times (L_1 + A)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$$



Dynamic moment:  

$$M_r = W \times (C + L_3) / 1000$$
 Static moment:  

$$M_{ro} = (W \times a \times (C + L_3)) / 1000g$$



Dynamic moment:  

$$M_y = 0$$
 Static moment:  

$$M_{yo} = (W \times a \times (C + L_3)) / 1000g$$

2. Check

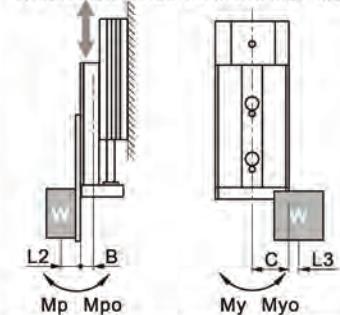
Dynamic moment:  

$$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$$
 Static moment:  

$$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} + \frac{M_{ro}}{M_{ro_{max}}} \leq 1$$

##### Vertical

1. Calculate actual moment:  $M_p, M_{po}, M_y, M_{yo}$ (Nm)



Dynamic moment:  

$$M_p = W \times (L_2 + B) / 1000$$
 Static moment:  

$$M_{po} = \frac{W \times (L_2 + B)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$$

Dynamic moment:  

$$M_y = W \times (C + L_3) / 1000$$
 Static moment:  

$$M_{yo} = \frac{W \times a \times (C + L_3)}{1000g} + \frac{W \times (C + L_3)}{1000}$$

2. Check

Dynamic moment:  

$$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$$
 Static moment:  

$$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} \leq 1$$

Explain:

$L_1/L_2/L_3$ : The distance of load center to mount plane(Determined by actuality).  
 $A/B/C$ : Correction value for center position distance of moment(Refer to table 2).  
 $M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{po_{max}}/M_{yo_{max}}/M_{ro_{max}}$ : Maximum allowable moment(Refer to table 2).  
 $g$ : Acceleration of gravity( $g=9.81m/s^2$ ).  
 $a$ : Acceleration of inertia  
 (Bumper:  $a=1600 \times (V_a/1000)^2$ , Shock absorber:  $a=400 \times (V_a/1000)^2$ )  
 $W$ : Load weight(Determined by actuality).

# Compact slide cylinder(Roller bearing)

## HLS, HLSSL Series

**Table 1:** Maximum allowable kinetic energy(Emax)  
Maximum allowable applied load(Wmax)

Model	Max. allowable kinetic energy Emax(J)			Max. allowable applied load Wmax(N)
	Basic type	Rubber stopper type	Shock absorber type	
HLS6	0.01	0.01	-	4
HLS8	0.024	0.024	0.048	8
HLS12	0.05	0.05	0.1	15
HLS16	0.1	0.1	0.2	30
HLS20	0.13	0.13	0.26	40
HLS25	0.22	0.22	0.44	70

Note: Symbol and unit

Symbol	Item	Unit
A, B, C	Correction value for center position distance of moment	mm
a	Acceleration of inertia	-
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
Emax	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s <sup>2</sup>
K	Mounting work coefficient	-
L1, L2, L3	Overhang	mm
Mp, My, Mr	Dynamic moment(Pitch, Yaw, Roll)	Nm
Mp <sub>max</sub> , My <sub>max</sub> , Mr <sub>max</sub>	Maximum allowable dynamic moment (Pitch, Yaw, Roll)	Nm
Mpo, Myo, Mro	Static moment(Pitch, Yaw, Roll)	Nm
Mpo <sub>max</sub> , Myo <sub>max</sub> , Mro <sub>max</sub>	Maximum allowable static moment (Pitch, Yaw, Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
Wmax	Maximum allowable applied load	N
β	Applied load coefficient	-

**Table 2:** Maximum allowable moment(Nm).  
Correction value for center position distance of moment(mm)

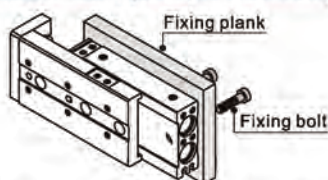
Bore size	Stroke	Static moment			Dynamic moment			Correction value		
		Mpo <sub>max</sub>	Myo <sub>max</sub>	Mro <sub>max</sub>	Mp <sub>max</sub>	My <sub>max</sub>	Mr <sub>max</sub>	A	B	C
6	10	3.3	3.8	2.6	0.7	0.7	0.6	27	7.3	16
	20	3.3	3.8	2.6	0.7	0.8	0.6	42		
	30	3.3	3.8	2.6	0.7	0.8	0.6	52		
	40	7.2	7.9	3.6	1.3	1.3	0.6	72		
	50	12.4	12.7	4.7	1.8	1.8	0.6	87		
8	10	10.1	9.1	8.8	2.5	2.5	2.0	32	8.5	20
	20	10.1	9.1	8.8	2.6	2.6	2.0	42		
	30	10.1	9.1	8.8	2.8	2.8	2.0	57		
	40	12.4	10.8	10.1	3.4	3.4	2.3	72		
	50	23.6	24.8	13.9	4.4	4.4	2.1	92		
12	75	32.8	35.3	16.4	4.6	4.6	1.8	132	10	25
	10	33.0	34.3	30.9	7.3	7.3	5.8	48		
	20	33.0	34.3	30.9	7.6	7.6	5.8	58		
	30	33.0	34.3	30.9	7.8	7.8	5.8	68		
	40	33.0	34.3	30.9	8.0	8.0	5.8	78		
16	50	53.4	49.6	39.7	9.8	9.8	5.8	88	11	30
	75	78.8	71.9	48.6	14.2	14.2	6.8	125		
	100	78.8	71.9	48.6	14.7	14.7	6.8	160		
	10	33.0	34.3	30.9	8.8	8.8	7.6	43		
	20	33.0	34.3	30.9	9.2	9.2	7.6	53		
20	30	33.0	34.3	30.9	9.5	9.5	7.6	63	16.5	35
	40	33.0	34.3	30.9	10.0	10.0	7.6	78		
	50	53.4	49.6	39.7	12.2	12.2	7.6	93		
	75	78.8	71.9	48.6	17.6	17.6	8.9	130		
	100	78.8	71.9	48.6	18.2	18.2	8.9	165		
25	125	143.7	144.5	53.3	24.8	24.8	7.8	204	20.3	42
	10	60.1	50.5	72.8	14.5	14.5	15.2	47		
	20	60.1	50.5	72.8	15.2	15.2	15.2	57		
	30	60.1	50.5	72.8	15.7	15.7	15.2	67		
	40	60.1	50.5	72.8	16.3	16.3	15.2	82		
30	50	60.1	50.5	72.8	16.6	16.6	15.2	92	25.3	48
	75	169.3	154.3	114.4	41.2	41.2	22.0	136		
	100	169.3	154.3	114.4	42.8	42.8	22.0	176		
	125	169.3	154.3	114.4	43.6	43.6	22.0	205		
	150	267.5	286.6	145.6	49.0	49.0	20.5	249		
40	10	60.1	50.5	72.8	16.3	16.3	17.6	52	30.3	54
	20	60.1	50.5	72.8	17.0	17.0	17.6	62		
	30	60.1	50.5	72.8	17.4	17.4	17.6	72		
	40	60.1	50.5	72.8	17.8	17.8	17.6	82		
	50	60.1	50.5	72.8	18.2	18.2	17.6	96		
50	75	169.3	154.3	114.4	45.2	45.2	25.3	141	35.3	60
	100	169.3	154.3	114.4	46.2	46.2	25.3	165		
	125	169.3	154.3	114.4	48.0	48.0	25.3	210		
	150	267.5	286.6	145.6	65.0	65.0	28.3	254		

## Installation and application

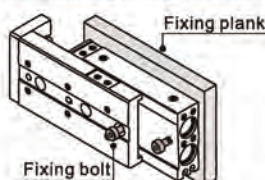
1. How to mount cylinder:

1.1) Cylinder can be mounted from 3 directions

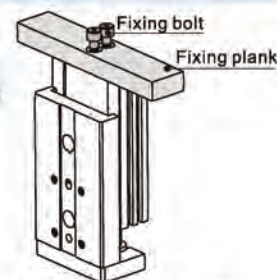
**Vertical Mounting(Body thread holes)**



**Vertical Mounting(Body through holes)**



**Axial Mounting (Body thread holes)**



1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque.

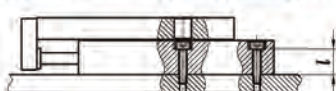
If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

**Vertical Mounting(Body thread holes)**



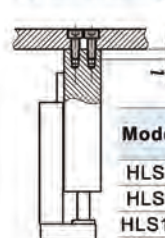
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M4×0.7	2.1	8
HLS8	M4×0.7	2.1	8
HLS12	M5×0.8	4.4	10
HLS16	M6×1.0	4.4	10
HLS20	M6×1.0	7.4	12
HLS25	M8×1.25	18.0	16

**Vertical Mounting(Body through holes)**



Model	Bolt used	Max. tightening torque (Nm)	Body depth(mm)
HLS6	M3×0.5	1.2	11.0
HLS8	M3×0.5	1.2	12.5
HLS12	M4×0.7	2.8	18.0
HLS16	M5×0.8	5.7	25.0
HLS20	M5×0.8	5.7	28.0
HLS25	M6×1.0	10.0	36.2

**Axial Mounting(Body thread holes)**



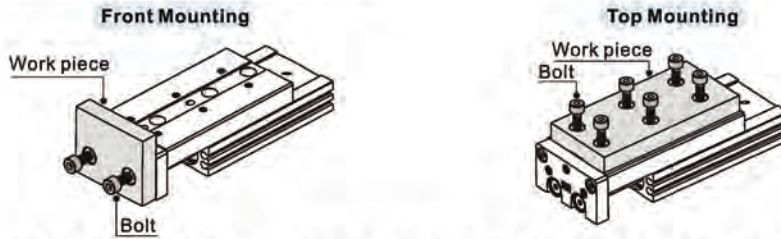
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M2.5×0.45	0.5	3.5
HLS8	M3×0.5	0.9	4.0
HLS12	M4×0.7	2.1	6.0
HLS16	M5×0.8	4.4	7.0
HLS20	M5×0.8	4.4	8.0
HLS25	M6×1.0	7.4	10.0

# Compact slide cylinder(Roller bearing)

## HLS、HLSL Series

### 2. Work Piece Mounting:

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

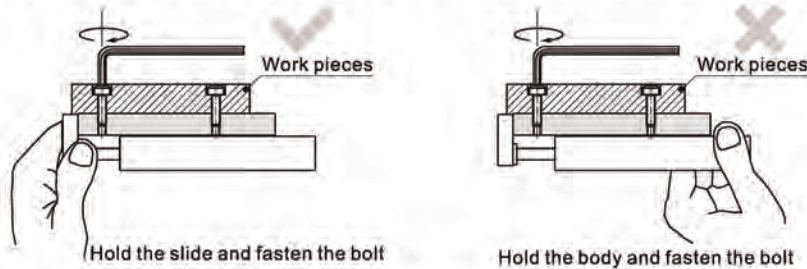


2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

Front Mounting				Top Mounting			
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)	Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M3 × 0.4	0.9	5	HLS6	M3 × 0.5	0.9	4.0
HLS8	M4 × 0.7	2.1	6	HLS8	M3 × 0.5	0.9	5.0
HLS12	M5 × 0.8	4.4	8	HLS12	M4 × 0.7	2.1	5.5
HLS16	M6 × 1.0	7.4	10	HLS16	M5 × 0.8	4.4	6.0
HLS20	M6 × 1.0	7.4	13	HLS20	M5 × 0.8	4.4	10.0
HLS25	M8 × 1.25	18.0	15	HLS25	M6 × 1.0	7.4	13.0

2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.

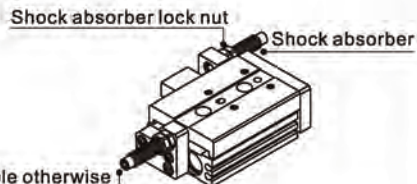


### 3. About shock absorber:

3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.

3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.

3.3) Follow the table for tightening torque of shock absorber to lock nuts.



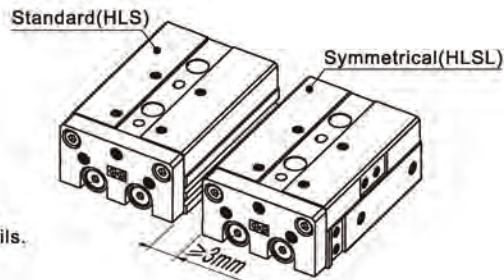
The screws are not adjustable otherwise would cause oil leakage.

Model	Shock absorber	Tightening torque
HLS6	Without shock absorber	
HLS8	ACA0806-1N	1.67(Nm)
HLS12	ACA0806-1N	1.67(Nm)
HLS16	ACA1007-1N	3.14(Nm)
HLS20	ACA1210-1N	3.14(Nm)
HLS25	ACA1412-1N	10.8(Nm)

### 4. How to mount sensor switch:

4.1) HLS Series are all with magnet. The matching sensor switches are CMSH、DMSH(S) series.

4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.



5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

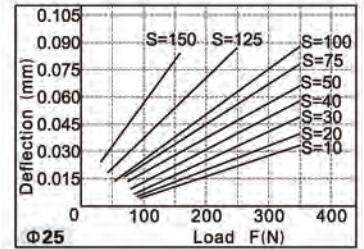
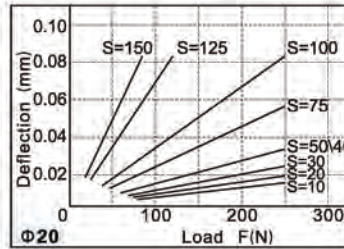
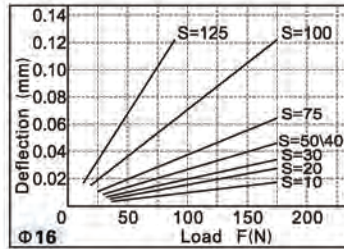
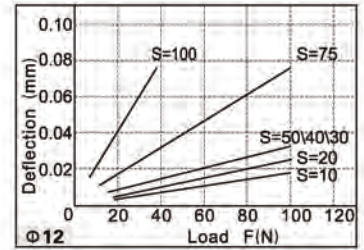
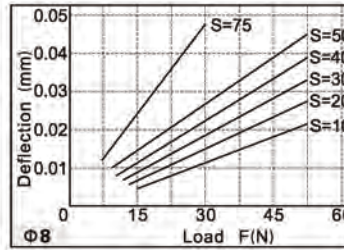
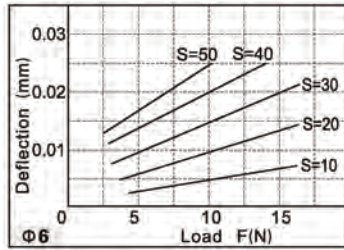
6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.

# Compact slide cylinder(Roller bearing)

## HLS, HLSL Series

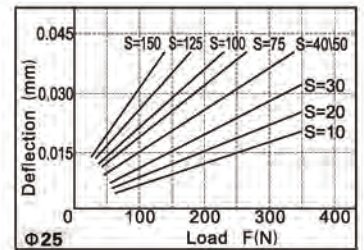
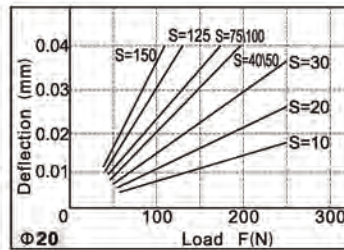
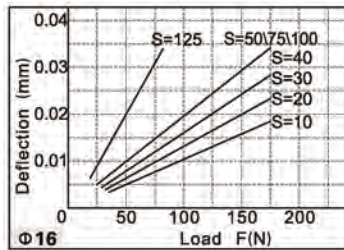
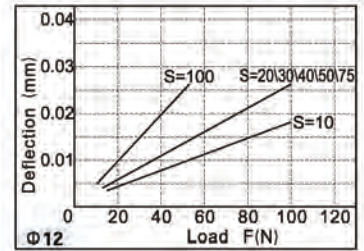
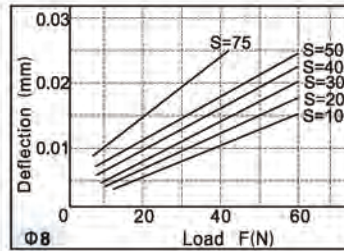
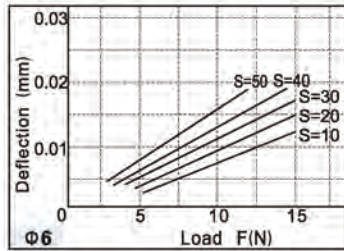
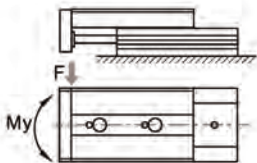
### 6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



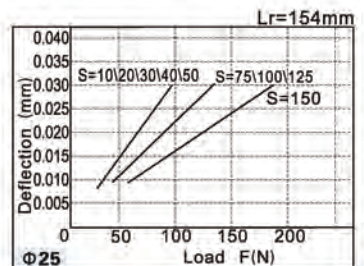
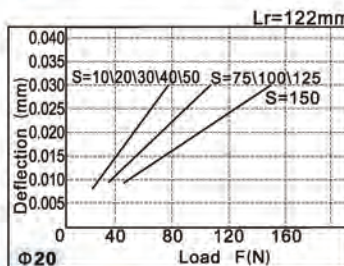
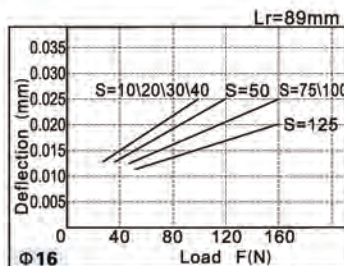
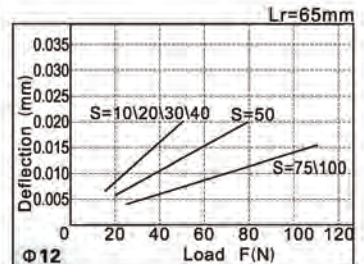
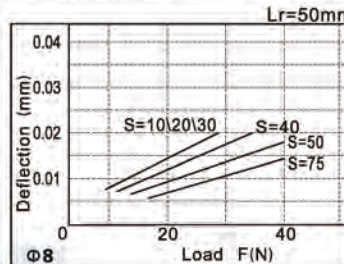
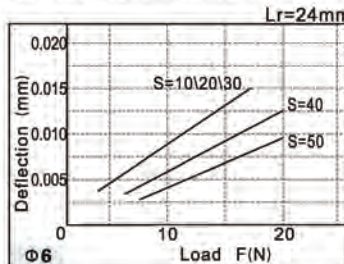
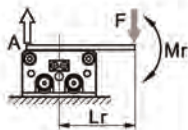
### 6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



### 6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.

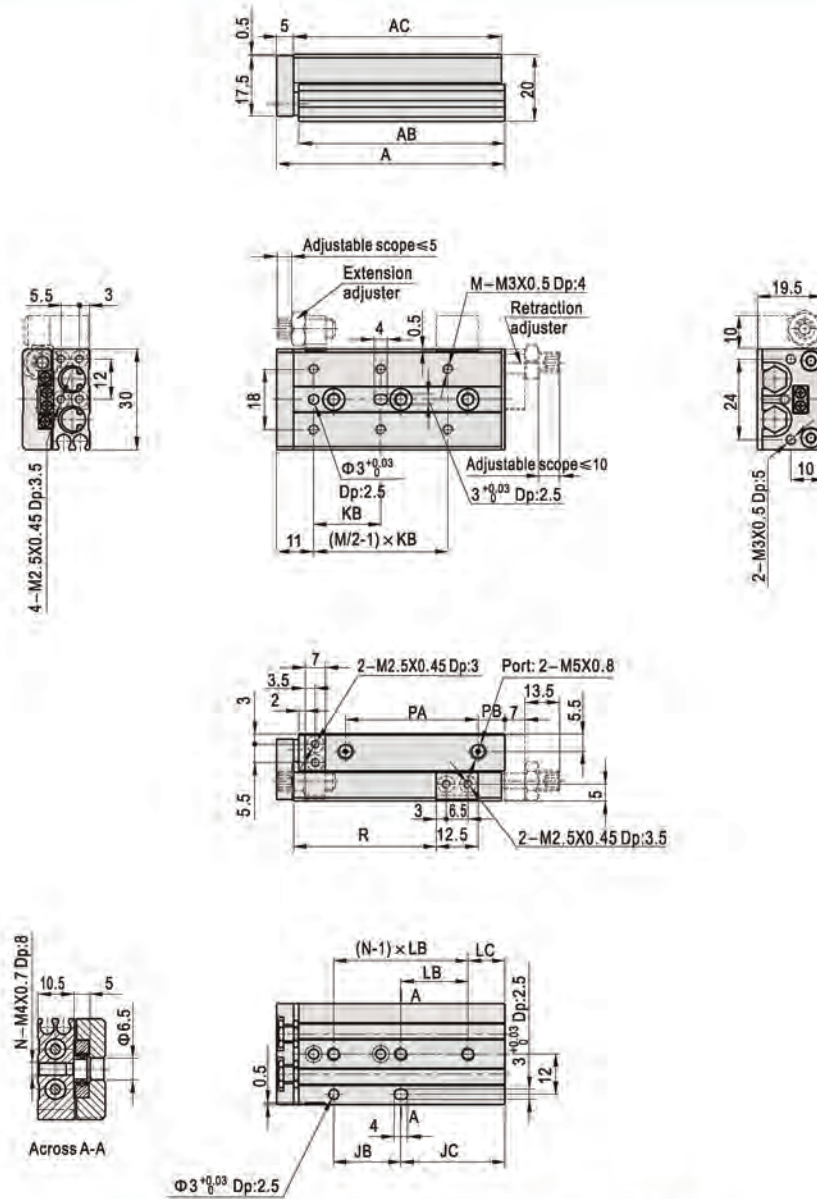


# Compact slide cylinder(Roller bearing)

HLS、HLSL Series

## Dimensions

HLS6

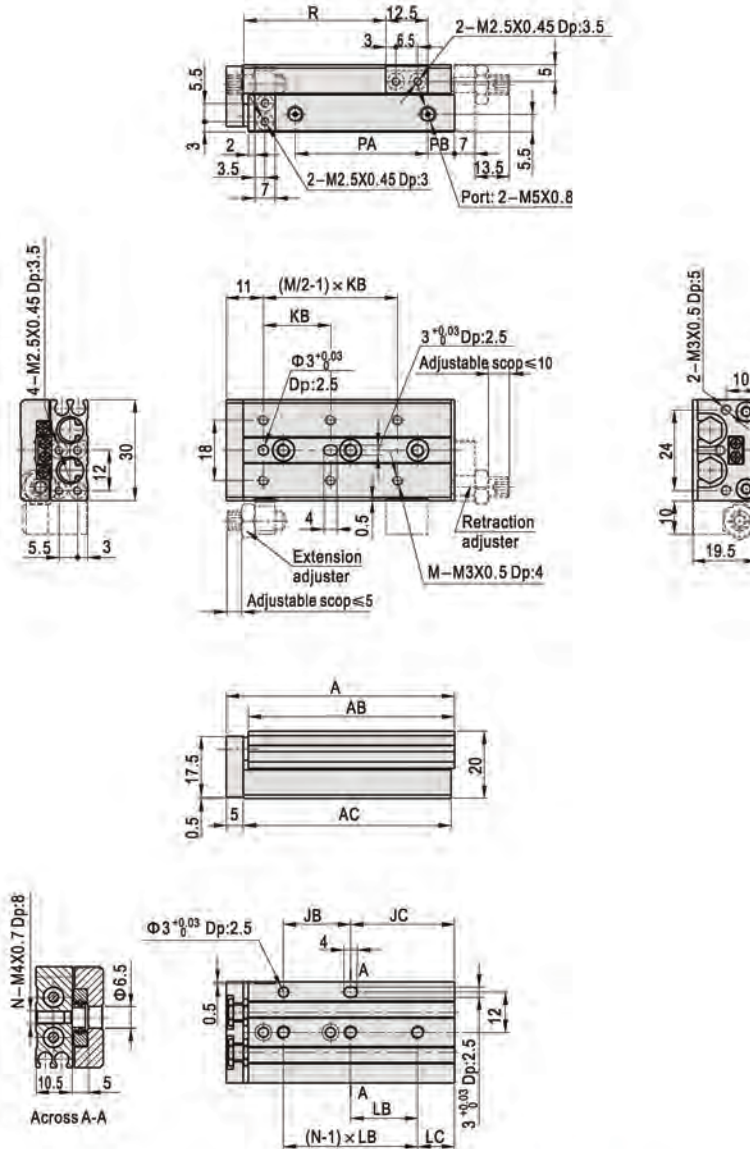


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5

# Compact slide cylinder(Roller bearing)

HLS、HLSL Series

HLSL6

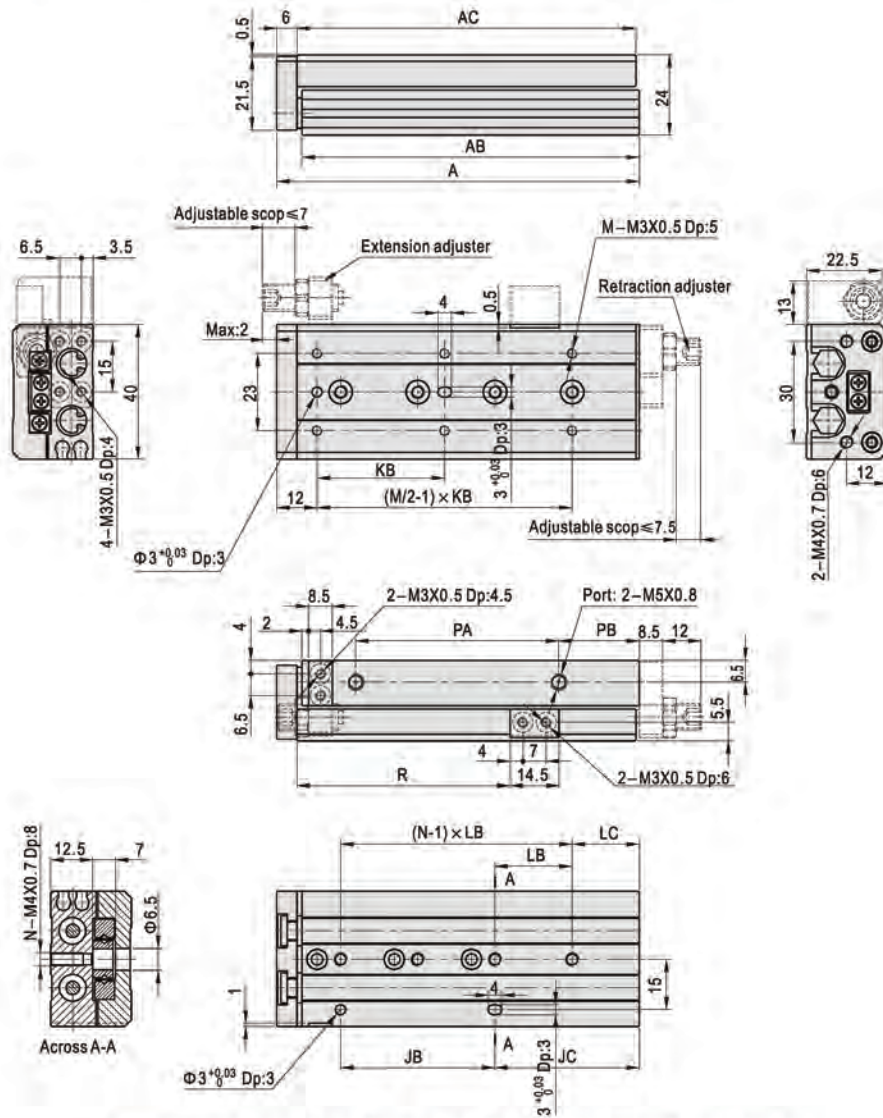


Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5

# Compact slide cylinder(Roller bearing)

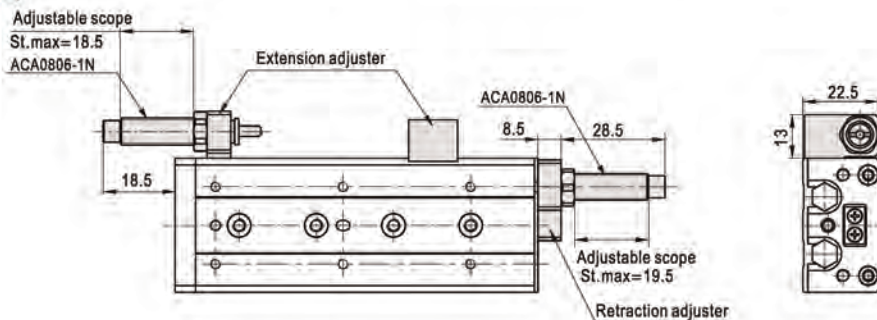
## HLS, HLSL Series

### HLS8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	19.5	12.5	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	68	16	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

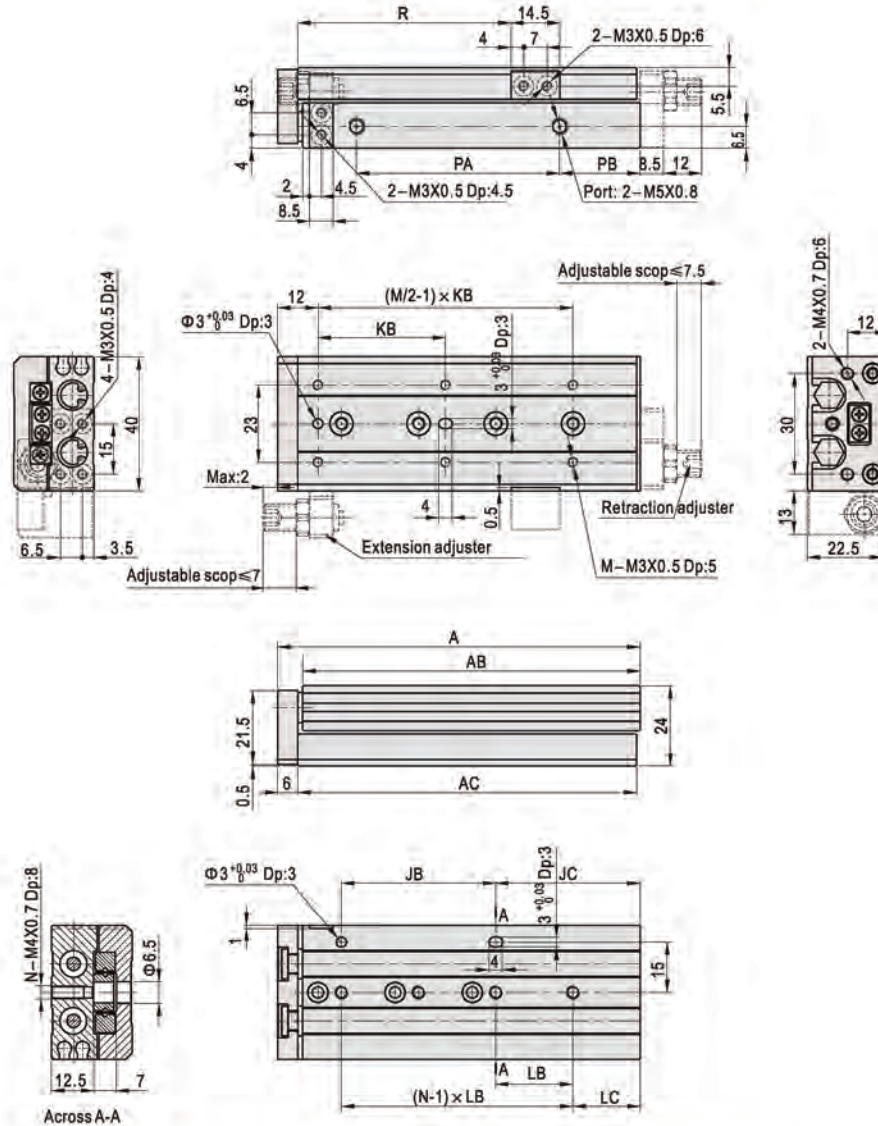
### HLS8(With shock absorber)



# Compact slide cylinder(Roller bearing)

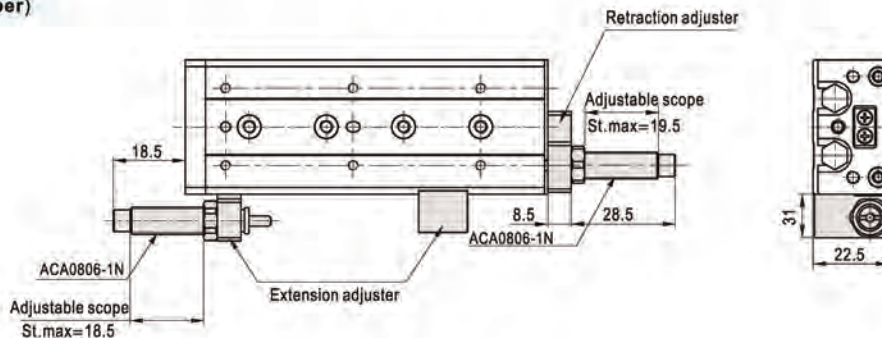
## HLS, HLSL Series

### HLSL8



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	19.5	12.5	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	68	16	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

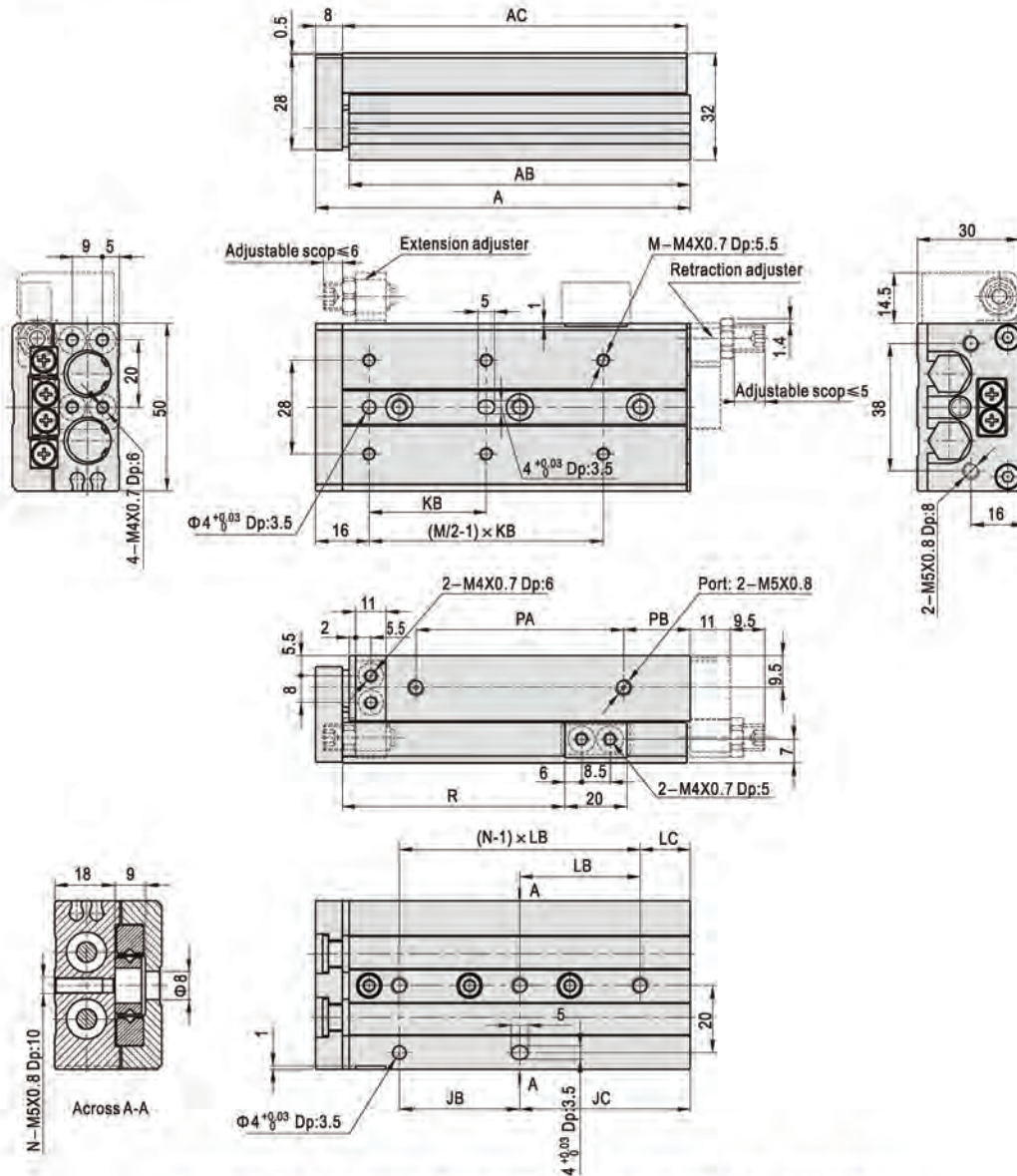
### HLSL8(With shock absorber)



# Compact slide cylinder(Roller bearing)

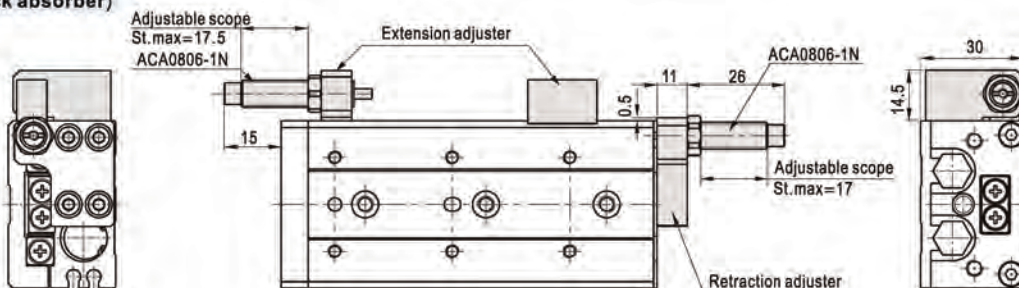
## HLS、HLSL Series

HLS12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

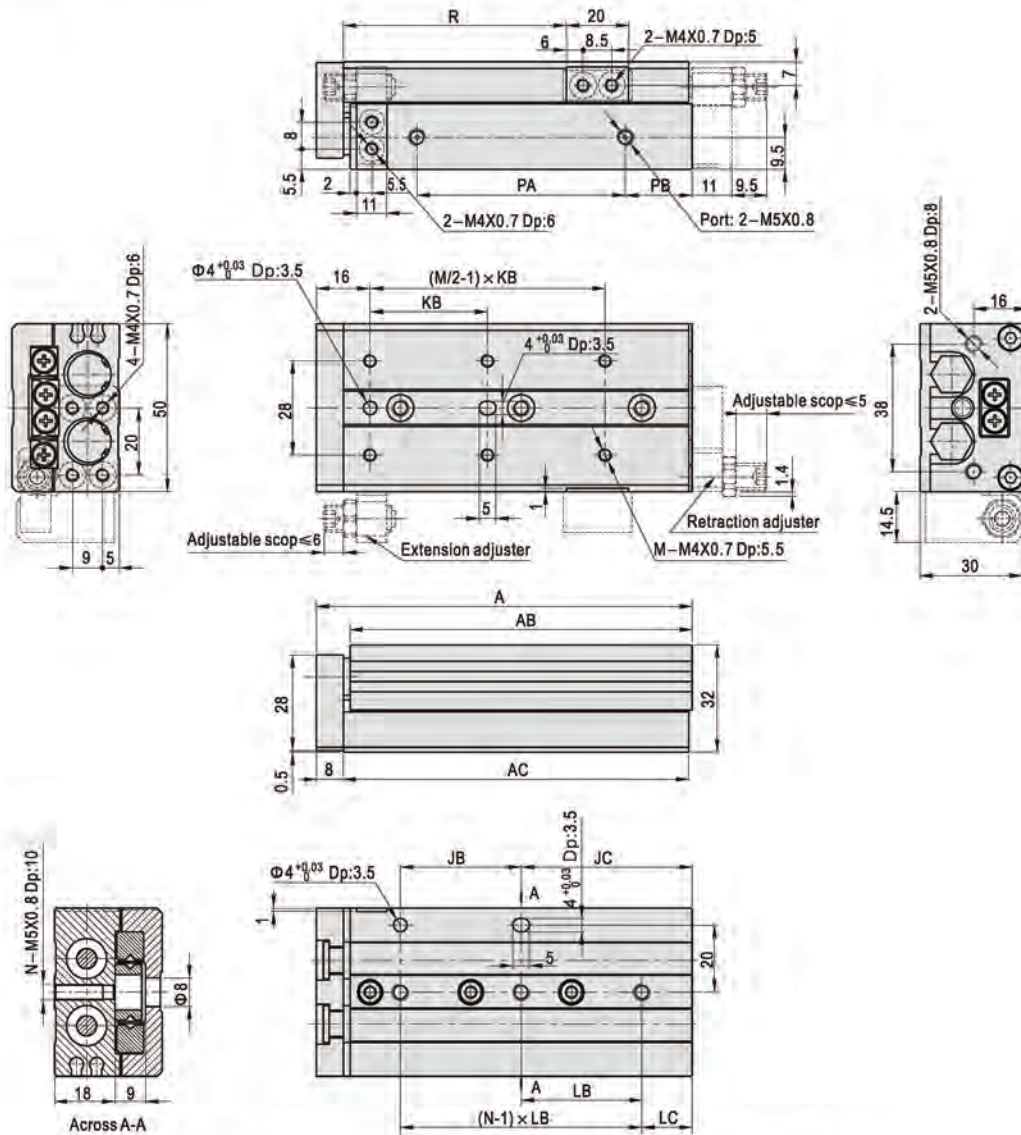
### HLS12(With shock absorber)



# Compact slide cylinder(Roller bearing)

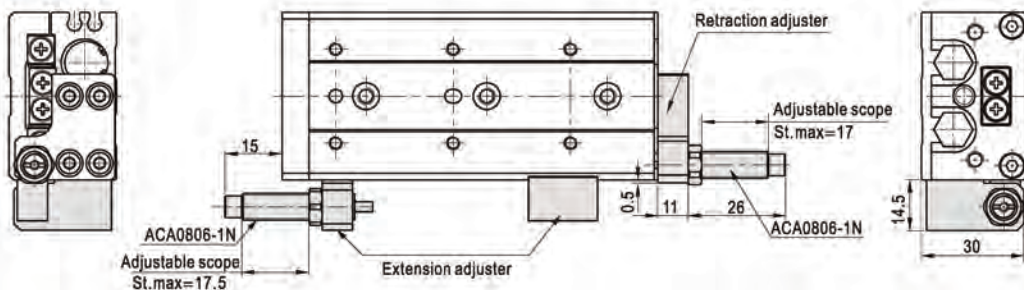
## HLS, HLSL Series

HLSL12



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

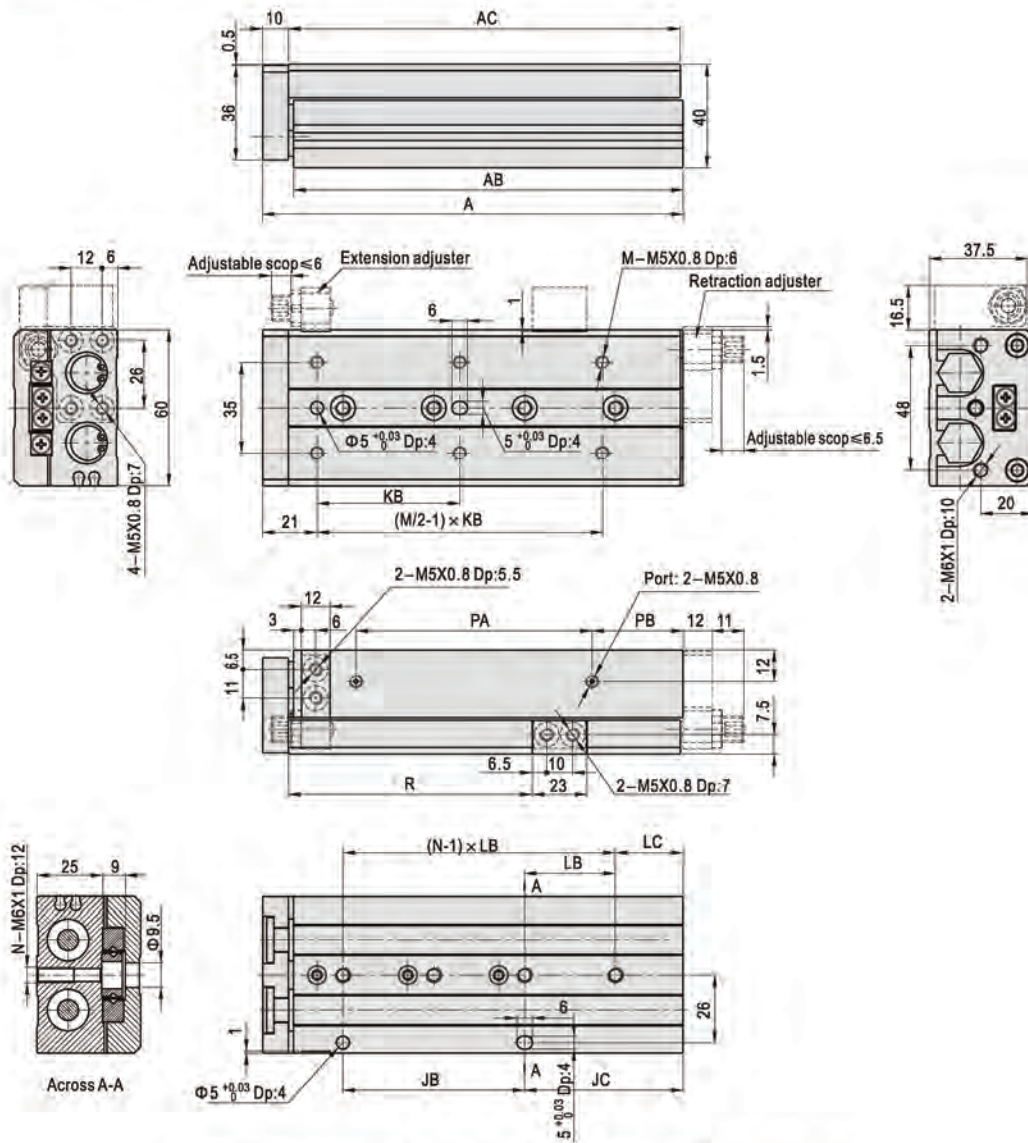
### HLSL12(With shock absorber)



# Compact slide cylinder(Roller bearing)

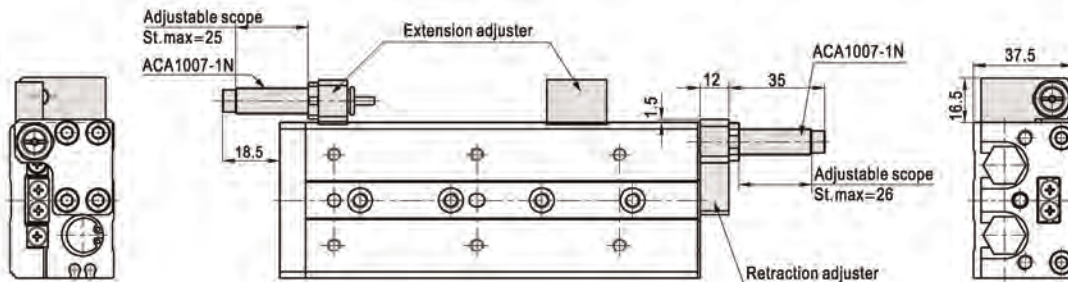
## HLS, HLSL Series

HLS16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

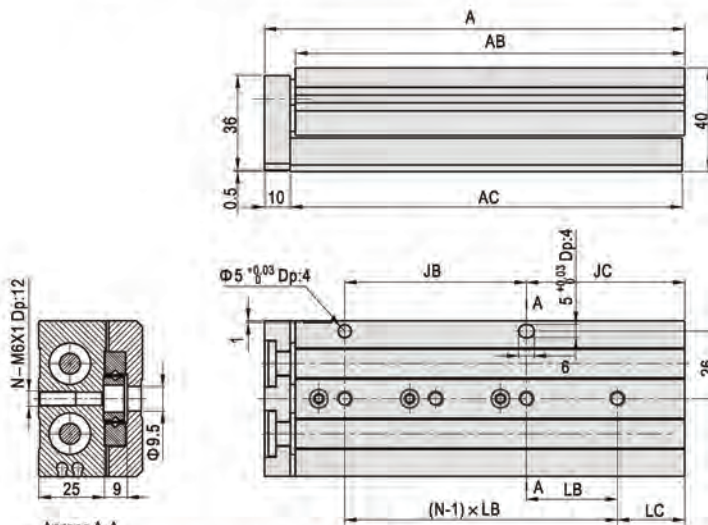
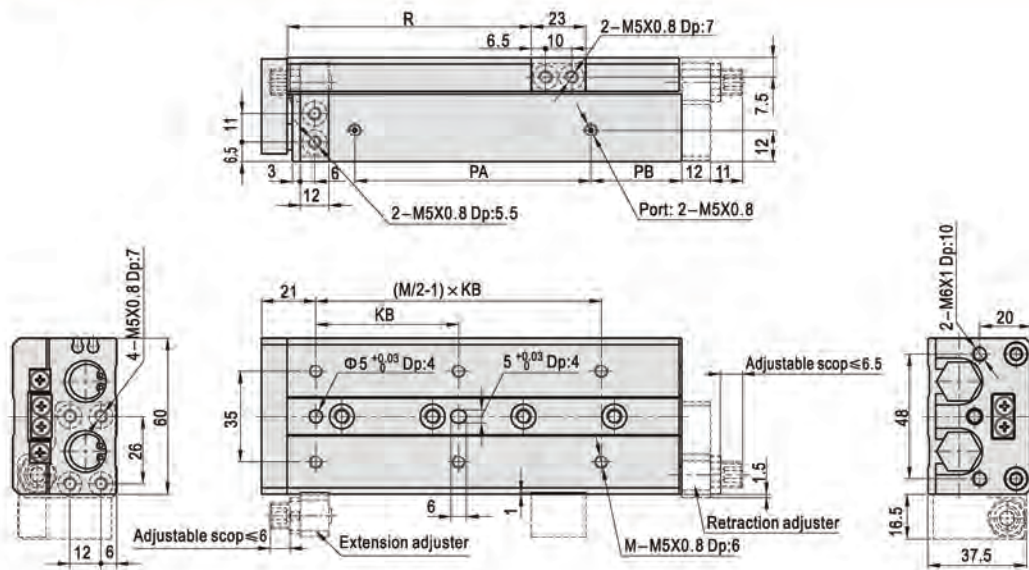
### HLS16(With shock absorber)



# Compact slide cylinder(Roller bearing)

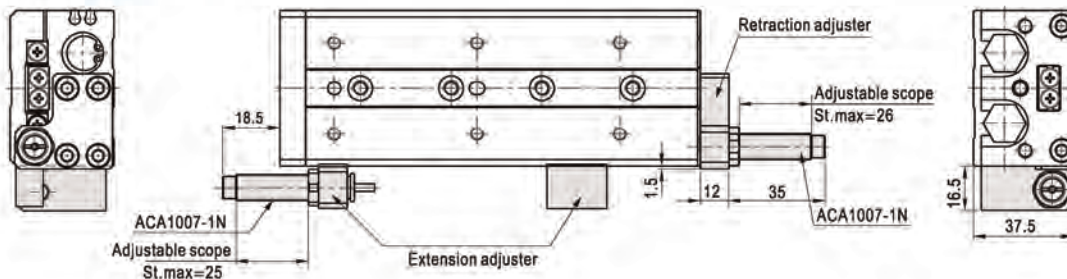
## HLS, HLSL Series

HLSL16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

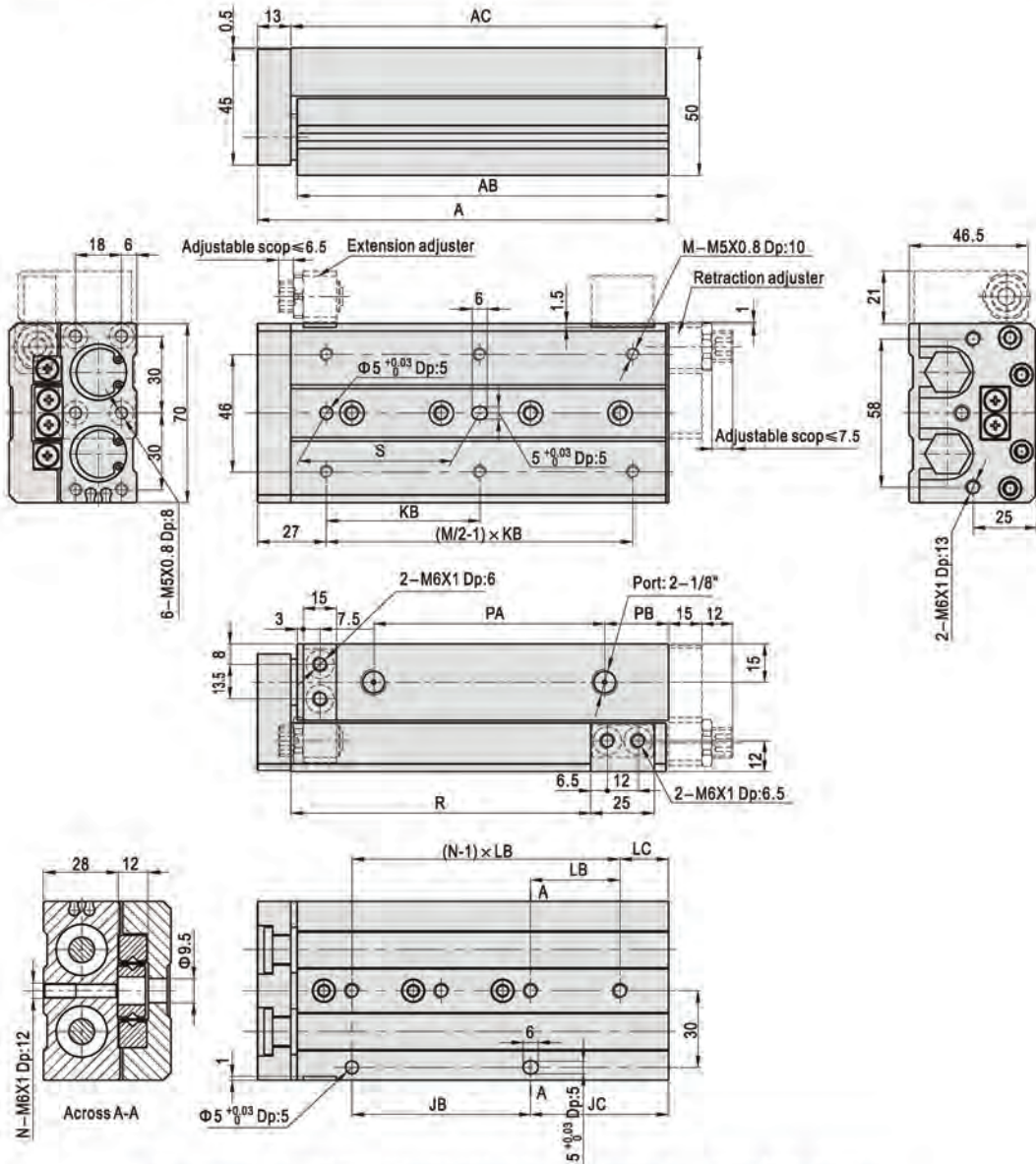
### HLSL16(With shock absorber)



# Compact slide cylinder(Roller bearing)

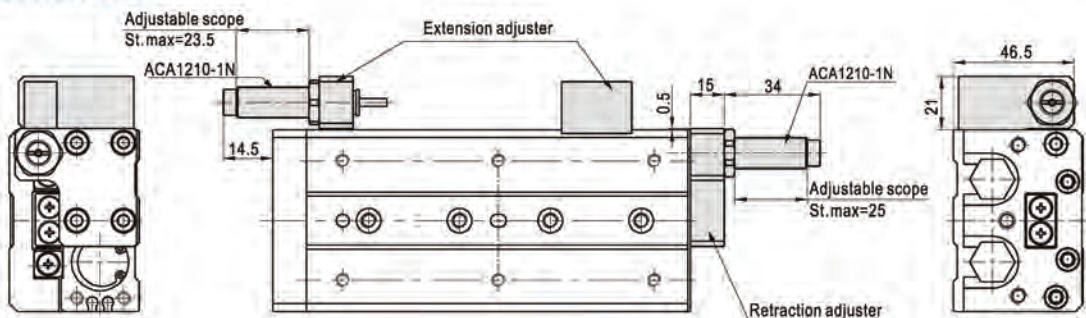
## HLS, HLSL Series

HLS20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

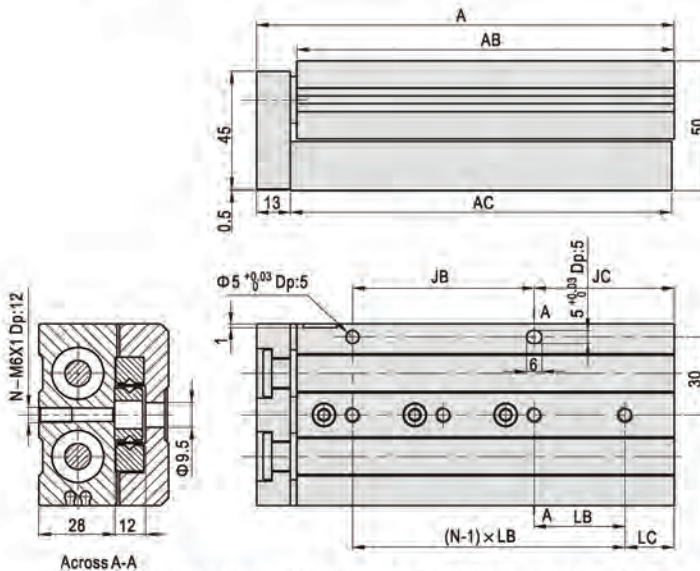
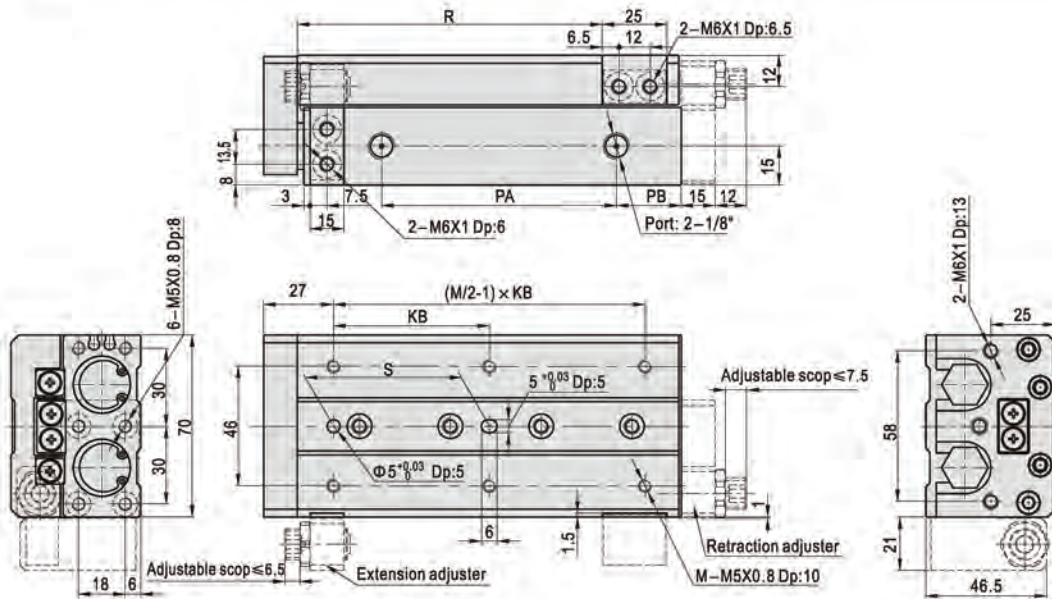
### HLS20(With shock absorber)



# Compact slide cylinder(Roller bearing)

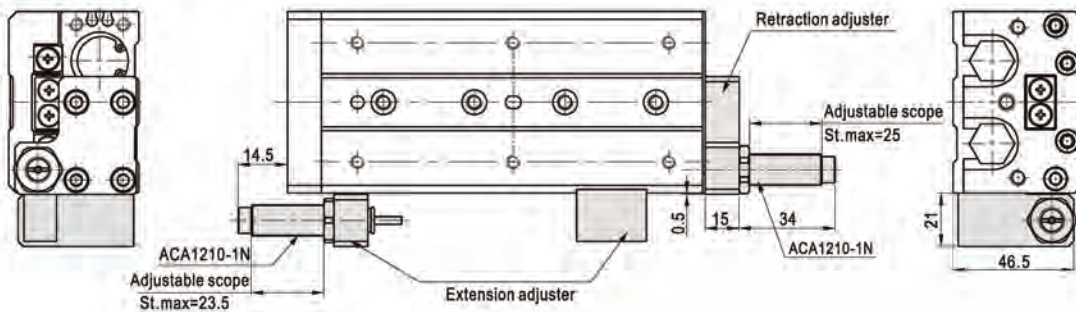
## HLS, HLSL Series

HLSL20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

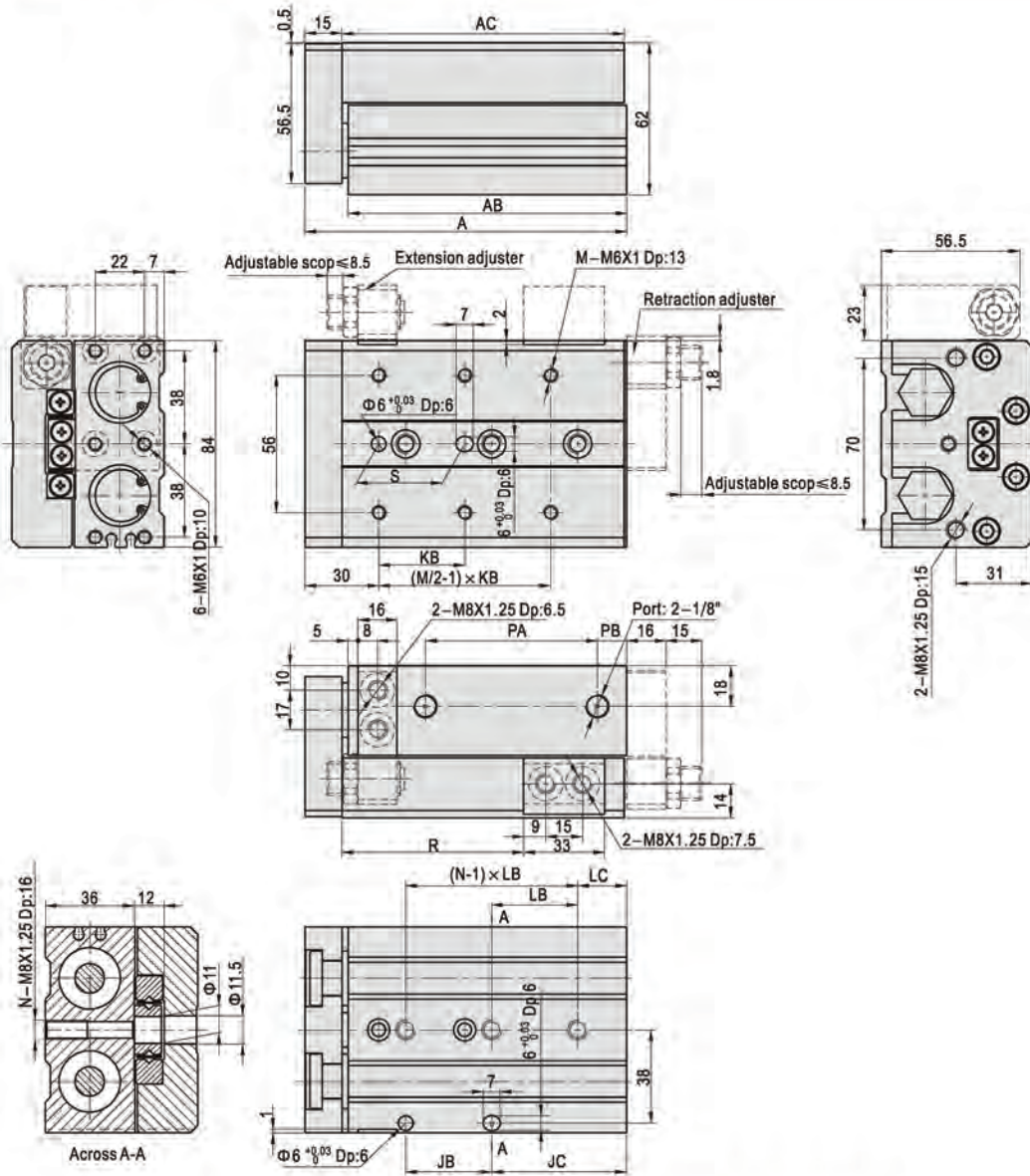
### HLSL20(With shock absorber)



# Compact slide cylinder(Roller bearing)

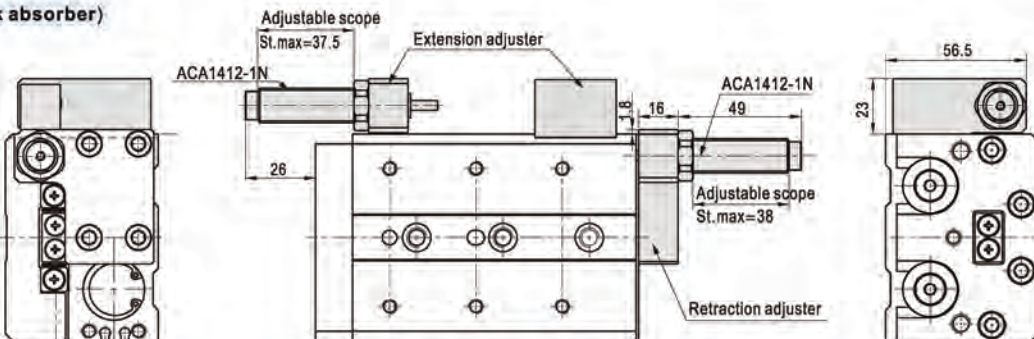
## HLS、HLSL Series

HLS25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

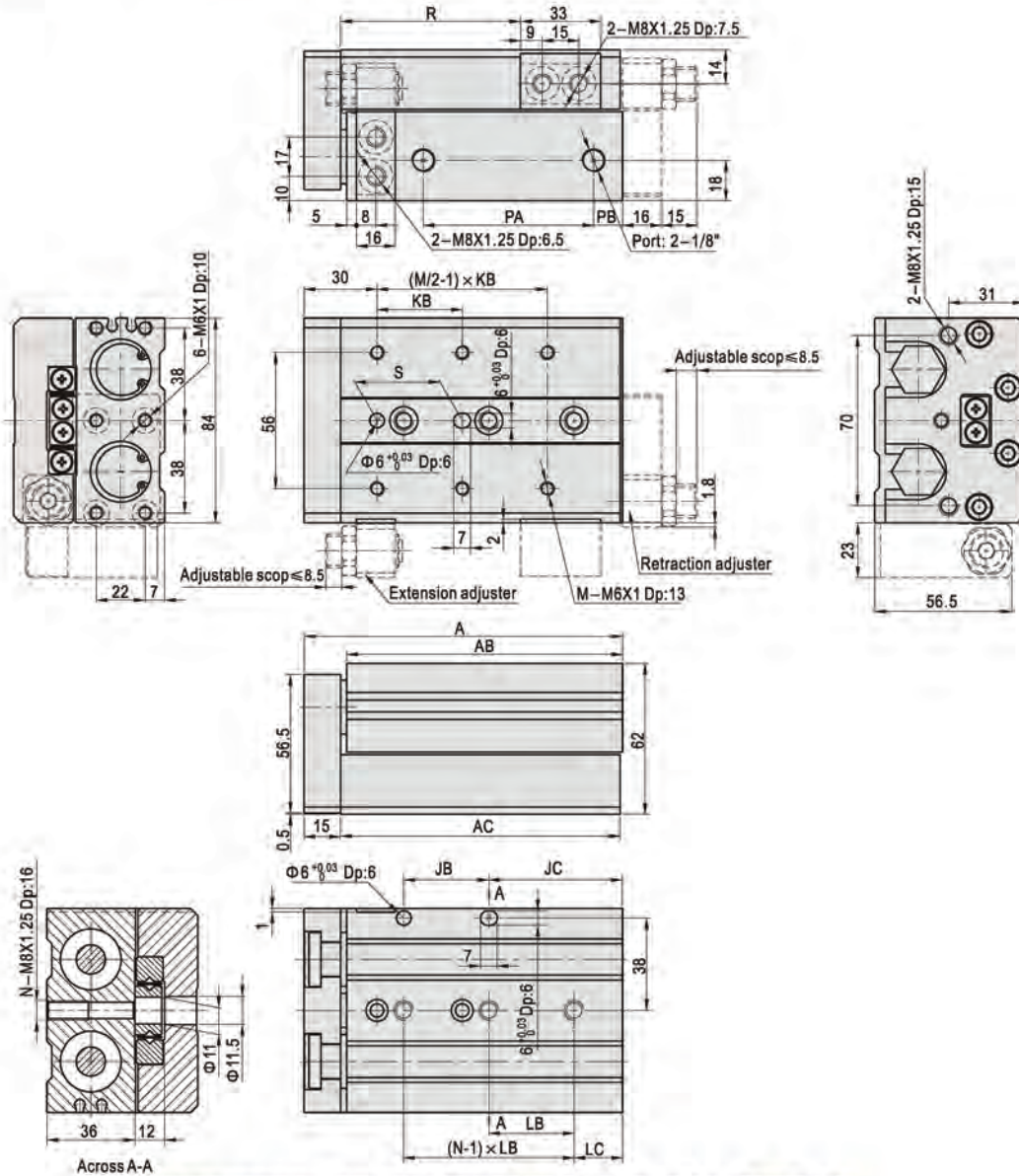
HLS25(With shock absorber)



# Compact slide cylinder(Roller bearing)

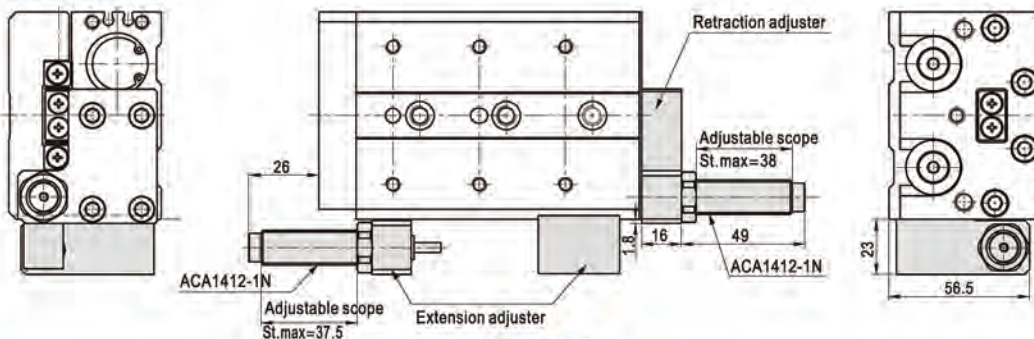
## HLS, HLSL Series

HLSL25



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

### HLSL25(With shock absorber)



# Compact slide cylinder(Roller bearing)

## HLS, HLSL Series—Accessories

### Accessory selection

Accessories\Bore size		6	8	12	
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLS8A	F-HLS12A
		B(Shock absorber)	×	F-HLS8B	F-HLS12B
	Extension	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLS8AF	F-HLS12AF	
	BF(Shock absorber)	×	F-HLS8BF	F-HLS12BF	
Accessories\Bore size		16	20	25	
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLS16A	F-HLS20A	F-HLS25A
		B(Shock absorber)	F-HLS16B	F-HLS20B	F-HLS25B
	Extension	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
Retraction	AF(Adjustable rubber stopper)	F-HLS16AF	F-HLS20AF	F-HLS25AF	
	BF(Shock absorber)	F-HLS16BF	F-HLS20BF	F-HLS25BF	
Accessories\Bore size		6	8	12	
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLSL8A	F-HLSL12A
		B(Shock absorber)	×	F-HLSL8B	F-HLSL12B
	Extension	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLSL8AF	F-HLSL12AF	
	BF(Shock absorber)	×	F-HLSL8BF	F-HLSL12BF	
Accessories\Bore size		16	20	25	
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLSL16A	F-HLSL20A	F-HLSL25A
		B(Shock absorber)	F-HLSL16B	F-HLSL20B	F-HLSL25B
	Extension	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
Retraction	AF(Adjustable rubber stopper)	F-HLSL16AF	F-HLSL20AF	F-HLSL25AF	
	BF(Shock absorber)	F-HLSL16BF	F-HLSL20BF	F-HLSL25BF	

Note): A=AS+AF; B=BS+BF.

**F - HLS 20 AF**

①
②
③
④

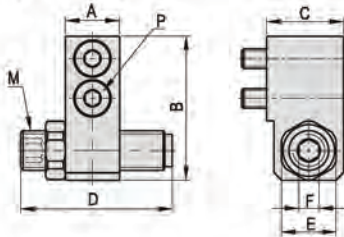
①Accessory	②Cylinder model	③Bore size	④Accessory type[Note]
	HLS: Standard	6	A: Adjustable rubber stopper(Both ends)
		8	AF: Adjustable rubber stopper(Retraction)
		12	B: Shock absorber (Both ends)
	HLSL: Symmetrical	16	BF: Shock absorber (Retraction)
		20	
		25	

[Note])The list accessories are for HLS cylinder. Accessories that are adaptable to other cylinder are not shown. Please refer to accessory list for selection and ordering information.

### Dimensions

AS: Adjustable rubber stopper(Extension)

#### Body Mounting



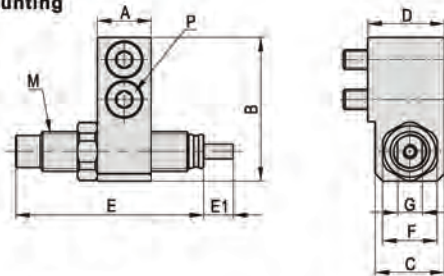
#### Table Mounting



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	M	P	H	I	J	Q
6	5	7	19	10.5	16.5	8	3	M6 × 1.0	M2.5 Length:10	12.5	6.5	10.5	M2.5 Length:10
8	5	8.5	21.5	14	21.5	11	4	M8 × 1.0	M3 Length:14	14.5	8	12	M3 Length:14
12	5	11	29	15.5	31.5	11	4	M8 × 1.0	M4 Length:16	20	9	13.5	M4 Length:12
16	5	12	36	17.5	24	14	5	M10 × 1.0	M5 Length:16	23	10.5	17	M5 Length:16
20	5	15	44.5	22	28	17	6	M12 × 1.0	M6 Length:20	25	12.5	21	M6 Length:20
25	5	16	53.5	24	32	19	6	M14 × 1.5	M8 Length:20	33	16.5	23	M8 Length:20

BS: Shock absorber(Extension)

#### Body Mounting



#### Table Mounting



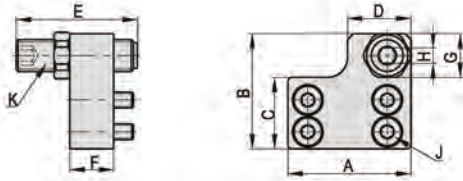
Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	21.5	12.5	14	40	6	11	7	M8 × 1.0	M3 Length:14	14.5	8	12	M3 Length:14
12	11	29	14	15.5	40	6	11	7	M8 × 1.0	M4 Length:16	20	9	13.5	M4 Length:12
16	12	36	16	17.5	49	7	14	9	M10 × 1.0	M5 Length:16	23	10.5	17	M5 Length:16
20	15	44.5	20	22	53.5	10	17	11	M12 × 1.0	M6 Length:20	25	12.5	21	M6 Length:20
25	16	53.5	22	24	68.5	12	19	12	M14 × 1.5	M8 Length:20	33	16.5	23	M8 Length:20

# Compact slide cylinder(Roller bearing)

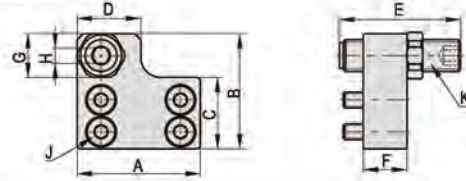
## HLS、HLSL Series—Accessories

AF: Adjustable rubber stopper(Retraction)

For standard type



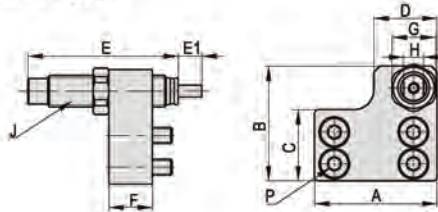
For symmetrical type



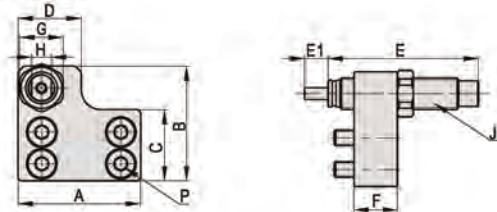
Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	G	H	J	K
6	5	18	19	11	8	21.5	7	8	3	M2.5 Length:6	M6×1.0
8	5	24	22	13	14	21.5	8.5	11	4	M3 Length:8	M8×1.0
12	5	31	29	18	16	21.5	11	11	4	M4 Length:12	M8×1.0
16	5	37	37.5	23	18	24	12	14	5	M5 Length:12	M10×1.0
20	5	45.5	47	28.5	23	28	15	17	6	M5 Length:16	M12×1.0
25	5	54	56	34	28	32	16	19	6	M6 Length:18	M14×1.5

BF: Shock absorber(Retraction)

For standard type



For symmetrical type

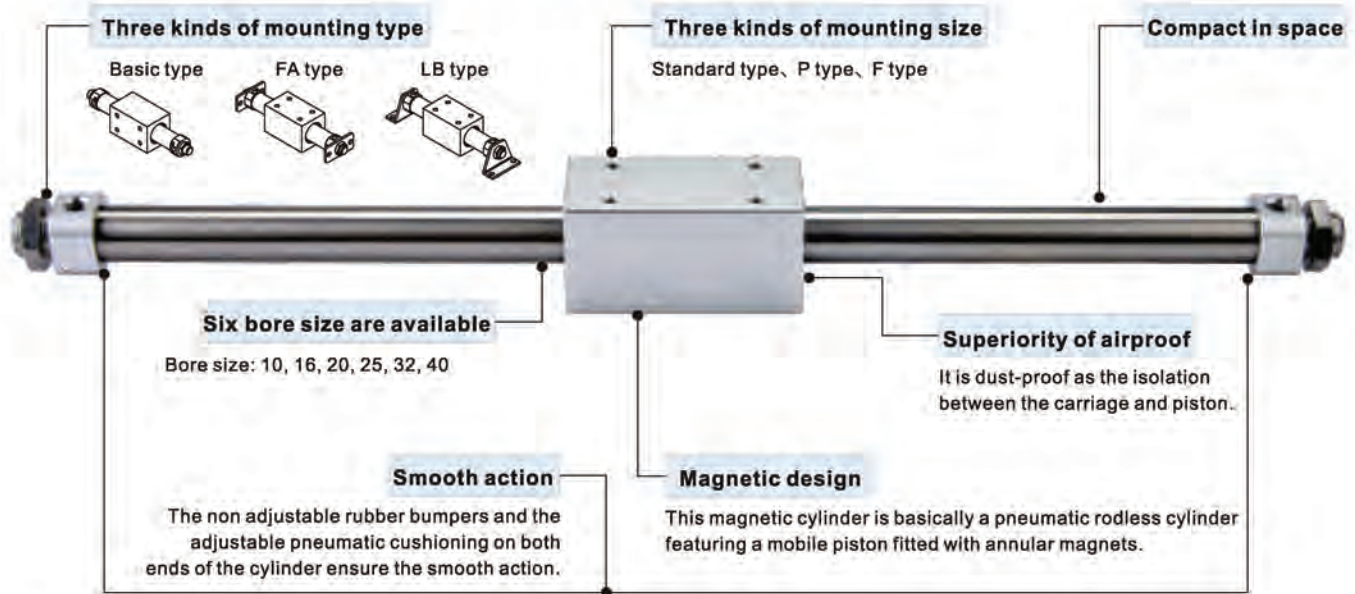


Bore size\Item	A	B	C	D	E	E1	F	G	H	J	P
8	24	22	13	14	40	6	8.5	11	7	M8×1.0	M3 Length:8
12	31	29	18	16	40	6	11	11	7	M8×1.0	M4 Length:12
16	37	37.5	23	18	49	7	12	14	9	M10×1.0	M5 Length:12
20	45.5	47	28.5	23	53.5	10	15	17	11	M12×1.0	M5 Length:16
25	54	56	34	28	68.5	12	16	19	12	M14×1.5	M6 Length:18



# Rodless magnetic cylinder—RMS Series

## Compendium of RMS Series



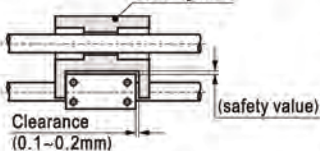
## Installation and application

1. The maxi load to move must be less than the theoretical holding force.

2. How to mount load:

2.1. Horizontal mounting: the permissible radial load must be lower than the figures in the chart below.

Horizontal oriented device  
Loading table

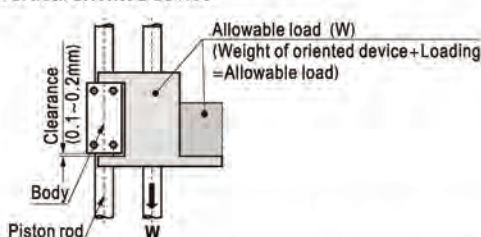


Bore size	Max. allowable load W (Loading+Weight of oriented device)
10	0.4kg
16	1.0kg
20	1.1kg
25	1.2kg
32	1.5kg
40	2.0kg

[Note] If Max. load be larger then the value of above table, please conform with our company.

2.2. Vertical mounting: Loading should be used with oriented device, the allowable direction moment must be lower than the figures in the chart below,

Vertical oriented device



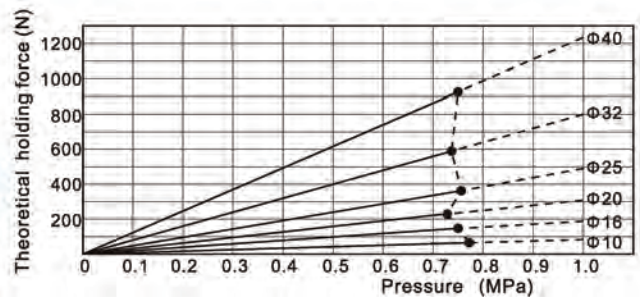
Bore size	Max. allowable load W(Weight of oriented device+Loading)	Max. pressure
10	2.7kg	0.55MPa
16	7.0kg	0.55MPa
20	11.0kg	0.65MPa
25	18.5kg	0.65MPa
32	30.0kg	0.65MPa
40	47.0kg	0.65MPa

[Note] If pressure be larger then the max. pressure, magnetic core might disengage.

3. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.

4. The medium used by cylinder shall be filtered to 40 μm or below.

5. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.



## RMS Series



### Specification

Series name	RMS Series	RMS, RMSF Series						RMSP Series		
Bore size(mm)	10	16	20	25	32	40	16	20	32	
Acting type	Double acting									
Fluid	Air(to be filtered by 40 μm filter element)									
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7bar)									
Proof pressure	1.2MPa(175psi)(12.0bar)									
Temperature °C	-20~70									
Speed range mm/s	50~400									
Stroke tolerance mm	0~250 <sup>+1.0</sup> <sub>0</sub> 251~1000 <sup>+1.5</sup> <sub>0</sub> 1001~ <sup>+2.0</sup> <sub>0</sub>									
Cushion type	Bumper	Variable cushion+Fixed cushion								
Port size [Note1]	M5×0.8	1/8"			1/4"		M5×0.8		1/8"	
Safe holding force N	55	140	220	350	550	900	140	220	550	

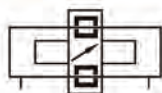
[Note1] PT thread, G thread and NPT thread are available.

### Stroke

Bore size (mm)	Standard stroke (mm)										Max.std stroke						
10	50	100	150	200	250	300					1000						
16	50	100	150	200	250	300	350	400	450	500	1500						
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	2000
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	2500
32	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	3000
40	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	3000

[Note] Consult us for non-standard stroke.

### Symbol



### Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action.

### Ordering code

RMS □ 20 x 200 □ □

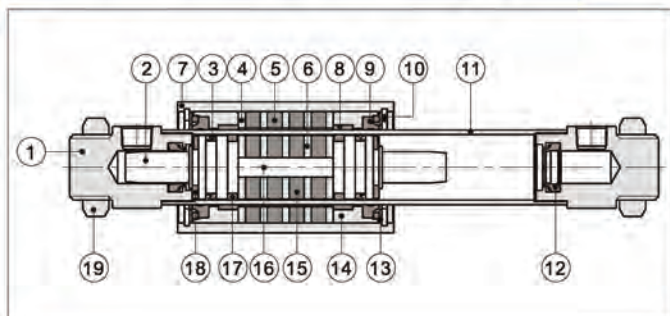
① ② ③ ④ ⑤ ⑥

① Model	② Version	③ Bore size	④ Stroke	⑤ Mounting type [Note1]	⑥ Thread type [Note2]
RMS: Rodless magnetic cylinder	Blank: basic version P: P size version F: F size version	10 16 20 25 32 40 16 20 32 16 20 25 32 40	Refer to stroke table for details	Blank: non bracket LB: LB type FA: FA type	Blank: PT G: G T: NPT

[Note1] RMSF40 series do not have FA mounting accessories.

[Note2] Blank on thread code means metric M thread. There is only metric thread for Φ16. If G or NPT thread is needed, please comment.

### Inner structure and material of major parts



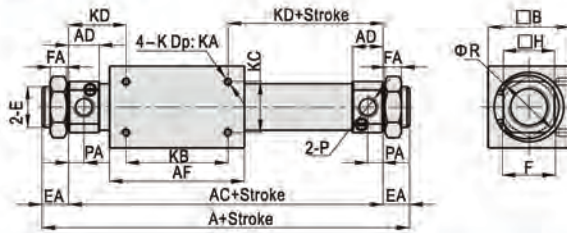
NO.	Item	Material	NO.	Item	Material
1	End cap	Aluminum alloy	11	Barrel	Stainless steel
2	Piston	Aluminum alloy	12	Cushion O-ring	TPU
3	Piston seal	TPU	13	Washer	Stainless steel
4	Magnet washer	Carbon steel	14	Cover	Aluminum alloy
5	Magnet	Rare-earth material	15	Magnet	Rare-earth material
6	Magnet washer	Carbon steel	16	Connecting rod	Stainless steel
7	Body	Aluminum alloy	17	Wear ring	Wear resistant material
8	Wear ring	Wear resistant material	18	Bumper	NBR
9	Scraping dust ring	Plastics	19	Nut	Stainless steel
10	C Clip	Spring steel			

# Rodless magnetic cylinder

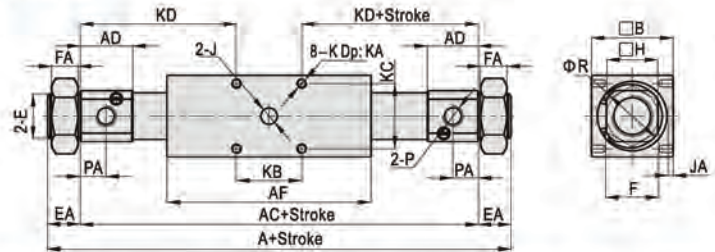
## RMS Series

### Dimensions

#### RMS RMS-P



#### RMS-F



Model/Item	A	AC	AD	AF	B	E	EA	F	FA	H	J	JA	K	KA	KB	KC	KD	P	PA	R
RMS10	91	73	9.5	48	25	M10×1.0	9	14	4	15	-	-	M3×0.5	4	30	16	21.5	M5×0.8	5	17
RMS16	103	83	10	57	35	M10×1.0	10	14	4	20	-	-	M4×0.7	5	35	19	24	M5×0.8	5.5	22
RMSP16	112	92	14.5	57		M10×1.0	10	14	4		-	-	M4×0.7	7	34	25	29		7.5	
RMSF16	205	181	34	80	40	M16×1.5	12	24	8	25	8	3	M5×0.8	7.5	26	26	77.5	1/8"	7.5	29
RMS20	132	106	15	66		M20×1.5	13	26	8		-	-	M4×0.7	5.5	50	25	28		1/8"	
RMSP20	143	115	19.5	66	46	M20×1.5	14	26	8	30	-	-	M5×0.8	7	40	30	37.5	1/8"	10	33.5
RMSF20	217	185	29.5	90		M22×1.5	16	29	7		8	2.5	M5×0.8	8.5	32	32	76		1/8"	
RMS25	137	111	15	70	60	M26×1.5	13	32	8	36	-	-	M5×0.8	7.5	50	30	30.5	1/8"	7.5	39.5
RMSF25	238	206	37.5	90		M22×1.5	16	29	7		10	3	M6×1.0	10	36	36	85		1/8"	
RMS32	156	124	16	80	70	M26×1.5	16	32	8	46	-	-	M6×1.0	8	50	40	41.5	1/8"	8	39.5
RMSP32	165	133	20.5	80		M26×1.5		32	8		-	-		-					-	
RMSF32	270	238	48	110	70	M30×1.5	16	36	7	46	10	3.5	M6×1.0	12.5	48	48	95	1/8"	28	49.5
RMS40	182	150	22	92		M32×2.0		41	10		-	-		-					-	
RMSF40	327	295	44.5	130	M38×1.5	46	8	12	4.5	M8×1.25	16	50	56	122	1/4"	25				

### List for ordering code of accessories

Accessories\Bore size	10		16				20			25		32			40	
	RMS	RMS	RMSP	RMSF	RMS	RMSP	RMSF	RMS	RMSF	RMS	RMSP	RMSF	RMS	RMSF		
Mounting accessories	LB	F-PB12LB	F-RMS16LB	F-RMSF16LB	F-RMS20LB	F-RMS20LB	F-RMS20LB	F-RMS25LB	F-RMS25LB	F-RMS32LB	F-RMS32LB	F-RMS32LB	F-RMS40LB	F-RMS40LB		
	FA	F-PB12FA	F-PB12FA	F-MI12FA	F-MF20FA	F-MA20FA	F-MF32FA	F-MA20FA	F-MF32FA	F-MA40FA	F-MF40FA	F-MA40FA	F-MF40FA	-		

### Accessory selection

Accessories\Cylinder model	RMS	RMSP	RMSF	
Mounting accessories	LB	●	●	●
	FA	●	●	●

### Material of accessories

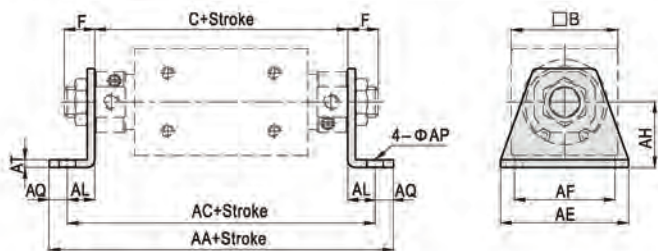
Accessories\Bore size	10		16				20			25		32			40	
	RMS	RMS	RMSP	RMSF	RMS	RMSP	RMSF	RMS	RMSF	RMS	RMSP	RMSF	RMS	RMSF		
Mounting accessories	LB	△	△	△	△	△	△	△	△	△	△	△	△	△		
	FA	△	△	△	△	△	△	○	△	○	△	○	△	-		

○—Lower carbon steel; △—SPCC

## RMS Series

### Dimensions

#### RMS-LB RMSF-LB



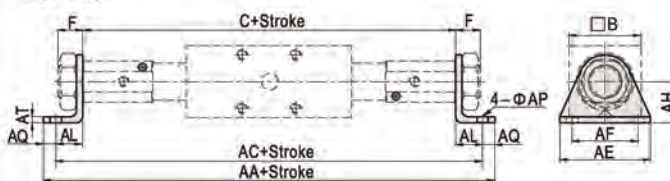
Bore size\Item	AA		AC		C		F	
	RMS	RMSP	RMS	RMSP	RMS	RMSP	RMS	RMSP
10	103	-	91	-	73	-	9	-
16	113	122	101	110	83	92	10	10
20	158	167	142	151	106	115	13	14
25	167	-	151	-	111	-	13	-
32	184	193	170	179	124	133	16	16
40	216	-	196	-	150	-	16	-

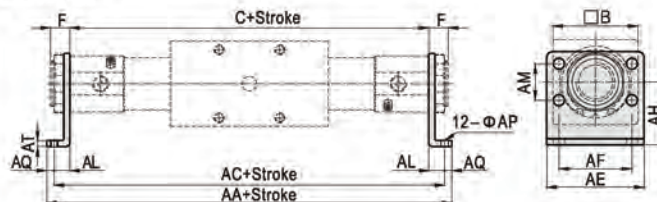
Bore size\Item	AE	AF	AH	AL	AP	AQ	AT	B
	10	42	33	14	9	5.5	6	2.5
16	42	33	20	9	5.5	6	2.5	35
20	43	30	23	18	6.5	8	3	40
25	54	40	26	20	6.5	8	4	46
32	62	46	33	23	7	7	4	60
40	75	55	38	23	9	10	5	70

#### RMSF-LB

Φ16~Φ25



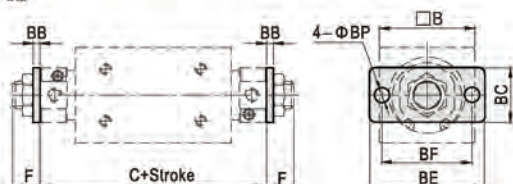
Φ32, Φ40



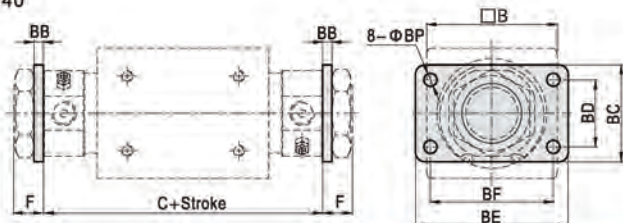
Bore size\Item	AA	AC	AE	AF	AH	AL	AM	AP	AQ	AT	B	C	F
	16	221	209	44	32	20	14	-	5.5	6	2.5	35	181
20	235	219	54	40	23	17	-	6.5	8	3	40	185	16
25	256	240	54	40	26	17	-	6.5	8	4	46	206	16
32	280	266	66	52	33	14	28	7	7	4	60	238	16
40	353	333	80	60	38	19	30	9	10	5	70	295	16

#### RMS-FA RMSF-FA

Φ16~Φ32



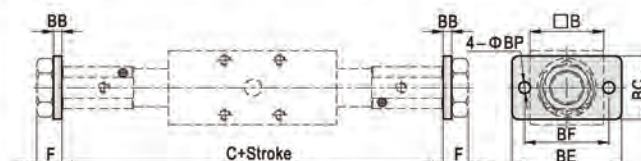
Φ40



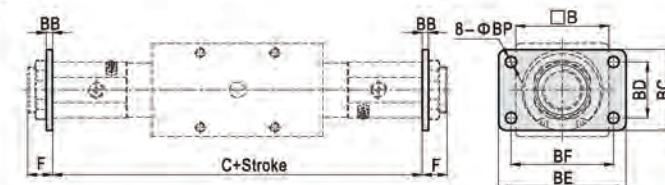
Bore size\Item	B	BB	BC	BD	BE	BF	BP	C		F	
								RMS	RMSP	RMS	RMSP
10	25	3	20	-	42	33	5.5	73	-	9	-
16	35	3	20	-	42	33	5.5	83	92	10	10
20	40	4	34	-	75	60	7	106	115	13	14
25	46	4	40	-	75	60	7	111	-	13	-
32	60	4	40	-	75	60	7	124	133	16	16
40	70	5	52	36	82	66	7	150	-	16	-

#### RMSF-FA

Φ16~Φ25



Φ32



Bore size\Item	B	BB	BC	BD	BE	BF	BP	C	F
	16	35	4	30	-	52	40	5.5	181
20	40	4	38	-	64	50	6.5	185	16
25	46	4	38	-	64	50	6.5	206	16
32	60	4	50	36	84	70	6.5	238	16

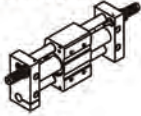


# Rodless magnetic cylinder(With guide)——RMT Series

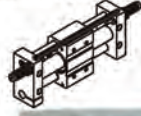
## Compendium of RMT Series

With magnet and without magnet are available

Without magnet



With magnet



**Magnetic design**

This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

**Two kinds of cushion type**

The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.



**Double guides**

Double guides ensure high precision and can endure proper side load or prejudicial load.

**Five bore size are available**

Bore size: 16, 20, 25, 32, 40

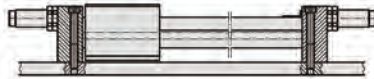
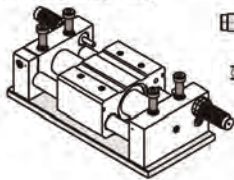
**It is compact in space**

Can be mounted from top and bottom.

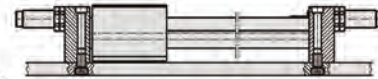
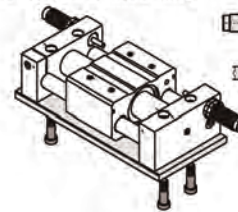
**Superiority of airproof**

It is dust-proof as the isolation between the carriage and piston.

Top bolt mounting



Bottom bolt mounting



## Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40 μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.  
Anti-dust caps shall be added in air inlet and outlet ports.

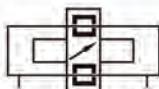


# Rodless magnetic cylinder(With guide)

## RMT Series



### Symbol



### Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.
5. Double guides ensure high precision and can endure proper side load or prejudicial load.

### Specification

<b>Bore size(mm)</b>	<b>16</b>	<b>20</b>	<b>25</b>	<b>32</b>	<b>40</b>
<b>Acting type</b>	Double acting				
<b>Fluid</b>	Air(to be filtered by 40 μm filter element)				
<b>Operating pressure</b>	0.2~0.7MPa(30~100psi(2.0~7bar))		0.25~0.7MPa(36~100psi(2.5~7bar))		
<b>Proof pressure</b>	1.2MPa(175psi)(12.0bar)				
<b>Temperature °C</b>	-20~70				
<b>Speed range mm/s</b>	50~400				
<b>Stroke tolerance mm</b>	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~ <sup>+2.0</sup> <sub>0</sub>
<b>Cushion type</b>	Fixed cushion		Shock absorber(Available)		
<b>Safe holding force N</b>	140		220		350 550 900
<b>Port size [Note1]</b>	M5×0.8		1/8"		1/4"

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Stroke

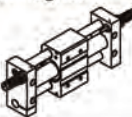
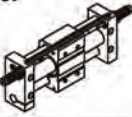
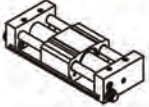
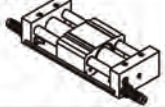
Bore size (mm)	Standard stroke (mm)													Max.std stroke				
16	50	100	150	200	250	300	350	400	450	500				750				
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1000	
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1500	
32	50	100	150	200	250	300	350	400	450	500	600	700	750	800			1500	
40	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000		1500

[Note] Consult us for non-standard stroke.

### Ordering code

RMT 20 × 100 S □ □

① ② ③ ④ ⑤ ⑥

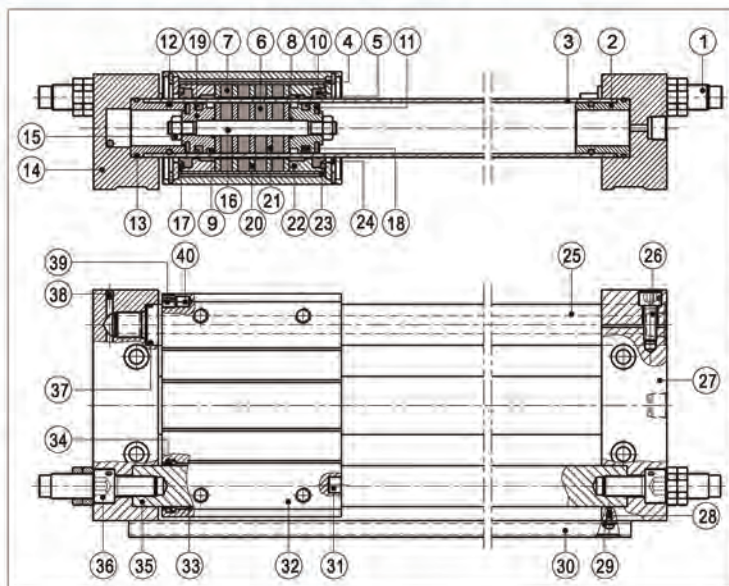
① Model	② Bore size	③ Stroke	④ Magnet	⑤ Cushion type	⑥ Thread type [Note1]
RMT: Rodless magnetic cylinder(With guide)	16 20 25 32 40	Refer to stroke table for details	Blank: Without magnet  S: With magnet 	Blank: With two adjustable nuts  A: With two shock absorbers 	Blank: PT G: G T: NPT

[Note1] Blank on thread code means metric M thread. There is only metric thread for Φ16. If G or NPT thread is needed, please comment.

# Rodless magnetic cylinder(With guide)

## RMT Series

### Inner structure and material of major parts

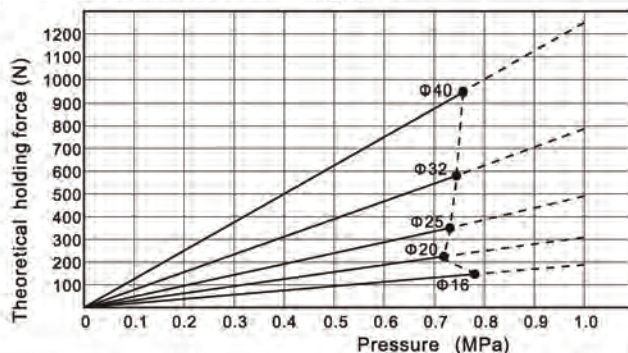


NO.	Item	Material	NO.	Item	Material
1	Shock absorber	Combination	21	Magnet washer	Carbon steel
2	Washer cover	Aluminum alloy	22	End cover	Aluminum alloy
3	Stainless steel barrel	Stainless steel	23	Mobility iron	Aluminum alloy
4	Washer	Carbon steel	24	C clip	Spring steel
5	Wearing ring	Wear resistant material	25	Guide I	Carbon steel
6	Magnet	Rare-earth material	26	Countersink screw	Carbon steel
7	Magnet	Rare-earth material	27	Fixing plate	Aluminum alloy
8	O-ring	NBR	28	Screw	Carbon steel
9	Wear ring	Wear resistant material	29	Spring washer	Spring steel
10	Scraping dust ring	Plastics	30	Rail	Aluminum alloy
11	Bumper	NBR	31	Bumper block	Stainless steel
12	O-ring	NBR	32	Barrel	Aluminum alloy
13	O-ring	NBR	33	Bushing	Bronze+Fill lubricant
14	Fixing plate	Aluminum alloy	34	Gasket	TPU
15	Nut	SS41	35	Guide II	Carbon steel
16	Joint pole	Stainless steel	36	Countersink screw	Carbon steel
17	O-ring	NBR	37	O-ring	NBR
18	Piston seal	TPU	38	Steel ball	Stainless steel
19	Magnet	Aluminum alloy	39	Location washer	NBR
20	Magnet washer	Carbon steel	40	Magnet	Rare-earth material

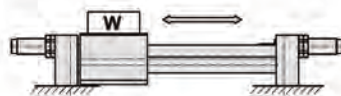
### Installation and application

#### 1. How to determine load;

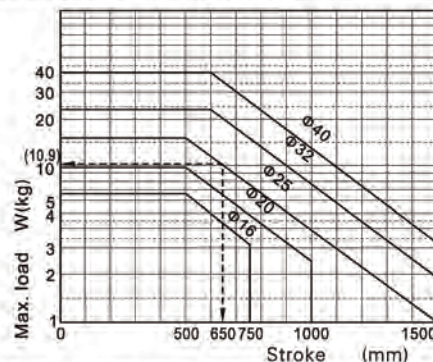
1.1) The maxi load to move must be less than the theoretical holding force.



1.2) The relation between loading and stroke as below (Loading center and slide table center must be superposition)



Bore size	Max.Load W(kg)	Stroke scope
16	5.5	~500mm
20	9.6	~500mm
25	16	~500mm
32	24	~600mm
40	40	~600mm



1.3) You should keep the loading center and the slide table center be superposition, if not you can calculate the load as below method.

First you should calculate the applied load coefficient( $\sigma$ ):

Example) Bore size: 25mm, Stroke: 650mm

(1) Max. Load=16kg

(2) When stroke=650mm, the allowable load=10.9kg

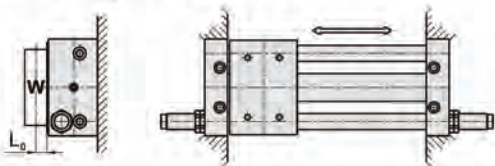
(3)  $\sigma = 10.9/16 = 0.68$

Note) When bore size is  $\Phi 16$  and stroke is 500mm, or bore size is  $\Phi 20$  and stroke is 500mm,

or bore size is  $\Phi 25$  and stroke is 500mm, or bore size is  $\Phi 32$  and stroke is 600mm, or bore size is  $\Phi 40$  and stroke is 600mm, the  $\sigma = 1$ .

## RMT Series

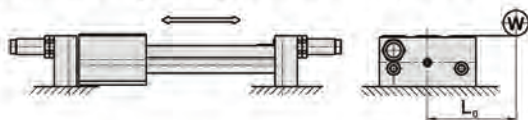
### 1.3.1) Horizontal acting(Vertical mounting):



Note: The unit of  $L_0$  is "cm".

Bore size	16	20	25	32	40
Max. load W(kg)	$\frac{\sigma \times 36.4}{10.6+2 \times L_0}$	$\frac{\sigma \times 74.4}{12+2 \times L_0}$	$\frac{\sigma \times 140}{13.8+2 \times L_0}$	$\frac{\sigma \times 258}{17+2 \times L_0}$	$\frac{\sigma \times 520}{20.6+2 \times L_0}$

### 1.3.2) Horizontal acting(Loading center and slide table center offset):

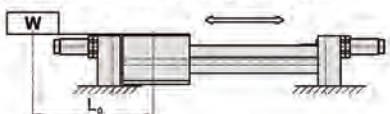


Note: The unit of  $L_0$  is "cm".

Bore size	16	20	25	32	40
Max. load W(kg)	$\frac{\sigma \times 25.48}{5.2+L_0}$	$\frac{\sigma \times 52.1}{6.2+L_0}$	$\frac{\sigma \times 98}{7.0+L_0}$	$\frac{\sigma \times 180}{8.6+L_0}$	$\frac{\sigma \times 364}{10.4+L_0}$

### 1.3.3) Horizontal acting(Loading barycenter and acting direction is coplanar.

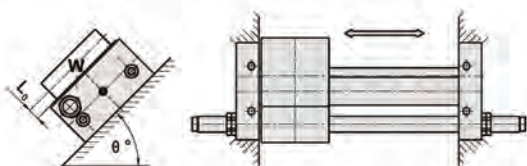
Loading center and slide table center offset):



Note: The unit of  $L_0$  is "cm".

Bore size	16	20	25	32	40
Max. load W(kg)	$\frac{\sigma \times 17.5}{5.0+L_0}$	$\frac{\sigma \times 36}{6.0+L_0}$	$\frac{\sigma \times 60}{6.0+L_0}$	$\frac{\sigma \times 105}{7.0+L_0}$	$\frac{\sigma \times 200}{8.0+L_0}$

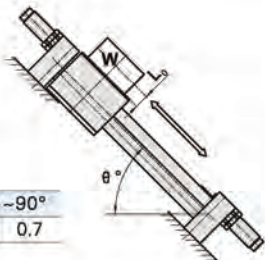
### 1.3.4) Incline acting(Acting direction and barycenter is vertical):



Note: The unit of  $L_0$  is "cm".

Bore size	16	20	
Max. load W(kg)	$\frac{\sigma \times 36.4}{5.2+2(2.7+L_0)\sin \theta}$	$\frac{\sigma \times 74.4}{6.2+2(2.9+L_0)\sin \theta}$	
Bore size	25	32	40
Max. load W(kg)	$\frac{\sigma \times 140}{7+2(3.4+L_0)\sin \theta}$	$\frac{\sigma \times 258}{8.6+2(4.2+L_0)\sin \theta}$	$\frac{\sigma \times 520}{10.4+2(5.1+L_0)\sin \theta}$

### 1.3.5) Incline acting(Acting direction):

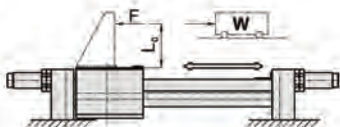


Note: The unit of  $L_0$  is "cm".

角度	~45°	~60°	~75°	~90°
角度系数 K	1	0.9	0.8	0.7

Bore size	16	20	
Max. load W(kg)	$\frac{\sigma \times 35 \times k}{5\cos \theta + 2(2.7+L_0)\sin \theta}$	$\frac{\sigma \times 72 \times k}{6\cos \theta + 2(2.9+L_0)\sin \theta}$	
Bore size	25	32	40
Max. load W(kg)	$\frac{\sigma \times 120 \times k}{6\cos \theta + 2(3.4+L_0)\sin \theta}$	$\frac{\sigma \times 210 \times k}{7\cos \theta + 2(4.2+L_0)\sin \theta}$	$\frac{\sigma \times 400 \times k}{8\cos \theta + 2(5.1+L_0)\sin \theta}$

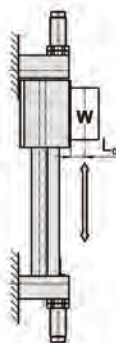
### 1.3.6) Horizontal acting(Loading offset):



Note: The unit of  $L_0$  is "cm".

Bore size	16	20	25	32	40
Max. load W(kg)	$\frac{\sigma \times 17.5}{2.7+L_0}$	$\frac{\sigma \times 36}{2.9+L_0}$	$\frac{\sigma \times 60}{3.4+L_0}$	$\frac{\sigma \times 105}{4.2+L_0}$	$\frac{\sigma \times 200}{5.1+L_0}$

### 1.3.7) Vertical acting:



Note: The unit of  $L_0$  is "cm".

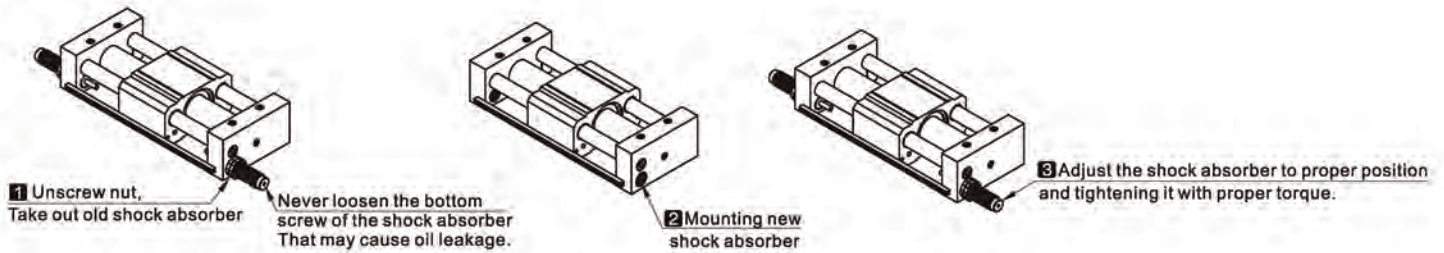
Bore size	16	20	25	32	40
Max. load W(kg)	$\frac{\sigma \times 13.23}{2.7+L_0}$	$\frac{\sigma \times 26.8}{2.9+L_0}$	$\frac{\sigma \times 44}{3.4+L_0}$	$\frac{\sigma \times 88.2}{4.2+L_0}$	$\frac{\sigma \times 167.8}{5.1+L_0}$

# Rodless magnetic cylinder(With guide)

## RMT Series

### 2. About shock absorber

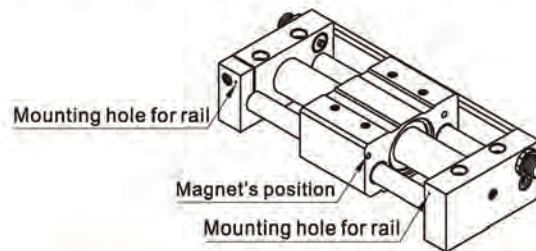
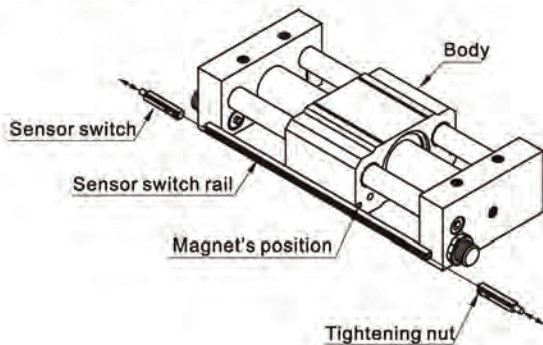
- 2.1) Shock absorbers are consumable parts. When a decrease in energy absorption capacity is noticed, it must be replaced. Refer to the table below for shock absorber type.
- 2.2) Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
- 2.3) Refer to the table below for tightening torques of the shock absorber setting nut.



Cylinder model	RMT16	RMT20	RMT25	RMT32	RMT40
Shock absorber type	ACA1006-A	ACA1007-1N	ACA1412-1N	ACA2020-1N	ACA2020-1N
Tightening torque(Nm)	1.67	1.67	3.14	10.80	10.80

### 3. About sensor switch

- 3.1) Sensor switch only can be used for the cylinder with magnet. The magnet is located at the four corners of the body (refer below). The cylinder with magnet has both groups of mounting holes for mounting rails. Please refer to below for ordering sensor switches, mounting them into the rail's groove, adjusting them to the proper position, and tightening them with the proper torque.



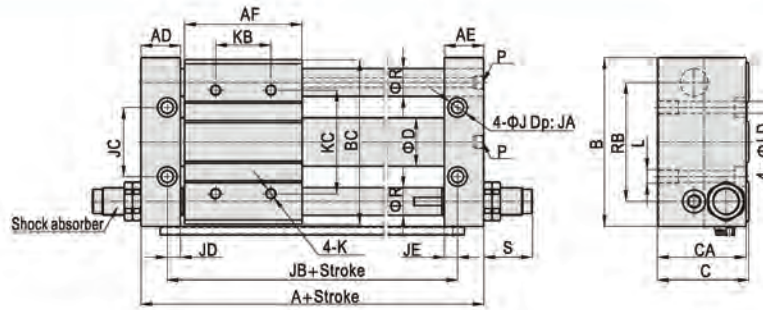
Cylinder model	RMT16	RMT20	RMT25	RMT32	RMT40
Sensor switch	CMMSG、DMSG(S)				

# Rodless magnetic cylinder(With guide)

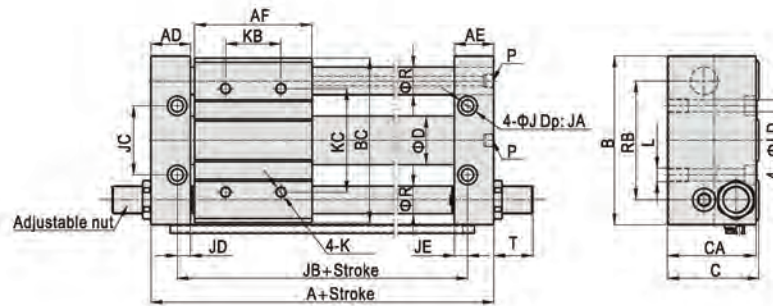
## RMT Series

### Dimensions

#### RMT-A



#### RMT



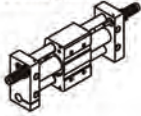
Bore size\Item	A	AD	AE	AF	B	BC	C	CA	D	J	JA	JB	JC	JD	JE	K	KB	KC	L	LD	P	R	RB	S	T
16	107	22.5	22.5	60	75	72	40	39	18	9.5	5	75	30	6.5	6.5	M5×0.8Dp:10	30	50	M6×1.0Dp:9.5	5.5	M5×0.8	12	52	18.5	13.5
20	124	25.5	25.5	70	90	87	46	45	22.8	9.5	5	90	38	8.5	8.5	M6×1.0Dp:10	40	70	M6×1.0Dp:9.5	5.5	1/8"	16	63	22.5	10
25	124	25.5	25.5	70	100	97	54	53	27.8	11	6.5	90	42	8.5	8.5	M6×1.0Dp:10	40	70	M8×1.25Dp:10	7	1/8"	16	70	40.5	15
32	148	28.5	28.5	85	122	119	66	64	35	14	8	110	50	9.5	9.5	M8×1.25Dp:12	40	75	M10×1.5Dp:15	8.5	1/8"	20	86	57.5	16
40	170	35.5	35.5	95	145	142	76	74	43	14	8	120	64	10.5	10.5	M8×1.25Dp:12	65	105	M10×1.5Dp:15	8.5	1/4"	25	105	50.5	10



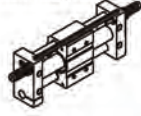
## Compendium of RMTL Series

With magnet and without magnet are available

Without magnet



With magnet



**Magnetic design**

This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

**Two kinds of cushion type**

The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.

**Six bore size are available**

Bore size: 16, 20, 25, 32, 40

**Double guides**

Double guides ensure high precision and can endure proper side load or prejudicial load.

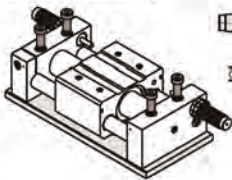
**It is compact in space**

Can be mounted from top and bottom.

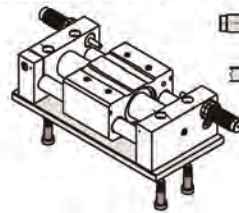
**Superiority of airproof**

It is dust-proof as the isolation between the carriage and piston.

Top bolt mounting



Bottom bolt mounting



## Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.  
Anti-dust caps shall be added in air inlet and outlet ports.

# Rodless magnetic cylinder(With exactitude guide)

## RMTL Series



### Specification

Bore size(mm)	10	16	20	25	32	40
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	0.2~0.7MPa(30~100psi)(2.0~7bar)					
Proof pressure	1.2MPa(175psi)(12.0bar)					
Temperature ℃	-20~70					
Speed range mm/s	50~500					
Stroke tolerance mm	0~250 <sup>+1.0</sup> <sub>0</sub>		251~1000 <sup>+1.5</sup> <sub>0</sub>		1001~ <sup>+2.0</sup> <sub>0</sub>	
Cushion type	Fixed cushion			Shock absorber(Available)		
Safe holding force N	55	140	220	350	550	900
Port size [Note1]	M5×0.8			1/8"		1/4"

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Symbol



### Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action. If shock absorber be used, the cushioning effect is more perfection.
5. Double guides ensure high precision and can endure proper side load or prejudicial load.

### Stroke

Bore size (mm)	Standard stroke (mm)											Max.std stroke					
10	50	100	150	200	250	300						500					
16	50	100	150	200	250	300	350	400	450	500			750				
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1000		
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1500		
32	50	100	150	200	250	300	350	400	450	500	600	700	750	800	1500		
40	50	100	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1500

[Note] Consult us for non-standard stroke.

### Ordering code

RMTL 20 × 100 S □ □

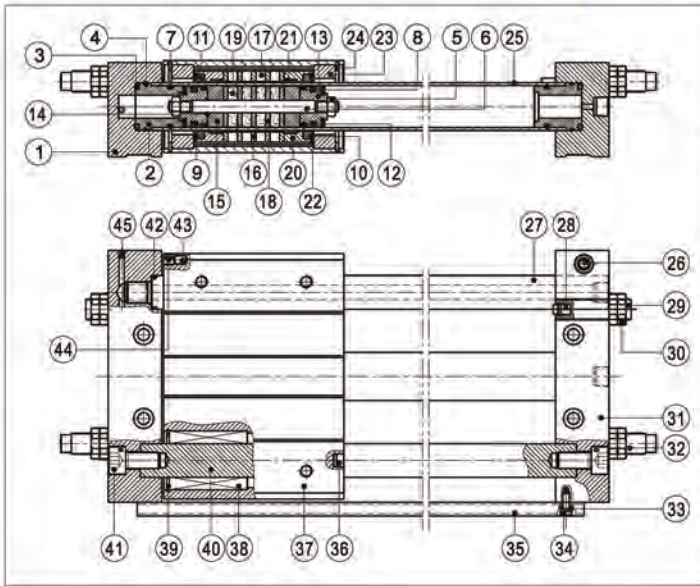
① ② ③ ④ ⑤ ⑥

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Cushion type [Note1]	⑥ Thread type
RMTL: Rodless magnetic cylinder (With exactitude guide)	10 16	Refer to stroke table for details	Blank: Without magnet 	Blank: With two adjustable nuts 	Blank: M5 Blank: PT G: G T: NPT
	20 25 32 40		S: With magnet 	A: With two shock absorbers 	

[Note1] When A type is selected, the two adjustable nuts are added too.

## RMTL Series

### Inner structure and material of major parts

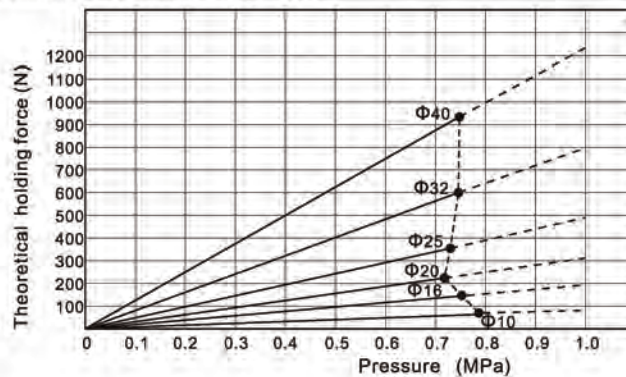


NO.	Item	Material	NO.	Item	Material
1	Fixing plate	Aluminum alloy	24	C clip	Spring steel
2	Washer cover	Aluminum alloy	25	Barrel	Stainless steel
3	O-ring	NBR	26	Countersink screw	Carbon steel
4	O-ring	NBR	27	Guide I	Carbon steel
5	Nut	Carbon steel	28	Bumper	TPU
6	Joint pole	Stainless steel	29	Adjustable screw	Carbon steel
7	O-ring	NBR	30	Nut	Ss41
8	Bumper	NBR	31	Fixing plate	Aluminum alloy
9	Piston seal	TPU	32	Shock absorber	Combination
10	O-ring	NBR	33	Spring washer	Spring steel
11	Scraping dust ring	Plastics	34	Countersink screw	Carbon steel
12	Wearing ring	Wear resistant material	35	Rail	Aluminum alloy
13	Piston	Aluminum alloy	36	Bumper block	Stainless steel
14	O-ring	NBR	37	Body	Aluminum alloy
15	Piston washer	Aluminum alloy	38	Bushing	
16	Magnet washer	Carbon steel	39	C clip	Spring steel
17	Magnet	Rare-earth material	40	Guide II	Carbon steel
18	Magnet washer	Carbon steel	41	Countersink screw	Carbon steel
19	Magnet	Rare-earth material	42	O-ring	NBR
20	Body cover	Aluminum alloy	43	Magnet	Rare-earth material
21	Wearing ring	Wear resistant material	44	Location washer	NBR
22	Mobility iron	Aluminum alloy	45	Steel ball	Stainless steel
23	Washer	Aluminum alloy			

### Installation and application

#### 1. How to determine load

The maxi load to move must be less than the theoretical holding force.

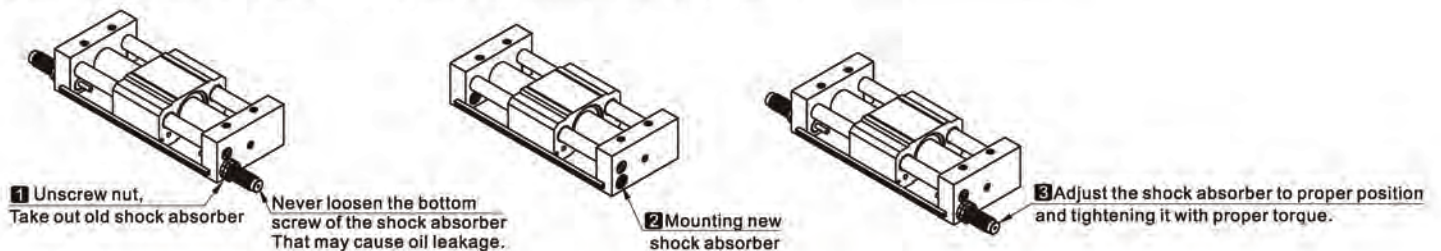


#### 2. About shock absorber

2.1) Shock absorbers are consumable parts. When a decrease in energy absorption capacity is noticed, it must be replaced. Refer to the table below for shock absorber type.

2.2) Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.

2.3) Refer to the table below for tightening torques of the shock absorber setting nut.



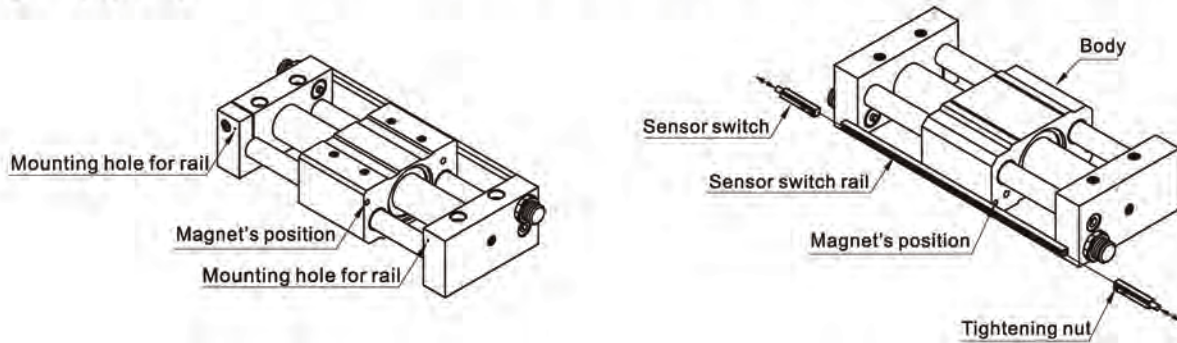
Bore size	10	16	20	25	32	40
Shock absorber type	ACA0806-1N	ACA1006-A	ACA1007-1N	ACA1412-1N	ACA2020-1N	ACA2020-1N
Tightening torque(Nm)	1.67	1.67	1.67	3.14	10.80	10.80

# Rodless magnetic cylinder(With exactitude guide)

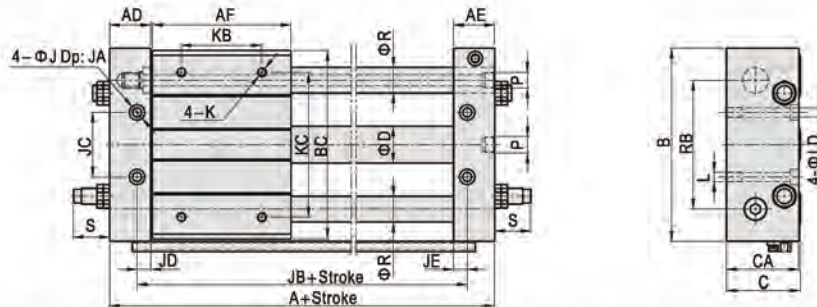
## RMTL Series

### 3. About sensor switch

3.1) Sensor switch only can be used for the cylinder with magnet . The magnet located the four corner of body's(refer below) .The cylinder with magnet have both group mounting hole for mounting rail. please refer to below for ordering sensor switch, mounting it into the rail's groove, adjusting it to proper position, tightening it with proper torque.



## Dimensions



Model	A	AD	AE	AF	B	BC	C	CA	D	J	JA	JB	JC	JD	JE	K	KB	KC	L	LD	P	R	RB	S
RMTL10	111	20.5	20.5	68	80	77	34	33	12	8	4	85	26	7.5	7.5	M4X0.7Dp:8	30	60	M5X0.8Dp:9.5	4.5	M5X0.8	10	52	17.5
RMTL16	122	22.5	22.5	75	95	92	40	39	18	9.5	5	90	30	6.5	6.5	M5X0.8Dp:10	45	70	M6X1.0Dp:9.5	5.5	M5X0.8	12	65	18.5
RMTL20	139	25.5	25.5	86	120	117	46	45	22.8	9.5	5	105	40	8.5	8.5	M6X1.0Dp:10	50	90	M6X1.0Dp:10	5.5	1/8"	16	80	22.5
RMTL25	139	25.5	25.5	86	130	127	54	53	27.8	11	6.5	105	50	8.5	8.5	M6X1.0Dp:10	60	100	M8X1.25Dp:10	7	1/8"	16	90	40.5
RMTL32	159	28.5	28.5	100	160	157	66	64	35	14	8	121	60	9.5	9.5	M8X1.25Dp:12	70	120	M10X1.5Dp:15	8.5	1/8"	20	110	57.5
RMTL40	209	35.5	35.5	136	190	187	78	74	43	14	8	159	84	10.5	10.5	M8X1.25Dp:12	90	140	M10X1.5Dp:15	8.5	1/4"	25	130	50.5



# Rodless magnetic cylinder (With Linear guide) — RMH Series

## Compendium of RMH Series

**Magnetic design**  
This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets.

**Inlet and outlet ports are on the same side**

**Sensor switch rail**  
Matching sensor model: CMSH, DMSH(S)

**With the slide rail**  
The operation accuracy of the body is high, the body does not rotate accurately, and the load capacity is strong.

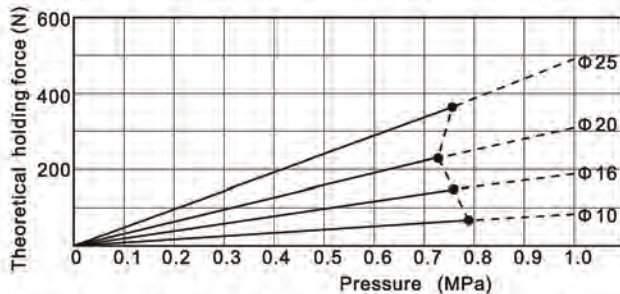
**Four bore size are available**  
Bore size: 10, 16, 20, 25

**Cylinder can be mounted from two directions**

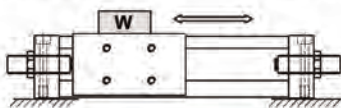
**Can be loaded from two directions**

## Installation and application

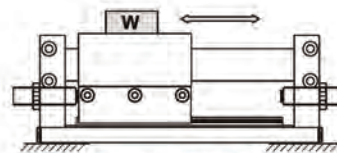
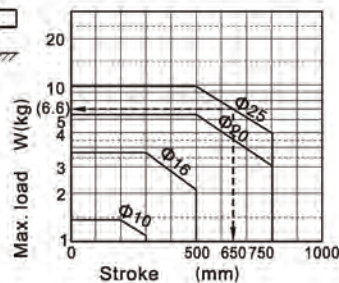
1. The maxi load to move must be less than the theoretical holding force.



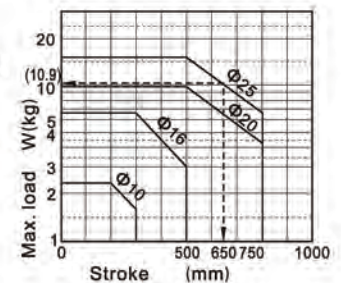
2. The relation between loading and stroke as below (Loading center and slide table center must be superposition)



Bore size	Max. Load W(kg)	Stroke scope
10	1.4	~200mm
16	3.3	~300mm
20	5.8	~500mm
25	9.6	~500mm



Bore size	Max. Load W(kg)	Stroke scope
10	2.4	~200mm
16	5.5	~300mm
20	9.6	~500mm
25	16	~500mm



3. About adjusting screw:

RMH series is compacted with two adjusting screws, but you can replace them with oil shock absorber by conditions.

Bore size	Shock absorber type
10	ACA0806-1
16	ACA1007-1
20	ACA1007-1
25	ACA1412-1

4. When use external limiter to stop load middle way: please refer to RMS series.
5. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
6. The medium used by cylinder shall be filtered to 40μm or below.
7. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface.  
Anti-dust jam cap shall be added in air inlet and outlet ports.



# Rodless magnetic cylinder(With Linear guide)

## RMH Series

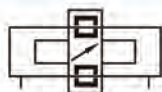


### Specification

Bore size(mm)	10	16	20	25
Acting type	Double acting			
Fluid	Air(to be filtered by 40µm filter element)			
Operating pressure	0.2~0.7MPa(28~100psi)(2~7bar)			
Proof pressure	1.2MPa(175psi)(12.0bar)			
Temperature °C	-20~70			
Speed range mm/s	50~400			
Stroke tolerance mm	0~250 <sup>+1.0</sup> <sub>0</sub> 251~800 <sup>+1.5</sup> <sub>0</sub>			
Cushion type	Bumper			
Port size [Note1]	M5×0.8		1/8"	
Safe holding force N	55	140	220	350

[Note1] PT thread, G thread and NPT thread are available.

### Symbol



### Stroke

Bore size (mm)	Standard stroke (mm)													
10	50	100	150	200	250	300								
16	50	100	150	200	250	300	350	400	450	500				
20	50	100	150	200	250	300	350	400	450	500	600	700	750	800
25	50	100	150	200	250	300	350	400	450	500	600	700	750	800

[Note] Consult us for non-standard stroke.

### Product feature

1. This magnetic cylinder is basically a pneumatic rodless cylinder featuring a mobile piston fitted with annular magnets. The mobile carriage is also equipped with magnets to provide magnetic coupling (carriage/piston). The carriage slide freely along the main tube.
2. It is dust-proof as the isolation between the carriage and piston.
3. It is compact in space.
4. The non adjustable rubber bumpers and the adjustable pneumatic cushioning on both ends of the cylinder ensure the smooth action.
5. With the slide rail, the operation accuracy of the body is high, the body does not rotate accurately, and the load capacity is strong.

### Ordering code

RMH 20 × 200 S □

① ② ③ ④ ⑤

① Model	② Bore Size	③ Stroke [Note1]	④ Magnet	⑤ Thread type [Note2]
RMH: Rodless magnetic cylinder (With linear guide)	10 16 20 25	Refer to stroke table for details	S: With magnet	Blank: PT thread G: G thread T: NPT thread

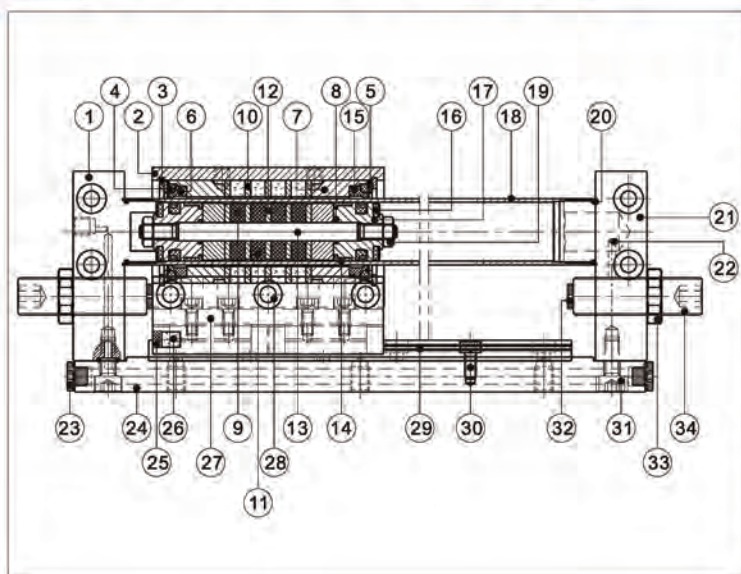
[Note1] Consult us for non-standard stroke.

[Note2] Blank on thread code means metric M thread. There is only metric thread for Φ10/Φ16. If NPT or G thread is needed, please comment.

# Rodless magnetic cylinder(With Linear guide)

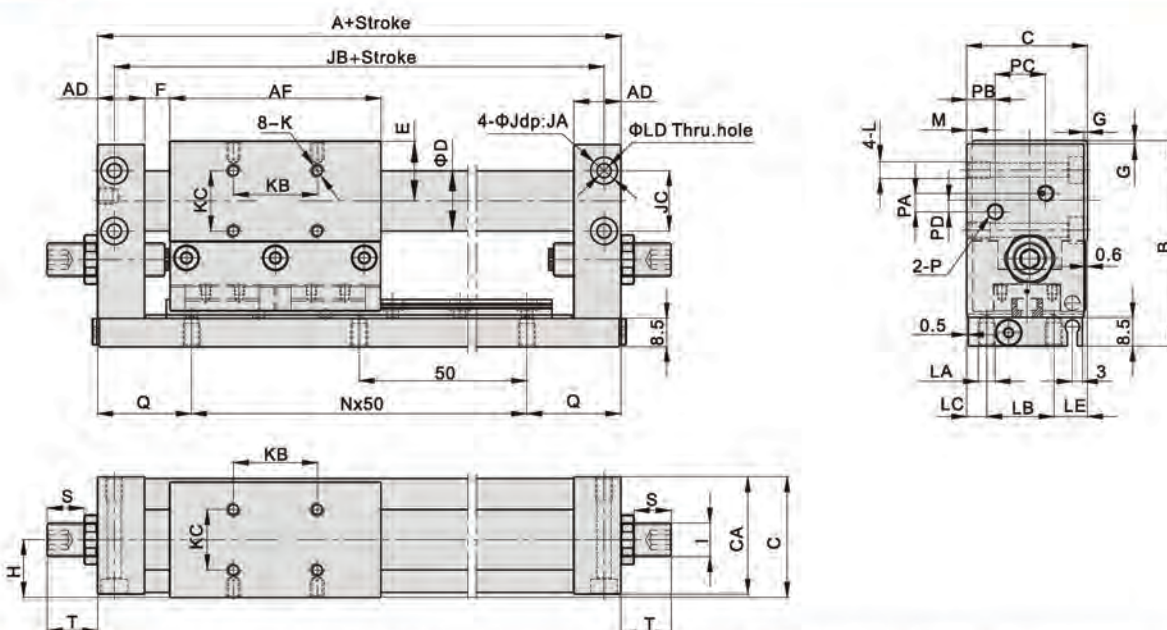
## RMH Series

### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	End cover	Aluminum alloy	18	Barrel	Stainless steel
2	Body	Aluminum alloy	19	Nut	Stainless steel
3	C Clip	TPU	20	O-ring	NBR
4	O-ring	NBR	21	End cover	Aluminum alloy
5	Washer	Stainless steel	22	Steel ball	Stainless steel
6	Scraping dust ring	Plastics	23	Plunger screw	Carbon steel
7	Cover	Aluminum alloy	24	Fixed block	Aluminum alloy
8	O-ring	NBR	25	Push block	Plastics
9	Magnet	Rare-earth material	26	Magnet	Rare-earth material
10	Magnet washer	Carbon steel	27	Joining block	Aluminum alloy
11	Magnet	Rare-earth material	28	Bolt	Alloy steel
12	Magnet washer	Carbon steel	29	Linear rail	-
13	Connecting rod	Stainless steel	30	Bolt	Alloy steel
14	Wear ring	Wear resistant material	31	Bolt	Alloy steel
15	Piston seal	TPU	32	Bumper	TPU
16	Bumper	NBR	33	Nut	Alloy steel
17	Piston	Aluminum alloy	34	Bolt	Alloy steel

### Dimensions



Type\Item	A	AD	AF	B	C	CA	D	E	F	G	H	I	J	JA	JB	JC	K	KB	KC	L	LA	LB	LC
RMH10	86	10.5	52	52	30	29	12	14	6.5	1	14	M8X1.0	6	3.5	78	14	M3X0.5dp:4	20	15	M4X0.7dp:6	M4X0.7dp:6	16	4
RMH16	106	14	63	61	36	35	18	17.5	7.5	1	17	M10X1.0	8	4.5	96	18	M4X0.7dp:5	25	18	M5X0.8dp:7	M5X0.8dp:7	20	6
RMH20	124	14	76	71	39	38	22.8	20	10	1	18.5	M10X1.0	9.5	5.5	112	17	M4X0.7dp:5	40	22	M6X1.0dp:8	M6X1.0dp:8	22	5
RMH25	137	17.5	77	76	45	43	27.8	22.5	12.5	2	21.5	M14X1.5	9.5	5.5	124	20	M5X0.8dp:6	40	28	M6X1.0dp:8	M6X1.0dp:8	26	7

Type\Item	Stroke	P	LD	LE	M	PA	PB	PC	PD	Q	S	T	N															
													50	100	150	200	250	300	350	400	450	500	600	700	750	800		
RMH10	M5X0.8	3.5	10	1.5	4	7.5	11	2	18	10.5	14.5	2	3	4	5	6	7	-	-	-	-	-	-	-	-			
RMH16	M5X0.8	4.5	10	1.5	5.5	8.5	15	3.5	28	11	15	2	3	4	5	6	7	8	9	10	11	-	-	-	-			
RMH20	1/8"	5.5	12	1.5	0	10	18.5	0	37	8.5	12.5	2	3	4	5	6	7	8	9	10	11	13	15	16	17			
RMH25	1/8"	5.5	12	1.5	0	11	22	0	43.5	16	22	2	3	4	5	6	7	8	9	10	11	13	15	16	17			



# Rotary table cylinder—HRQ Series

## Compendium of HRQ Series

### Higher manufacturing precision of working platform

The manufacturing precision of working platform is high, and is easy for installation, and is of precise orientation. The center of working platform has a through hole, and pipe can be located and passed through this hole;

### Double cylinder structure

Double cylinder structure, double output could be achieved.

### Rack and pinion design

Rack and pinion design, stable functioning.

### With magnetic switch slots

### Three kinds of type could be chosen

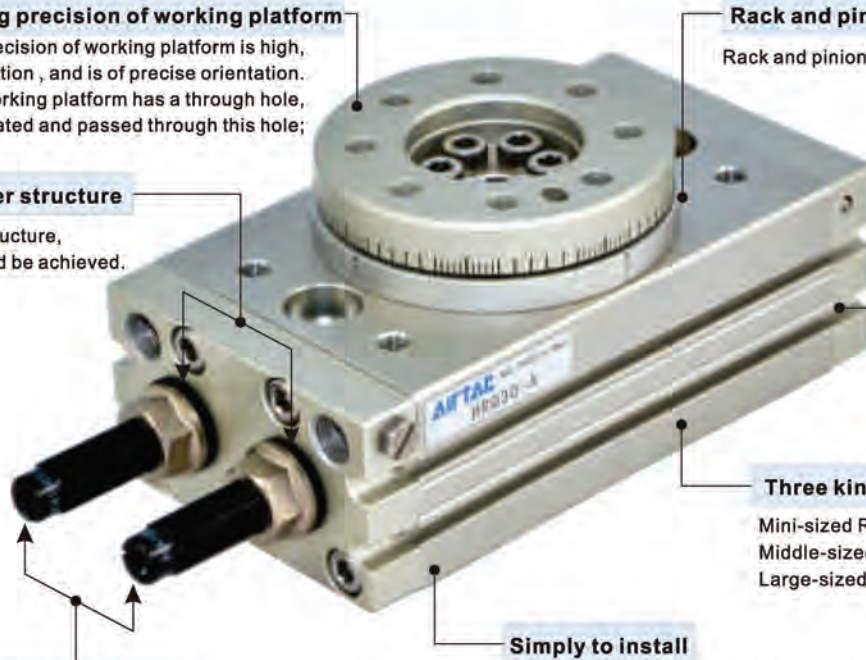
Mini-sized Rotary Cylinder: 2、3、7  
Middle-sized Rotary Cylinder: 10、20、30、50  
Large-sized Rotary Cylinder: 70、100、200

### Simply to install

Guide hole is designed on the both side of the cylinder body (10~200) or undersurface (2~7), which is simply to install.

### Two modes of buffer could be chosen

Adjustment bolt buffer and internal shock absorber could be chosen



## Installation and application

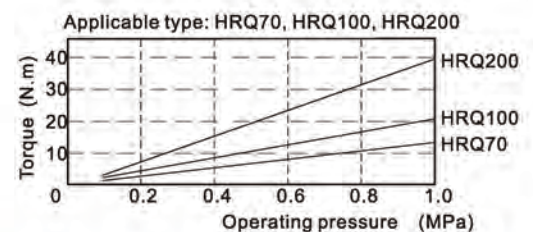
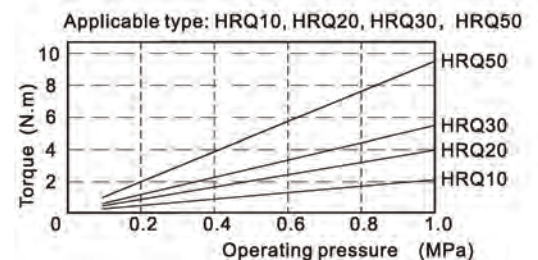
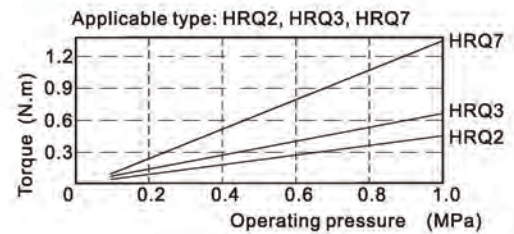


1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to  $40\ \mu\text{m}$  or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

## Maximum allowed loading

Loading type	Model									
	HRQ2	HRQ3	HRQ7	HRQ10	HRQ20	HRQ30	HRQ50	HRQ70	HRQ100	HRQ200
Maximum allowed radial loading (N) 	18	30	50	80	150	200	300	330	390	540
Maximum allowed axial loading (N) 	35	50	70	80	150	200	300	300	500	740
Maximum allowed bending moment (Nm) 	0.8	1.1	1.5	2.5	4.0	5.5	10.0	12.0	18.0	25.0

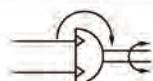
## Actual torque output



## HRQ Series



### Symbol



### Product feature

1. Rack and pinion design, stable functioning.
2. Double cylinder structure, double output could be achieved.
3. The manufacturing precision of working platform is high, and is easy for installation, and is of precise orientation.
4. The center of working platform has a through hole, and pipe can be located and passed through this hole;
5. Guide hole is designed on the both side of the cylinder body (10~200) or undersurface (2~7), which is simply to install.
6. Two modes of buffer could be chosen, adjustment bolt buffer and internal shock absorber, the maximum buffer energy of internal shock absorber is 3-5 times that of adjustment bolt buffer.

### Specification

Specification	2	3	7	10	20	30	50	70	100	200
Acting type	Double rack and pinion(Double acting)									
Fluid	Air(to be filtered by 40 μ m filter element)									
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)									
With adjustment bolt										
With internal shock absorber	-									
Proof pressure	1.2MPa(175psi)(12.0bar)									
Temperature °C	-20~70									
Angle adjustment range	0~190°									
Repeatable precision	0.2°									
With adjustment bolt										
With internal shock absorber	-									
Theoretic moment (Nm)(0.5MPa)	0.2	0.33	0.63	1.1	2.2	2.8	5.0	7.5	11.0	22.0
Cushion type	Rubber bumper									
With adjustment bolt										
With internal shock absorber	Shock absorber									
Port size	M5×0.8									
End ports	1/8" [Note1]									
Side ports	M5×0.8									
Weight g	120	175	270	535	940	1260	2060	2890	4100	7650

[Note1] PT thread, G thread and NPT thread are available.

Add) Refer to P353 for detail of sensor switch.

### Maximum allowed movement energy and rotation times

Model	Maximal allowed energy (J)		Rotation times (s/90°)	
	With adjustment bolt	With internal shock absorber	With adjustment bolt	With internal shock absorber
HRQ2	0.0015	-	0.2~0.7	-
HRQ3	0.002	-	0.2~0.7	-
HRQ7	0.006	-	0.2~1.0	-
HRQ10	0.01	0.04	0.2~1.0	0.2~0.7
HRQ20	0.025	0.12	0.2~1.0	0.2~0.7
HRQ30	0.05	0.12	0.2~1.0	0.2~0.7
HRQ50	0.08	0.30	0.2~1.0	0.2~0.7
HRQ70	0.24	1.1	0.2~1.5	0.2~1.0
HRQ100	0.32	1.6	0.2~2.0	0.2~1.0
HRQ200	0.56	2.9	0.2~2.5	0.2~1.0

[Note]

1: The movement energy should not exceed the allowed maximum energy, or the inner accessories of product would be damaged;

2: When the rotation times of with shock absorber is larger than the allowed tolerance, the bigger effect will be lost.

### Ordering code

HRQ 20 A □

① ② ③ ④

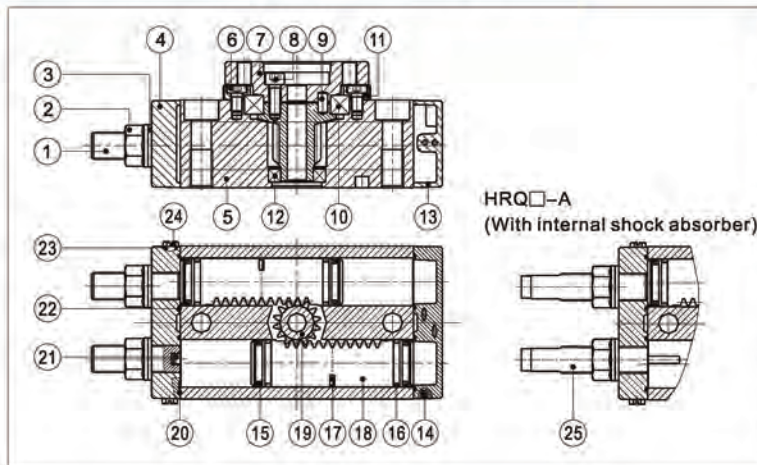
①Model	②Specification	③Cushion type	④Thread type
HRQ: Rotary Table/Rack & Pinion Style	2	Blank: With adjustment bolt	No this code
	3		
	7		
	10	Blank: With adjustment bolt A: With internal shock absorber	Blank: PT G: G T: NPT
	20		
	30		
	50		
	70		
	100		
	200		

[Note] HRQ series are all attached with magnet.

# Rotary table cylinder

## HRQ Series

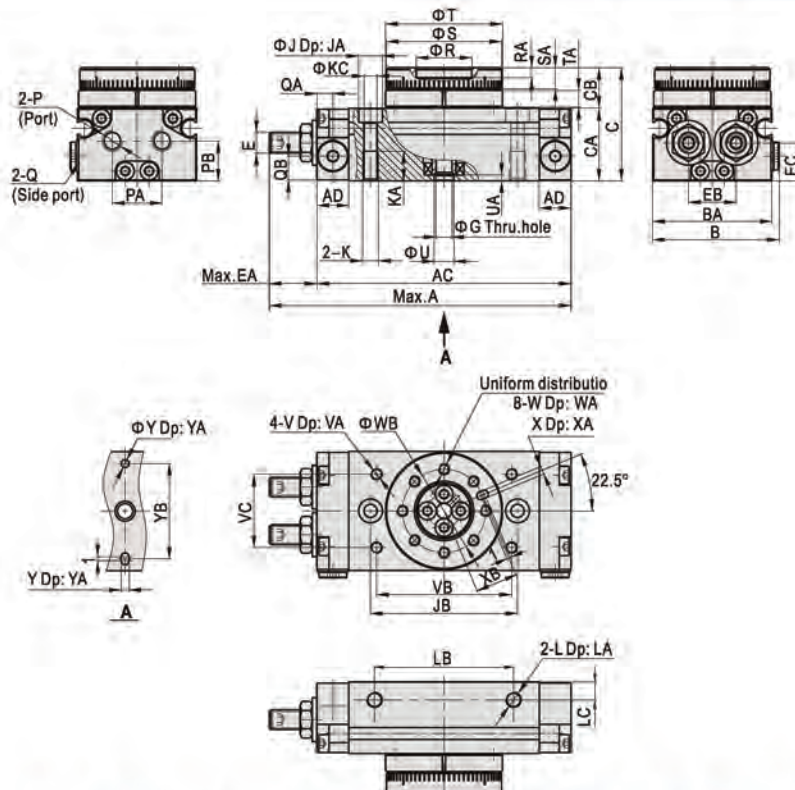
### Inner structure and material of major parts



NO.	Item	Material
1	Adjustment bole	Carbon steel
2	Hexagon nut	Carbon steel
3	Seal washer	Carbon steel & Rubber
4	Front cover	Aluminum alloy
5	Body	Aluminum alloy
6	Hexagon socket head set bole	Carbon steel
7	Table	Aluminum alloy
8	Hexagon socket head set bole	Carbon steel
9	Guide pin/flat key	Carbon steel
10	Deep-groove bearing	Subassembly
11	Bearing retainer	Aluminum alloy
12	Deep-groove bearing/Needle bearing	Subassembly
13	Back cover	Aluminum alloy
14	Steel ball	Stainless steel
15	Piston seal	NBR
16	Wear ring	Wear resistant material
17	Magnet	Rare earths
18	Rack	Stainless steel/Carbon steel
19	Pinion	Chrome molybdenum steel
20	O-ring	NBR
21	Bumper	NBR
22	O-ring	NBR
23	O-ring	NBR
24	Hexagon screw	Stainless steel
25	Shock absorber	Subassembly

### Dimensions

#### HRQ2/3/7

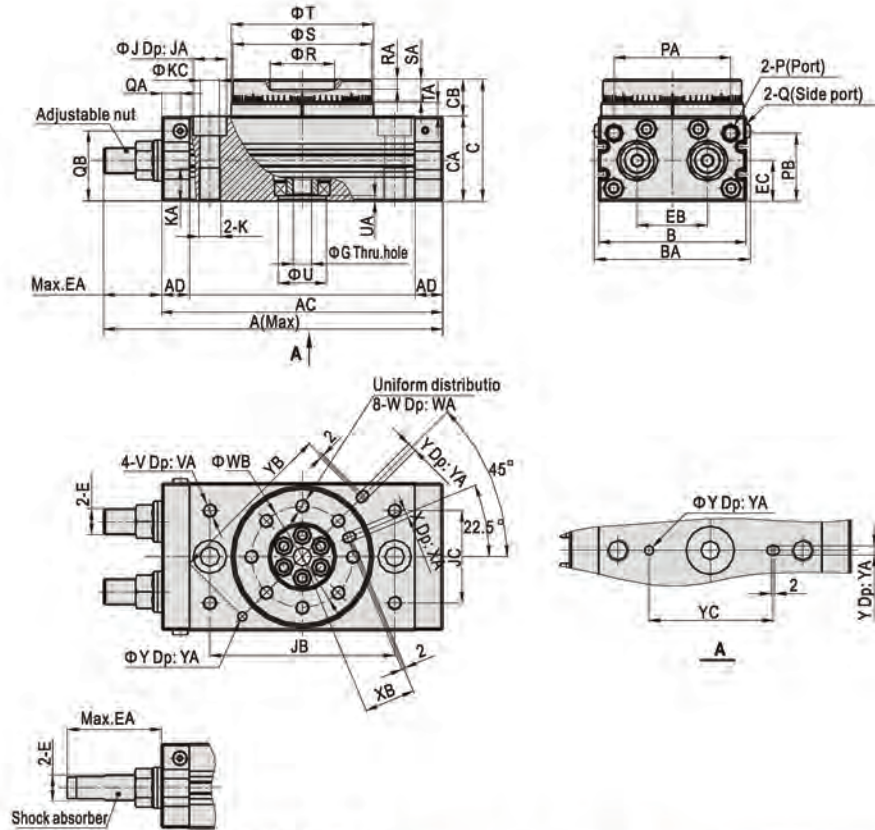


Type\Item	A	AC	AD	B	BA	C	CA	CB	E	EA	EB	EC	G	J	JA	JB	K	KA	KC	L	LA	LB	LC	P	PA
2	76	64	8	32	30	28	18	10	M5×0.8	12	12	9.5	4	6	3.5	37	M4×0.7	7.5	3.5	M4×0.7	4	35	4.5	M5×0.8	12.5
3	82	70	8	36.5	34.5	30.5	20.5	10	M5×0.8	12	15.5	10.5	5	7.5	4.5	43	M5×0.8	8.5	4.5	M4×0.7	4	40	4.5	M5×0.8	15.5
7	94.5	79.5	8	43	41	34.5	23	11.5	M6×1.0	15	18.5	12	6	7.5	4.5	50	M5×0.8	8.5	4.5	M5×0.8	5	50	5	M5×0.8	18.5
Type\Item	PB	Q	QA	QB	R	RA	S	SA	T	TA	U	UA	V	VA	VB	VC	W	WA	WB	X	XA	XB	Y	YA	YB
2	10	M5×0.8	4	6	14(H9)	2.5	29(h9)	5.5	29.5(h9)	4	5(H9)	1.5	M3×0.5	3.5	34	18.5	M3×0.5	5.5	21	2(H9)	2	10.5	2(H9)	2	24
3	12	M5×0.8	4	7.5	17(H9)	2.5	33(h9)	5.5	34(h9)	4	6(H9)	1.5	M3×0.5	3.5	38	23	M3×0.5	5.5	25	2(H9)	2	12.5	2(H9)	2	28
7	14	M5×0.8	4	9	20(H9)	3	39(h9)	6.5	40(h9)	4.5	7(H9)	1.5	M4×0.7	4.5	45	30	M4×0.7	6.5	29	3(H9)	3	14.5	3(H9)	3	32

# Rotary table cylinder

## HRQ Series

### HRQ10-50



HRQ□-A( With internal shock absorber)

Type\Item	A(With internal shock absorber)	A(With adjustment bolt)	AC	AD	B	BA	C	CA	CB	E	EA(With internal shock absorber)	EA(With adjustment bolt)
10	123	112	92	9.5	50	54	47	34	13	M10 × 1.0	31	20
20	169	145.3	117	11	65	69	54	37	17	M12 × 1.0	52	28.3
30	178.5	154.5	127	11.5	70	74	57	40	17	M12 × 1.0	51.5	27.5
50	212	185.9	152	15	80	84	66	46	20	M14 × 1.5	60	33.9

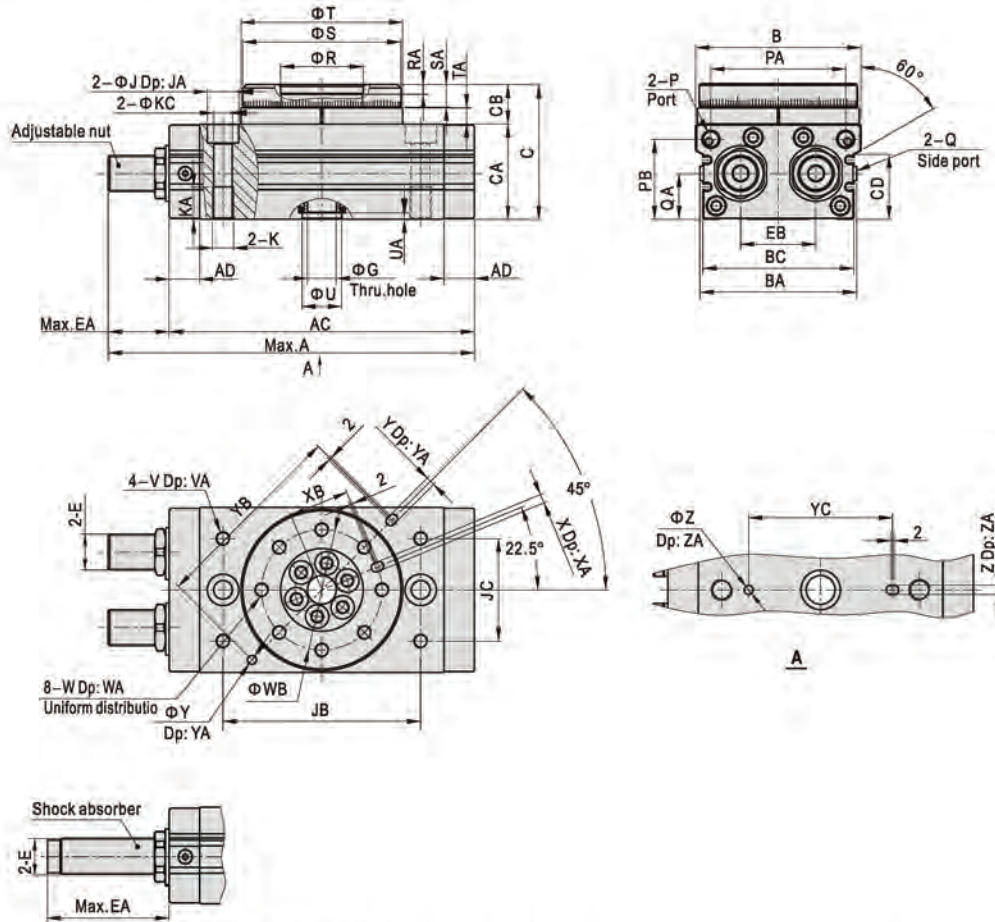
Type\Item	EB	EC	G	J	JA	JB	JC	K	KA	KC	P	PA	PB	Q	QA	QB	R	RA	S	SA
10	20.5	14	5	11	6.5	60	27	M8 × 1.25	12	6.5	M5 × 0.8	34.5	28	M5 × 0.8	4.5	29	20(H9)	4.5	45(h9)	8
20	27.5	16	9	14	8.5	76	34	M10 × 1.5	15	8.5	M5 × 0.8	47	30	M5 × 0.8	6	30	28(H9)	6.5	60(h9)	10
30	29	18.5	9	14	8.5	84	37	M10 × 1.5	15	8.5	1/8"	50	32	M5 × 0.8	6.5	34	32(H9)	5	65(h9)	10
50	38	22	10	18	10.5	100	50	M12 × 1.75	18	10.5	1/8"	63	38	M5 × 0.8	10	38	35(H9)	5.5	75(h9)	12

Type\Item	T	TA	U	UA	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC
10	46(h9)	4.5	15(H9)	3	M5 × 0.8	8	M5 × 0.8	8	32	3(H9)	3.5	16	3(H9)	3.5	56	40
20	61(h9)	6.5	17(H9)	2.5	M6 × 1.0	8	M6 × 1.0	10	43	4(H9)	4.5	21.5	4(H9)	4.5	74	50
30	67(h9)	6.5	22(H9)	3	M6 × 1.0	8	M6 × 1.0	10	48	4(H9)	5	24	4(H9)	4.5	80	58
50	77(h9)	7.5	26(H9)	3	M8 × 1.25	8	M8 × 1.25	12	55	5(H9)	6	27.5	5(H9)	5.5	92	68

# Rotary table cylinder

## HRQ Series

HRQ70-200



HRQ□-A (With internal shock absorber)

Type\Item	A(With adjustment bolt)	A(With internal shock absorber)	AC	AD	B	BA	BC	C	CA	CB	CD	E	EA(With adjustment bolt)						
70	206.8	244	170	17	92	88	84	75	53	22	36	M20 × 1.5	36.8						
100	225.7	263	189	17	102	99	95	86	59	27	42	M20 × 1.5	36.7						
200	279.5	316.5	240	24	120	117	113	106	74	32	57	M27 × 1.5	39.5						
Type\Item	EA(With internal shock absorber)	EB	G	J	JA	JB	JC	K	KA	KC	P	PA	PB	Q	QA	R	RA	S	SA
70	74	42	16	17.5	12	110	57	M12 × 1.75	18	10.5	1/8"	75	44	M5 × 0.8	25	46(H9)	5	88(h9)	12.5
100	74	50	19	17.5	12	130	66	M12 × 1.75	18	10.5	1/8"	85	50	M5 × 0.8	29	56(H9)	6	98(h9)	14.5
200	76.5	60	24	20	12.5	150	80	M16 × 2.0	25	14	1/8"	103	62.5	M5 × 0.8	36	64(H9)	9	116(h9)	16.5
Type\Item	T	TA	U	UA	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC	Z	ZA	
70	90(h9)	9	22(H9)	3.5	M8 × 1.25	10	M8 × 1.25	12.5	67	5(H9)	5.5	33.5	5(H9)	3.5	110	80	5(H9)	3.5	
100	100(h9)	12	24(H9)	3.5	M8 × 1.25	10	M10 × 1.5	14.5	77	6(H9)	6.5	38.5	6(H9)	4.5	120	100	6(H9)	4.5	
200	118(h9)	15	32(H9)	5.5	M12 × 1.75	13	M12 × 1.75	16.5	90	8(H9)	8.5	45	8(H9)	4.5	140	110	8(H9)	6.5	

## HRQ Series

### How to select product

1. Determine the following working conditions according to the actual situation:

- 1.1) Rotation angle  $\theta$ : The actual rotation angle must be within the maximum allowed range of rotation angle of cylinder.
- 1.2) Rotation time  $t$ : The rotation time must be within the maximum allowed range of rotation time of cylinder.
- 1.3) Installation position of cylinder: Allow enough installation space, so as to ensure leaving adequate space for rotation of cylinder and workpieces.
- 1.4) Determination of loading mass and loading shape.

2. Calculation of necessary forgue needed when loading rotation (T(N.m)):

Calculate the necessary moment required for loading rotation according to the formula below, and combine with the forgue diagram of actual effect, to choose pneumatic cylinder with suitable forgue output.

2.1) Calculation method of moment of inertia in different conditions

$T = K \times I \times \dot{\omega}$	T: Necessary forgue required for loading rotation (N.m)
$\dot{\omega} = \frac{2\theta}{t^2}$	K: Coefficient of allowance, K is defined as 5
	I: Moment of inertia (kg.m <sup>2</sup> )
	$\omega$ : Angular acceleration (rad/s <sup>2</sup> )
	$\theta$ : Rotation Angle (rad)
	t: Rotation time (s)

Diagram	Description	Calculation formula of moment of inertia	Rotation radius	Diagram	Description	Calculation formula of moment of inertia	Rotation radius
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{8}$	$\frac{d^2}{8}$		a: Sheet length (m) b: Length of side (m) m: Mass (kg)	$I = \frac{m(a^2+b^2)}{12}$	$\frac{a^2+b^2}{12}$
		Note: no special installation direction				Note: no special installation direction	
	d <sub>1</sub> : Diameter (m) d <sub>2</sub> : Diameter (m) m <sub>1</sub> : d <sub>1</sub> Mass (kg) m <sub>2</sub> : d <sub>2</sub> Mass (kg)	$I = \frac{m_1 d_1^2 + m_2 d_2^2}{8}$	$\frac{d_1^2 + d_2^2}{8}$		a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{12}$	$\frac{a^2}{12}$
		Note: compare d <sub>1</sub> with d <sub>2</sub> , disregard d <sub>1</sub> if d <sub>1</sub> is extremely tiny				Note: no special installation direction	
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{16}$	$\frac{d^2}{16}$		a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{3}$	$\frac{a^2}{3}$
		Note: no special installation direction				Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.	
	r: Radius (m) m: Mass (kg)	$I = \frac{2mr^2}{5}$	$\frac{2r^2}{5}$		a: Sheet length (m) b: Distance between the rotation axis and the gravity center of loading (m) m: Mass (kg)	$I = \frac{ma^2}{12} + mb^2$	$\frac{a^2}{12} + b^2$
		Note: no special installation direction				Note: the cuboids are same too.	
	a <sub>1</sub> : Length of stick (m) a <sub>2</sub> : Length of stick (m) m <sub>1</sub> : a <sub>1</sub> Mass (kg) m <sub>2</sub> : a <sub>2</sub> Mass (kg)	$I = \frac{m_1 a_1^2 + m_2 a_2^2}{3}$	$\frac{a_1^2 + a_2^2}{3}$		a: Tooth number of gear b: Tooth number of loading gear	$I_s = \left(\frac{a}{b}\right)^2 I_b$	
		Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.					
	a <sub>1</sub> : Sheet length (m) a <sub>2</sub> : Sheet length (m) b: Length of side (m) m <sub>1</sub> : a <sub>1</sub> Mass (kg) m <sub>2</sub> : a <sub>2</sub> Mass (kg)	$I = \frac{m_1(4a_1^2 + b^2) + m_2(4a_2^2 + b^2)}{12}$	$\frac{2a_1^2 + 2a_2^2 + b^2}{6}$		a <sub>1</sub> : Vertical distance between the rotation axis and the concentrated loading (m) a <sub>2</sub> : Length of arm (m) m <sub>1</sub> : Mass of concentrated loading (kg) m <sub>2</sub> : Mass of arm (kg)	$I = m_1 a_1^2 + \frac{m_2 a_2^2}{3} + m_2 K$	
		Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.				Note: 1. horizontal installation. 2. compared with m <sub>1</sub> , disregard if m <sub>1</sub> is extremely tiny. 3. calculate K according to the shape of concentrated loading row by row. For example, when the loading is spheroid, K=2r <sup>2</sup> /5	

3. Calculation of maximum movement energy  $E_{max}$  (J):

Calculate the maximum movement energy  $E_{max}$  according to the formula below, and make sure that the maximum movement energy is within allowed energy range of the chosen pneumatic cylinder, excessive large movement energy would lead to damage of inner parts, please choose rotation cylinder attached with shock absorber when the movement energy is fairly large.

$$E_{max} = \frac{1}{2} I \omega_{max}^2 \quad \omega_{max} = \frac{2\theta}{t} \quad \omega_{max}: \text{Maximal angular velocity (rad/s)}$$

4. Calculation of loading rate

Calculate the loading rate according to the formula below, and the loading rate must not be more than 1.

$$\text{Loading rate} = \frac{W_a}{\text{Maximal allowed axial loading}} + \frac{W_r}{\text{Maximal allowed radial loading}} + \frac{M}{\text{Maximal allowed bending moment of working platform}} \leq 1$$

$W_a$ : Actual axial loading     $W_r$ : Actual radial loading    M: Actual loaded bending moment of working platform

5. Determination method

It could be used only when the chosen pneumatic cylinder must meet the requirements of article 2, 3 and 4 simultaneously.

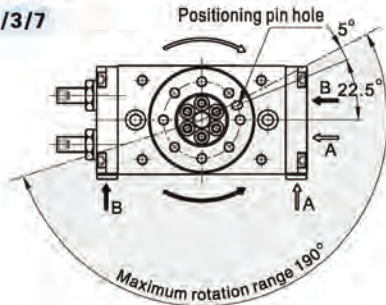
## HRQ Series

### Installation and application

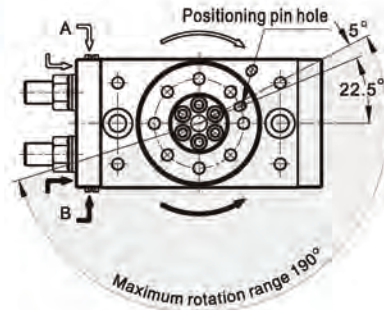
#### 1. Rotation Direction and Rotation Angle

##### 1.1) Rotation Direction

**HRQ2/3/7**



**HRQ10~200**

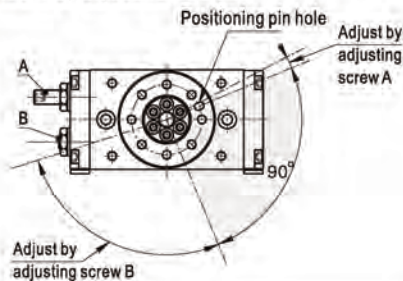


- A) By adjusting the adjustment bolt, the rotation end can be set within the range shown in the up drawing: Maximum rotation is  $190^\circ$  ;  
 B) The rotary table turns in the clockwise direction when the A port is pressurized, and in the counter-clockwise direction when the B port is pressurized.

##### 1.2) Rotation Range Example( $90^\circ$ Rotation)

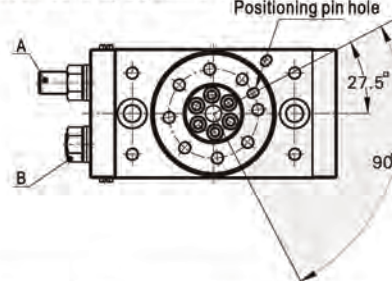
**HRQ2/3/7**

Adjustment amount by adjustment bolt B

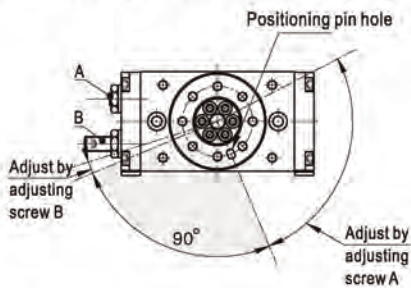


**HRQ10~200**

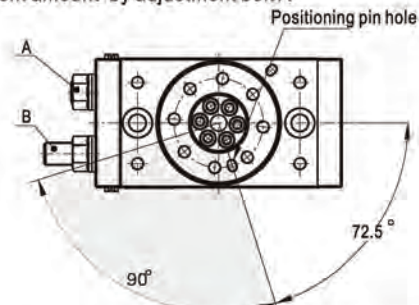
Adjustment amount by adjustment bolt B



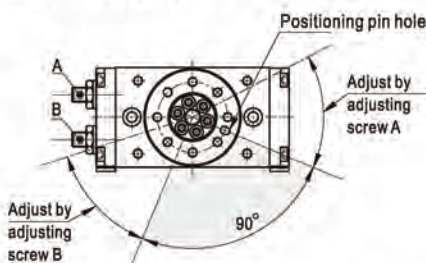
Adjustment amount by adjustment bolt A



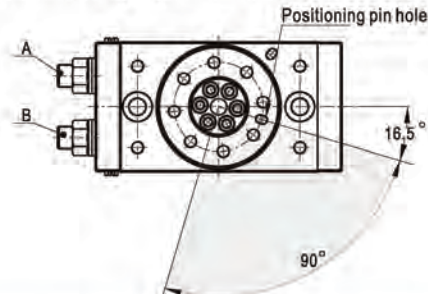
Adjustment amount by adjustment bolt A



Adjustment amount by adjustment bolt A, B



Adjustment amount by adjustment bolt A, B



##### 1.3) The rotation angle can also be set on a type with internal absorber.

Model	Adjustment angle per rotation of angle (adjustment screw)	Model	Adjustment angle per rotation of angle (adjustment screw or shock absorber)
HRQ2	$11.5^\circ$	HRQ10	$10.2^\circ$
HRQ3	$10.9^\circ$	HRQ20	$6.5^\circ$
HRQ7	$10.2^\circ$	HRQ30	$6.5^\circ$
		HRQ50	$8.2^\circ$
		HRQ70	$7.0^\circ$
		HRQ100	$6.1^\circ$
		HRQ200	$4.9^\circ$

## HRQ Series

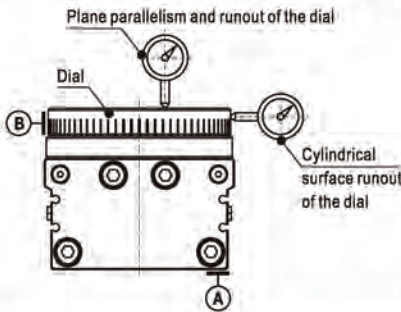
2. The range of rotation angle has been adjusted to the maximum in the factory, please do not enlarge the rotation angle any more.
3. The movement energy should not exceed the allowed maximum energy, or the inner parts will be damaged.
4. The rotary parts need no lubrication.
5. Series HRQ is equipped with a rubber bumper or shock absorber. Therefore, perform rotation adjustment in the pressurized condition (minimum operation pressure: 0.1 Mpa or more for adjustment bolt and internal shock absorber types, and 0.2 MPa or more for external shock absorber type.)
6. Refer to the table below for tightening torques of the shock absorber setting nut.

Shock absorber size	Max. tightening torque(Nm)
M10	3.5
M12	8.0
M14	11.0
M20	24.0
M27	63.0

7. Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
8. Shock absorbers are consumable parts.  
When a decrease in energy absorption capacity is noticed, it must be replaced.

Rotary table cylinder	Shock absorber
HRQ10	ACA1006-A
HRQ20\HRQ30	ACA1215-A
HRQ50	ACA1416-A
HRQ70\HRQ100	ACA2020-A
HRQ200	ACA2725-A

9. Strictly control run out and parallelism of the dial according to the requirements of the following table.

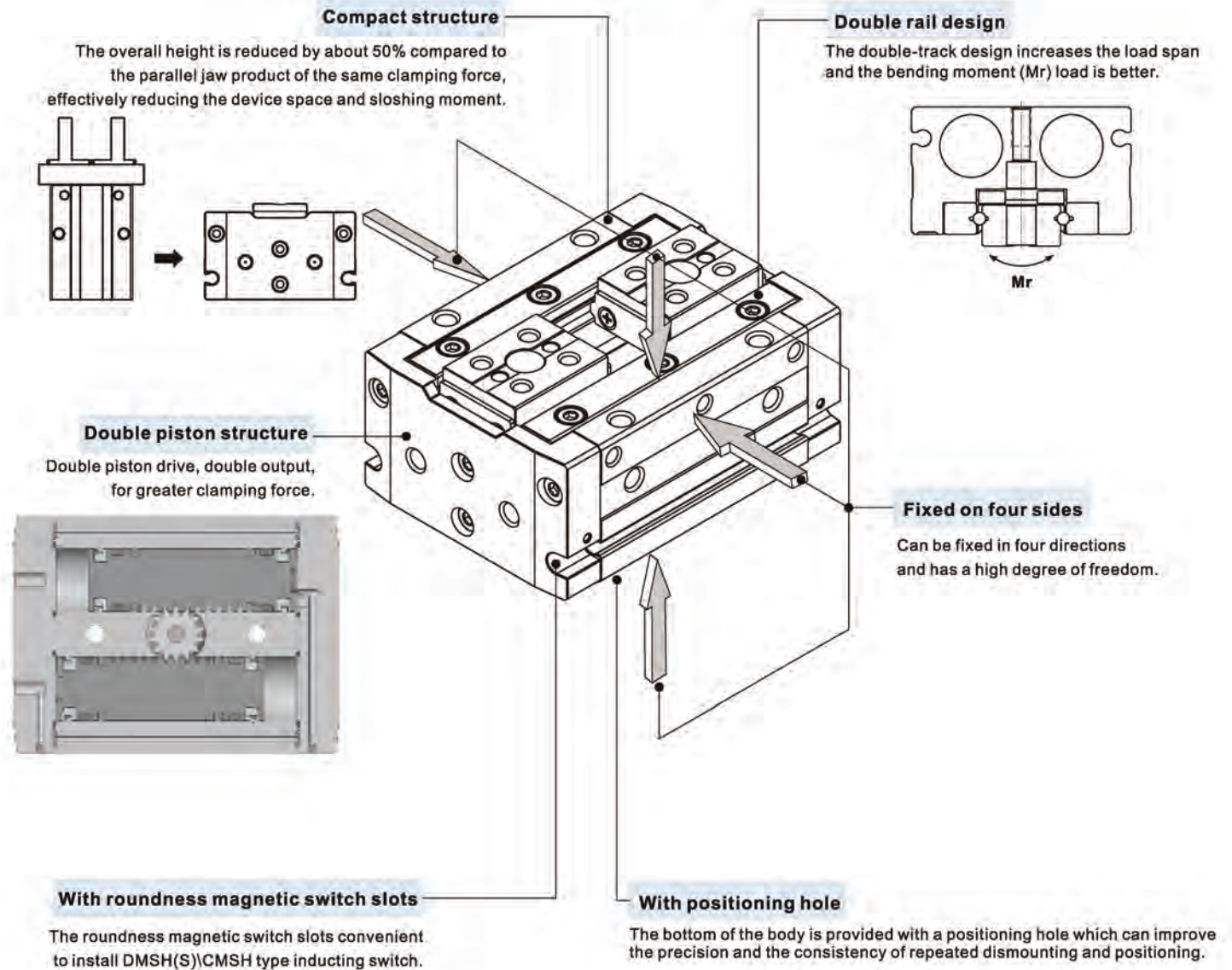


Items	Specific requirements	Relative datum
Plane parallelism of the dial	0.1	A
Plane runout of the dial	0.1	A
Cylindrical surface runout of the dial	0.1	A



# Compact air gripper—HFD Series

## Compendium of HFD Series



## Gripping force and stroke

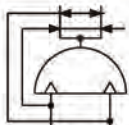
Bore size	8			12			16			20			25	
Stroke (mm)	8	15	30	10	25	50	15	30	60	20	40	80	40	80
Gripping force per finger Effective value(N)	19			48			90			141			210	
Weight (g)	88.8	105.7	153.4	226.7	303.7	441.9	505.3	642.3	946.7	1019.6	1319.1	1983.3	1693.7	2558.9

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.





### Symbol



### Ordering code

**HFD 16 X 15**



①Model	②Bore size		③Stroke	
	8	12	8	15 30
HFD: Compact air finger (Double acting)	12	10	25	50
	16	15	30	60
	20	20	40	80
	25	40	80	

### Specification

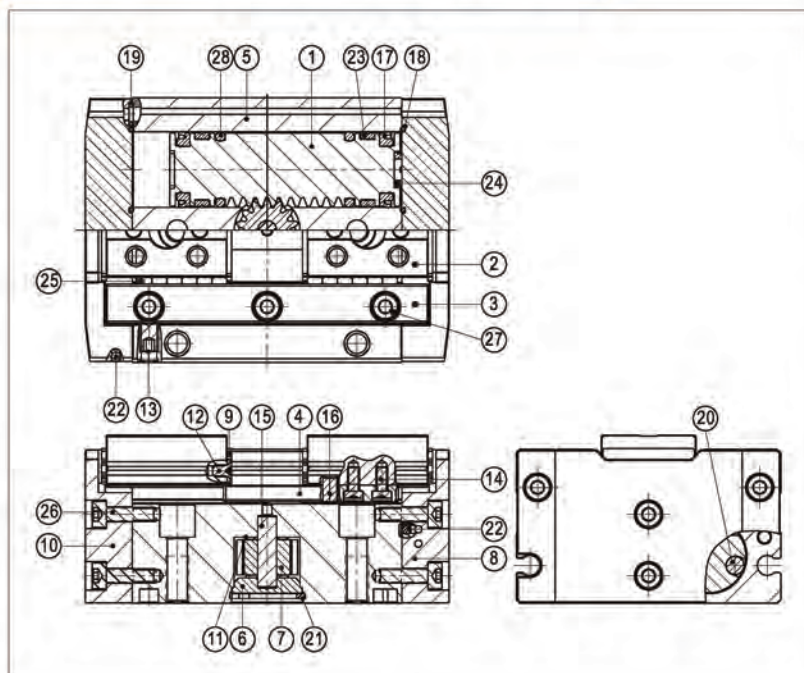
Bore size (mm)	8	12	16	20	25
Acting type	Double acting				
Fluid	Air(to be filtered by 40µm filter element)				
Operating pressure	0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
Proof pressure	1.2MPa(175psi)(12bar)				
Temperature	-20~70°C				
Lubrication	Not required				
Repeatability mm	±0.05				
Max. frequency	Longer stroke		60(c.p.m)		
	Middle and short stroke		120(c.p.m)		
Sensor switches	CMSH, DMSH(S)				
Port size	M3×0.5		M5×0.8		

Note) Refer to P353 for detail of sensor switch.

### Product feature

1. The double-track design increases the load span and the bending moment ( $M_r$ ) load is better.
2. Double piston drive, double output, for greater clamping force.
3. The bottom of the body is provided with a positioning hole which can improve the precision and the consistency of repeated dismounting and positioning.
4. The jaw rails are made of stainless steel for high rigidity and corrosion resistance.
5. Can be fixed in four directions and has a high degree of freedom.
6. The overall height is reduced by about 50% compared to the parallel jaw product of the same clamping force, effectively reducing the device space and sloshing moment.

### Inner structure and material of major parts



NO.	Item	Material
1	Rack	Stainless steel
2	Jaws	Stainless steel
3	Guide	Stainless steel
4	Joint arm	Cr-Mo steel
5	Body	Aluminum alloy
6	Rack end cap	Aluminum alloy
7	Gear	Cr-Mo steel
8	Back cover	Aluminum alloy
9	Baffle	Stainless steel
10	Front cover	Aluminum alloy
11	Plastic bearing	Wear resistant material
12	Screw	Stainless steel
13	Screw	Stainless steel
14	Screw	Alloy steel
15	Pin	Bearing steel
16	Pin	Bearing steel
17	Piston seal	NBR
18	O-ring	NBR
19	O-ring	NBR
20	Magnet	Rare earth material
21	C clip	Spring steel
22	Steel ball	Stainless steel
23	Wear ring	Wear resistant material
24	Bumper	TPU
25	Steel ball	Bearing steel
26	Bolt	Stainless steel
27	Bolt	Stainless steel
28	O-ring	NBR

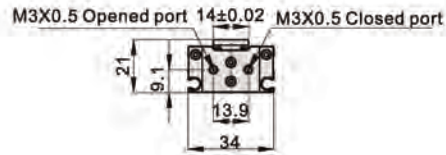
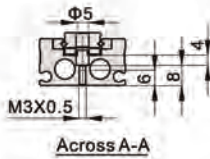
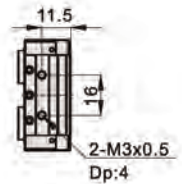
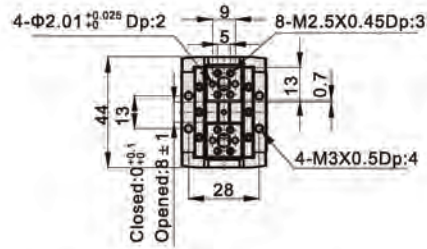
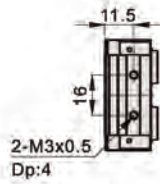
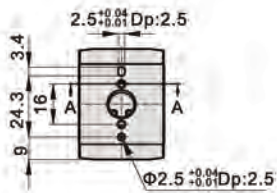
Note: HFD8 No. 12 and No. 27 are made of alloy steel.

# Compact air gripper

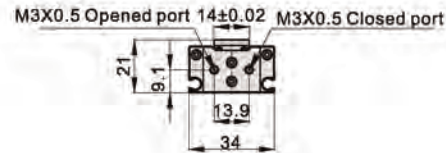
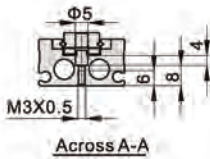
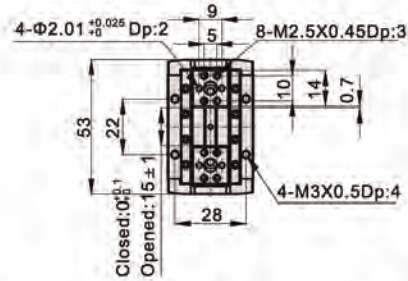
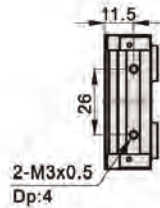
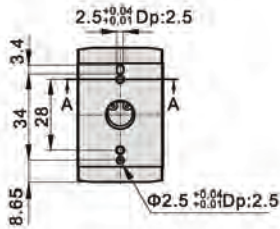
## HFD Series

### Dimensions

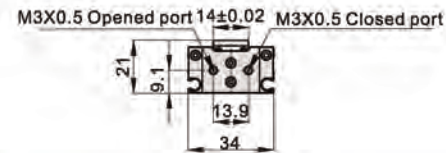
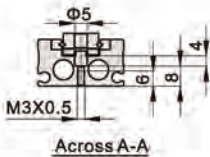
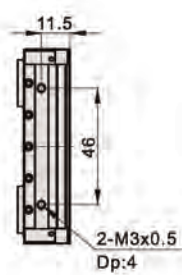
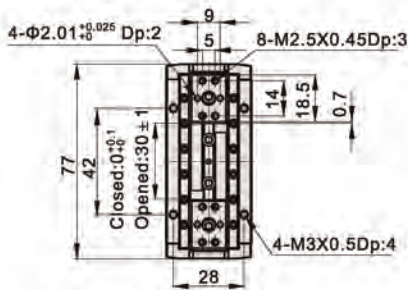
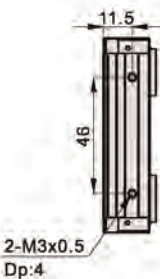
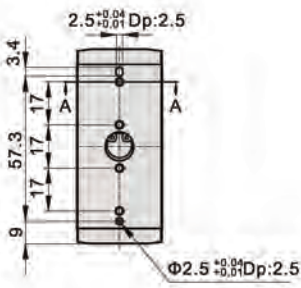
#### HFD8X8



#### HFD8X15



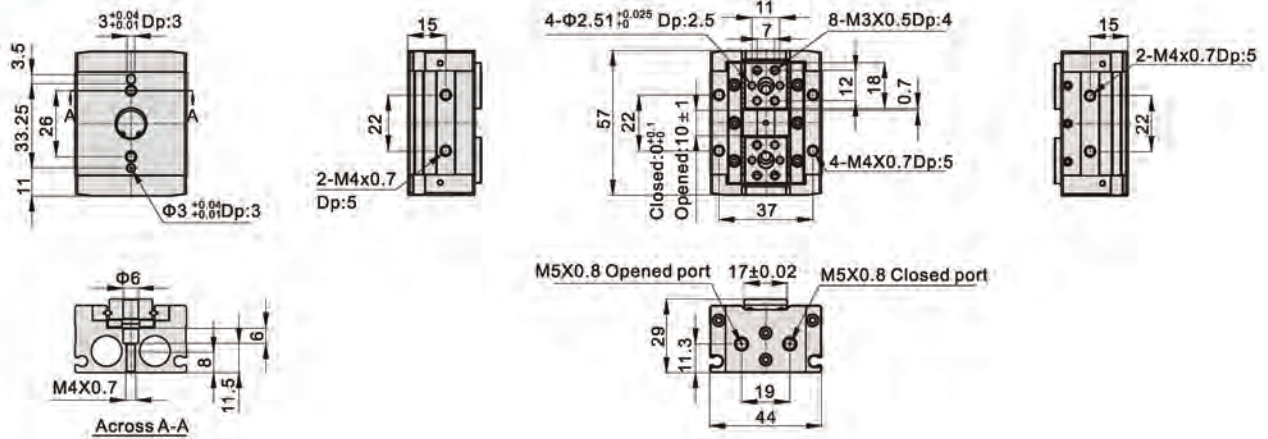
#### HFD8X30



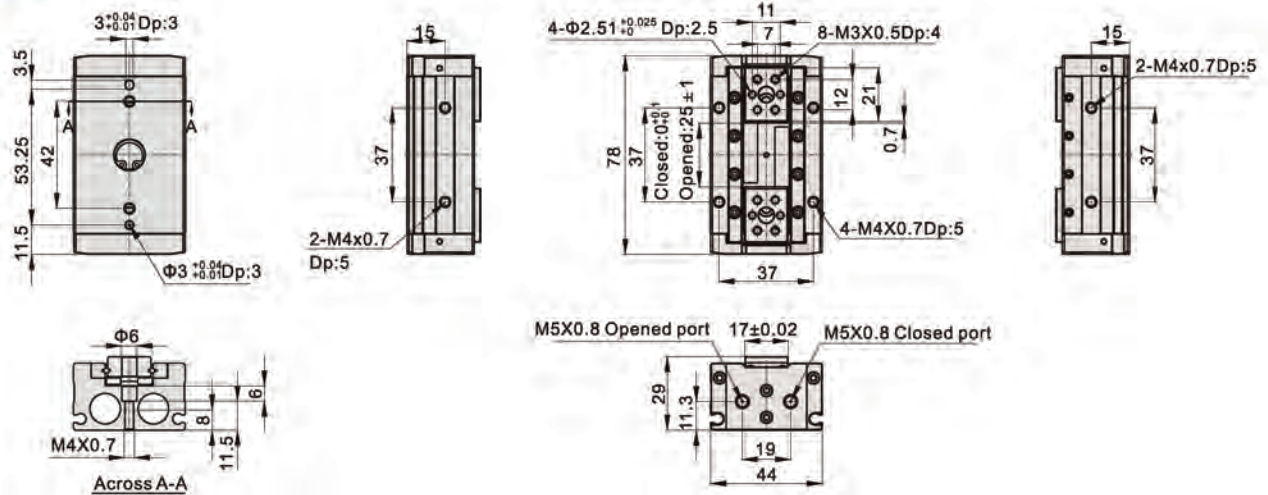
# Compact air gripper

## HFD Series

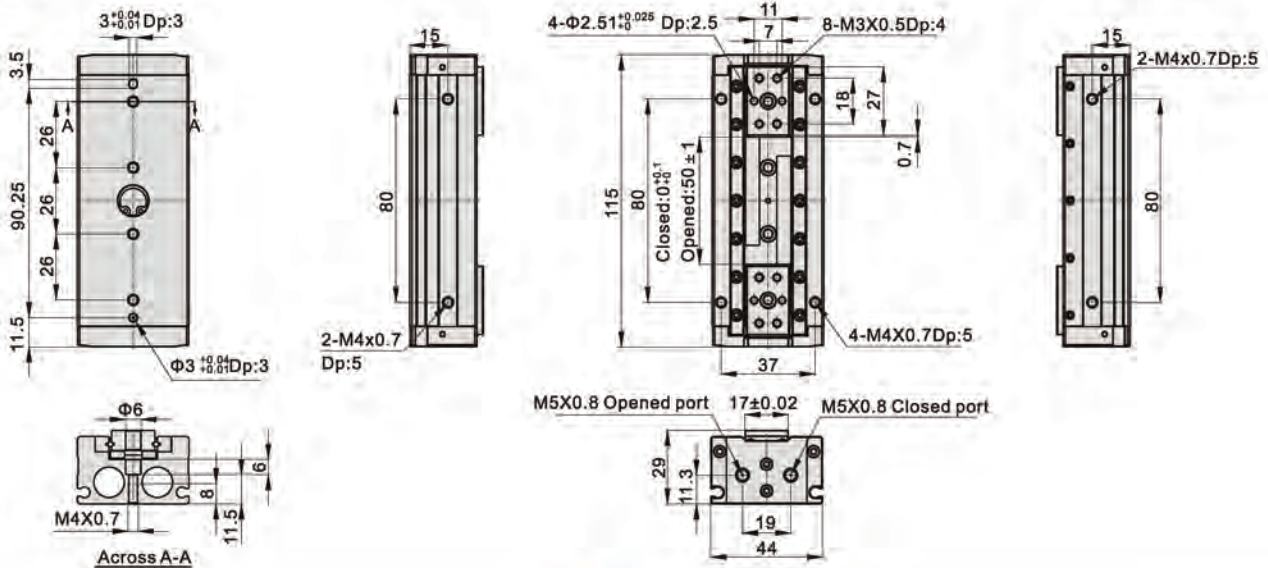
### HFD12X10



### HFD12X25



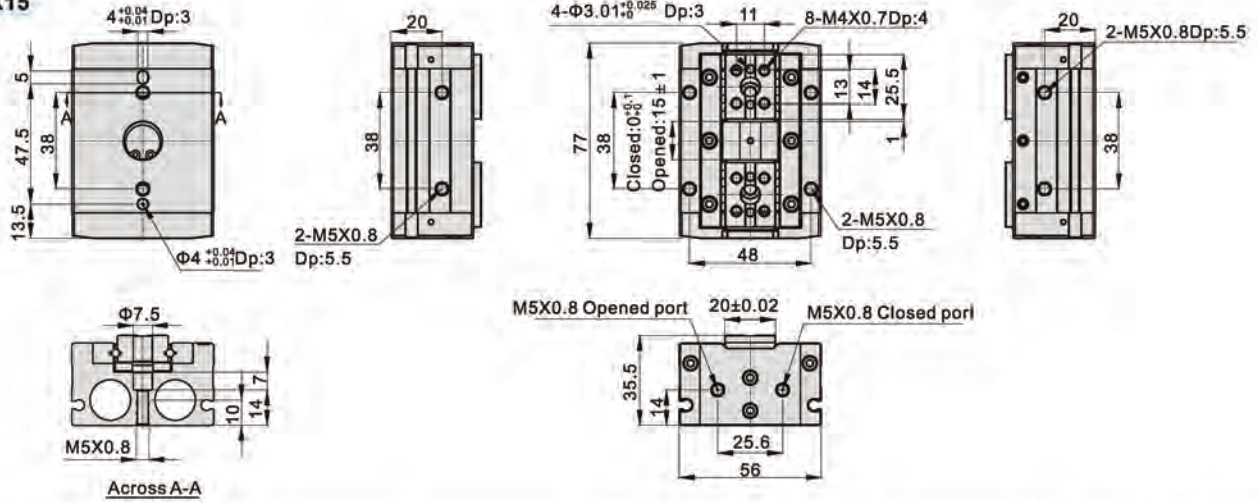
### HFD12X50



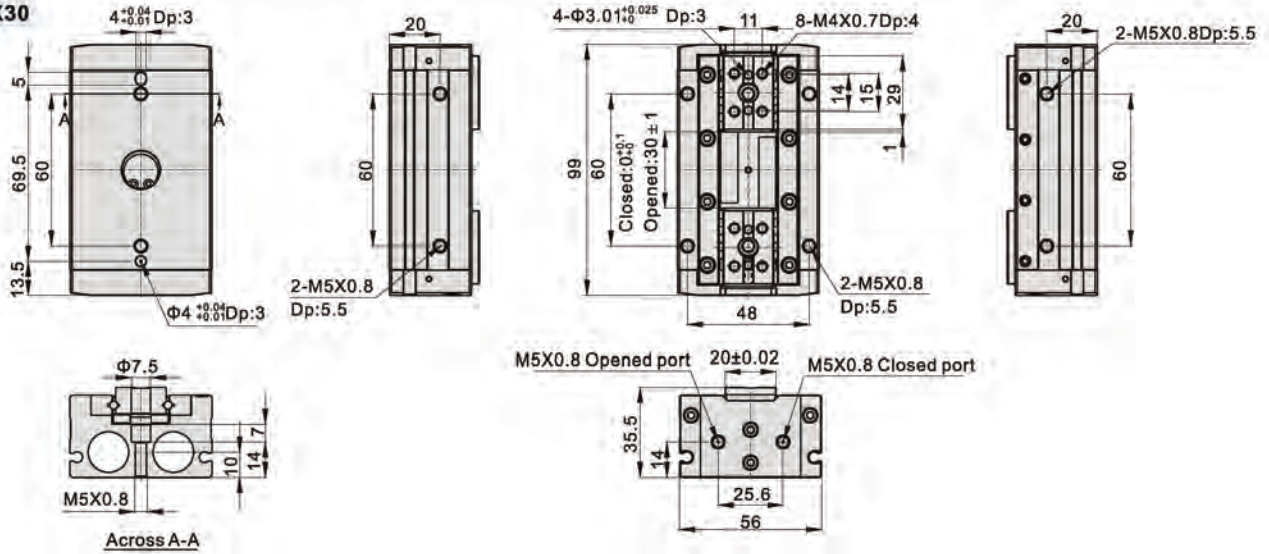
# Compact air gripper

## HFD Series

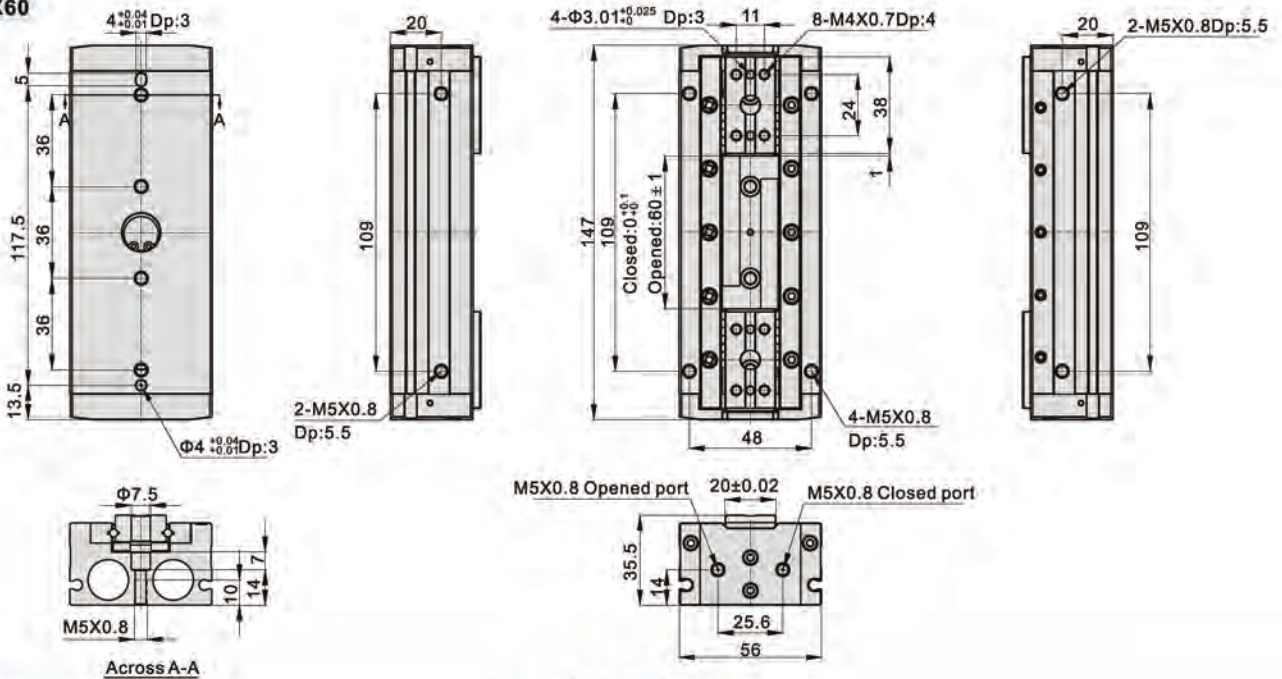
### HFD16X15



### HFD16X30



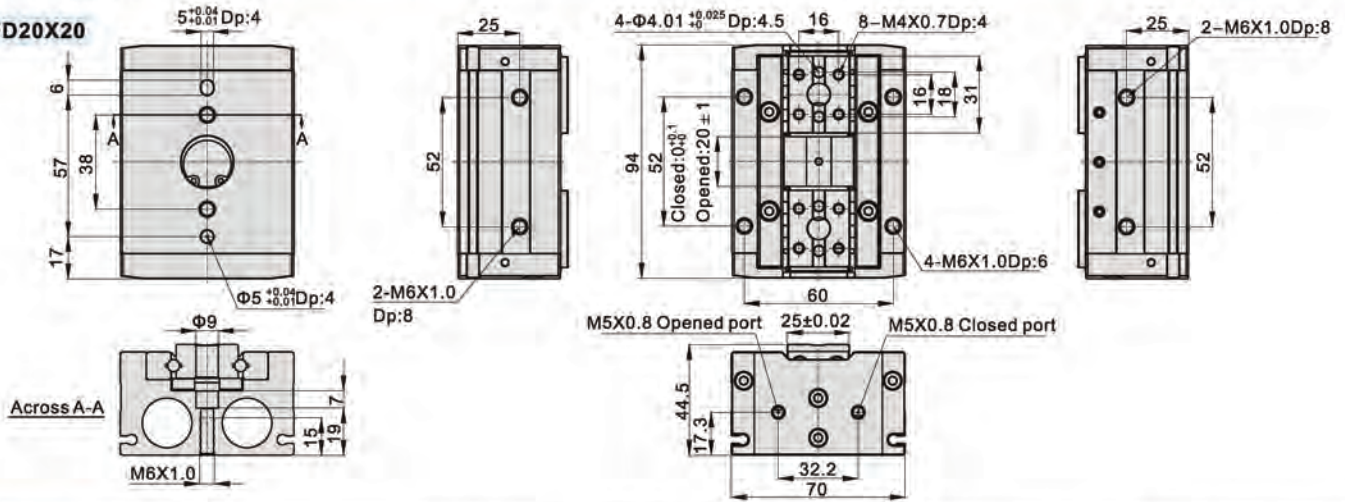
### HFD16X60



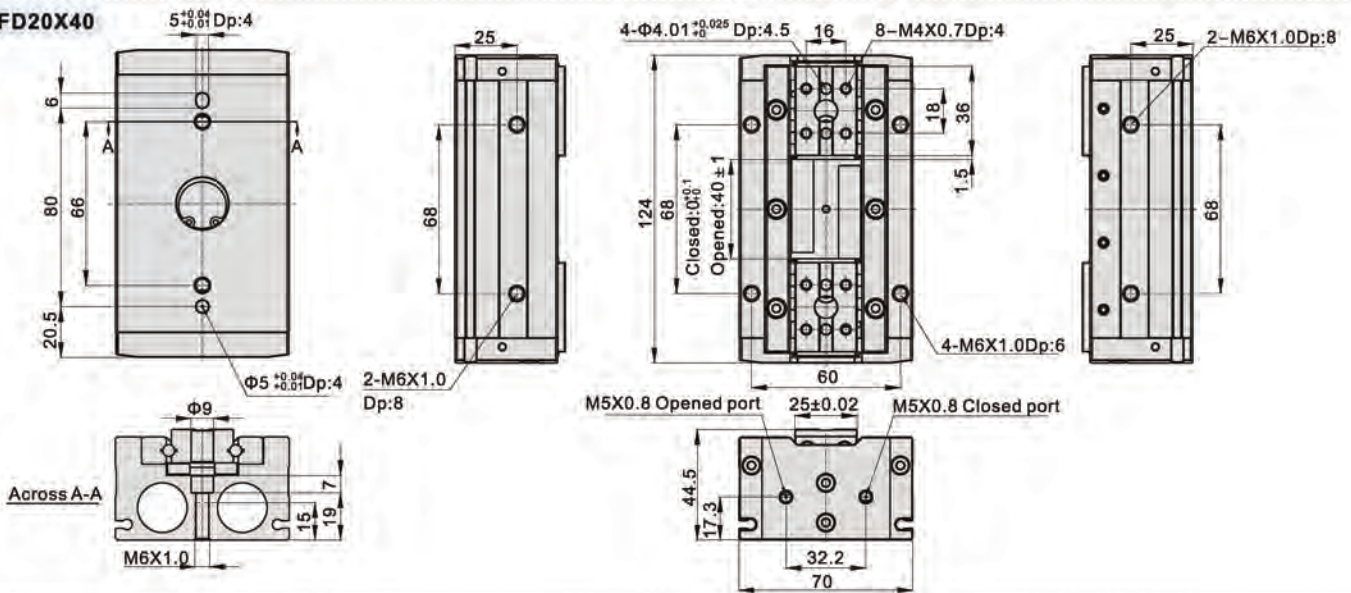
# Compact air gripper

## HFD Series

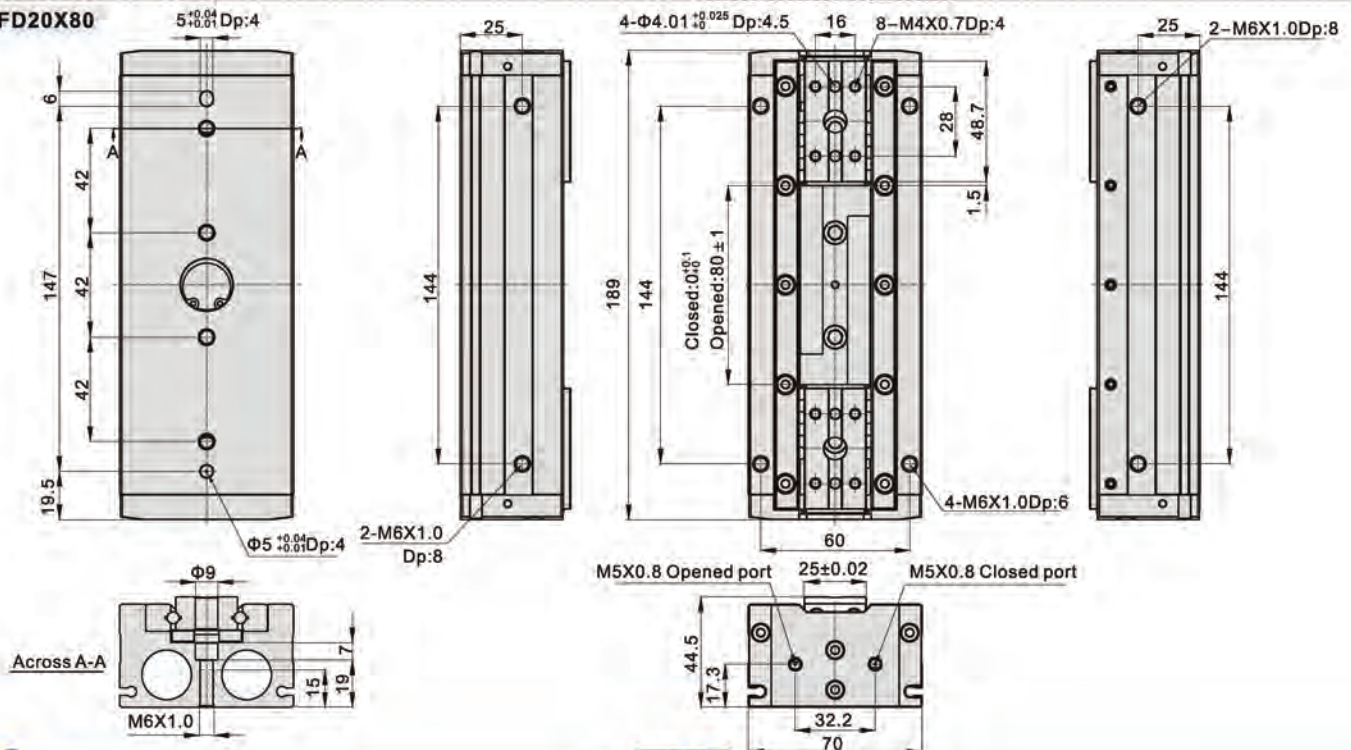
**HFD20X20**



**HFD20X40**



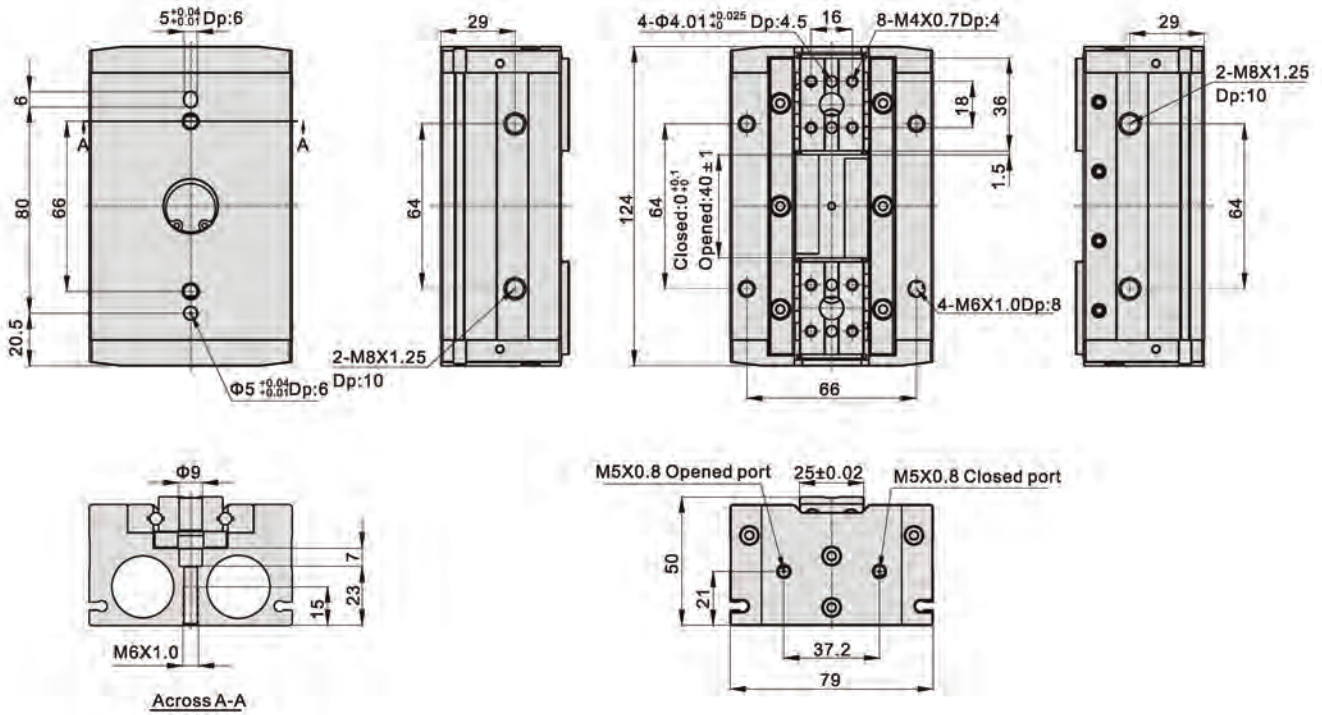
**HFD20X80**



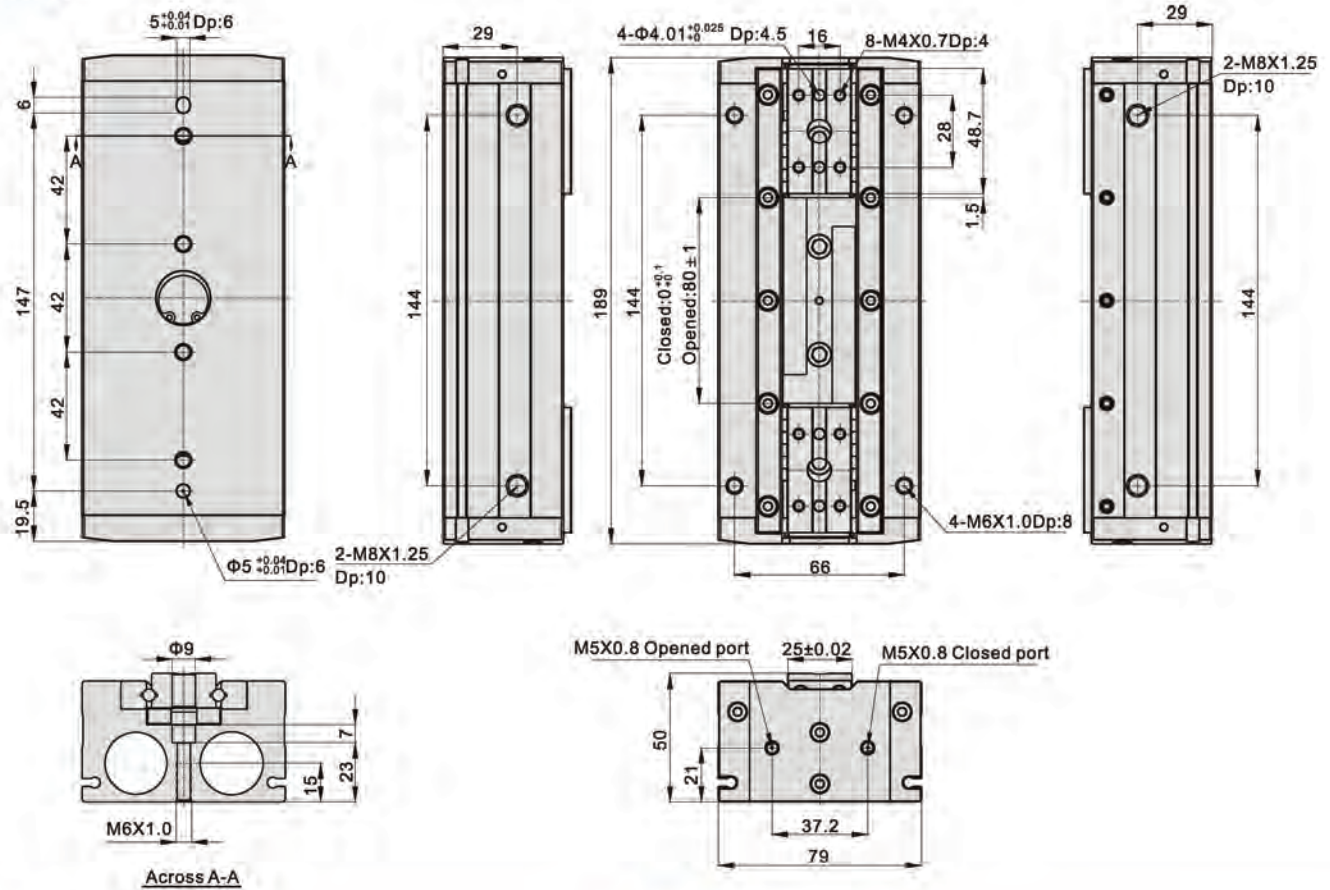
# Compact air gripper

## HFD Series

### HFD25X40



### HFD25X80



## HFD Series

### How to select product

Please select pneumatic finger according to the following steps:

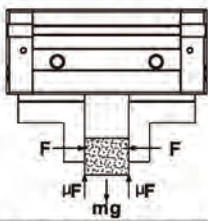
① The selection of the effective gripping force

② The confirmation of the gripping point

③ The confirmation of the external force put on the gripping jaw

#### 1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left :

$n$ : Number of gripping  
 $F$ : Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 $m$ : mass of work-pieces  
 $g$ : acceleration of gravity ( $=9.8m/s^2$ )

The condition that the work-pieces won't drop is:  $n \times \mu F > mg$

$$\text{so: } F > \frac{mg}{n \times \mu}$$

Safety coefficient is  $a$ , so  $F$  is:

$$F = \frac{mg}{n \times \mu} \times a$$

$\mu = 0.2$

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

$\mu = 0.1$

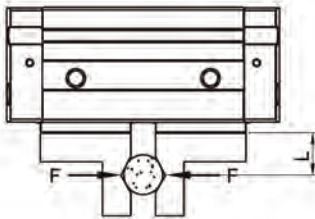
$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

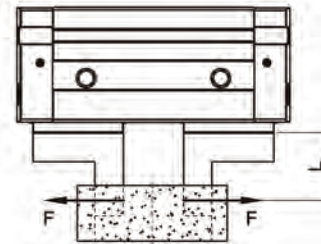
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

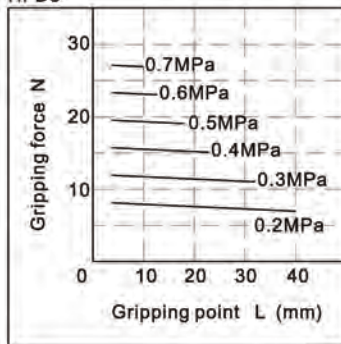
#### Closed gripping force



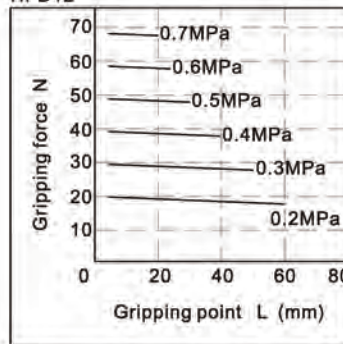
#### Opened gripping force



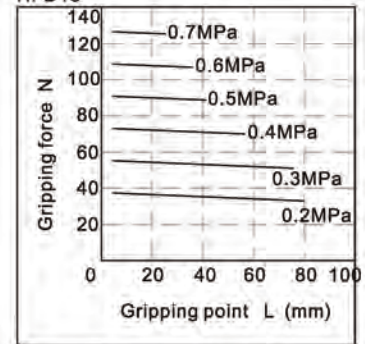
HFD8



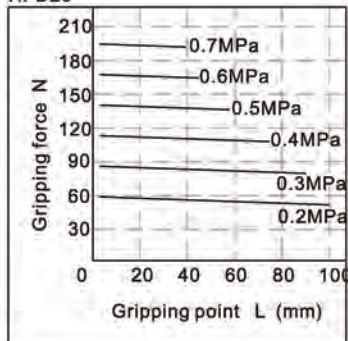
HFD12



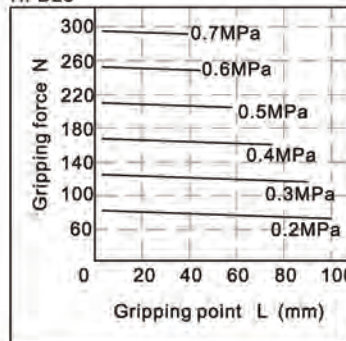
HFD16



HFD20



HFD25



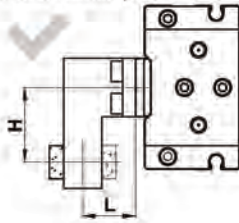
## HFD Series

### 2. The selection of the gripping point

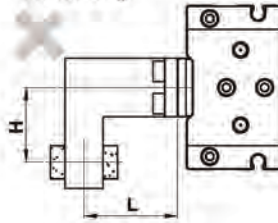
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.

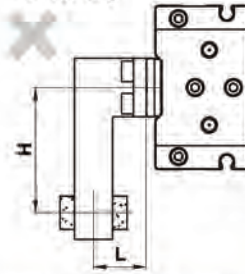
L and H have proper sizes



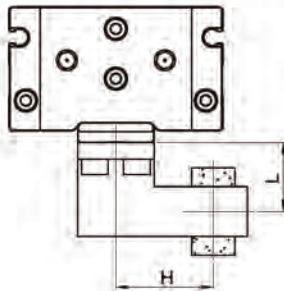
L is too long



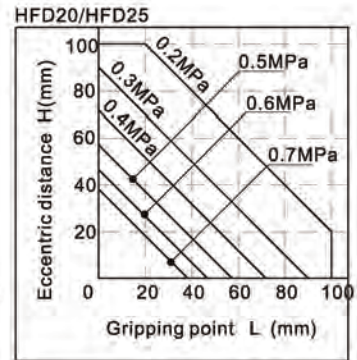
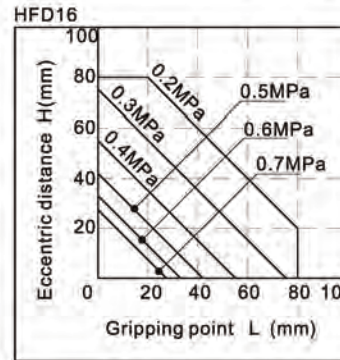
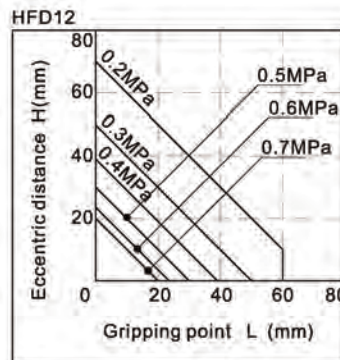
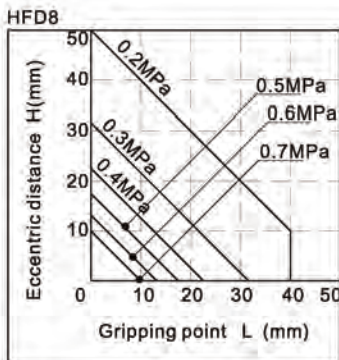
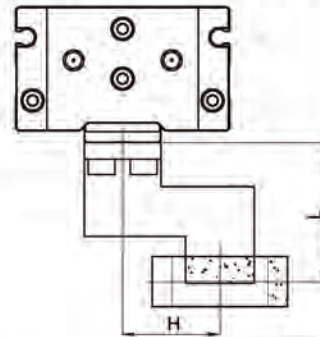
H is too long



### The range of the closed gripping points

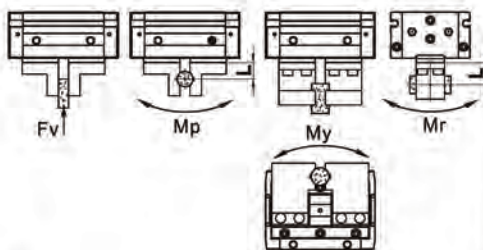


### The range of the Opened clamping point



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

### 3. The confirmation of the external force put on the gripping jaw.



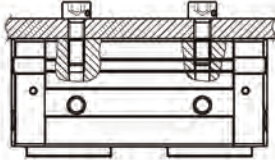
[Note]  
The loads and torque values of said are all static values.  
L=Distance to load point(mm).

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
8	58	0.26	0.26	0.64	$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFD12, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, $\frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$ Actual load f=10(N) < 22.7(N) To meet the using requirements
12	98	0.68	0.68	1.68		
16	176	1.4	1.4	3.36		
20	294	2	2	4.8		
25	294	2	2	4.8		

### Installation and application

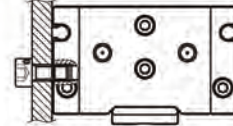
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces.  
In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart.  
If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



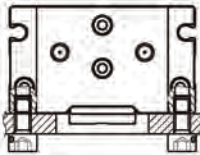
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.95	6
12	M4×0.7	2.2	8
16	M5×0.8	4.5	10
20	M6×1.0	7.8	15
25	M6×1.0	7.8	15

#### Side installation type



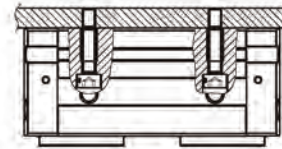
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	8
25	M8×1.25	12	10

#### Bottom installation type



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	6
25	M6×1.0	5.2	8

#### Front installation type

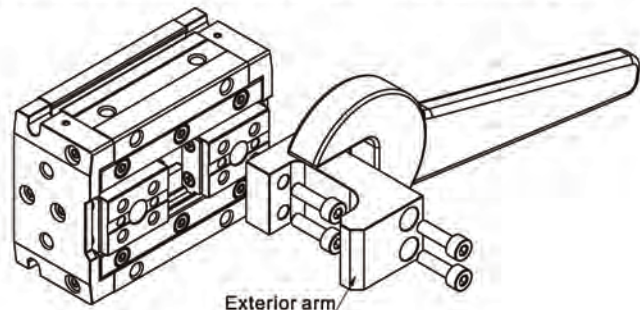


Bore size	The bolts type	Max. locking moment(N.m)
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M5×0.8	5
25	M5×0.8	5

#### 7. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Bore size	The bolts type	Max. locking moment(N.m)
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M4×0.7	1.5
25	M4×0.7	1.5

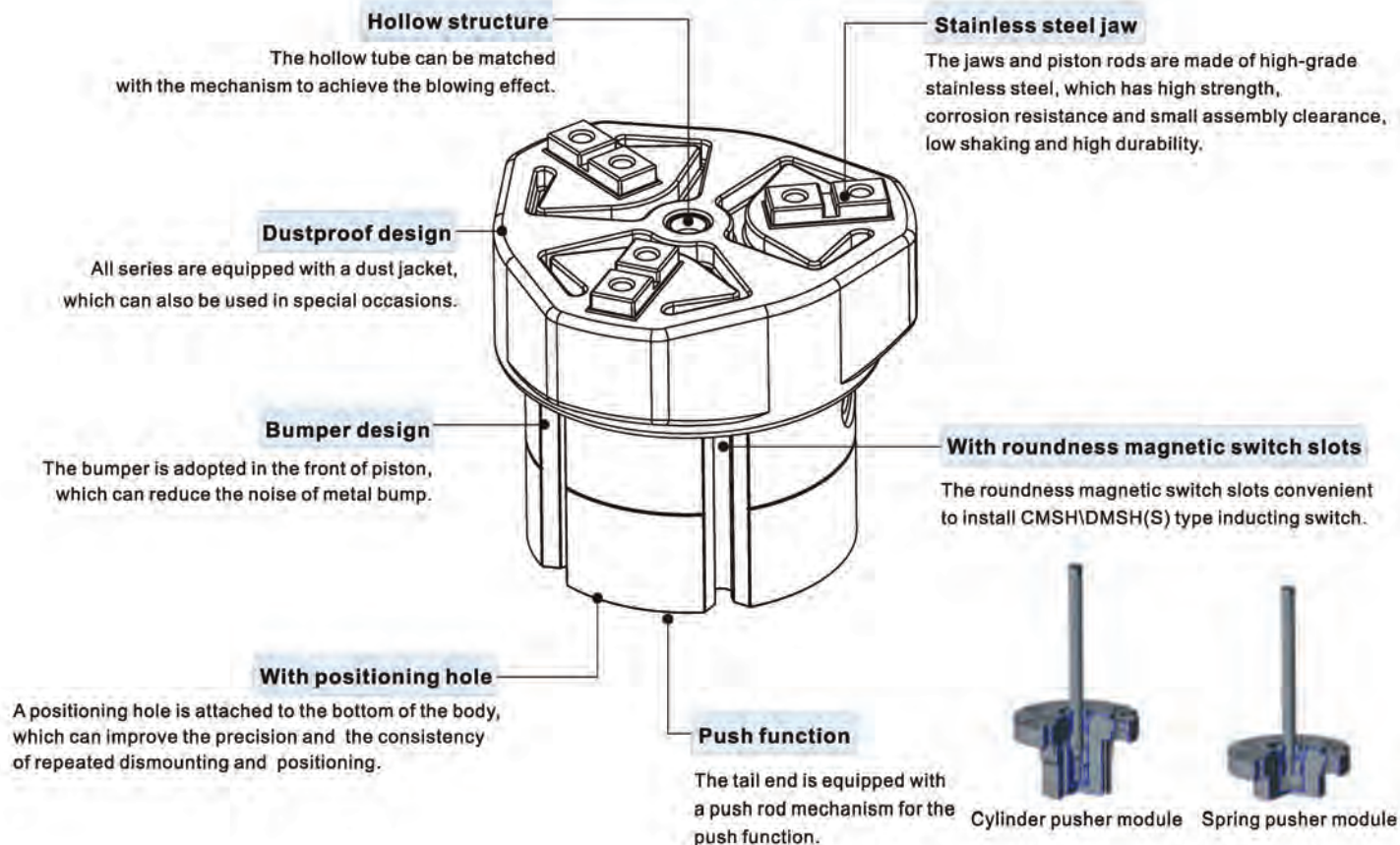




# Air gripper—HFCQ Series

Parallel open/close hollow style

## Compendium of HFCQ Series



## Gripping force and stroke

Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	Weight (g)
	Internal	External		
HFCQ16	15	9	4	100
HFCQ20	26	21	4	140
HFCQ25	45	36	6	220
HFCQ32	77	62	8	430
HFCQ40	118	97	8	560
HFCQ50	187	155	12	950
HFCQ63	329	280	16	1600

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).

Add) Please refer to page 263 for the definition of 'L'.

## Installation and application



1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



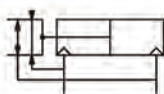


### Specification

Bore size (mm)	16	20	25	32	40	50	63
Acting type	Double acting						
Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	0.2~0.7MPa(28~100psi)(2.0~7.0bar)0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
Temperature °C	-20~70						
Lubrication	Not required						
Repeatability mm	± 0.01						
Max. frequency	120(c.p.m)			60(c.p.m)			
Sensor switches	CMSH、DMSH(S)						
Port size	M3×0.5			M5×0.8			
Hollow diameter	Φ3 <sup>+0.04</sup> <sub>0</sub>	Φ3 <sup>+0.04</sup> <sub>0</sub>	Φ4 <sup>+0.048</sup> <sub>0</sub>	Φ6 <sup>+0.04</sup> <sub>0</sub>	Φ10 <sup>+0.058</sup> <sub>0</sub>	Φ12 <sup>+0.07</sup> <sub>0</sub>	Φ16 <sup>+0.07</sup> <sub>0</sub>
Push rod mechanism	-			Cylinder or Spring push rod mechanism			
Port size of push rod mechanism	-			M5×0.8			

[Note] Sensor switch should be ordered additionally. Refer to P353 for detail.

### Symbol





### Product feature

1. The hollow tube can be matched with the mechanism to achieve the blowing effect.
2. The jaws and piston rods are made of high-grade stainless steel, which has high strength, corrosion resistance and small assembly clearance, low shaking and high durability.
3. All series are equipped with a dust jacket, which can also be used in special occasions.
4. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
5. The tail end is equipped with a push rod mechanism for the push function.
6. The sensor grooves of each specification are shared.

### Ordering code

HFCQ 20 E



① ② ③

①Model	②Bore size	③Push rod mechanism		
HFCQ: Air finger (Double acting, parallel hollow type)	16 20 25 32 40 50 63	Blank: Without push rod mechanism	E: Cylinder push rod mechanism 	V: Spring push rod mechanism 

### Push rod mechanism ordering code

F-HFCQ 32 E

① ② ③

①Model	②Bore size	③Push rod mechanism type	
HFCQ: Air finger (Double acting, parallel hollow type)	32 40 50 63	E: Cylinder push rod mechanism 	V: Spring push rod mechanism 

[Note]

1. The push rod mechanism can only be used with Φ32/Φ40/Φ50/Φ63.
2. HFCQ series are all attached with magnet.

### Specification of Cylinder push rod mechanism

Model	HFCQ32E	HFCQ40E	HFCQ50E	HFCQ63E
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.2~0.7MPa(28~100psi)		0.15~0.7MPa(22~100psi)	
Temperature	-20~70 °C			
Lubrication	Not required			
Push stroke mm	7	8	14	15
Max. frequency	60(c.p.m)			
Sensor switches	DMSH(S)			
Push force N(0.5MPa)	45	130	204	335
Weight g	560	790	1350	2280

### Specification of Spring push rod mechanism

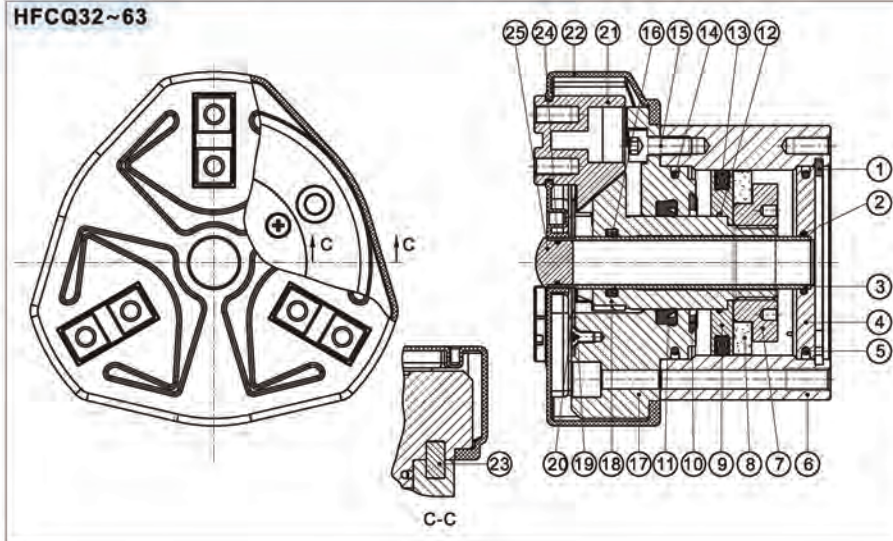
Model	HFCQ32V	HFCQ40V	HFCQ50V	HFCQ63V
Push stroke mm	7	8	14	15
Push spring force N	5~12	9~18	16~31	24~40
Weight g	530	730	1270	2190

# Air gripper(parallel open/close hollow style)

## HFCQ Series

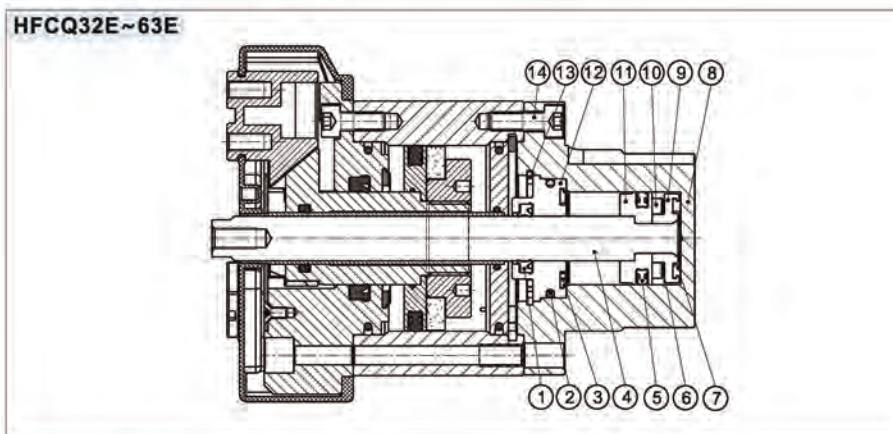
### Inner structure and material of major parts

HFCQ32~63



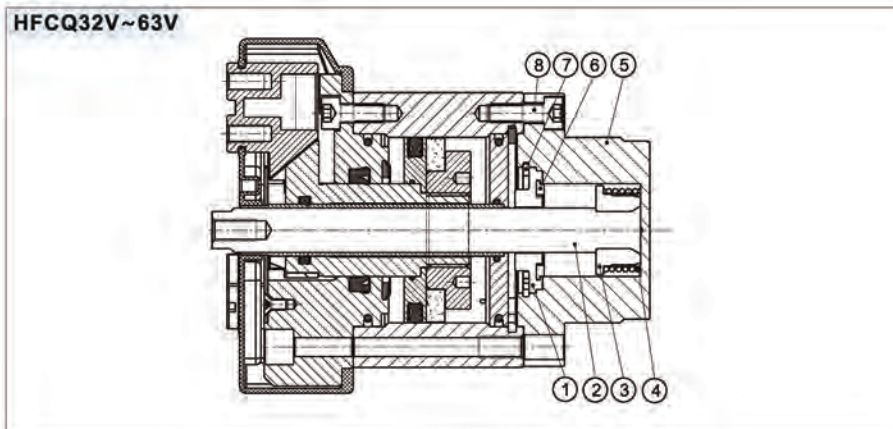
NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Hollow tube	Stainless steel
4	Back cover	Aluminum alloy
5	O-ring	NBR
6	Body	Aluminum alloy
7	Magnet holder	Stainless steel
8	Magnet	Rare earths/Plastic
9	Piston	Aluminum alloy
10	Bumper	TPU
11	Rod packing	NBR
12	O-ring	NBR
13	Piston seal	NBR
14	O-ring	NBR
15	Countersink screw	Carbon steel
16	Rod packing	TPU
17	Front cover	Aluminum alloy
18	Piston rod	Stainless steel
19	Screw	Stainless steel
20	Cover blank	Stainless steel
21	Jaw	Stainless steel
22	Dustproof cover	NBR
23	Pin	Stainless steel
24	O-ring	NBR
25	Dustproof pluger	NBR

HFCQ32E~63E



NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU/NBR
4	Push rod	Stainless steel
5	Piston seal	NBR
6	Magnet washer	NBR
7	Bumper	TPU/NBR
8	Body	Aluminum alloy
9	Magnet holder	Brass/Aluminum alloy
10	Magnet	Rare earths
11	Piston	Brass/Aluminum alloy
12	Front cover	Aluminum alloy
13	C clip	Spring steel
14	Countersink screw	Carbon steel

HFCQ32V~63V



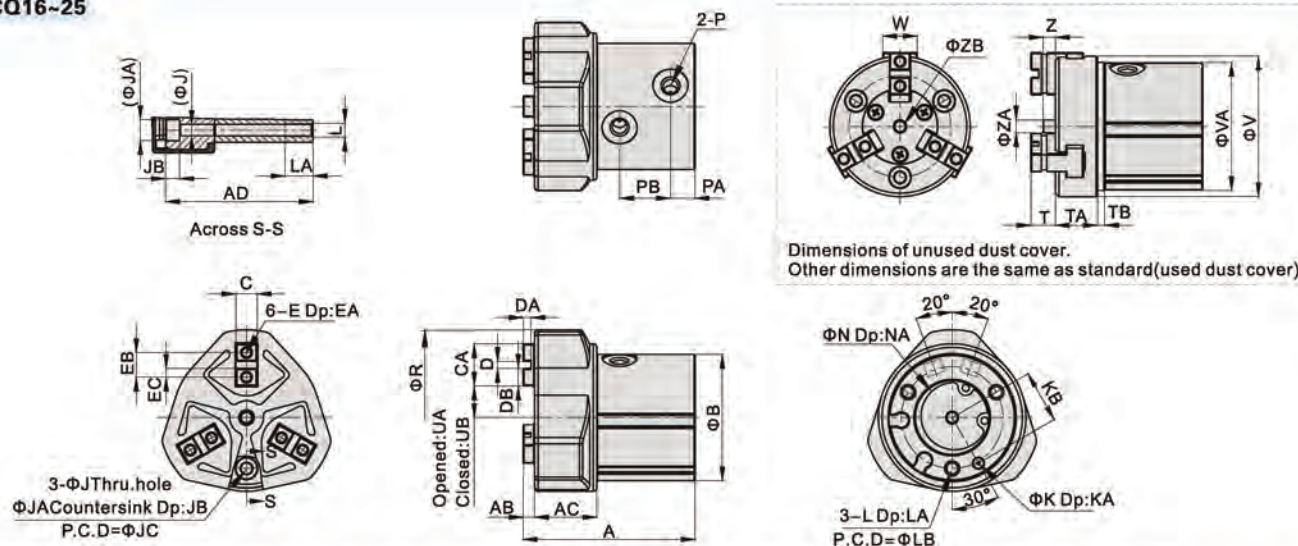
NO.	Item	Material
1	Front cover	Aluminum alloy
2	Push rod	Stainless steel
3	Piston	Aluminum alloy
4	Spring	SWPB
5	Body	Aluminum alloy
6	Bumper	TPU/NBR
7	C clip	Spring steel
8	Countersink screw	Carbon steel

# Air gripper(parallel open/close hollow style)

## HFCQ Series

### Dimensions

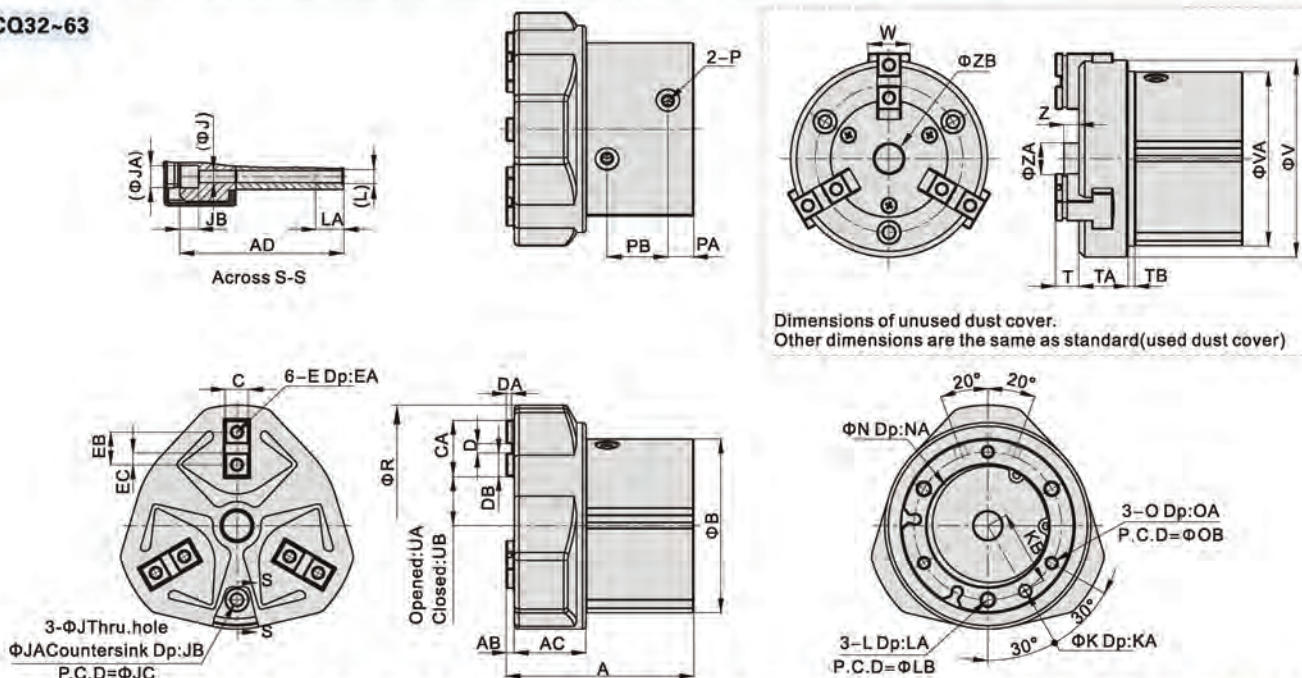
#### HFCQ16-25



Bore size\Item	A	AB	AC	AD	B	C	CA	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB
16	46	3	16	39	31	5 <sup>+0.01</sup>	11	2 <sup>+0.04</sup>	2 <sup>+0.2</sup>	4.5	M3×0.5	5	6	2	3.2	6	4	24	3 <sup>+0.04</sup>	3	12	M4×0.7	8	24
20	49	3	18	42	36	6 <sup>+0.01</sup>	12	2 <sup>+0.04</sup>	2 <sup>+0.2</sup>	5	M3×0.5	5	7	2.5	3.2	6	4	29	3 <sup>+0.04</sup>	3	15	M4×0.7	8	29
25	55	3	20	47	42	6 <sup>+0.01</sup>	14	2 <sup>+0.04</sup>	2 <sup>+0.2</sup>	6	M3×0.5	5	8	3	3.2	6	4	34	3 <sup>+0.04</sup>	3	18	M4×0.7	8	34

Bore size\Item	N	NA	P	PA	PB	R	T	TA	TB	UA	UB	V	VA	W	Z	ZA	ZB
16	17 <sup>+0.05</sup>	1.5	M3×0.5	7	14	44	7	10.5	3	9	7	34	31.5	8	3.5	3.7	3 <sup>+0.04</sup>
20	21 <sup>+0.05</sup>	1.5	M5×0.8	7	14	50	7	12	3	10	8	40	36.5	10	3.5	3.7	3 <sup>+0.04</sup>
25	26 <sup>+0.05</sup>	1.5	M5×0.8	8	17	59	8	13	3	12.5	9.5	47	42.5	12	4.5	4.7	4 <sup>+0.048</sup>

#### HFCQ32-63



Bore size\Item	A	AB	AC	AD	B	CA	C	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB	N	NA
32	63	3	24	54	55	20	8 <sup>+0.01</sup>	2 <sup>+0.04</sup>	2 <sup>+0.2</sup>	9	M4×0.7	8	11	4.5	4.2	8	7	44	4 <sup>+0.04</sup>	4	22	M5×0.8	10	44	34 <sup>+0.05</sup>	2
40	66	3	26	57	62	21	8 <sup>+0.01</sup>	3 <sup>+0.04</sup>	2 <sup>+0.2</sup>	9	M4×0.7	8	12	4.5	4.2	8	7	52	4 <sup>+0.04</sup>	4	26	M5×0.8	10	52	42 <sup>+0.05</sup>	2
50	80	3	31	70	74	24	10 <sup>+0.01</sup>	4 <sup>+0.04</sup>	2 <sup>+0.2</sup>	10	M5×0.8	10	14	5	5.1	9.5	8	63	5 <sup>+0.04</sup>	5	32	M6×1.0	12	63	52 <sup>+0.05</sup>	2
63	91	4	37	79	92	28	12 <sup>+0.01</sup>	6 <sup>+0.04</sup>	3 <sup>+0.2</sup>	11	M5×0.8	10	17	5.5	6.6	11	8	78	6 <sup>+0.04</sup>	6	40	M8×1.25	16	78	65 <sup>+0.05</sup>	2.5

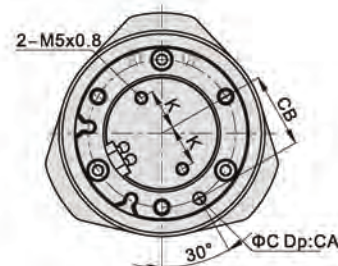
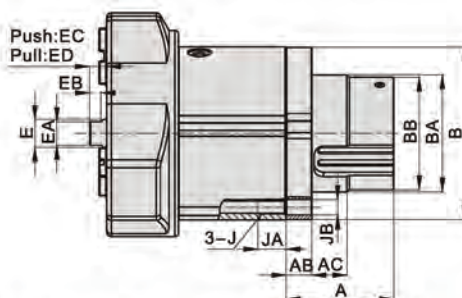
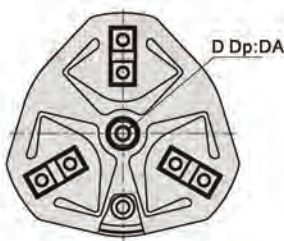
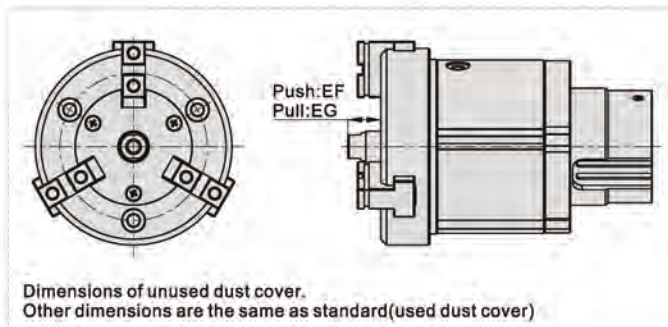
Bore size\Item	O	OA	OB	P	PA	PB	R	UA	UB	T	TA	TB	V	VA	W	Z	ZA	ZB
32	M4×0.7	8	44	M5×0.8	10	19	76	15.5	11.5	9	15.5	2.5	62	55.5	14	5	7.4	6 <sup>+0.048</sup>
40	M4×0.7	8	52	M5×0.8	11	19	86	19	15	9	17.5	2.5	72	62.5	16	5	11.4	10 <sup>+0.058</sup>
50	M5×0.8	10	63	M5×0.8	11	26	103	24	18	10	21	3	84	74.5	18	6	13.4	12 <sup>+0.07</sup>
63	M6×1.0	12	78	M5×0.8	13	29	125	31	23	12	26	3	102	92.5	24	7	17.4	16 <sup>+0.07</sup>

# Air gripper(parallel open/close hollow style)

## HFCQ Series

### HFCQ32E~63E

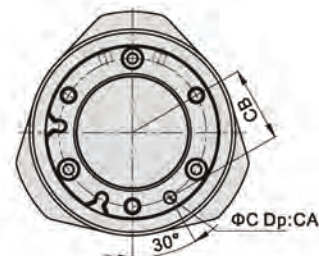
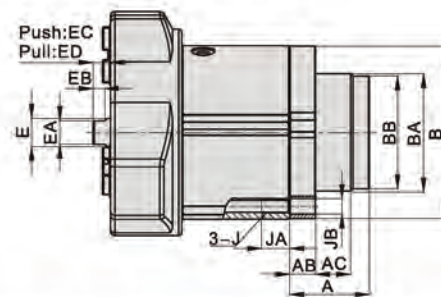
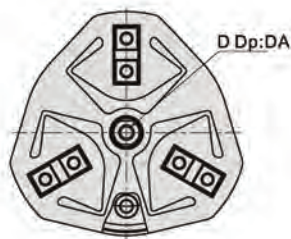
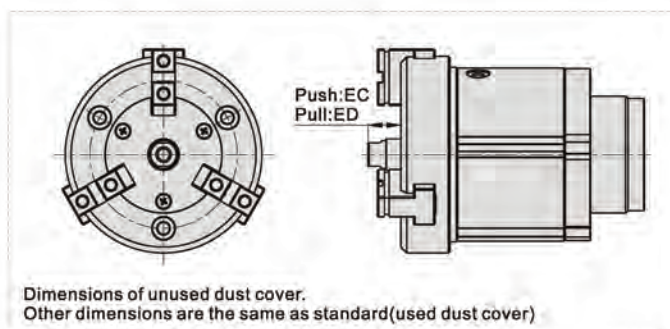
(With Cylinder push rod mechanism)



Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB	K
32	36	9	9	54.5	32 <sup>-0.06</sup>	30	4 <sup>+0.04</sup>	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5	9.5
40	38	9	12	61.5	40 <sup>-0.06</sup>	38	4 <sup>+0.04</sup>	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5	13.5
50	48	11	15	73.5	50 <sup>-0.06</sup>	48	5 <sup>+0.04</sup>	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6	17.5
63	53	13	18	91.5	60 <sup>-0.06</sup>	58	6 <sup>+0.04</sup>	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6	20

### HFCQ32C~63V

(With Spring push rod mechanism)



Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB
32	20	9	11	54.5	32 <sup>-0.06</sup>	-	4 <sup>+0.04</sup>	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5
40	24	9	15	61.5	40 <sup>-0.06</sup>	-	4 <sup>+0.04</sup>	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5
50	34	11	15	73.5	50 <sup>-0.06</sup>	48	5 <sup>+0.04</sup>	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6
63	40	13	18	91.5	60 <sup>-0.06</sup>	58	6 <sup>+0.04</sup>	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6

## HFCQ Series

### How to select product

Please select pneumatic finger according to the following steps:

#### ① The selection of the effective gripping force

#### ② the confirmation of the gripping point

##### 1. The selection of the gripping force

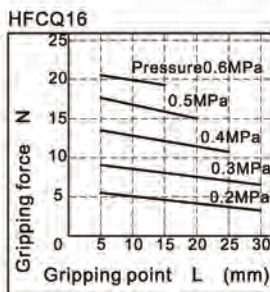
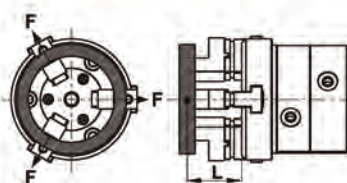
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left: $n$ : number of gripper $F$ : Gripping force (N) $\mu$ : friction coefficient between fittings and work-pieces. $m$ : mass of work-pieces $g$ : acceleration of gravity ( $=9.8m/s^2$ )	The condition that the work-pieces won't drop is: $n \times \mu F > mg$	
		so: $F > \frac{mg}{n \times \mu}$ Safety coefficient is $a$ , so $F$ is: $F = \frac{mg}{n \times \mu} \times a$	
		$\mu = 0.2$	$\mu = 0.1$
		$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

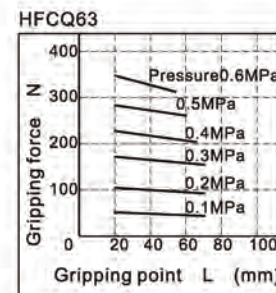
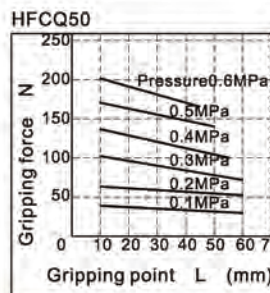
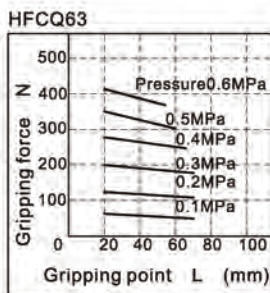
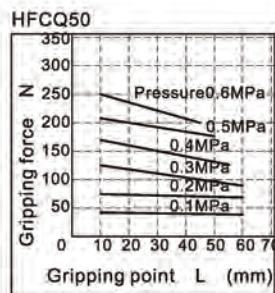
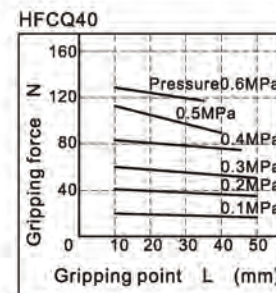
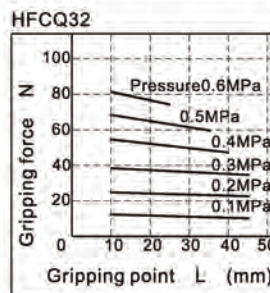
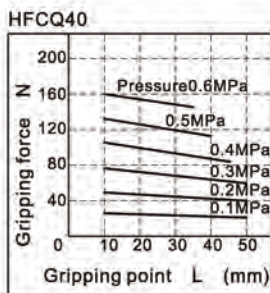
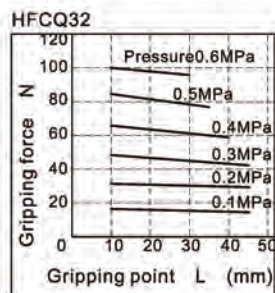
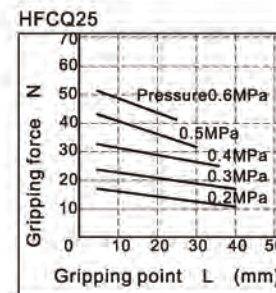
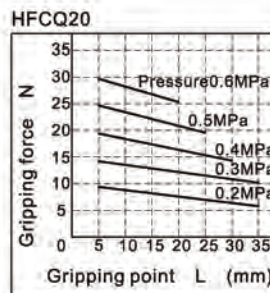
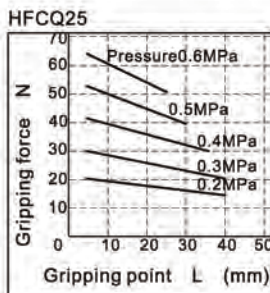
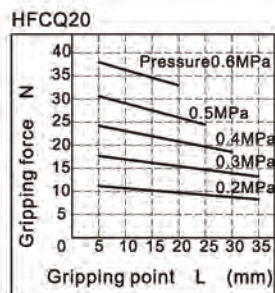
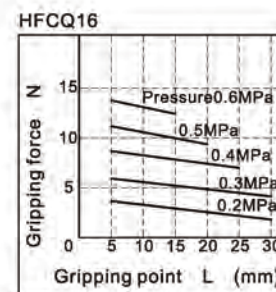
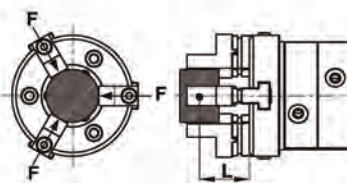
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

#### Opened gripping force



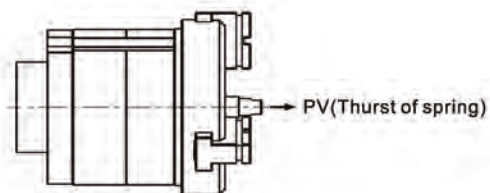
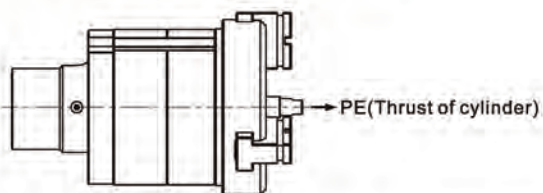
#### Closed gripping force



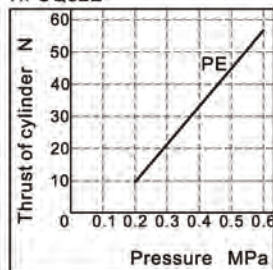
# Air gripper(parallel open/close hollow style)

## HFCQ Series

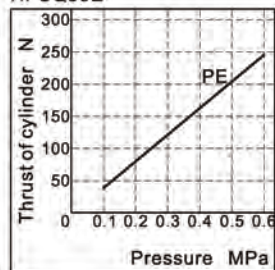
### Effective thrust of Push rod mechanism



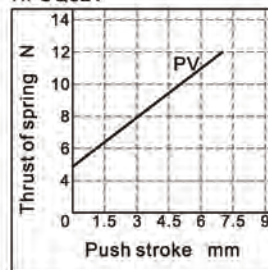
HFCQ32E



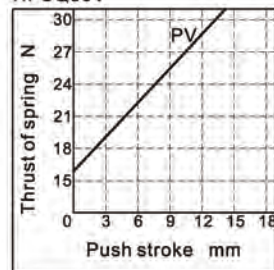
HFCQ50E



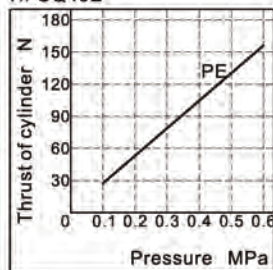
HFCQ32V



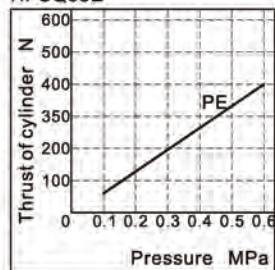
HFCQ50V



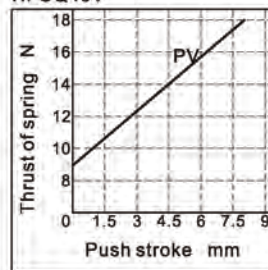
HFCQ40E



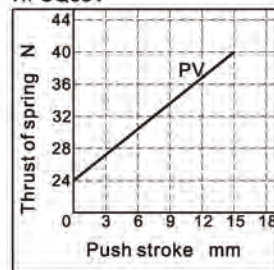
HFCQ63E



HFCQ40V



HFCQ63V

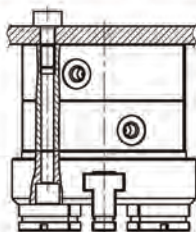


## HFCQ Series

### Installation and application

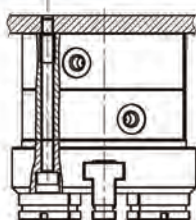
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces.  
In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart.  
If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



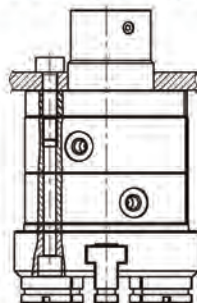
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
16	M4×0.7	2.1	8	Φ17 <sup>+0.05</sup> <sub>0</sub>	1.5
20	M4×0.7	2.1	8	Φ21 <sup>+0.05</sup> <sub>0</sub>	1.5
25	M4×0.7	2.1	8	Φ26 <sup>+0.05</sup> <sub>0</sub>	1.5
32	M4×0.7	2.1	8	Φ34 <sup>+0.05</sup> <sub>0</sub>	2
	M5×0.8	4.3	10	Φ34 <sup>+0.05</sup> <sub>0</sub>	2
40	M4×0.7	2.1	8	Φ42 <sup>+0.05</sup> <sub>0</sub>	2
	M5×0.8	4.3	10	Φ42 <sup>+0.05</sup> <sub>0</sub>	2
50	M5×0.8	4.3	10	Φ52 <sup>+0.05</sup> <sub>0</sub>	2
	M6×1.0	7.3	12	Φ52 <sup>+0.05</sup> <sub>0</sub>	2
63	M6×1.0	7.3	12	Φ65 <sup>+0.05</sup> <sub>0</sub>	2.5
	M8×1.25	18	16	Φ65 <sup>+0.05</sup> <sub>0</sub>	2.5

#### The installation of the front through hole



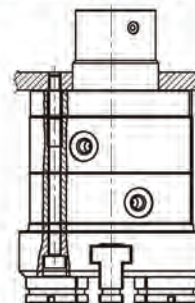
Bore size	The bolts type	Max. locking mement(N.m)
16	M3×0.5	0.88
20	M3×0.5	0.88
25	M3×0.5	0.88
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

#### The installation of the front through hole(with push rod)



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)
32	M5×0.8	4.3	10	Φ32 <sup>0</sup> <sub>-0.05</sub>
40	M5×0.8	4.3	10	Φ40 <sup>0</sup> <sub>-0.05</sub>
50	M6×1.0	7.3	12	Φ50 <sup>0</sup> <sub>-0.05</sub>
63	M8×1.25	18	16	Φ60 <sup>0</sup> <sub>-0.05</sub>

#### Tail installation type(with push rod)



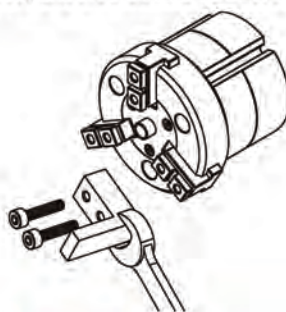
Bore size	The bolts type	Max. locking mement(N.m)
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

#### Install the gripping jaw fittings

Bore size	The bolts type	Max. locking mement(N.m)
16	M3×0.5	0.59
20	M3×0.5	0.59
25	M3×0.5	0.59
32	M4×0.7	1.4
40	M4×0.7	1.4
50	M5×0.8	2.8
63	M5×0.8	2.8



# Air gripper—HFKL Series

Parallel with guide/longer stroke/ball bearing style

## Compendium of HFKL Series

### Four kinds of bore size and three kinds of type

Bore size: 10, 16, 20, 25. HFKL: Double acting  
HFSKL: Single acting and normally closed  
HFTKL: Single acting and normally opened

### Long clamping stroke

The gripping stroke is long and the size of the gripping object is different.

### Integrated design of linear guide roller

Integrated design of linear guide roller, high rigidity and high precision.

Integration of a linear guide roller

### With positioning pin

A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.

The positioning pin prevents the deviation of the rail and body

### Can be mounted from three directions

With mounting holes on the side and tail.

Surface installation

Tail installation

Front installation

### With positioning hole

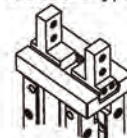
The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.

The positioning hole

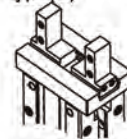
### Seven kinds of finger type

According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

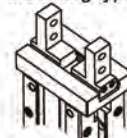
Standard type



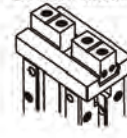
Side mounting type(B)



Thru.hole mounting type(N)



Bottom mounting type(F)



Closed port

Opened port

### With squareness magnetic switch slots

The squareness magnetic switch slots convenient to install DMSG(S)\CMSG type inducting switch.

### With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install DMSH(S)\CMSH type inducting switch.

Bore size (mm)		10	16	20	25
Acting type		Double acting		Single acting	
Fluid		Air(to be filtered by 40 μm filter element)			
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)		
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)		
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)		
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)		
Temperature °C		-20~70			
Lubrication		Not required			
Repeatability mm		±0.01			
Max. frequency		120(c.p.m)			
Sensor switches		DMSH(S)\CMSH		DMSG(S)\CMSG, MSH(S)\CMSH	
Port size		M3×0.5		M5×0.8	

Note) Refer to P353 for detail of sensor switch.

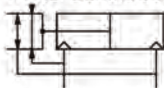
# Air gripper(Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

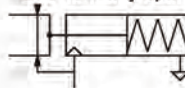


### Symbol

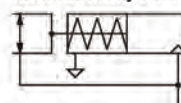
HFKL: Double acting



HFTKL: Single acting and normally opened



HFSKL: Single acting and normally closed



### Gripping force and stroke

Acting type		Double acting(HFKL)				Single acting_NO (HFTKL)				Single acting_NC (HFSKL)			
Bore size		10	16	20	25	10	16	20	25	10	16	20	25
Gripping force per finger Effective value(N)	External	11	34	45	69	7	27	35	55	-	-	-	-
	Internal	17	45	68	102	-	-	-	-	13	38	59	87
Opening/Closing stroke(Both sides)(mm)		8	12	18	22	8	12	18	22	8	12	18	22
Weight (g)	F Type	64	146	275	484	74	154	294	530	73	154	294	528
	Others	64	146	273	489	73	155	292	525	72	155	292	523

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 270 for the definition of "L".

### Ordering code

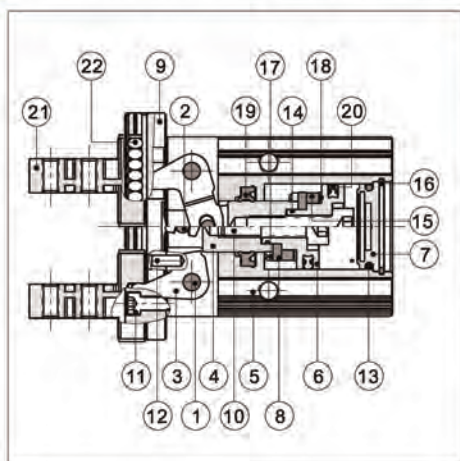
HFKL 20 □

① ② ③

①Model	②Bore size	③Finger type			
HFKL: Air finger(Double acting)	10 16 20 25	Blank: Standard	B: Side mounting type	N: Thru.hole mounting type	F: Bottom mounting type
HFSKL: Air finger (Single acting and normally closed)					
HFTKL: Air finger (Single acting and normally opened)					

[Note] HFKL series are all attached with magnet, and sensor switch should be ordered additionally.

### Inner structure and material of major parts



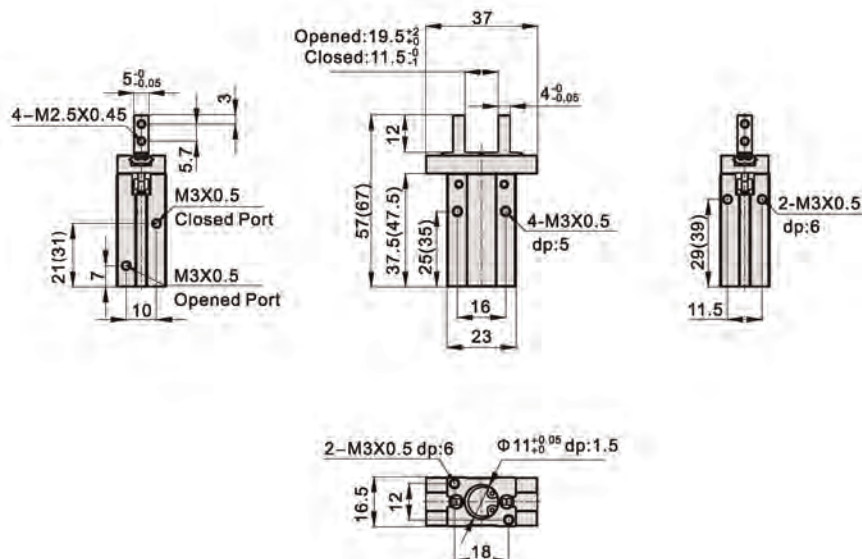
NO.	Item	Material	NO.	Item	Material
1	Pin	Stainless steel	12	Pin	Bearing steel
2	Pin	Stainless steel	13	O-ring	NBR
3	Curved bar	Stainless steel	14	O-ring	NBR
4	Piston rod	Aluminum alloy/Stainless steel	15	Magnet	Sintered metal(Neodymium-iron-boron)
5	Body	Aluminum alloy	16	C clip	Spring steel
6	Piston	Aluminum alloy/Stainless steel	17	Bumper	TPU
7	Back cover	Brass/Aluminum alloy	18	Magnet washer	NBR
8	Magnet fixed flake	Aluminum alloy/Stainless steel	19	Rod packing	NBR
9	Bearing steel	Stainless steel	20	Piston seal	NBR
10	Countersink screw	Carbon steel	21	Clamping jaw	Bearing steel
11	Countersink screw	Carbon steel	22	Guide roller	Bearing steel

# Air gripper (Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

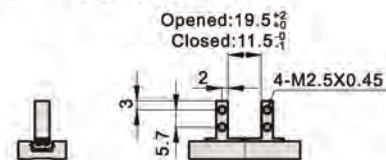
### Dimensions

#### HFKL10



[Note] The values in "( )" in the above table are single acting type sizes.

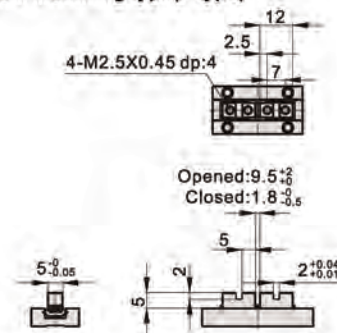
#### Side mounting type(B type)



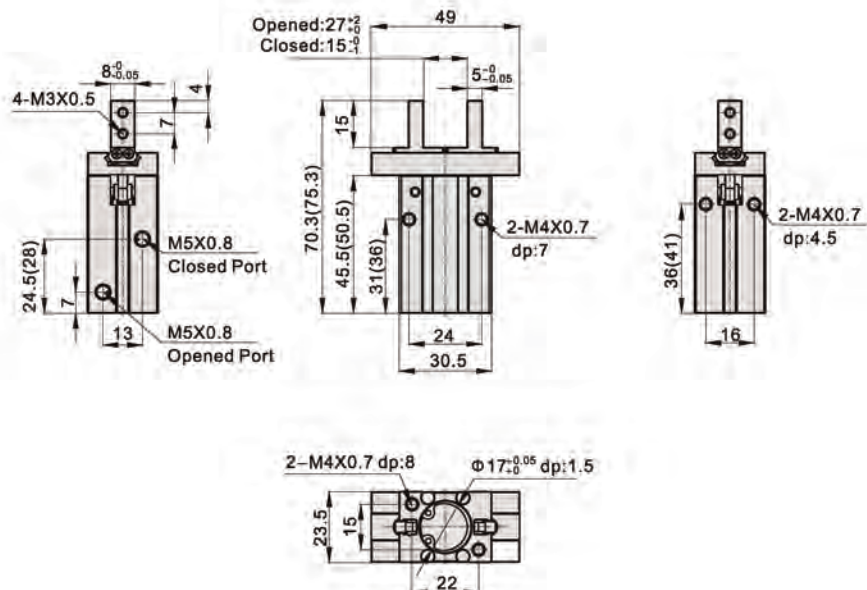
#### Thru.hole mounting type(N type)



#### Bottom mounting type(F type)

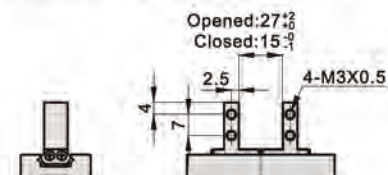


#### HFKL16

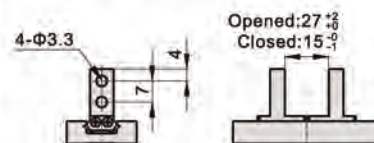


[Note] The values in "( )" in the above table are single acting type sizes.

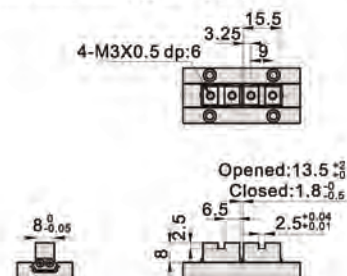
#### Side mounting type(B type)



#### Thru.hole mounting type(N type)



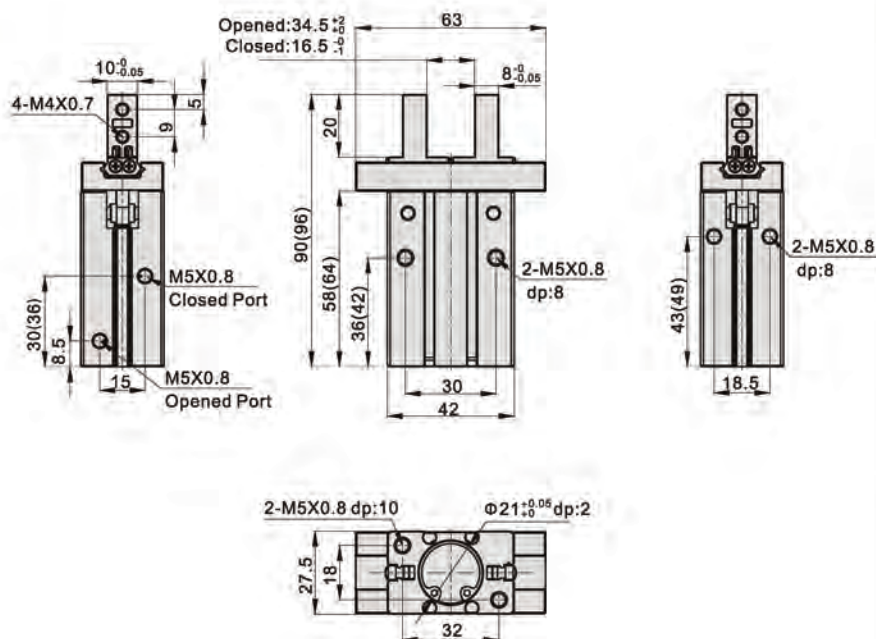
#### Bottom mounting type(F type)



# Air gripper (Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

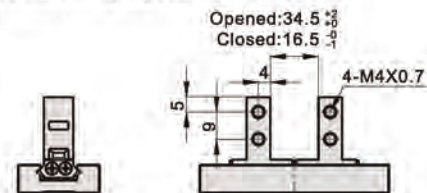
## HFKL Series

### HFKL20

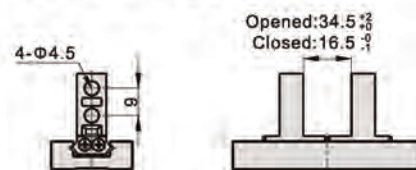


[Note]The values in "( )" in the above table are single acting type sizes.

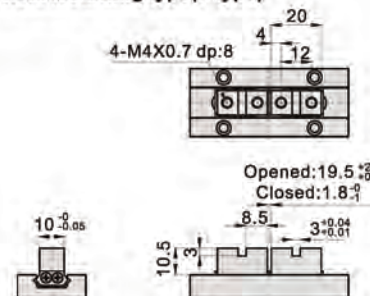
### Side mounting type(B type)



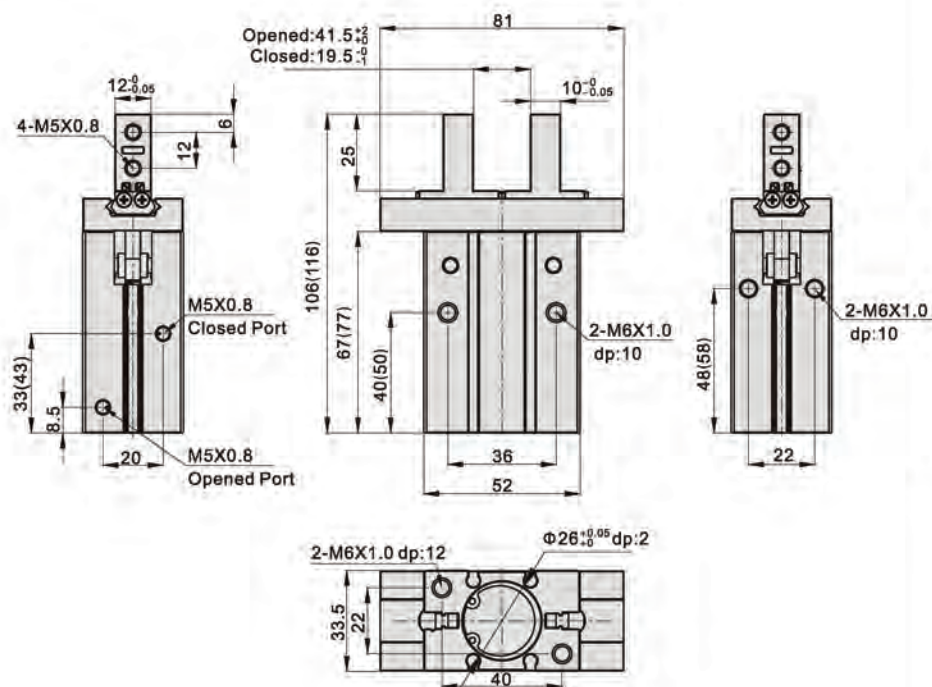
### Thru.hole mounting type(N type)



### Bottom mounting type(F type)

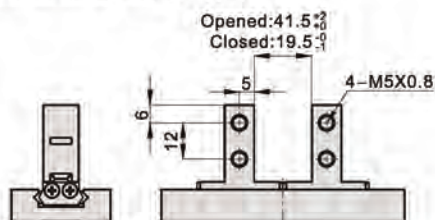


### HFKL25

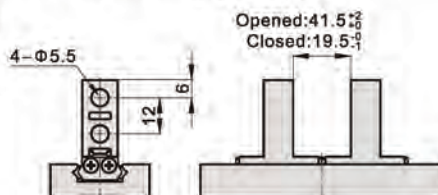


[Note]The values in "( )" in the above table are single acting type sizes.

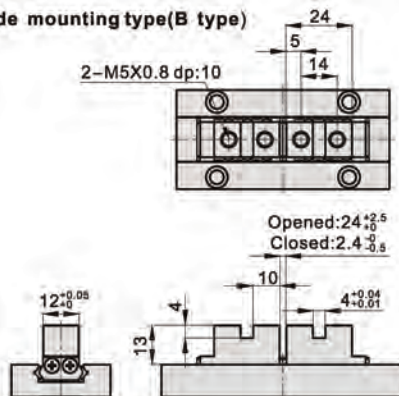
### Side mounting type(B type)



### Thru.hole mounting type(N type)



### Side mounting type(B type)



# Air gripper (Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

### How to select product

Please select pneumatic finger according to the following steps:

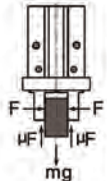
#### ① The selection of the effective gripping force

#### ② the confirmation of the gripping point

#### ③ the confirmation of the external force put on the gripping jaw

##### 1. The selection of the gripping force

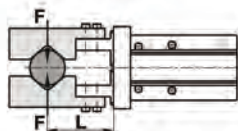
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left:		$\mu=0.2$	$\mu=0.1$
	<p>F: Gripping force (N)  <math>\mu</math>: friction coefficient between fittings and work-pieces.                  m: mass of work-pieces                  g: acceleration of gravity (<math>=9.8m/s^2</math>)</p>	<p>The condition that the work-pieces won't drop is: <math>2 \times \mu F &gt; mg</math>                  so: <math>F &gt; \frac{mg}{2 \times \mu}</math>                  Safety coefficient is a, so F is:  <math>F = \frac{mg}{2 \times \mu} \times a</math></p>	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$  10 times of the mass of the gripped objects	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$  20 times of the mass of the gripped objects

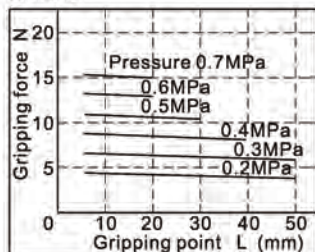
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

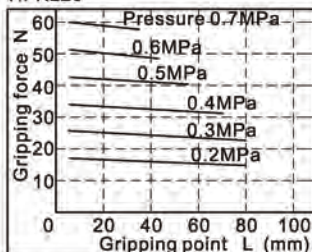
#### Double acting type closed gripping force



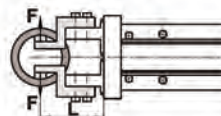
HFKL10



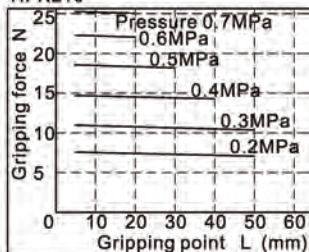
HFKL20



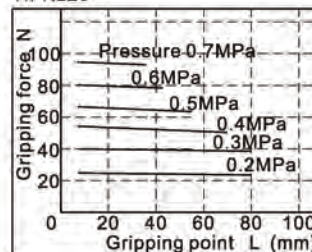
#### Double acting type opened gripping force



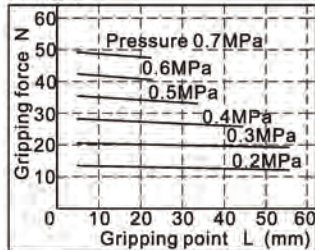
HFKL10



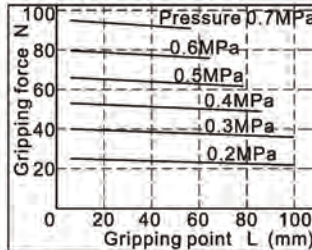
HFKL20



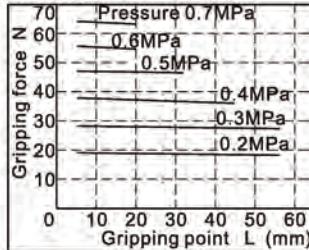
HFKL16



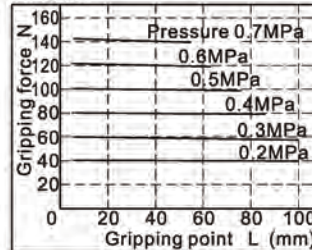
HFKL25



HFKL16



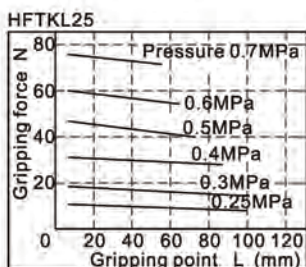
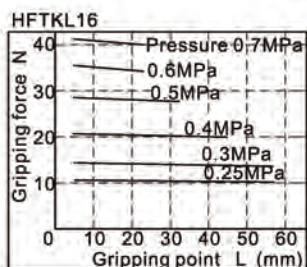
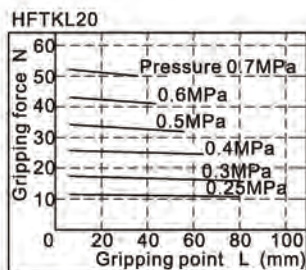
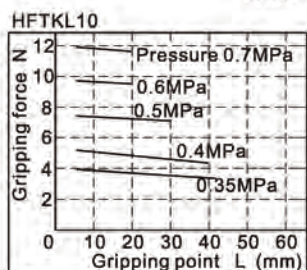
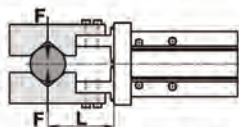
HFKL25



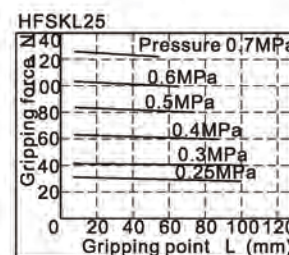
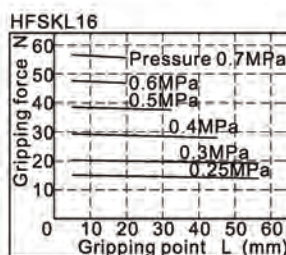
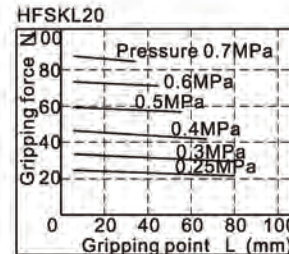
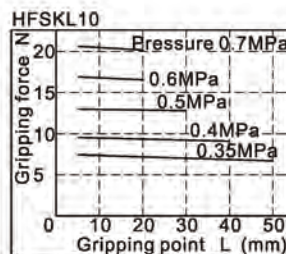
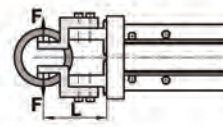
# Air gripper(Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

### Single acting normally opened gripping force



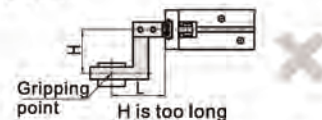
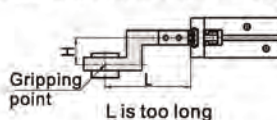
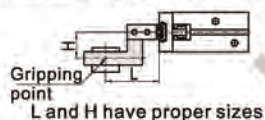
### Single acting normally closed clamping force



### 2. The selection of the gripping point

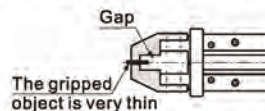
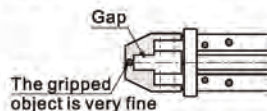
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



### 3. The confirmation of the external force put on the gripping jaw.

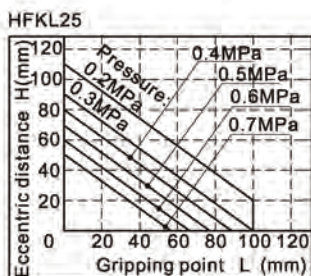
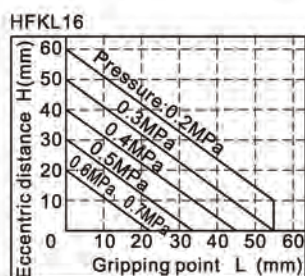
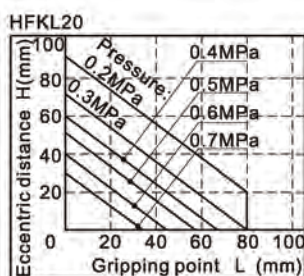
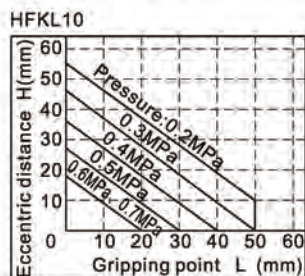
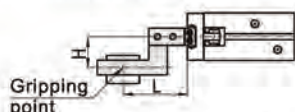
Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
10	87	0.26	0.26	0.53	Allowable load(N) $M(\text{Maximum permissible moment})(N.m)$ $L \times 10^{-3}$ Unit conversion constant	In the guide rail of HFJKL16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F = $0.68 / (30 \times 10^{-3}) = 22.7(N)$ Actual load f=10(N)<22.7(N) To meet the using requirements
16	147	0.68	0.68	1.36		
20	221	1.32	1.32	2.65		
25	382	1.94	1.94	3.88		

[Note] The loads and torque values of said are all static values.

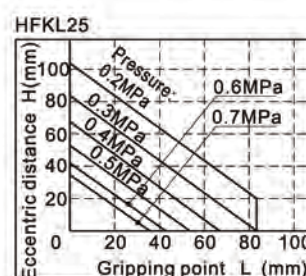
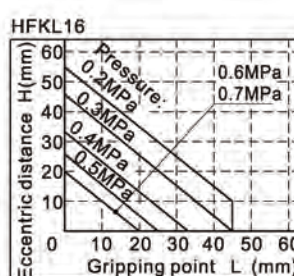
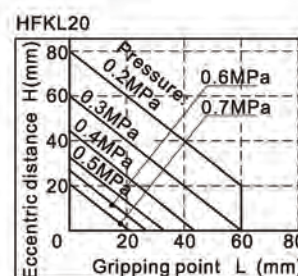
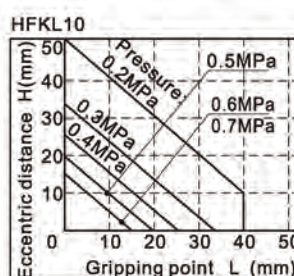
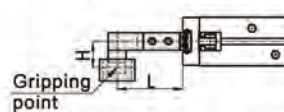
# Air gripper (Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

The range of the closed gripping points



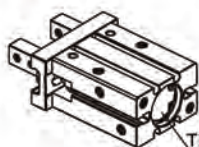
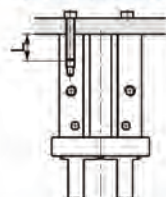
The range of the opened clamping point



## Installation and application

1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. Please contact with us when the single acting type clamps only with the spring force.
4. When install and fix the air gripper, avoid falling down, collision and damage.
5. When fixing the gripping jaw parts, don't twist the gripping jaw.
6. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

### Tail installation type



The bore of the tail is used for mounting and positioning

Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm <sup>+0.05</sup>	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm <sup>+0.05</sup>	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm <sup>+0.05</sup>	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm <sup>+0.05</sup>	2mm

### The installation of the front threaded hole



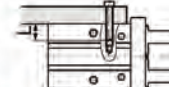
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10

### The installation of the front through hole



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.5	4.3	12

### Surface installation type



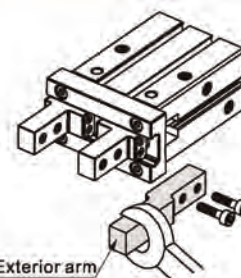
Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M3×0.5	0.9	6
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10

# Air gripper (Parallel with guide/longer stroke/ball bearing style) **AIRTAC**

## HFKL Series

7. The installation method of the gripping jaw fittings  
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

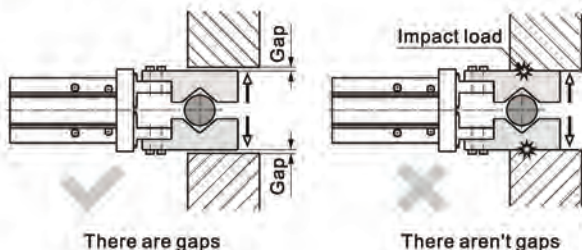
Bore size	The bolts type	Max. locking moment (Nm)
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8



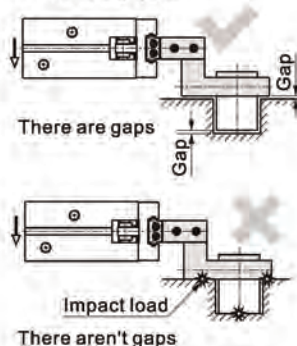
8. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

8.1) The end of stroke under the open state of air gripper

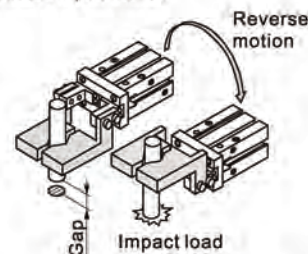


8.2) The end of stroke under the move state of air gripper



8.3) Reverse motion state

When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load.



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.

11. People can not enter the movement path of air gripper and articles can not be placed on the path too.

12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.

# Air gripper(parallel style——Roller bearing/Dustproof) **AIRTAC**

## HFKP Series

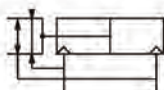


### Specification

Bore size (mm)	10	16	20	25	32	40
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Operating pressure	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)				
	Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
Temperature °C	-20~70					
Lubrication	Not required					
Repeatability mm	±0.01				±0.02	
Max. frequency	180(c.p.m)				60(c.p.m)	
Sensor switches	DMSH(S)\CMSH		DMSG(S)\CMSG, DMSH(S)\CMSH			
Port size	M3×0.5		M5×0.8			

Note) Refer to P353 for detail of sensor switch.

### Symbol



### Gripping force and stroke

Bore size		10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	9.8	30	42	65	158	254
	Internal	17	40	66	104	193	318
Opening/Closing stroke(Both sides)(mm)		4	6	10	14	22	30
Weight (g)							

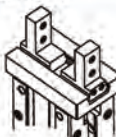
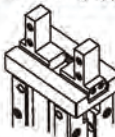
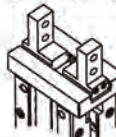
[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 277 for the definition of "L".

### Ordering code

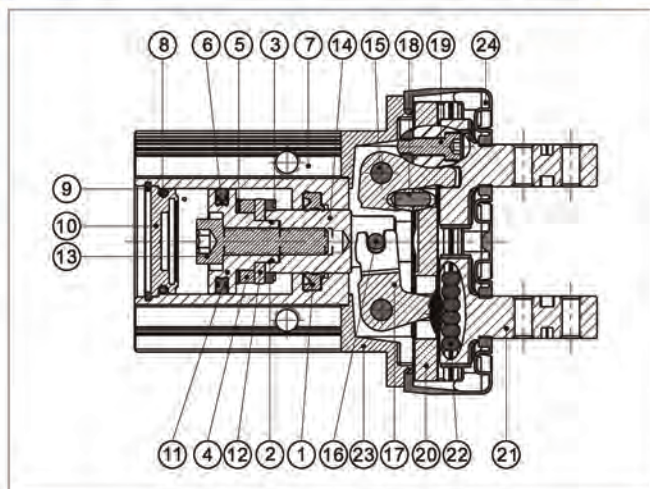
HFKP 32 □



①Model	②Bore size	③Finger type		
HFKP: Air finger(Double acting/Dustproof)	10 16 20 25 32 40	Blank: Standard 	B: Side mounting type 	N: Thru.hole mounting type 

HFKP series are all attached with magnet.

### Inner structure and material of major parts



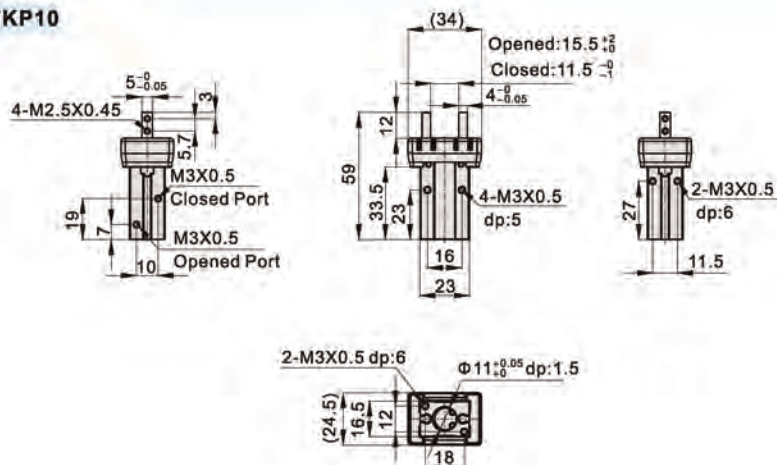
NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU
4	Magnet	Sintered metal(Neodymium-iron-boron)
5	Magnet washer	NBR
6	Piston seal	NBR
7	Body	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Back cover	Aluminum alloy
11	Piston	Aluminum alloy/Stainless steel
12	Magnet fixed flake	Stainless steel
13	Countersink screw	Alloy steel
14	Piston rod	Aluminum alloy/Stainless steel
15	Pin	Bearing steel
16	Pin	Bearing steel
17	Curved bar	Stainless steel
18	Pin	Bearing steel
19	Countersink screw	Alloy steel
20	Guide roller	Alloy steel
21	Clamping jaw	Alloy steel
22	Bearing steel	Bearing steel
23	Dustproof cover ring	Plastic
24	Dustproof cover	NBR

# Air gripper(parallel style——Roller bearing/Dustproof) **AIRTAC**

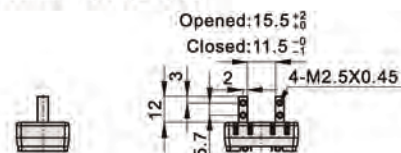
## HFKP Series

### Dimensions

#### HFKP10



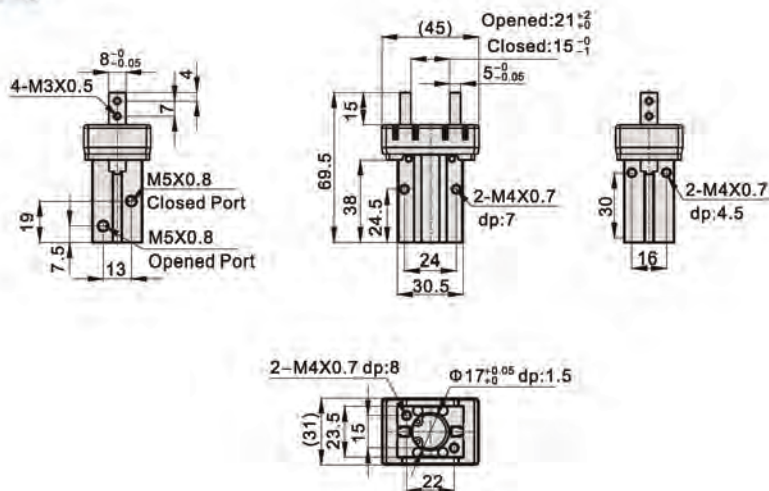
#### Side mounting type(B type)



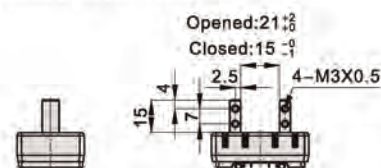
#### Thru.hole mounting type(N type)



#### HFKP16



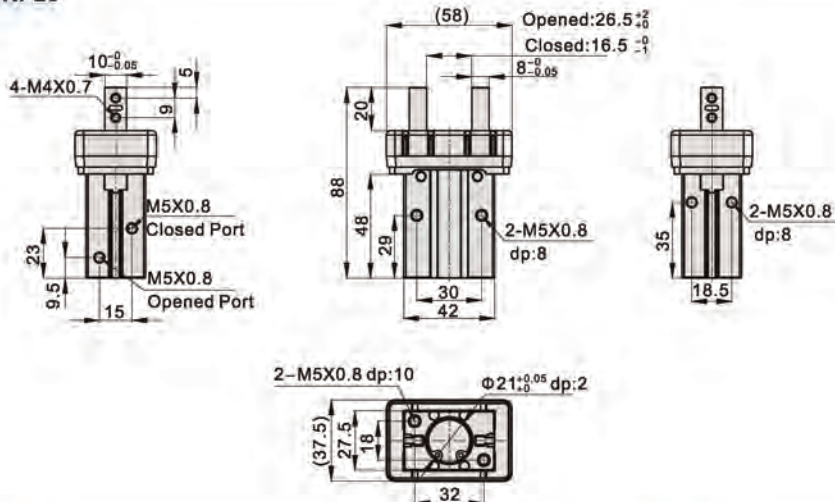
#### Side mounting type(B type)



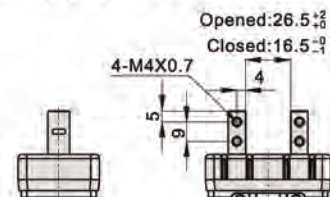
#### Thru.hole mounting type(N type)



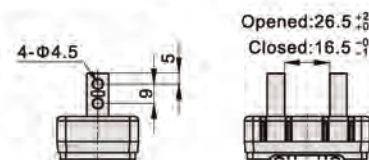
#### HFKP20



#### Side mounting type(B type)

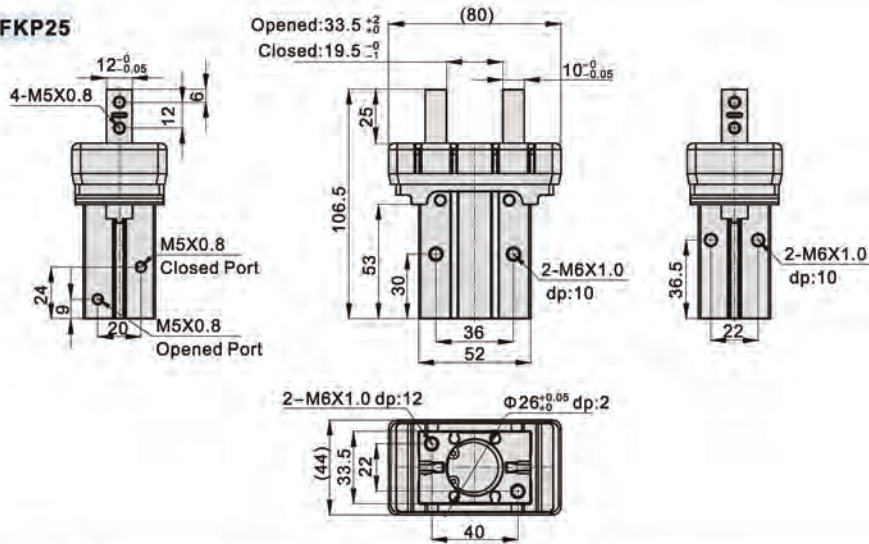


#### Thru.hole mounting type(N type)

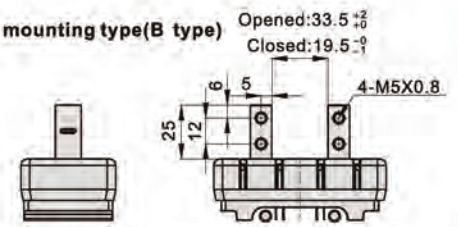


## HF KP Series

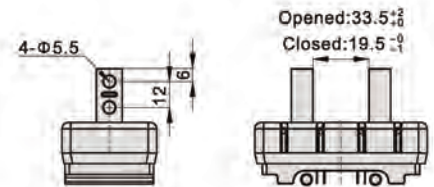
### HF KP25



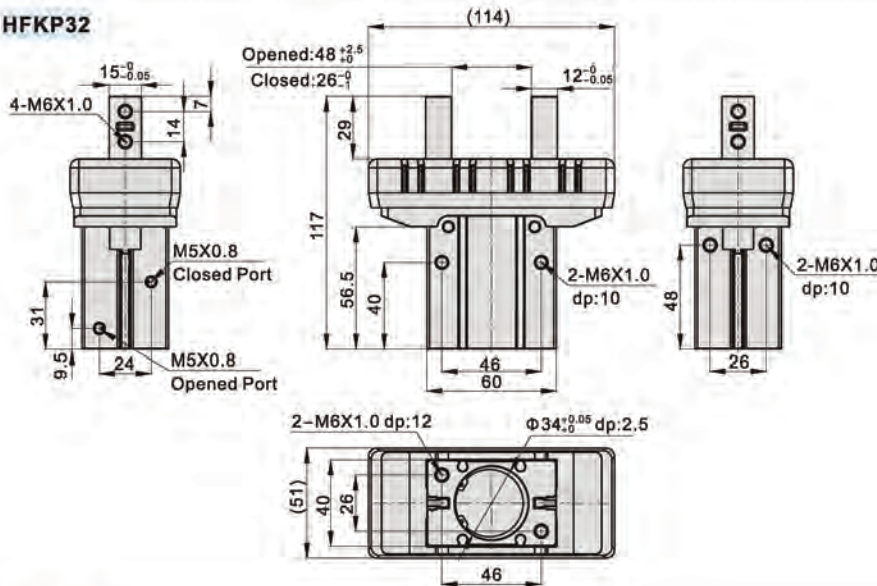
### Side mounting type(B type)



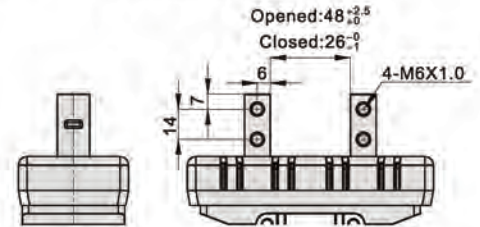
### Thru.hole mounting type(N type)



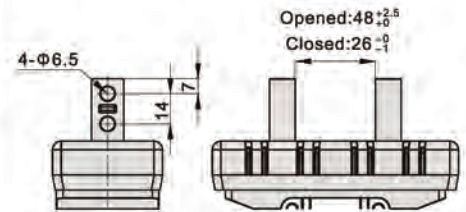
### HF KP32



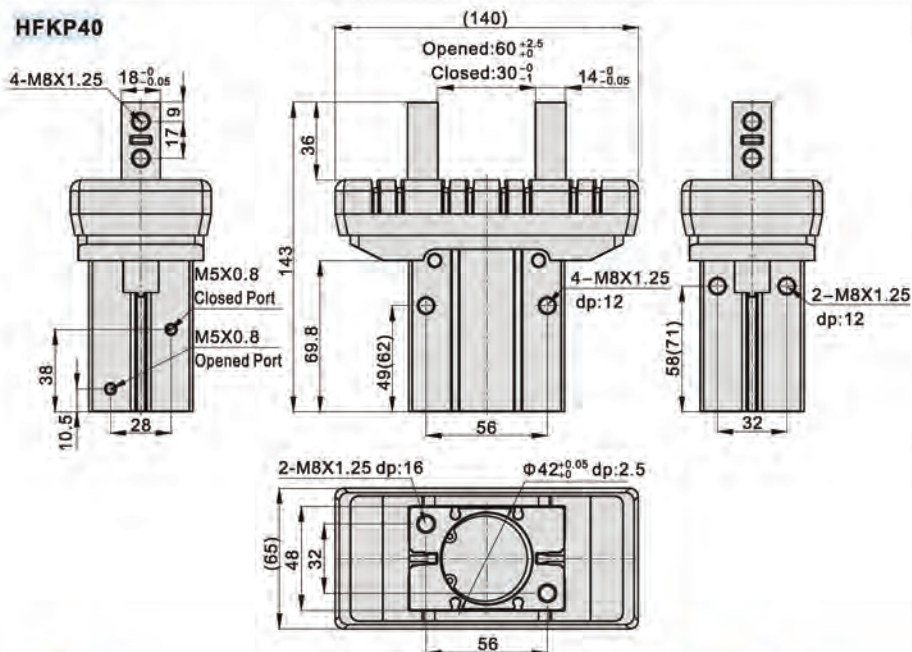
### Side mounting type(B type)



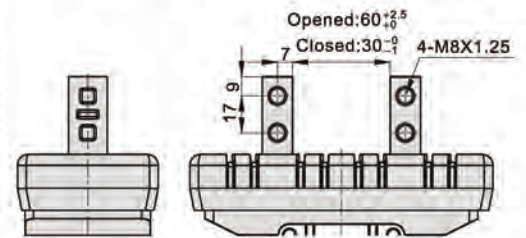
### Thru.hole mounting type(N type)



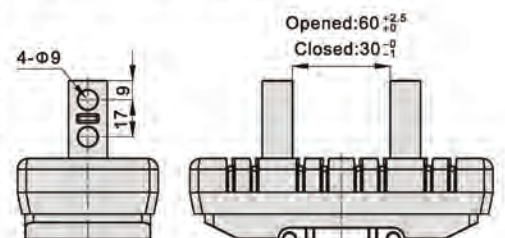
### HF KP40



### Side mounting type(B type)



### Thru.hole mounting type(N type)



## HFKP Series

### How to select product

Please select pneumatic finger according to the following steps:

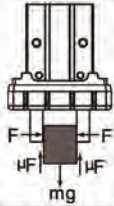
① The selection of the effective gripping force

② the confirmation of the gripping point

③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left:

F: Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity ( $=9.8m/s^2$ )

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

$$F = \frac{mg}{2 \times \mu} \times a$$

$\mu=0.2$

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

$\mu=0.1$

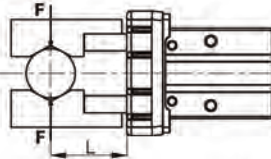
$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

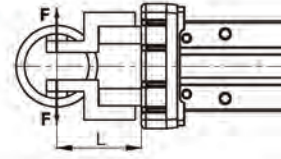
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

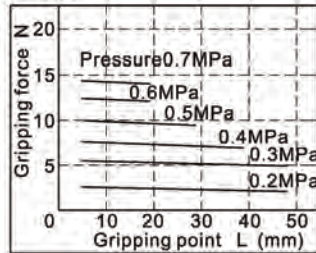
Closed gripping force



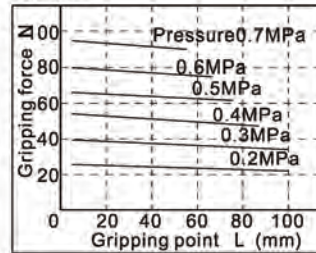
Opened gripping force



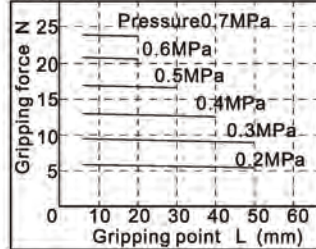
HFKP10



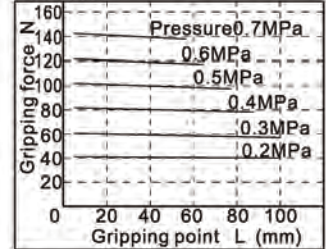
HFKP25



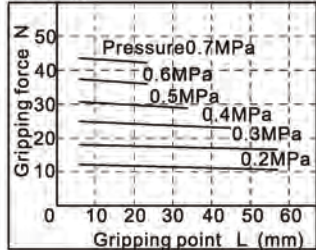
HFKP10



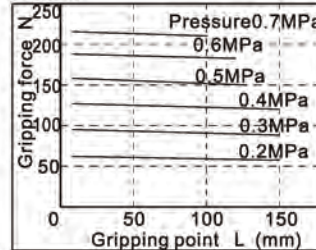
HFKP25



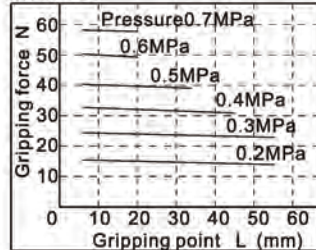
HFKP16



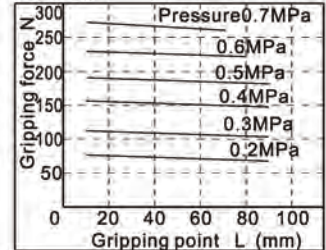
HFKP32



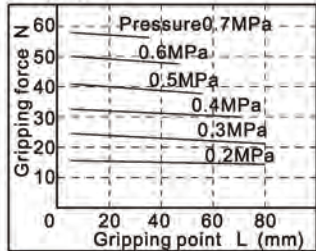
HFKP16



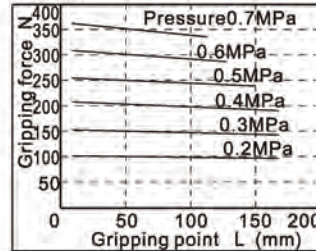
HFKP32



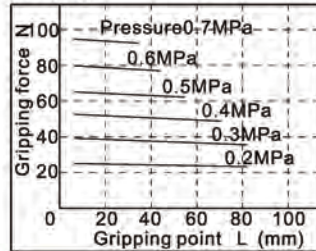
HFKP20



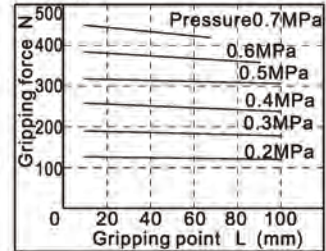
HFKP40



HFKP20



HFKP40

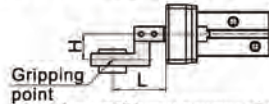


## HFKP Series

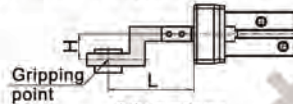
### 2. The selection of the gripping point

2.1) Please select the gripping point within the limited field shown below.

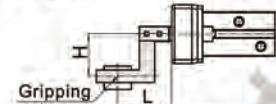
Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



L and H have proper sizes



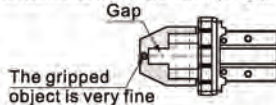
L is too long



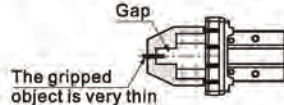
H is too long

2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.

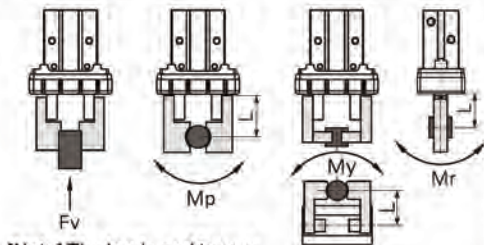


The gripped object is very fine



The gripped object is very thin

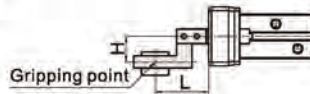
### 3. The confirmation of the external force put on the gripping jaw.



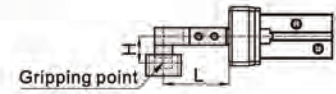
[Note] The loads and torque values of said are all static values.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
10	87	0.26	0.26	0.53	$\text{Allowable load(N)} = \frac{\text{M(Maximum permissible moment)(N.m)}}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFKP16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F = 0.68/(30×10 <sup>-3</sup> ) = 22.7(N) Actual load f=10(N)<22.7(N) To meet the using requirements
16	147	0.68	0.68	1.36		
20	221	1.32	1.32	2.65		
25	382	1.94	1.94	3.88		
32	514	3	3	6		
40	735	4.5	4.5	9		

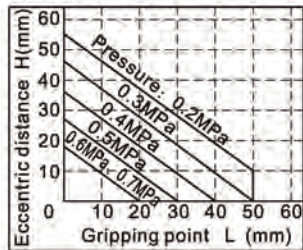
#### Closed gripping points



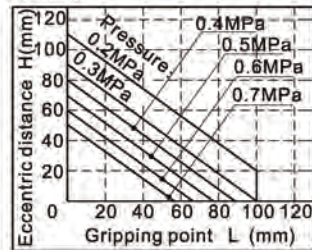
#### Opened clamping point



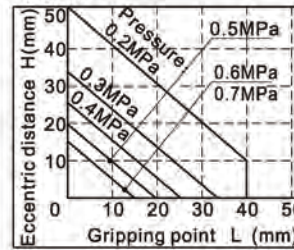
HFKP10



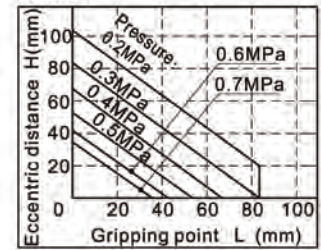
HFKP25



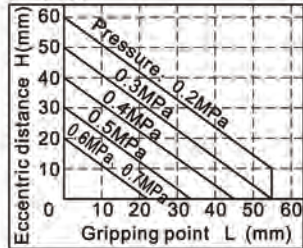
HFKP10



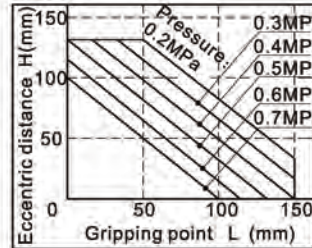
HFKP25



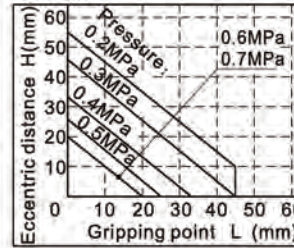
HFKP16



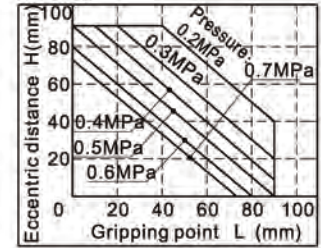
HFKP32



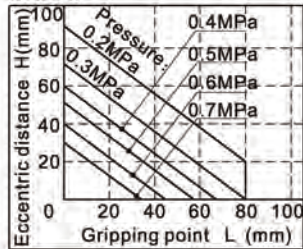
HFKP16



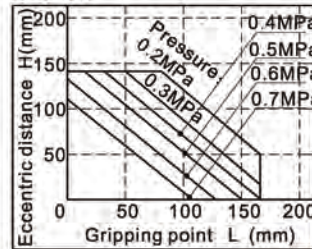
HFKP32



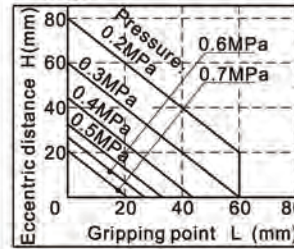
HFKP20



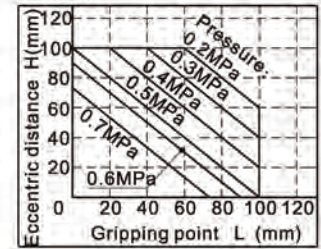
HFKP40



HFKP20



HFKP40





# Air gripper—HFZ Series

Parallel style with guide track—ball bearing

## Compendium of HFZ Series

### Seven kinds of bore size and three kinds of type

Bore size: 6, 10, 16, 20, 25, 32, 40,  
 HFZ: Double acting  
 HFSZ: Single acting and normally closed  
 HFTZ: Single acting and normally opened

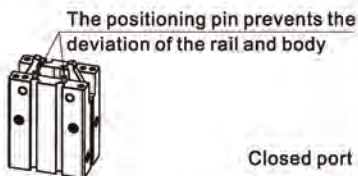
### Integrated design of linear guide rail

Integrated design of linear guide rail,  
 high rigidity and high precision.

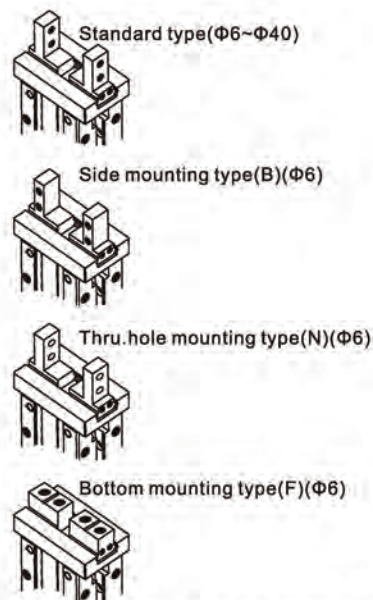


### With positioning pin

A positioning pin is attached to the bottom  
 of the linear guide rail, which can prevent  
 the deviation of the positioning rail and body.



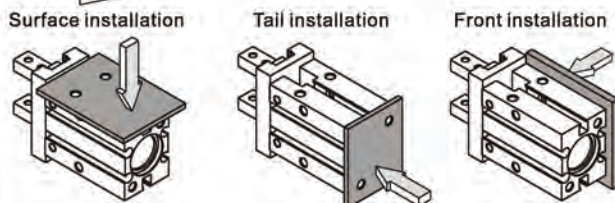
### Four kinds of finger type



According to the actual using requirements of  
 customers, the initial position of clamping jaw  
 can be customized to meet the different needs  
 under different working conditions.

### Can be mounted from three directions

With mounting holes on the side and tail.



### With squareness magnetic switch slots

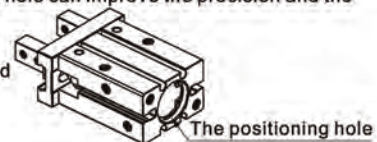
The squareness magnetic switch slots convenient  
 to install DMSG(S)\CMSG type inducting switch.

### With roundness magnetic switch slots

The roundness magnetic switch slots convenient  
 to install DMSH(S)\CMSH type inducting switch.

### With positioning hole

The positioning hole can improve the precision and the  
 consistency of  
 repeated  
 dismantling and  
 positioning.



Bore size (mm)		6	10	16	20	25	32	40	
Acting type		Double acting		Single acting					
Fluid		Air(to be filtered by 40 μm filter element)							
Operating pressure	Double acting	Φ6, Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)						
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
	Single acting	Φ6, Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)						
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)						
Temperature °C		-20~70							
Lubrication		Not required							
Repeatability mm		±0.01				±0.02			
Max. frequency		180(c.p.m)				60(c.p.m)			
Sensor switches		DMSH(S)\CMSH		DMSG(S)\CMSG, DMSH(S)\CMSH					
Port size		M3×0.5			M5×0.8				

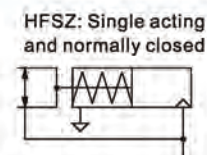
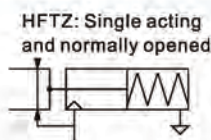
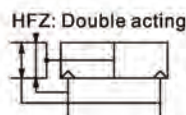
Note) Refer to P353 for detail of sensor switch.



## HFZ Series



### Symbol



### Gripping force and stroke

Acting type		Double acting(HFZ)							Single acting_NO (HFTZ)							Single acting_NC (HFSZ)						
Bore size		6	10	16	20	25	32	40	6	10	16	20	25	32	40	6	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	3.3	11	34	45	69	160	255	1.9	7	27	35	55	133	220	-	-	-	-	-	-	-
	Internal	6.1	17	45	68	102	195	320	-	-	-	-	-	-	3.7	13	38	59	87	163	270	
Opening/Closing stroke(Both sides)(mm)		3	4	6	10	14	22	30	3	4	6	10	14	22	30	3	4	6	10	14	22	30
Weight (g)	F Type	24	-	-	-	-	-	-	25	-	-	-	-	-	25	-	-	-	-	-	-	
	Others	25	56	124	236	428	729	1268	26	57	125	238	430	778	1365	26	57	125	238	430	778	1365

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 285 for the definition of "L".

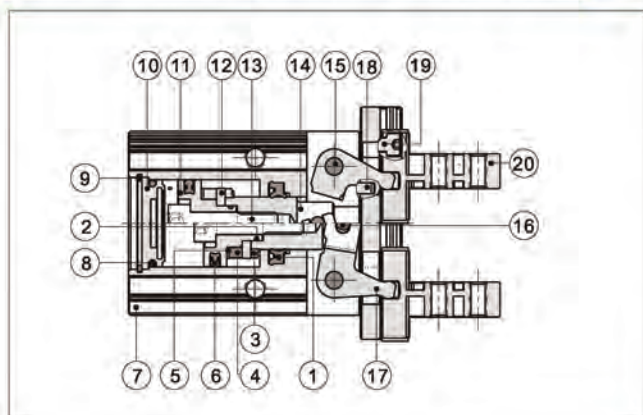
### Ordering code

HFZ 20 □

1 2 3

①Model	②Bore size	③Finger type		
HFZ: Air finger(Double acting) HFSZ: Air finger (Single acting and normally closed) HFTZ: Air finger (Single acting and normally opened)	6 10 16 20 25 32 40	Blank:Standard 		
	6	B:Side mounting type 	N:Thru.hole mounting type 	F:Bottom mounting type 
HFZ series are all attached with magnet.				

### Inner structure and material of major parts



NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU
4	Magnet	Sintered metal(Neodymium-iron-boron)
5	Magnet washer	NBR
6	Piston seal	NBR
7	Body	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Back cover	Aluminum alloy
11	Piston	Aluminum alloy/Stainless steel
12	Magnet fixed flake	Stainless steel
13	Screw	Carbon steel
14	Piston rod	Aluminum alloy/Stainless steel
15	Pin	Stainless steel
16	Pin	Stainless steel
17	Curved bar	Stainless steel
18	Pin	Stainless steel
19	Countersink screw	Carbon steel
20	Assembly of clamping jaw and guide rail	Stainless steel

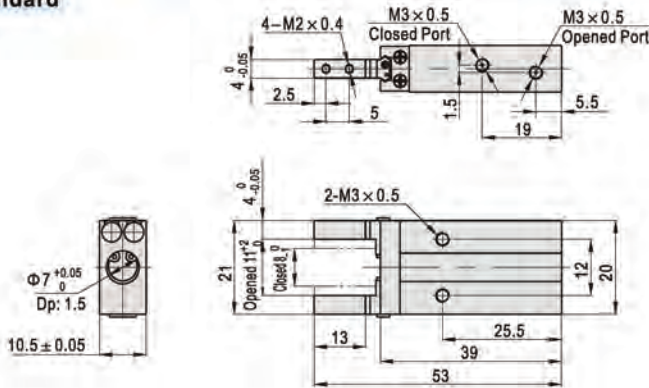
# Air gripper(parallel style——ball bearing)

## HFZ Series

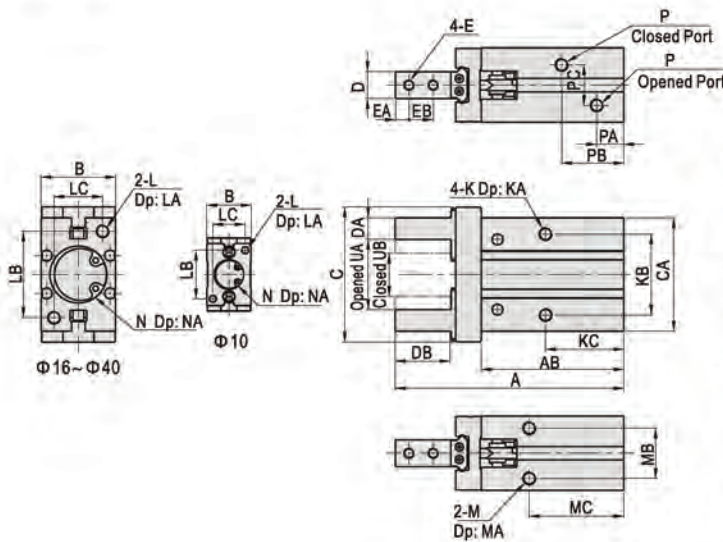
### Dimensions

#### Standard

Φ6



Φ10~Φ40



Model\Item	A	AB	B	C	CA	D	DA	DB	E	EA
HFZ10	57	37.5	16.5	30	23	5 <sup>0</sup> / <sub>-0.05</sub>	4 <sup>0</sup> / <sub>-0.05</sub>	12	M2.5×0.45	3
HFZ16	67.5	42.5	23.5	39	30.5	8 <sup>0</sup> / <sub>-0.05</sub>	5 <sup>0</sup> / <sub>-0.05</sub>	15	M3×0.5	4
HFZ20	85	53	27.5	53	42	10 <sup>0</sup> / <sub>-0.05</sub>	8 <sup>0</sup> / <sub>-0.05</sub>	20	M4×0.7	5
HFZ25	103	64	33.5	71	52	12 <sup>0</sup> / <sub>-0.05</sub>	10 <sup>0</sup> / <sub>-0.05</sub>	25	M5×0.8	6
HFZ32	113(122)	67(76)	40	106	60	15 <sup>0</sup> / <sub>-0.05</sub>	12 <sup>0</sup> / <sub>-0.05</sub>	29	M6×1.0	7
HFZ40	139(152)	83(96)	48	132	72	18 <sup>0</sup> / <sub>-0.05</sub>	14 <sup>0</sup> / <sub>-0.05</sub>	36	M8×1.25	9

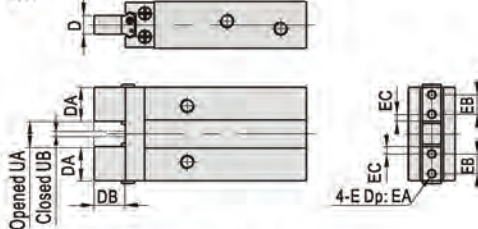
Model\Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFZ10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFZ16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFZ20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFZ25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFZ32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFZ40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model\Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFZ10	27	Φ11 <sup>+0.05</sup> / <sub>0</sub>	1.5	M3×0.5	7	19	10	15.5 <sup>+0.2</sup> / <sub>0</sub>	11.5 <sup>-0.2</sup> / <sub>0</sub>
HFZ16	30	Φ17 <sup>+0.06</sup> / <sub>0</sub>	1.5	M5×0.8	7.5	19	13	21 <sup>+0.2</sup> / <sub>0</sub>	15 <sup>-0.2</sup> / <sub>0</sub>
HFZ20	35	Φ21 <sup>+0.06</sup> / <sub>0</sub>	2	M5×0.8	9.5	23	15	26.5 <sup>+0.2</sup> / <sub>0</sub>	16.5 <sup>-0.2</sup> / <sub>0</sub>
HFZ25	36.5	Φ26 <sup>+0.06</sup> / <sub>0</sub>	2	M5×0.8	9	24	20	33.5 <sup>+0.2</sup> / <sub>0</sub>	19.5 <sup>-0.2</sup> / <sub>0</sub>
HFZ32	48(57)	Φ34 <sup>+0.06</sup> / <sub>0</sub>	2.5	M5×0.8	9.5	31(40)	24	48 <sup>+0.5</sup> / <sub>0</sub>	26 <sup>-0.2</sup> / <sub>0</sub>
HFZ40	58(71)	Φ42 <sup>+0.06</sup> / <sub>0</sub>	2.5	M5×0.8	10.5	38(50)	28	60 <sup>+0.5</sup> / <sub>0</sub>	30 <sup>-0.2</sup> / <sub>0</sub>

[Note] The values in "( )" in the above table are single acting type sizes.

#### Bottom mounting type(F type)

Φ6

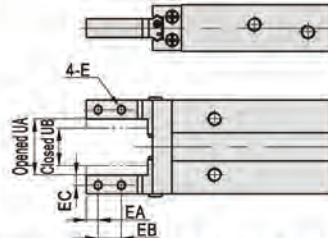


Model\Item	D	DA	DB	EA	EB	E
HFZ6-F	4 <sup>0</sup> / <sub>-0.05</sub>	7.5	7	3	3.5	M2×0.4
Model\Item	UA(Opened)	UB(Closed)				
HFZ6-F	5 <sup>+1.5</sup> / <sub>0</sub>	1.8 <sup>0</sup> / <sub>-0.5</sub>				

[Note] The other dimensions are the same as standard type.

#### Side mounting type(B type)

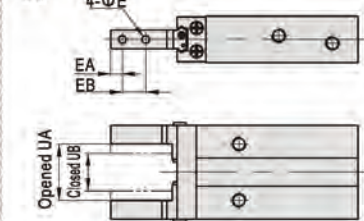
Φ6



Model\Item	E	EA	EB	EC
HFZ6-B	M2×0.4	2.5	5	2
Model\Item	UA(Opened)	UB(Closed)		
HFZ6-B	11 <sup>+0.2</sup> / <sub>0</sub>	8 <sup>-0.2</sup> / <sub>0</sub>		

#### Thru-hole mounting type(N type)

Φ6



Model\Item	E	EA	EB
HFZ6-N	2.3	2.5	5
Model\Item	UA(Opened)	UB(Closed)	
HFZ6-N	11 <sup>+0.2</sup> / <sub>0</sub>	8 <sup>-0.2</sup> / <sub>0</sub>	

### How to select product \ Installation and application

Please refer to HFK series for details.



# Air gripper—HFK Series

Parallel style with guide track—roller bearing

## Compendium of HFK Series

### Six kinds of bore size and three kinds of type

Bore size: 10, 16, 20, 25, 32, 40,  
HFK: Double acting  
HFSK: Single acting and normally closed  
HFTK: Single acting and normally opened

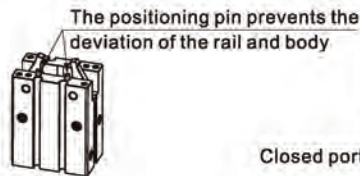
### Integrated design of linear guide roller

Integrated design of linear guide roller,  
high rigidity and high precision.



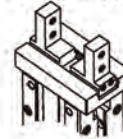
### With positioning pin

A positioning pin is attached to the bottom  
of the linear guide rail, which can prevent  
the deviation of the positioning rail and body.

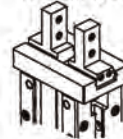


### Seven kinds of finger type

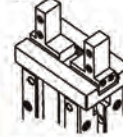
Standard type



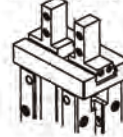
Narrow type(R)



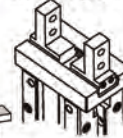
Side mounting  
type(B)



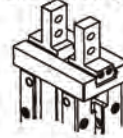
Side mounting and  
narrow type(W)



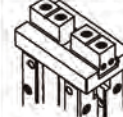
Thru.hole  
mounting type(N)



Thru.hole mounting  
and narrow type(M)



Bottom mounting  
type(F)



According to the actual using requirements of  
customers, the initial position of clamping jaw  
can be customized to meet the different needs  
under different working conditions.

### Can be mounted from three directions

With mounting holes on the side and tail.

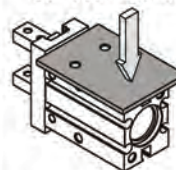
### With squareness magnetic switch slots

The squareness magnetic switch slots convenient  
to install DMSG(S)\CMSG type inducting switch.

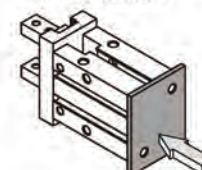
### With roundness magnetic switch slots

The roundness magnetic switch slots convenient  
to install DMSH(S)\CMSH type inducting switch.

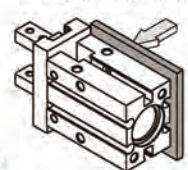
Surface installation



Tail installation

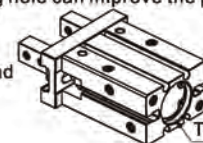


Front installation



### With positioning hole

The positioning hole can improve the precision and the  
consistency of  
repeated  
dismounting and  
positioning.



The positioning hole

Bore size (mm)		10	16	20	25	32	40	
Acting type		Double acting		Single acting				
Fluid		Air(to be filtered by 40 μm filter element)						
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)					
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)					
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)					
Temperature °C		-20~70						
Lubrication		Not required						
Repeatability mm		±0.01			±0.02			
Max. frequency		180(c.p.m)			60(c.p.m)			
Sensor switches		DMSH(S)\CMSH		DMSG(S)\CMSG, DMSH(S)\CMSH				
Port size		M3×0.5		M5×0.8				

Note) Refer to P353 for detail of sensor switch.



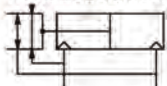
# Air gripper(parallel style—roller bearing)

## HFK Series

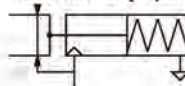


### Symbol

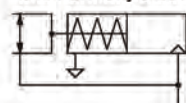
HFK: Double acting



HFTK: Single acting and normally opened



HFSK: Single acting and normally closed



### Gripping force and stroke

Acting type		Double acting(HFK)						Single acting_NO (HFTK)						Single acting_NC (HFSK)					
Bore size		10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	11	34	45	69	160	255	7	27	35	55	133	220	-	-	-	-	-	-
	Internal	17	45	68	102	195	320	-	-	-	-	-	-	13	38	59	87	163	270
Opening/Closing stroke(Both sides)(mm)		4	6	10	14	22	30	4	6	10	14	22	30	4	6	10	14	22	30
Weight (g)	F Type	56	124	236	418	750	1340	57	125	238	420	799	1437	57	125	238	420	799	1437
	Others	56	124	236	428	729	1268	57	125	238	430	778	1365	57	125	238	430	778	1365

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Add) Please refer to page 285 for the definition of "L".

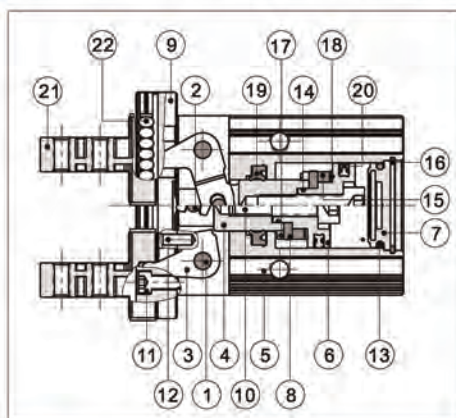
### Ordering code

HFK 20 □

1 2 3

①Model	②Bore size	③Finger type			
HFK: Air finger(Double acting)  HFSK: Air finger (Single acting and normally closed)  HFTK: Air finger (Single acting and normally opened)	10 16 20 25 32 40	Blank: Standard 	B: Side mounting type 	R: Narrow type 	F: Bottom mounting type 
	10 16 20 25	N: Thru.hole mounting type 	W: Side mounting and narrow type 	M: Thru.hole mounting and narrow type 	HFK series are all attached with magnet.

### Inner structure and material of major parts



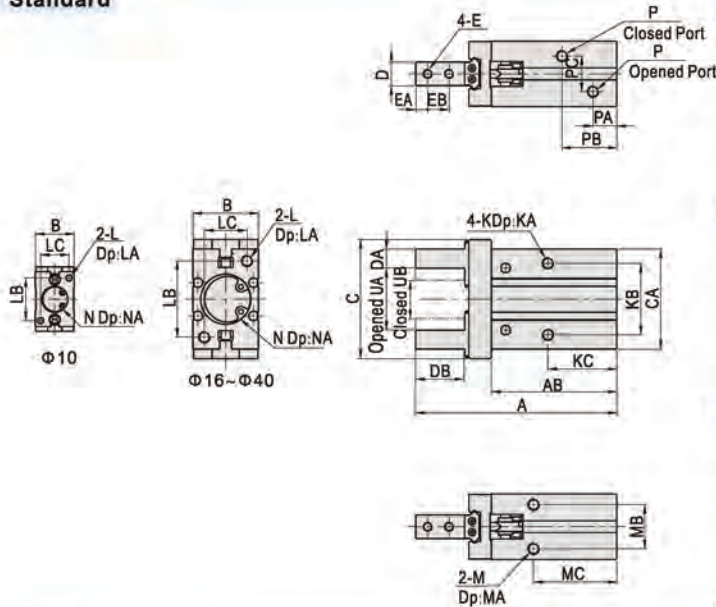
NO.	Item	Material	NO.	Item	Material
1	Pin	Stainless steel	12	Pin	Bearing steel
2	Pin	Stainless steel	13	O-ring	NBR
3	Curved bar	Stainless steel	14	O-ring	NBR
4	Piston rod	Aluminum alloy/Stainless steel	15	Magnet	Sintered metal(Neodymium-iron-boron)
5	Body	Aluminum alloy	16	C clip	Spring steel
6	Piston	Aluminum alloy/Stainless steel	17	Bumper	TPU
7	Back cover	Brass/Aluminum alloy	18	Magnet washer	NBR
8	Magnet fixed flake	Aluminum alloy/Stainless steel	19	Rod packing	NBR
9	Bearing steel	Stainless steel	20	Piston seal	NBR
10	Countersink screw	Carbon steel	21	Clamping jaw	Bearing steel
11	Countersink screw	Carbon steel	22	Guide roller	Bearing steel

# Air gripper(parallel style——roller bearing)

## HFK Series

### Dimensions

#### Standard



Model\Item	A	AB	B	C	CA	D	DA	DB	E	EA
HFK10	57	37.5	16.5	30	23	5 <sup>-0.05</sup> <sub>0</sub>	4 <sup>-0.05</sup> <sub>0</sub>	12	M2.5×0.45	3
HFK16	67.5	42.5	23.5	39	30.5	8 <sup>-0.05</sup> <sub>0</sub>	5 <sup>-0.05</sup> <sub>0</sub>	15	M3×0.5	4
HFK20	85	53	27.5	53	42	10 <sup>-0.05</sup> <sub>0</sub>	8 <sup>-0.05</sup> <sub>0</sub>	20	M4×0.7	5
HFK25	103	64	33.5	71	52	12 <sup>-0.05</sup> <sub>0</sub>	10 <sup>-0.05</sup> <sub>0</sub>	25	M5×0.8	6
HFK32	113(122)	67(76)	40	106	60	15 <sup>-0.05</sup> <sub>0</sub>	12 <sup>-0.05</sup> <sub>0</sub>	29	M6×1.0	7
HFK40	139(152)	83(96)	48	132	72	18 <sup>-0.05</sup> <sub>0</sub>	14 <sup>-0.05</sup> <sub>0</sub>	36	M8×1.25	9

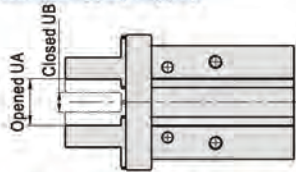
Model\Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFK10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFK16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFK20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFK25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFK32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFK40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model\Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFK10	27	φ11 <sup>+0.05</sup> <sub>0</sub>	1.5	M3×0.5	7	19	10	15.5 <sup>+2</sup> <sub>0</sub>	11.5 <sup>-1</sup> <sub>0</sub>
HFK16	30	φ17 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	7.5	19	13	21 <sup>+2</sup> <sub>0</sub>	15 <sup>-1</sup> <sub>0</sub>
HFK20	35	φ21 <sup>+0.05</sup> <sub>0</sub>	2	M5×0.8	9.5	23	15	26.5 <sup>+2</sup> <sub>0</sub>	16.5 <sup>-1</sup> <sub>0</sub>
HFK25	36.5	φ26 <sup>+0.05</sup> <sub>0</sub>	2	M5×0.8	9	24	20	33.5 <sup>+2</sup> <sub>0</sub>	19.5 <sup>-1</sup> <sub>0</sub>
HFK32	48(57)	φ34 <sup>+0.05</sup> <sub>0</sub>	2.5	M5×0.8	9.5	31(40)	24	48 <sup>+2.5</sup> <sub>0</sub>	26 <sup>-1</sup> <sub>0</sub>
HFK40	58(71)	φ42 <sup>+0.05</sup> <sub>0</sub>	2.5	M5×0.8	10.5	38(50)	28	60 <sup>+2.5</sup> <sub>0</sub>	30 <sup>-1</sup> <sub>0</sub>

[Note]The values in "( )" in the above table are single acting type sizes.

#### Narrow type(R type)

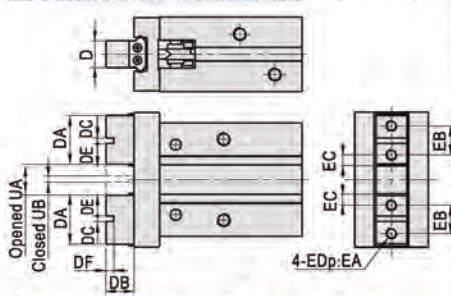
φ10~φ25



Model\Item	UA(Opened)	UB(Closed)
HFK10-R	10 <sup>+2</sup> <sub>0</sub>	6 <sup>-1</sup> <sub>0</sub>
HFK16-R	12.5 <sup>+2</sup> <sub>0</sub>	6.5 <sup>-1</sup> <sub>0</sub>
HFK20-R	17 <sup>+2</sup> <sub>0</sub>	7 <sup>-1</sup> <sub>0</sub>
HFK25-R	23 <sup>+2.5</sup> <sub>0</sub>	9 <sup>-1</sup> <sub>0</sub>

#### Bottom mounting type(F type)

φ10~φ40

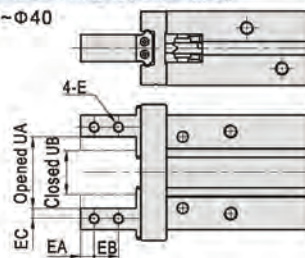


Model\Item	D	DA	DB	DC	DE	E
HFK10-F	5 <sup>-0.05</sup> <sub>0</sub>	11	5	2 <sup>+0.04</sup> <sub>-0.01</sub>	4.5	M2.5×0.45
HFK16-F	8 <sup>-0.05</sup> <sub>0</sub>	14	8	2.5 <sup>+0.04</sup> <sub>-0.01</sub>	5.8	M3×0.5
HFK20-F	10 <sup>-0.05</sup> <sub>0</sub>	18	10.5	3 <sup>+0.04</sup> <sub>-0.01</sub>	7.5	M4×0.7
HFK25-F	12 <sup>-0.05</sup> <sub>0</sub>	22	13	4 <sup>+0.04</sup> <sub>-0.01</sub>	9	M5×0.8
HFK32-F	15 <sup>-0.05</sup> <sub>0</sub>	34.5	18	5 <sup>+0.04</sup> <sub>-0.01</sub>	14.8	M6×1.0
HFK40-F	18 <sup>-0.05</sup> <sub>0</sub>	41.5	22	6 <sup>+0.04</sup> <sub>-0.01</sub>	17.7	M8×1.25

Model\Item	DF	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-F	2	4	6	2.45	5.5 <sup>+2</sup> <sub>0</sub>	1.8 <sup>-0.5</sup> <sub>0</sub>
HFK16-F	2.5	6	8	3.05	7.5 <sup>+2</sup> <sub>0</sub>	1.8 <sup>-0.5</sup> <sub>0</sub>
HFK20-F	3	8	10	3.95	11.5 <sup>+2</sup> <sub>0</sub>	1.8 <sup>-0.5</sup> <sub>0</sub>
HFK25-F	4	10	12	4.9	16 <sup>+2.5</sup> <sub>0</sub>	2.4 <sup>-0.5</sup> <sub>0</sub>
HFK32-F	5	12	20	7.3	25 <sup>+2.5</sup> <sub>0</sub>	3.4 <sup>-0.5</sup> <sub>0</sub>
HFK40-F	6	16	24	8.7	33 <sup>+2</sup> <sub>0</sub>	3.4 <sup>-0.5</sup> <sub>0</sub>

#### Side mounting type(B type)

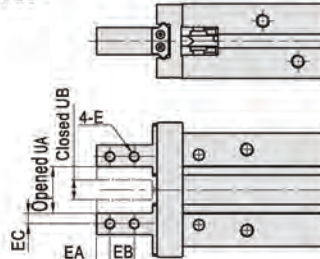
φ10~φ40



Model\Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-B	M2.5×0.45	3	5.7	2	15.5 <sup>+2</sup> <sub>0</sub>	11.5 <sup>-1</sup> <sub>0</sub>
HFK16-B	M3×0.5	4	7	2.5	21 <sup>+2</sup> <sub>0</sub>	15 <sup>-1</sup> <sub>0</sub>
HFK20-B	M4×0.7	5	9	4	26.5 <sup>+2</sup> <sub>0</sub>	16.5 <sup>-1</sup> <sub>0</sub>
HFK25-B	M5×0.8	6	12	5	33.5 <sup>+2</sup> <sub>0</sub>	19.5 <sup>-1</sup> <sub>0</sub>
HFK32-B	M6×1.0	7	14	6	48 <sup>+2.5</sup> <sub>0</sub>	26 <sup>-1</sup> <sub>0</sub>
HFK40-B	M8×1.25	9	17	7	60 <sup>+2.5</sup> <sub>0</sub>	30 <sup>-1</sup> <sub>0</sub>

#### Side mounting and narrow type(W type)

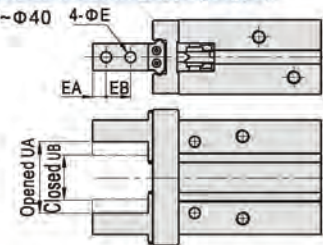
φ10~φ25



Model\Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-W	M2.5×0.45	3	5.7	2	10 <sup>+2</sup> <sub>0</sub>	6 <sup>-1</sup> <sub>0</sub>
HFK16-W	M3×0.5	4	7	2.5	12.5 <sup>+2</sup> <sub>0</sub>	6.5 <sup>-1</sup> <sub>0</sub>
HFK20-W	M4×0.7	5	9	4	17 <sup>+2</sup> <sub>0</sub>	7 <sup>-1</sup> <sub>0</sub>
HFK25-W	M5×0.8	6	12	5	23 <sup>+2.5</sup> <sub>0</sub>	9 <sup>-1</sup> <sub>0</sub>

#### Thru-hole mounting type(N type)

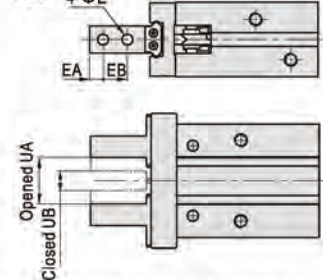
φ10~φ40



Model\Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10-N	2.8	3	5.7	15.5 <sup>+2</sup> <sub>0</sub>	11.5 <sup>-1</sup> <sub>0</sub>
HFK16-N	3.3	4	7	21 <sup>+2</sup> <sub>0</sub>	15 <sup>-1</sup> <sub>0</sub>
HFK20-N	4.5	5	9	26.5 <sup>+2</sup> <sub>0</sub>	16.5 <sup>-1</sup> <sub>0</sub>
HFK25-N	5.5	6	12	33.5 <sup>+2</sup> <sub>0</sub>	19.5 <sup>-1</sup> <sub>0</sub>
HFK32-N	6.5	7	14	48 <sup>+2.5</sup> <sub>0</sub>	26 <sup>-1</sup> <sub>0</sub>
HFK40-N	9	9	17	60 <sup>+2.5</sup> <sub>0</sub>	30 <sup>-1</sup> <sub>0</sub>

#### Thru-hole mounting and narrow type(M type)

φ10~φ25



Model\Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10-M	2.8	3	5.7	10 <sup>+2</sup> <sub>0</sub>	6 <sup>-1</sup> <sub>0</sub>
HFK16-M	3.3	4	7	12.5 <sup>+2</sup> <sub>0</sub>	6.5 <sup>-1</sup> <sub>0</sub>
HFK20-M	4.5	5	9	17 <sup>+2</sup> <sub>0</sub>	7 <sup>-1</sup> <sub>0</sub>
HFK25-M	5.5	6	12	23 <sup>+2.5</sup> <sub>0</sub>	9 <sup>-1</sup> <sub>0</sub>

[Note] The other dimensions are the same as standard type.

## HFK Series

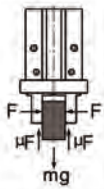
### How to select product

Please select pneumatic finger according to the following steps:

- ①The selection of the effective gripping force >> ②the confirmation of the gripping point >> ③the confirmation of the external force put on the gripping jaw

#### 1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left:

F: Gripping force (N)  
 $\mu$ : friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity (=9.8m/s<sup>2</sup>)

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$   
 so:  $F > \frac{mg}{2 \times \mu}$   
 Safety coefficient is a, so F is:  
 $F = \frac{mg}{2 \times \mu} \times a$

$\mu = 0.2$

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

$\mu = 0.1$

$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

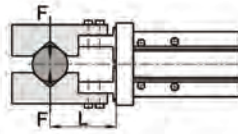
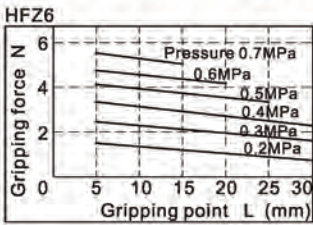
10 times of the mass of the gripped objects

20 times of the mass of the gripped objects

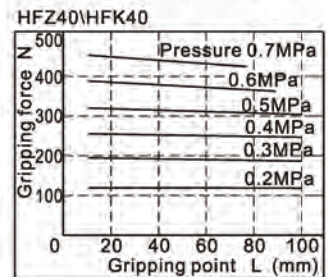
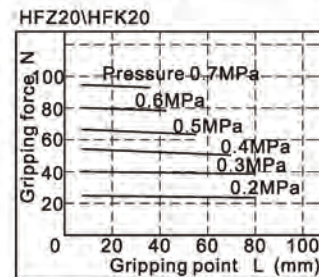
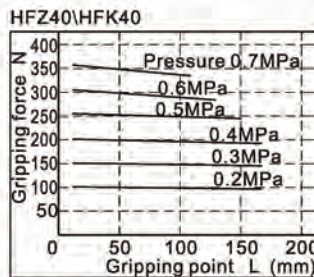
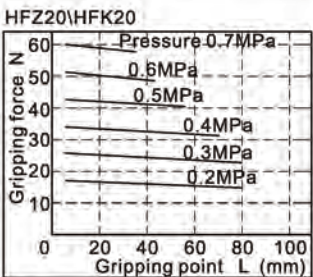
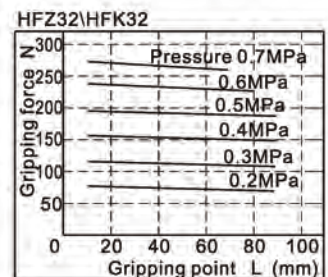
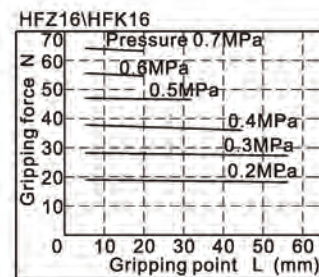
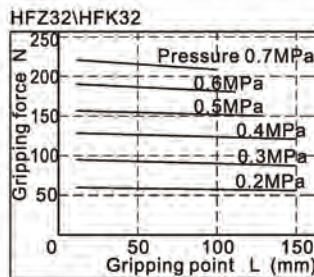
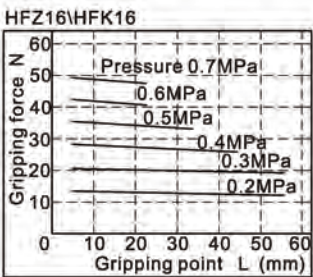
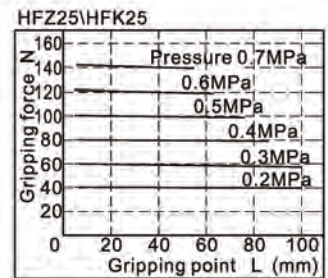
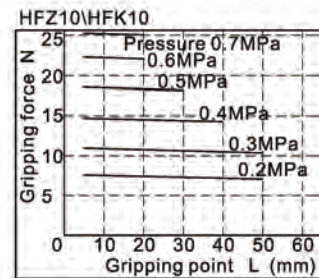
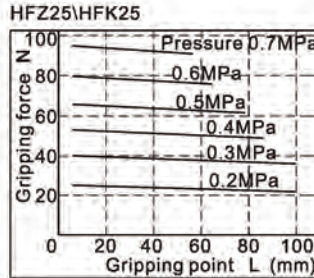
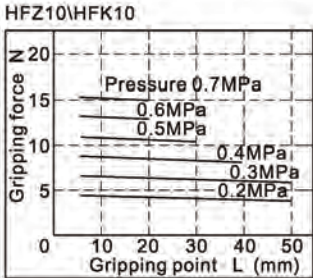
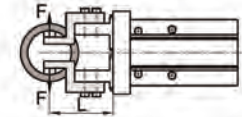
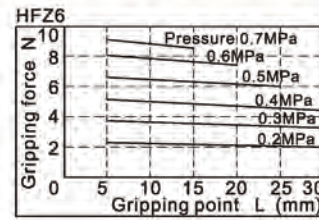
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

#### Double acting type closed gripping force

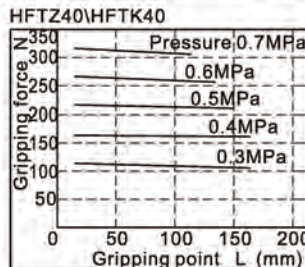
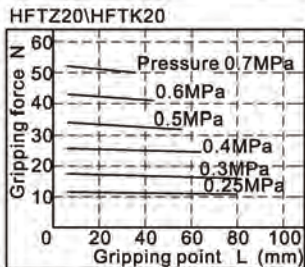
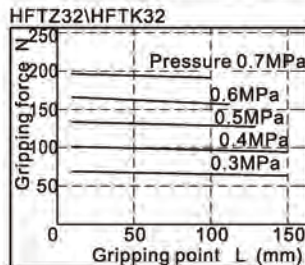
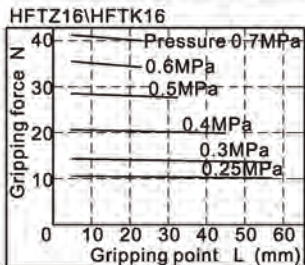
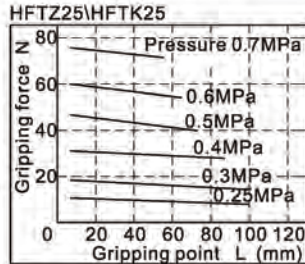
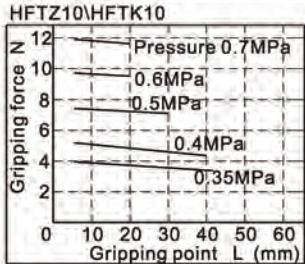
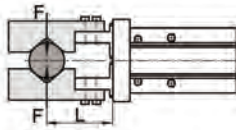
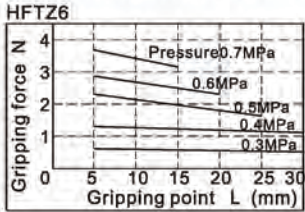


#### Double acting type opened gripping force

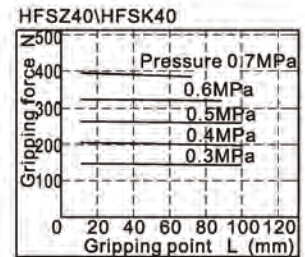
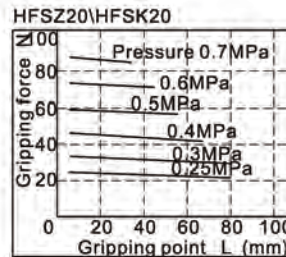
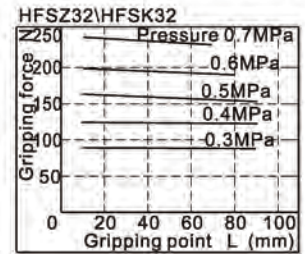
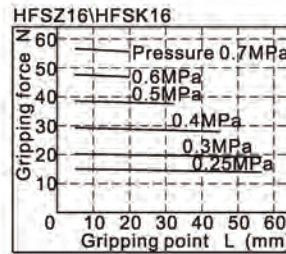
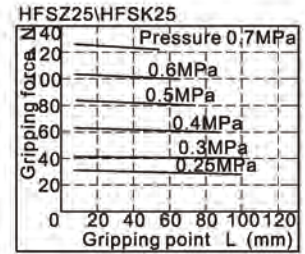
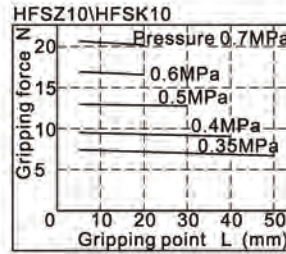
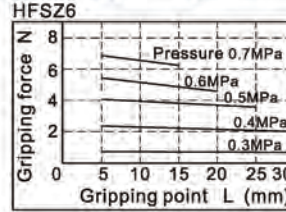


## HFK Series

### Single acting normally opened gripping force



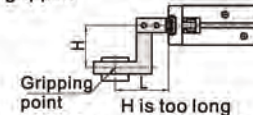
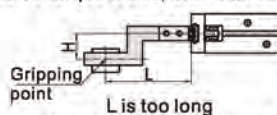
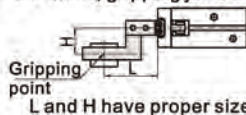
### Single acting normally closed clamping force



### 2. The selection of the gripping point

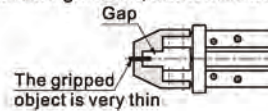
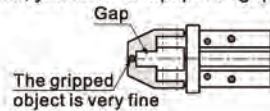
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.

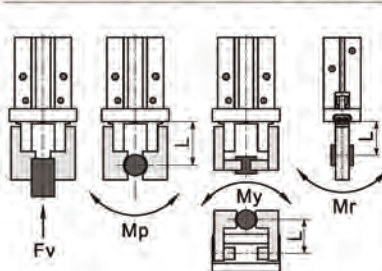


2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



### 3. The confirmation of the external force put on the gripping jaw.



Bore size	The allowed vertical loads Fv(N)		Max. permissible torque(Nm)		
	Hfz	Hfk	Mp	My	Mr
6	10	-	0.04	0.04	0.08
10	58	87	0.26	0.26	0.53
16	98	147	0.68	0.68	1.36
20	147	221	1.32	1.32	2.65
25	255	382	1.94	1.94	3.88
32	343	514	3	3	6
40	490	735	4.5	4.5	9

The calculation of allowable forces when moment loads work

$$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$$

Unit conversion constant

#### Examples of calculation

In the guide rail of HFK16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N,

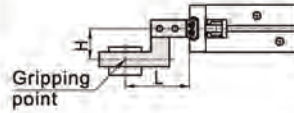
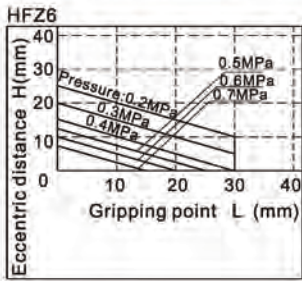
$$\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$$

Actual load f=10(N) < 22.7(N)  
To meet the using requirements

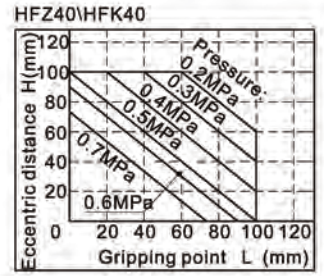
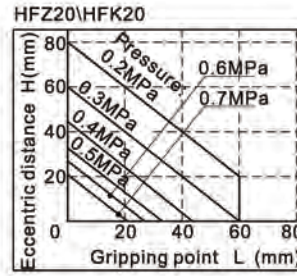
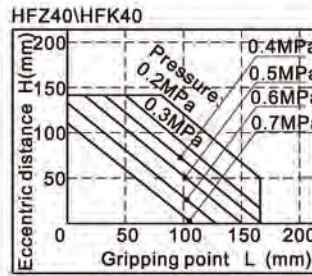
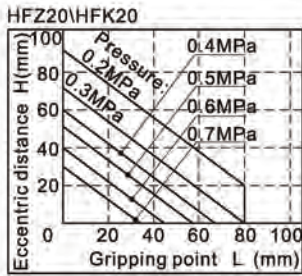
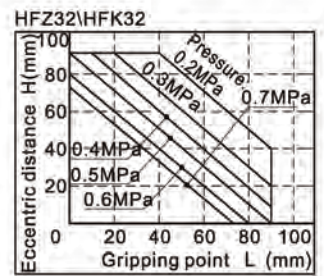
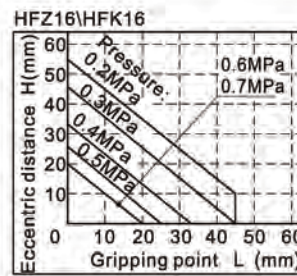
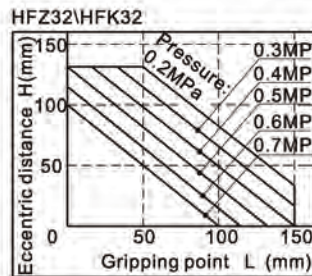
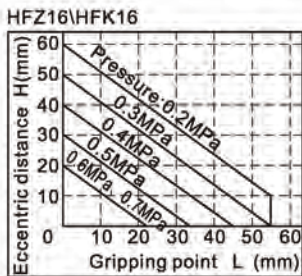
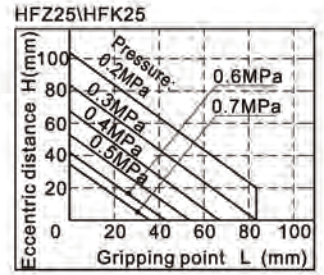
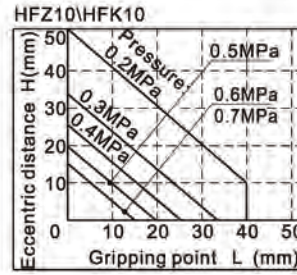
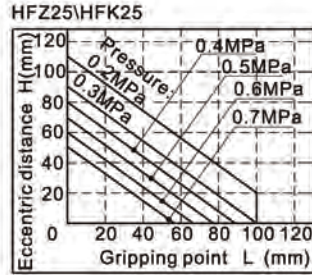
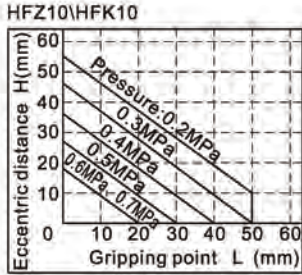
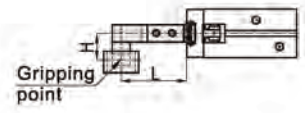
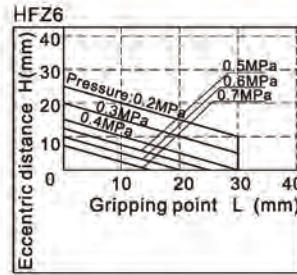
[Note] The loads and torque values of said are all static values.

## HFK Series

The range of the closed gripping points



The range of the opened clamping point

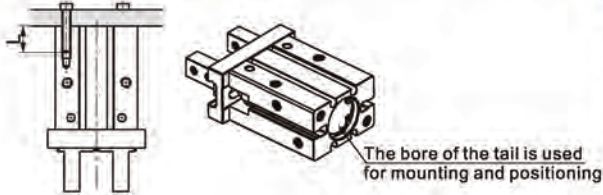


## HFK Series

### Installation and application

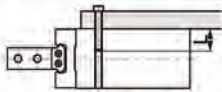
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. Please contact with us when the single acting type clamps only with the spring force.
4. When install and fix the air gripper, avoid falling down, collision and damage.
5. When fixing the gripping jaw parts, don't twist the gripping jaw.
6. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



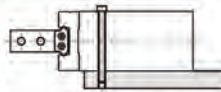
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm <sup>+0.05</sup> <sub>0</sub>	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm <sup>+0.05</sup> <sub>0</sub>	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm <sup>+0.05</sup> <sub>0</sub>	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm <sup>+0.05</sup> <sub>0</sub>	2mm
32	M6×1.0	7.9N.m	12mm	Φ34mm <sup>+0.05</sup> <sub>0</sub>	2.5mm
40	M8×1.25	17.7N.m	16mm	Φ42mm <sup>+0.05</sup> <sub>0</sub>	2.5mm

#### The installation of the front threaded hole



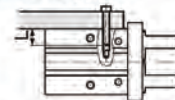
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.88	10
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.9	12
40	M8×1.25	17.7	12

#### The installation of the front through hole



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
6	M2.5×0.45	0.49	-
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.5	4.3	12
32	M5×0.8	4.3	13
40	M6×1.0	7.3	16

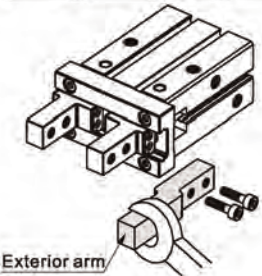
#### Surface installation type



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M3×0.5	0.9	6
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10
40	M8×1.25	13.7	12

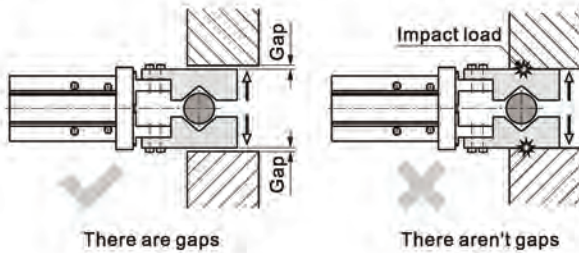
7. The installation method of the gripping jaw fittings  
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Bore size	The bolts type	Max. locking moment (Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9
40	M8×1.25	11.8

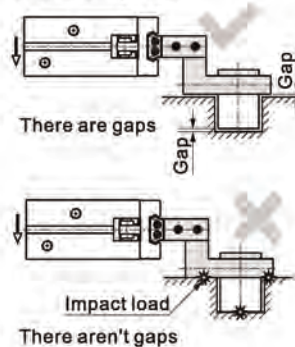


8. Confirm that there is no external forces exerted on the gripping jaw.  
Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

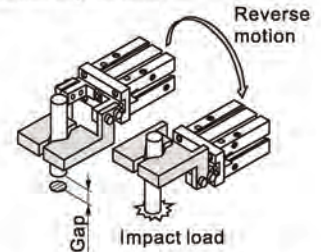
8.1) The end of stroke under the open state of air gripper



8.2) The end of stroke under the move state of air gripper



8.3) Reverse motion state  
When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load.



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
11. People can not enter the movement path of air gripper and articles can not be placed on the path too.
12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



# Air gripper—HFP Series

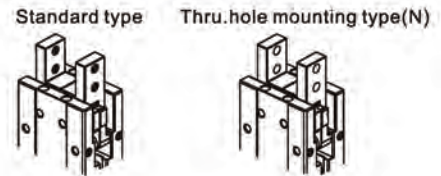
Mechanical parallel style

## Compendium of HFP Series

### Five kinds of bore size and two kinds of type

Bore size: 10, 16, 20, 25, 32  
 HFP: Double acting  
 HFTP: Single acting and normally opened

### Two kinds of finger type



### Structure of lever type gripping

A structure of lever type gripping is designed to reduce the cost under the premise of accuracy. The finger clamps when the piston rod pushes out and stretches when the piston rod retracts. The gripping force is 20%~30% greater than the tensile force.

### High gripping accuracy

The contact area between finger and body is enlarged to reduce shaking and enhance the gripping accuracy.

### Anti-abrasion

A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.

### Can be mounted from two directions

With mounting holes on the side and tail.

Opened port

Closed port

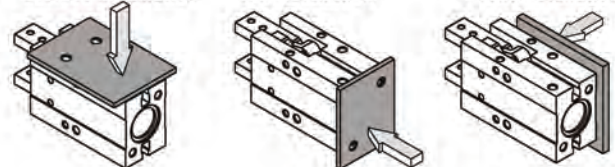
### With magnetic switch slots

The magnetic switch slots convenient to install inducting switch.

Surface installation

Tail installation

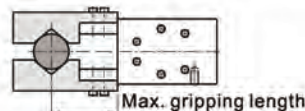
Front installation



Bore size (mm)		10	16	20	25	32
Acting type		Double acting, Single acting				
Fluid		Air (to be filtered by 40 μm filter element)				
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)			
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)			
Proof pressure		1.05MPa(150psi)(10.5bar)				
Temperature °C		-20~70				
Lubrication		Cylinder: Not required; Gripper jaws: Lubricate grease				
Max. gripping length [Note1] mm		30	40	60	70	90
Max. frequency		180(c.p.m)				60(c.p.m)
Sensor switches [Note2]		CMSG\DMSG(S)				CMSG\DMSG(S), CMSH\DMSH(S)
Port size		M3×0.5			M5×0.8	

[Note1] Refer to right graph for the definition of max. gripping length.

[Note2] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.



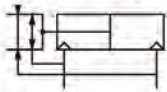
# Air gripper(Mechanical parallel style)

## HFP Series

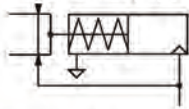


### Symbol

HFP: Double acting



HFTP: Single acting and normally opened



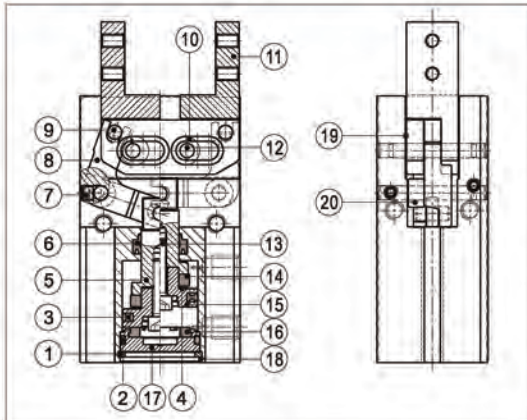
### Ordering code

HFP 20 □

① Model	② Bore size	③ Finger type
HFP: Air finger(Double acting) (mechanical parallel style)	10 16 20 25 32	Blank: Standard
HFTP: Air finger (Single acting and normally opened) (mechanical parallel style)		N: Thru.hole mounting type

[Note] HFP series are all attached with magnet.

### Inner structure and material of major parts

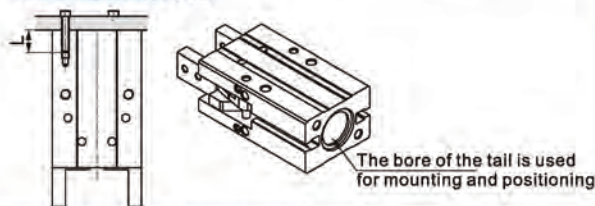


NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	11	Gripping jaws	Stainless steel
2	O-ring	NBR	12	Pin	Stainless steel
3	Piston seal	NBR	13	Screw	Carbon steel
4	Magnet washer	NBR	14	Magnet	Sintered metal (Neodymium-iron-boron)
5	Piston rod	Aluminum alloy Stainless steel	15	Piston	Aluminum alloy Stainless steel
6	Rod packing	NBR	16	Bumper	TPU
7	Countersink screw	Carbon steel	17	Back cover	Aluminum alloy
8	Curved bar	Stainless steel	18	Body	Aluminum alloy
9	Pin	Stainless steel	19	Retaining ring	Stainless steel
10	Guide sleeve	Stainless steel	20	Stopper sleeve	Stainless steel

### Installation and application

- Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
- Don't use the air gripper under strong external force and impact force.
- When install and fix the air gripper, avoid falling down, collision and damage.
- When fixing the gripping jaw parts, don't twist the gripping jaw.
- There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mm <sup>+0.05</sup> <sub>0</sub>	1.0mm
16	M4×0.7	2.0N.m	8mm	Φ17mm <sup>+0.05</sup> <sub>0</sub>	1.2mm
20	M5×0.8	4.5N.m	10mm	Φ21mm <sup>+0.05</sup> <sub>0</sub>	1.2mm
25	M6×1.0	7.0N.m	12mm	Φ26mm <sup>+0.05</sup> <sub>0</sub>	1.5mm
32	M6×1.0	7.0N.m	12mm	Φ34mm <sup>+0.05</sup> <sub>0</sub>	1.5mm

#### The installation of the front threaded hole

Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.7	5
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

#### Surface installation type

Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

6. Other contents of installation and operation are the same with those of HFZ. Refer to the "Installation and Operation" instruction of HFZ.



## HFP Series

### How to select product

Please select pneumatic finger according to the following steps:

- ① The selection of the effective gripping force    ② the confirmation of the gripping point    ③ the confirmation of the external force put on the gripping jaw

#### 1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.

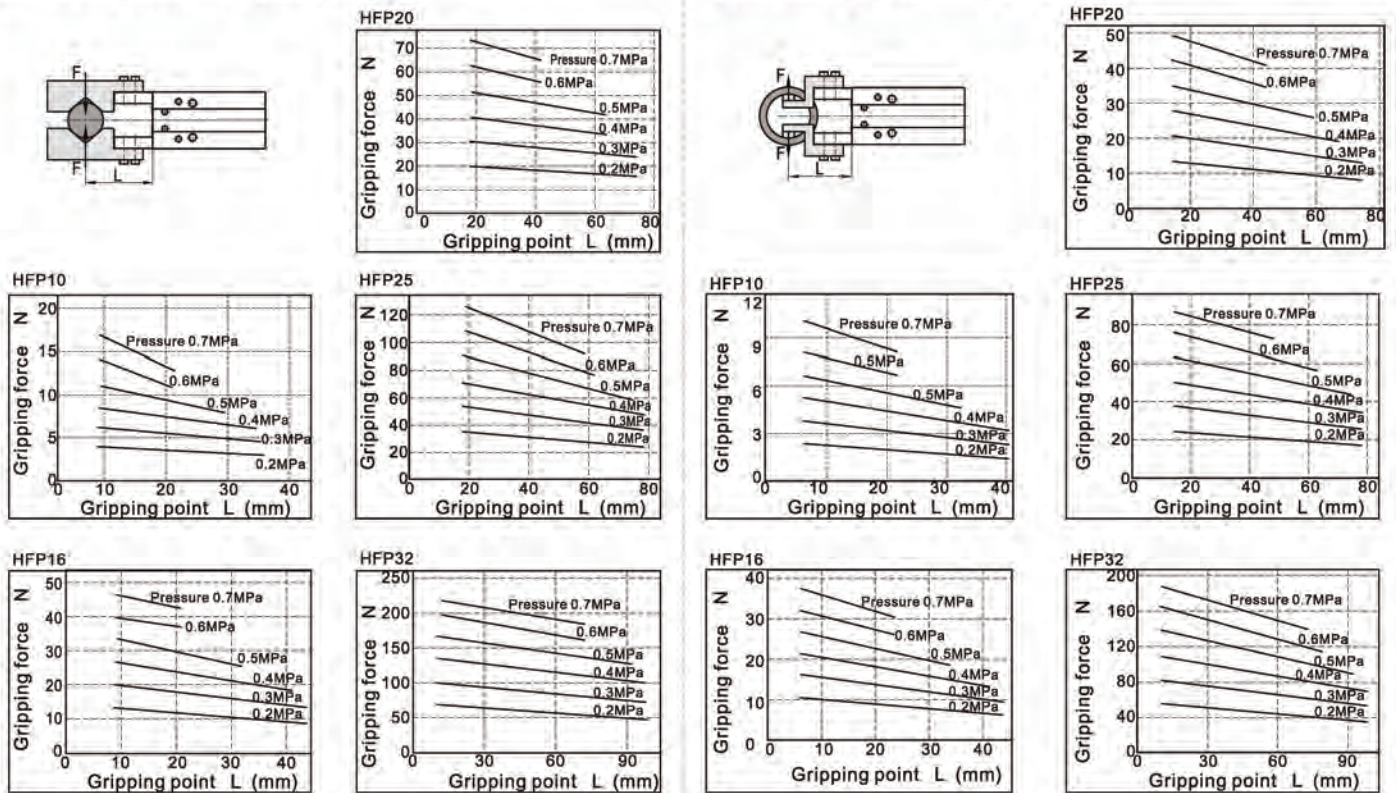
	The work-pieces as shown in the left :		$\mu=0.2$	$\mu=0.1$
	<p>F: Gripping force (N)  <math>\mu</math>: friction coefficient between fittings and work-pieces.                  m: mass of work-pieces                  g: acceleration of gravity (<math>=9.8m/s^2</math>)</p>	<p>The condition that the work-pieces won't drop is: <math>2 \times \mu F &gt; mg</math>                  so: <math>F &gt; \frac{mg}{2 \times \mu}</math>                  Safety coefficient is a, so F is:  <math>F = \frac{mg}{2 \times \mu} \times a</math></p>	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
			10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

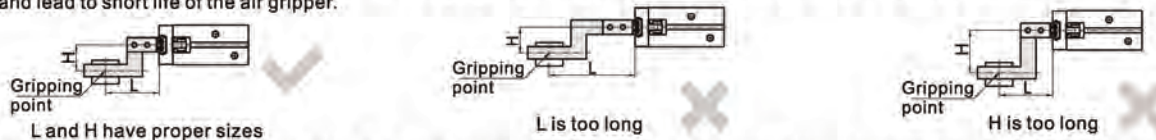
#### Double acting type closed gripping force

#### Double acting type opened gripping force



#### 2. The selection of the gripping point

2.1) Select the gripping point within the maximum gripping length range. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

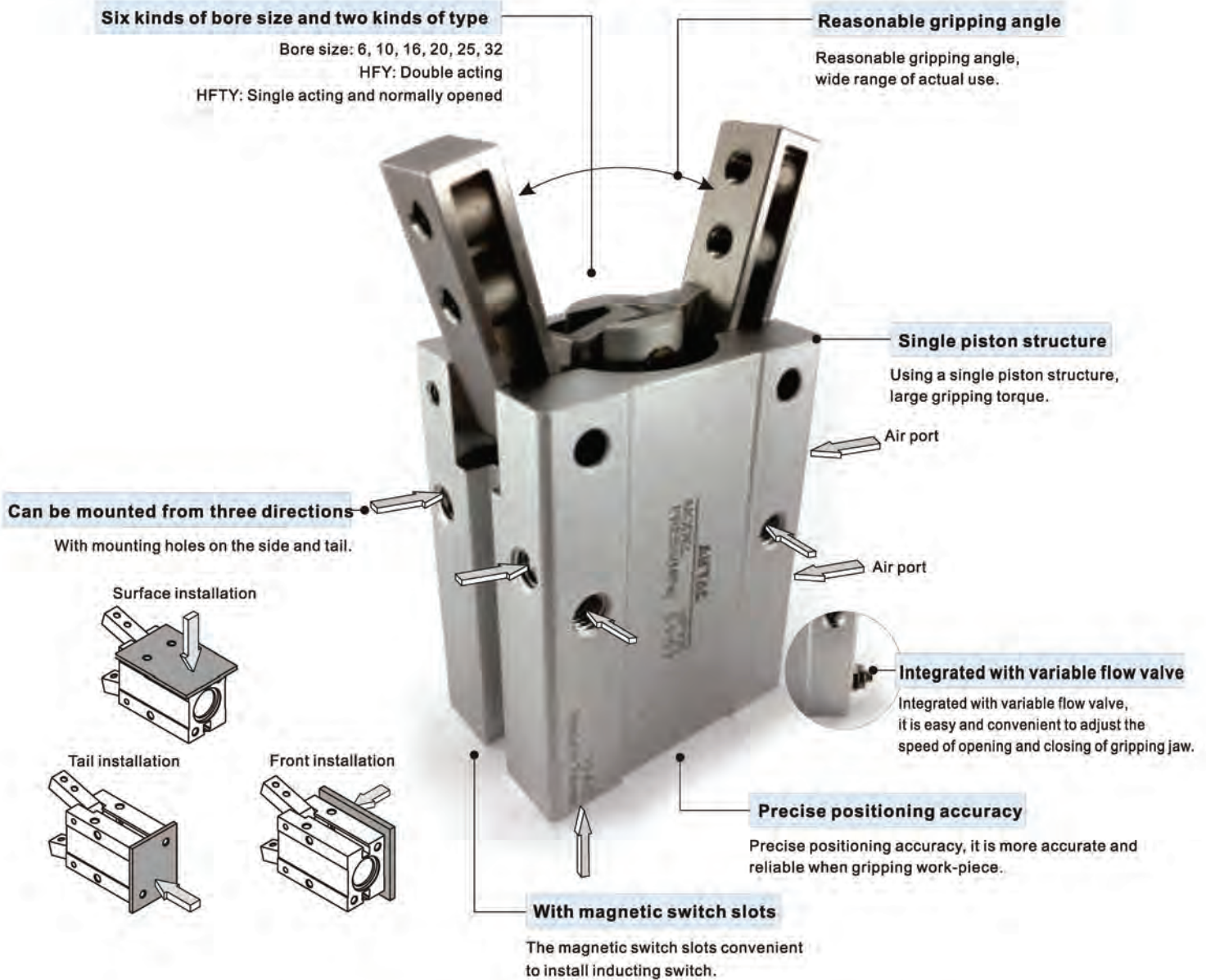
2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.







### Compendium of HFY Series



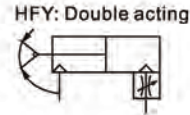
Bore size (mm)		6	10	16	20	25	32
Acting type		Double acting		Single acting			
Fluid		Air(to be filtered by 40 μ m filter element)					
Operating pressure	Double acting	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
	Single acting	Φ6	0.3~0.7MPa(45~100psi)(3.0~7.0bar)				
		Φ10~Φ32	0.25~0.7MPa(36~100psi)(2.5~7.0bar)				
Temperature °C		-20~70					
Lubrication		Cylinder: Not required;		Gripper jaws: Lubricate grease			
Cushion type		Bumper					
Max. frequency		180(c.p.m)					
Sensor switches [Note1]		CMSHIDMSH(S)			CMSGDMSG(S)		
Port size		M3×0.5			M5×0.8		

[Note1] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

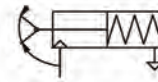
## HFY Series



### Symbol



HFTY: Single acting and normally opened



### Gripping force and stroke

Acting type		Double acting(HFY)						Single acting Normally opened(HFTY)					
Bore size		6	10	16	20	25	32	6	10	16	20	25	32
Theoretical gripping torque (N·cm)	Closed	7.4 × P	17.6 × P	90 × P	152 × P	304 × P	637 × P	5.7 × P	11.8 × P	71.2 × P	122.4 × P	252 × P	589 × P
	Opened	10.6 × P	29.4 × P	129 × P	252 × P	473 × P	904 × P	-	-	-	-	-	-
Max. length of gripping point (L)(mm)		30	30	40	60	70	85	30	30	40	60	70	85
Opening angle (°)								30 <sup>+3</sup> <sub>0</sub>					
Closing angle (°)								-10 <sup>0</sup> <sub>-3</sub>					

[Note] The P in the gripping torque shown in the above chart represents the actual use of air pressure.

### Ordering code

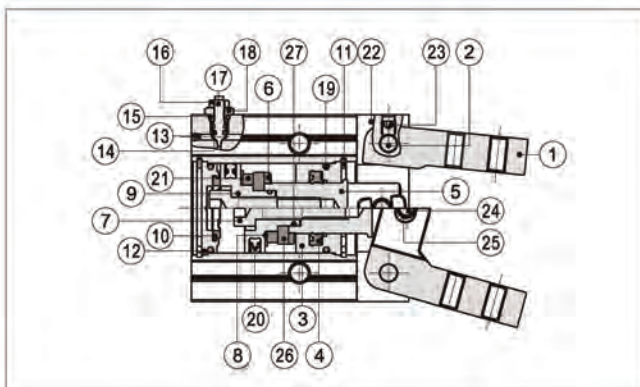
**HFY 20**

① ②

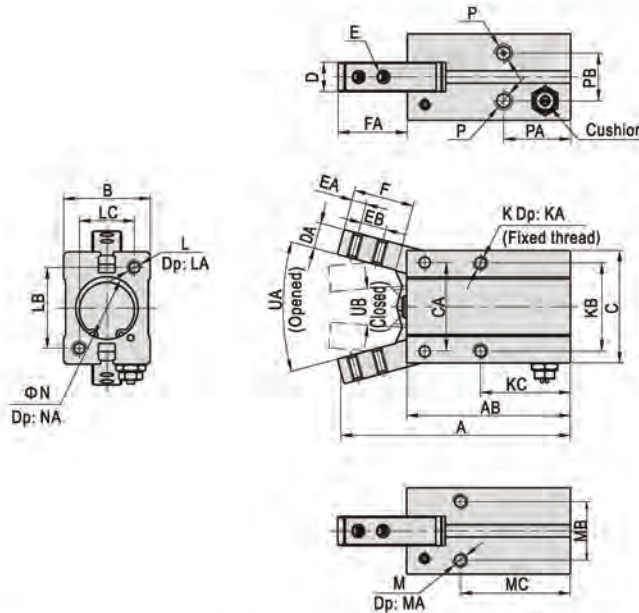
① Model	② Bore size
HFY: Air finger (Angle style, Double acting)	6
	10
	16
HFTY: Air finger (Angle style, Single acting and normally opened)	20
	25
	32

[Note] HFY series are all attached with magnet.

### Inner structure and material of major parts



NO.	Item	Material
1	Gripping jaws	Carbon steel
2	Pin	Stainless steel
3	Front cover	Aluminum alloy
4	Rod packing	NBR
5	Piston rod	Aluminum alloy/Stainless steel
6	Bumper	TPU
7	Countersink screw	Carbon steel
8	Magnet washer	NBR
9	Piston	Aluminum alloy/Stainless steel
10	Bumper	TPU
11	C clip	Spring steel
12	Back cover	Aluminum alloy
13	Steel ball	Stainless steel
14	O-ring	NBR
15	O-ring	NBR
16	Screw cap	Carbon steel
17	Adjustable nut	Brass
18	Fixed nut	Brass
19	O-ring	NBR
20	Piston seal	NBR
21	Magnet	Sintered metal(Neodymium-iron-boron)
22	Body	Aluminum alloy
23	Countersink screw	Carbon steel
24	Pin	Stainless steel
25	Pin sheath	Stainless steel
26	Magnet fixed flake	Stainless steel
27	O-ring	NBR



Bore size\Item	A	AB	B	C	CA	D	DA	E	EA	EB	F	FA	K	KA	KB	KC	L
6	47.5	36	10.5	20	14	4	4	M2×0.4	2.5	5	11	12	M3×0.5	Thru. thread	12	26	-
10	52.5	38.5	16.5	23	14	6.4	4	M2.5×0.45	3	5.7	12	14.5	M3×0.5	5	16	23	M3×0.5
16	62.5	44.5	23.5	30.5	24	8	7	M3×0.5	4	7	16	19	M4×0.7	7	24	24.5	M4×0.7
20	78	55	27.5	42	30	10	8	M4×0.7	5	9	20	23.5	M5×0.8	8	30	29	M5×0.8
25	92	60.5	33.5	52	36	12	10	M5×0.8	8	12	27	33	M6×1.0	10	36	30	M6×1.0
32	96.5	68	40	60	42	18	10	M6×1.0	6	14	27	29.5	M6×1.0	10	44	37.5	M6×1.0

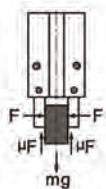
  

Bore size\Item	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	UA(Opened)	UB(Closed)
6	-	-	-	-	-	-	-	7 <sup>+0.05</sup>	1.5	M3×0.5	19	1.5	30°	10°
10	6	18	12	M3×0.5	6	11.5	27	11 <sup>+0.05</sup>	1.5	M3×0.5	19	10	30°	10°
16	8	22	15	M4×0.7	8	16	30	17 <sup>+0.05</sup>	1.5	M5×0.8	18.5	13	30°	10°
20	10	32	18	M5×0.8	10	18.5	35	21 <sup>+0.05</sup>	1.5	M5×0.8	22	15	30°	10°
25	12	40	22	M6×1.0	10	22	36.5	26 <sup>+0.05</sup>	1.5	M5×0.8	23.5	20	30°	10°
32	12	46	26	M6×1.0	10	26	30	34 <sup>+0.05</sup>	2	M5×0.8	31	24	30°	10°

### How to select product

#### 1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.



The work-pieces as shown in the left :

F: Gripping force (N)

$\mu$  : friction coefficient between fittings and work-pieces.

m: mass of work-pieces

g: acceleration of gravity (=9.8m/s<sup>2</sup>)

The condition that the work-pieces won't drop is:  $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

$$F = \frac{mg}{2 \times \mu} \times a$$

$\mu = 0.2$

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

$\mu = 0.1$

$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

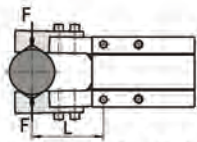
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

#### 2. The selection of the gripping point

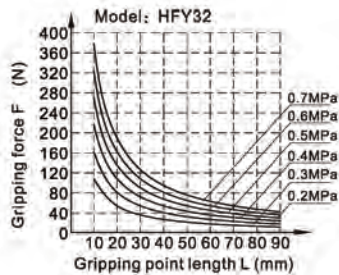
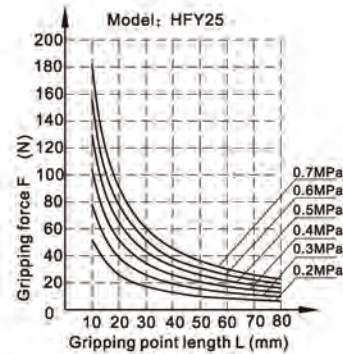
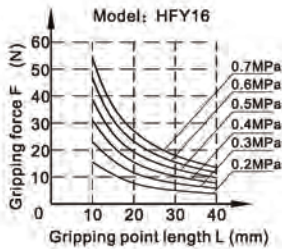
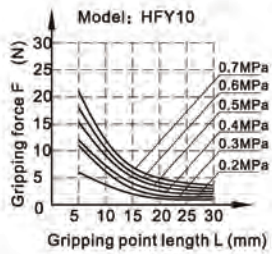
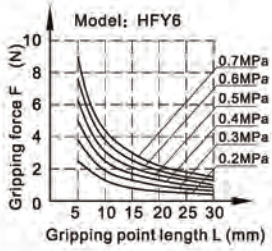
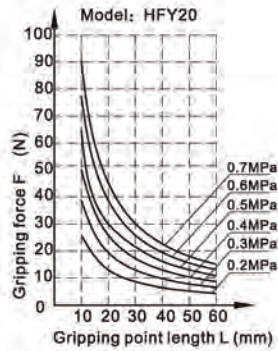
When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.

## HFY Series

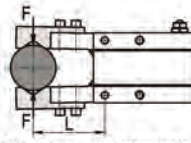
### Double acting type closed gripping force



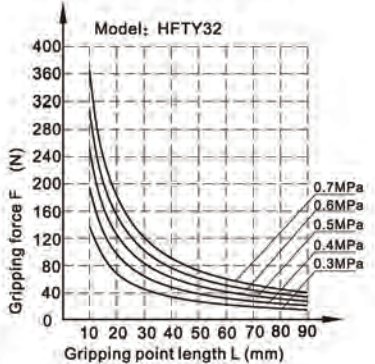
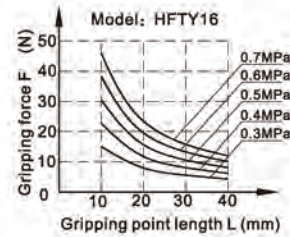
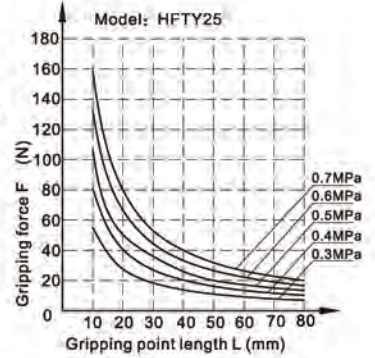
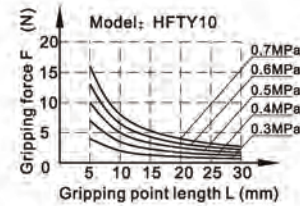
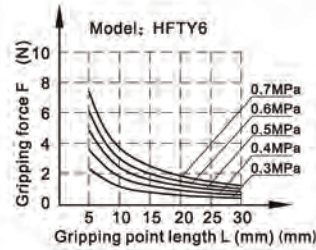
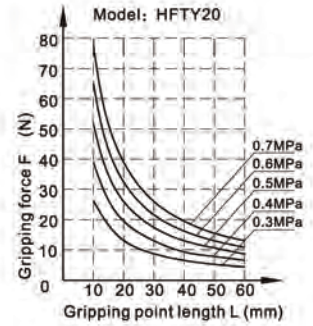
Gripping point length (mm)



### Single acting closed gripping force



Gripping point length (mm)

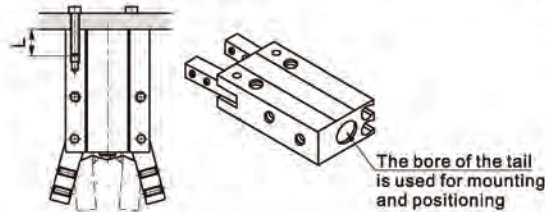


## HFY Series

### Installation and application

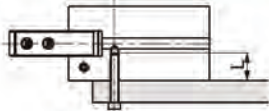
1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

#### Tail installation type



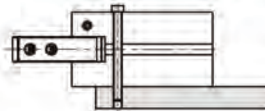
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
6	-	-	-	Φ7mm <sup>+0.04</sup> / <sub>+0.01</sub>	1.5mm
10	M3×0.5	0.88N.m	6mm	Φ11mm <sup>+0.04</sup> / <sub>+0.01</sub>	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm <sup>+0.06</sup> / <sub>0</sub>	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm <sup>+0.06</sup> / <sub>0</sub>	1.5mm
25	M6×1.0	7.3N.m	12mm	Φ26mm <sup>+0.06</sup> / <sub>0</sub>	1.5mm
32	M6×1.0	7.3N.m	12mm	Φ34mm <sup>+0.06</sup> / <sub>0</sub>	2.0mm

#### The installation of the front threaded hole



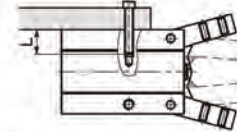
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.69	5
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.3	10

#### The installation of the front through hole



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M2.5×0.45	0.49	5
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	7
20	M4×0.7	2.1	8
25	M5×0.8	4.3	10
32	M5×0.8	4.3	10

#### Surface installation type

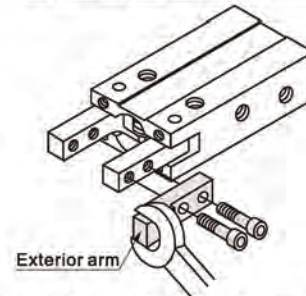


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	-	-	-
10	M3×0.5	0.88	6
16	M4×0.7	1.6	6.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

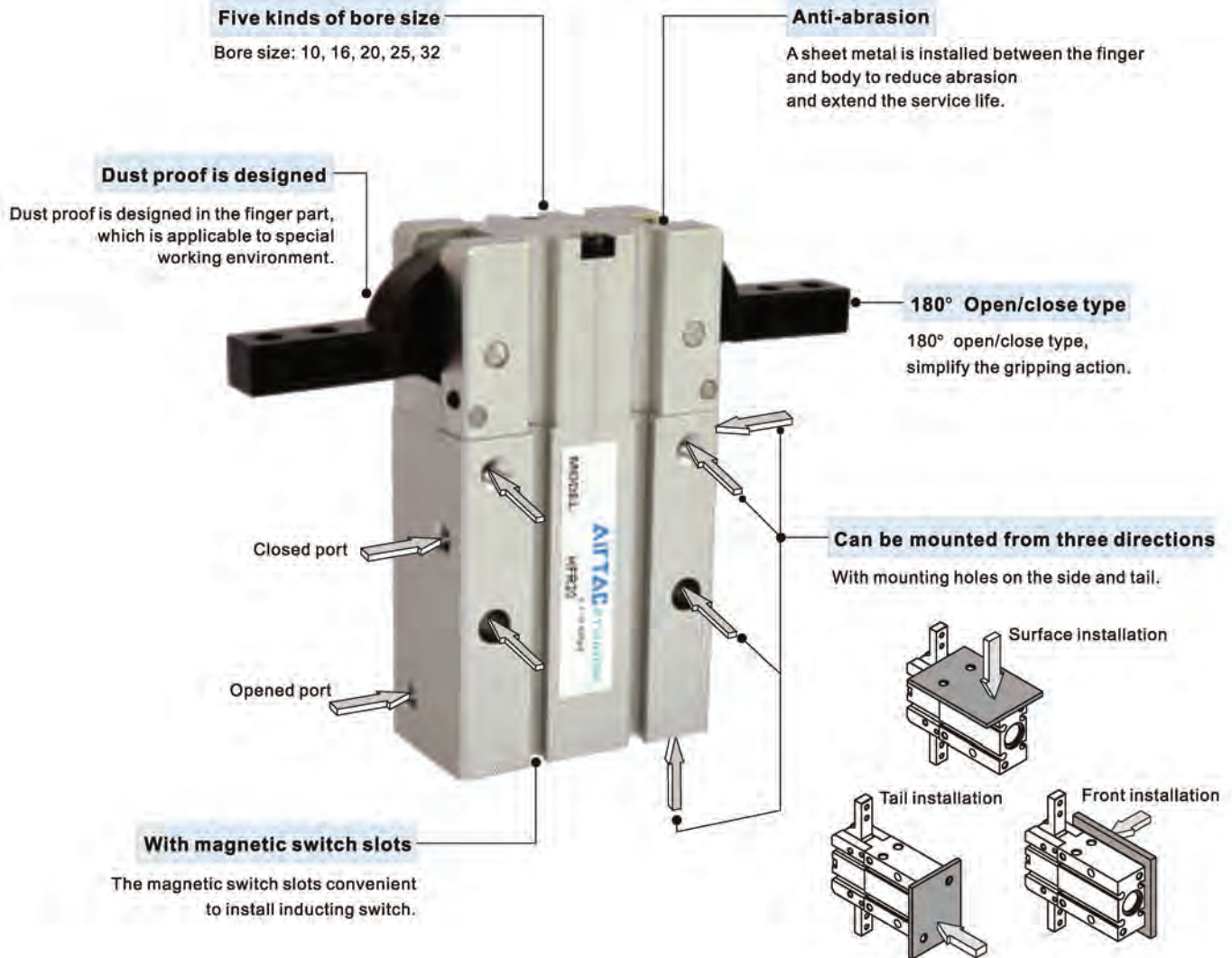
Bore size	The bolts type	Max. locking moment (Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9



7. When gripping work-piece, the work-piece must be located in the center line of the two gripping jaws, and the two gripping jaws also need to touch the work-piece at the same time, otherwise they will be easily damaged.
8. Confirm that there is no additional external forces that are exerted on the gripping jaw. Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.
9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.
10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
11. People can not enter the movement path of air gripper and articles can not be placed on the path too.
12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.

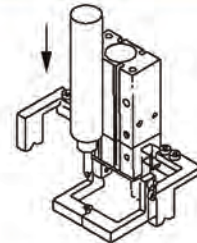


### Compendium of HFR Series

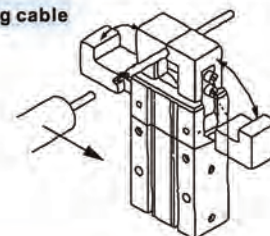


### Example

**Screw down**



**Clamping cable**



Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	0.15~0.7MPa(21~100psi)(1.5~7.0bar)				
Temperature °C	-20~70				
Lubrication	Cylinder: Not required; Gripper jaws: Lubricate grease				
Cushion type	Bumper				
Max. frequency	60(c.p.m)				
Repeatability	±0.2mm				
Gripping force [Note1]	0.16N.m	0.55N.m	1.10N.m	2.30N.m	5.00N.m
Open or close angle	Open: -2° ~ -5°		Close: 180° ±2°		
Port size	M5×0.8				
Sensor switches [Note2]	CMSHDM5H(S)				

[Note1] The gripping force is the value when the operating pressure is 0.5Mpa.

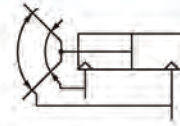
[Note2] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

# Air gripper (180° open/close style)

## HFR Series



## Symbol



## Ordering code

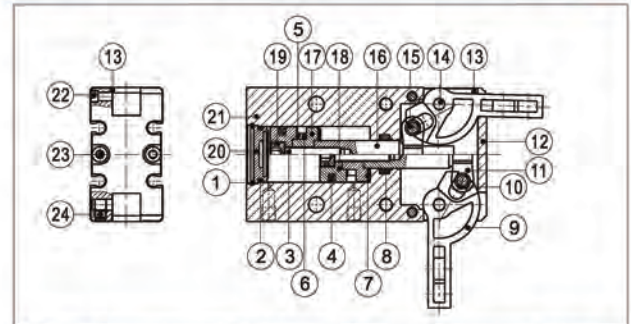
**HFR 20** □

① ② ③

① Model	② Bore size	③ Mounting type
HFR: 180° open/close air gripper	10 16 20 25 32	Blank: Mounting through tapped holes 
		N: Mounting through holes (tapped in open/close direction) 

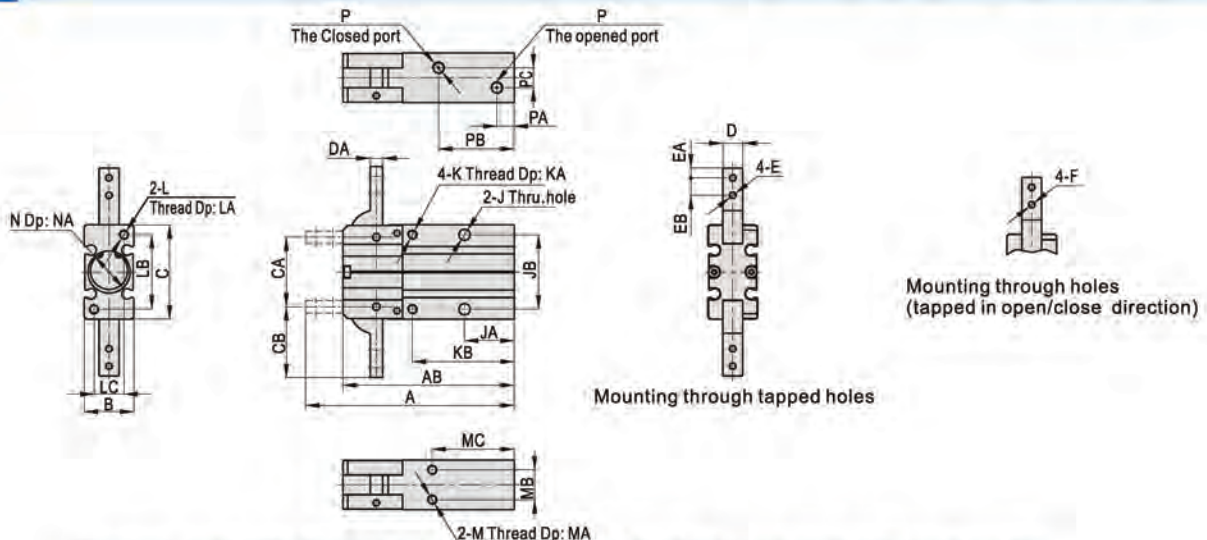
[Note] HFR series are all attached with magnet.

## Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	12	Front cover	Aluminum alloy
2	O-ring	Stainless steel	13	Sheet metal	Stainless steel
3	Countersink screw	Carbon steel	14	Pin	Stainless steel
4	Piston seal	NBR	15	Pin	Stainless steel
5	Magnet washer	NBR	16	Piston rod	Stainless steel
6	Magnet	Sintered metal (Neodymium-iron-iron)	17	Magnet holder	Aluminum alloy
7	Bumper	TPU	18	Piston	Aluminum alloy
8	Rod packing	NBR	19	O-ring	NBR
9	Gripping jaws	Stainless steel	20	Back cover	Aluminum alloy
10	Pin sheath	Stainless steel	21	Body	Aluminum alloy
11	Push block	Stainless steel	22	Pin	Stainless steel
			23	Countersink screw	Carbon steel
			24	Countersink screw	Carbon steel

## Dimensions



Bore size/Item	A	AB	B	C	CA	CB	D	DA	E	F	EA	EB	J	JA	JB	K	KA
10	71	58	15	30	22	23.5	6	4	M3 × 0.5	Φ3.3	3	6	Φ3.3	18	24	M3 × 0.5	6
16	84	69	20	38	28	28.5	8	5	M3 × 0.5	Φ3.3	4	7	Φ4.5	20	30	M4 × 0.7	8
20	106	86	26	48	36	37	10	8	M4 × 0.7	Φ4.5	5	9	Φ5.5	25	36	M5 × 0.8	10
25	131	107	30	58	45	45	12	10	M5 × 0.8	Φ5.5	6	12	Φ6.5	30	42	M6 × 1.0	12
32	158.5	122	40	72	55	62.5	14	12	M6 × 1.0	Φ6.5	9	16	Φ6.5	35	46	M6 × 1.0	12

Bore size/Item	KB	L	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	PC
10	35	M3 × 0.5	6	24	9	M3 × 0.5	4	9	30	Φ11 <sup>+0.05</sup>	1.5	M5 × 0.8	7	28.5	3
16	41	M4 × 0.7	8	30	12	M4 × 0.7	5	12	33	Φ17 <sup>+0.05</sup>	1.5	M5 × 0.8	7	30.5	8
20	50	M5 × 0.8	10	38	16	M5 × 0.8	8	14	42	Φ21 <sup>+0.05</sup>	1.5	M5 × 0.8	8	38.5	12
25	60	M6 × 1.0	12	46	18	M6 × 1.0	10	16	50	Φ26 <sup>+0.05</sup>	1.5	M5 × 0.8	8	48	14
32	64	M6 × 1.0	14	46	26	M6 × 1.0	12	26	59	Φ34 <sup>+0.05</sup>	2	M5 × 0.8	9	56	18



## HFR Series

### How to select product

#### 1. Confirmation of effective gripping force

- 1.1) Though the coefficient of friction between the attachments and the workpiece is different, select a gripping force which is 10 to 20 times greater than the workpiece weight.
- 1.2) If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

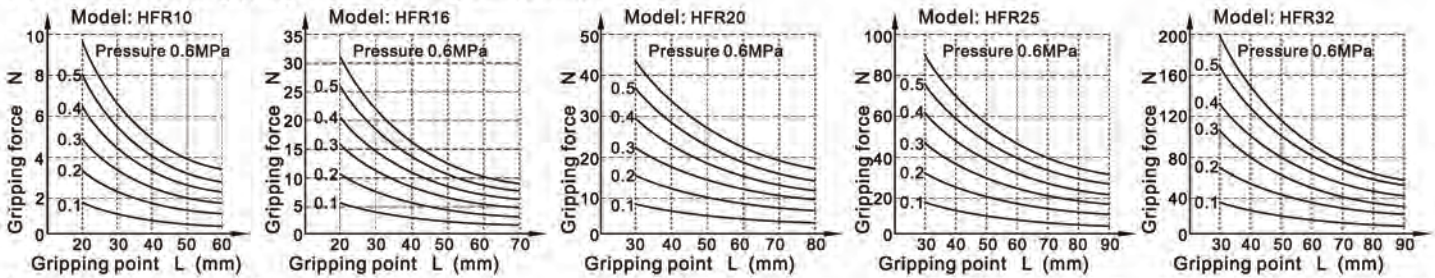
Example: When the workpiece weight is 0.05 and the gripping point distance L is 30mm, the operating pressure will be 5kgf/cm<sup>2</sup>.

Effective gripping force=0.05kg×20 times×9.8m/s<sup>2</sup>=more than 10N

Model selection: HFR16 is recommended. The effective gripping force is 17N, which is 20 times greater than the set value of gripping force.

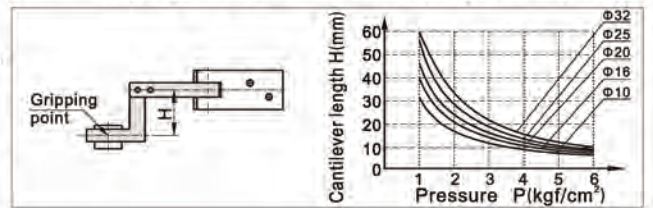
- 1.3) The finger thrust is expressed as F, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

#### 2. Connection between gripping force and gripping point distance



#### 3. The selection of the gripping point

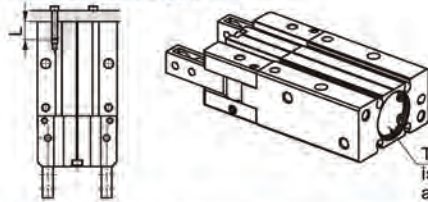
- 3.1) Please select the gripping point within the limited field shown left. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.
- 3.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.



### Installation and application

1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

#### Tail installation type



The bore of the tail is used for mounting and positioning

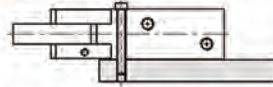
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mmH9	1.5mm
16	M4×0.7	2.0N.m	8mm	Φ17mmH9	1.5mm
20	M5×0.8	4.5N.m	10mm	Φ21mmH9	1.5mm
25	M6×1.0	7.0N.m	12mm	Φ26mmH9	1.5mm
32	M6×1.0	7.0N.m	14mm	Φ34mmH9	2.0mm

#### The installation of the front threaded hole



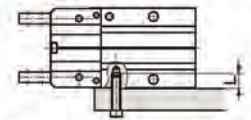
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	14

#### The installation of the front through hole



Bore size	The bolts type	Max. locking moment (Nm)
10	M3×0.5	1.0
16	M4×0.7	2.0
20	M5×0.8	4.5
25	M6×1.0	7.0
32	M6×1.0	7.0

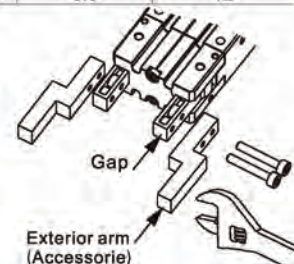
#### Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.6	4
16	M4×0.7	1.5	5
20	M5×0.8	3.5	8
25	M6×1.0	6.0	10
32	M6×1.0	6.0	12

6. The installation method of the gripping jaw fittings. When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.
7. Other contents of installation and operation are the same with those of HFY. Refer to the "Installation and Operation" instruction of HFY.

Bore size	The bolts type	Max. locking moment (Nm)
10	M3×0.5	0.6
16	M3×0.5	0.6
20	M4×0.7	0.8
25	M5×0.8	1.5
32	M6×1.0	3.0

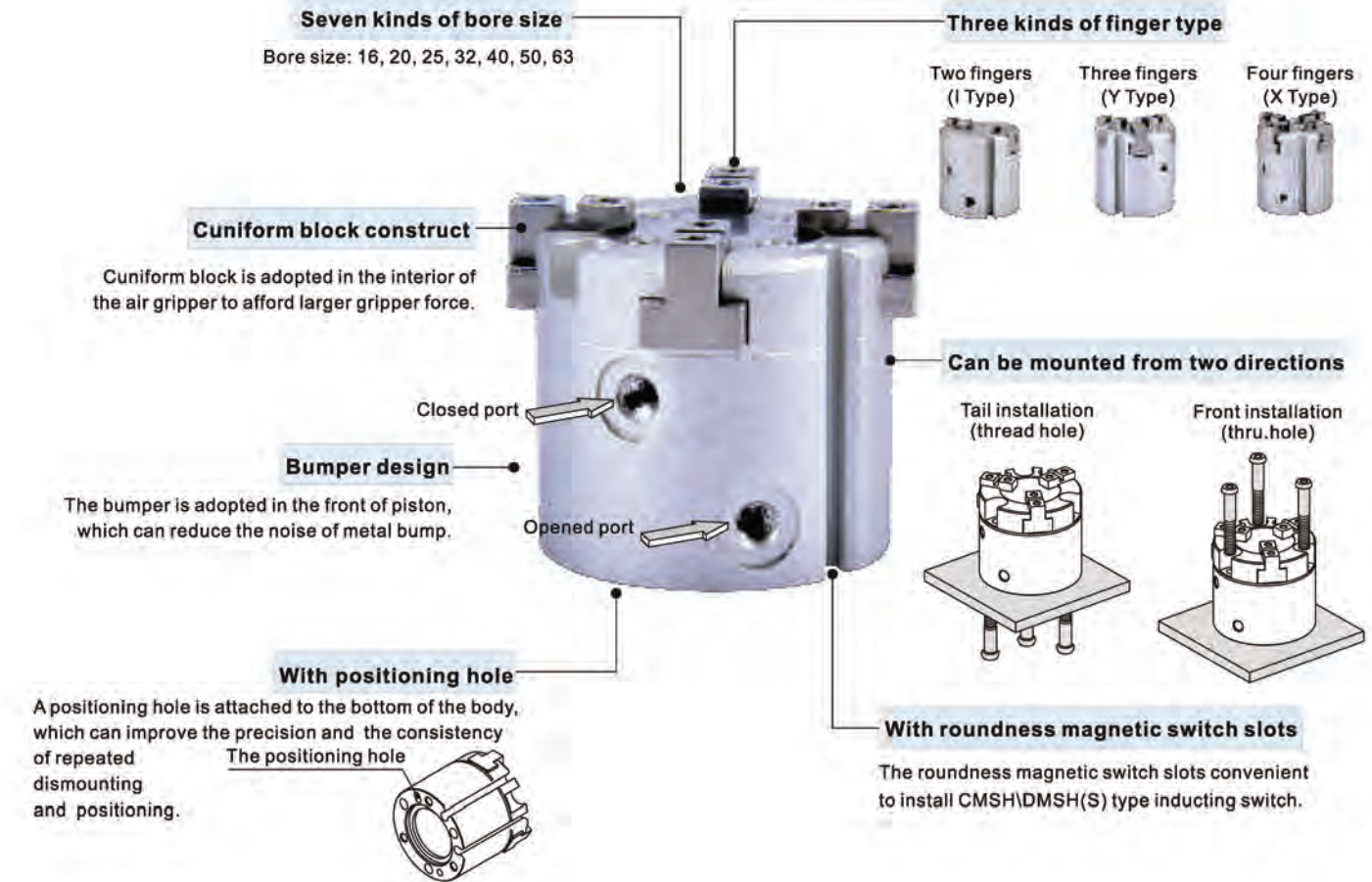




# Air gripper—HFC Series

Parallel open/close style

## Compendium of HFC Series



## Gripping force and stroke

Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	
	Internal	External		
2 grippers	HFCI16	23	21	4
	HFCI20	42	37	4
	HFCI25	71	63	6
	HFCI32	123	111	8
	HFCI40	195	177	8
	HFCI50	306	280	12
	HFCI63	537	502	16
3 grippers	HFCY16	16	14	4
	HFCY20	28	25	4
	HFCY25	47	42	6
	HFCY32	82	74	8
	HFCY40	130	118	8
	HFCY50	204	187	12
	HFCY63	359	335	16
4 grippers	HFCX16	12	10	4
	HFCX20	21	19	4
	HFCX25	35	31	6
	HFCX32	61	55	8
	HFCX40	97	88	8
	HFCX50	153	140	12
	HFCX63	268	251	16

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).  
Add) Please refer to page 305 for the definition of "L".

## Installation and application



1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.



# Air gripper(parallel open/close style)

## HFC Series

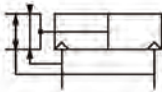


### Specification

Bore size (mm)	16	20	25	32	40	50	63
Acting type	Double acting						
Fluid	Air(to be filtered by 40µm filter element)						
Operating pressure	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
Temperature °C	-10~60						
Lubrication	Not required						
Repeatability mm	±0.01						
Max. frequency	120(c.p.m)			60(c.p.m)			
Sensor switches	CM5H\DM5H(S) [Note]						
Port size	M3×0.5			M5×0.8			

[Note] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

### Symbol



### Product feature

1. Uniform block is adopted in the interior of the air gripper to afford larger gripper force.
2. The bumper is adopted in the front of piston, which can reduce the noise of metal bump.
3. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
4. Precision repeating snatch which adopted roboticized equipment.
5. Kinds of series and styles for you to choice which snatch multiform workpiece.

### Ordering code

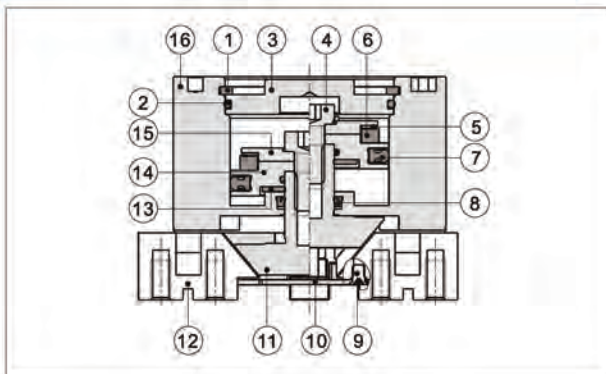
HFC Y 20

① ② ③

① Model	② Finger type			③ Bore size
HFC: Air finger (Double acting, parallel type)	I: Two grippers	Y: Three grippers	X: Four grippers	16
				20
				25
				32
				40
			50	
			63	

Note: HFC series are all attached with magnet.

### Inner structure and material of major parts



NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Back cover	Aluminum alloy
4	Screw	Carbon steel
5	Magnet washer	NBR
6	Magnet	Sintered metal(Neodymium-iron-boron)
7	Piston seal	NBR
8	Rod packing	NBR
9	Countersink screw	Stainless steel
10	Cover blank	Stainless steel
11	Piston rod	Stainless steel
12	Gripper	Stainless steel
13	Bumper	TPU
14	Piston	Aluminum alloy
15	Magnet holder	Aluminum alloy
16	Body	Aluminum alloy

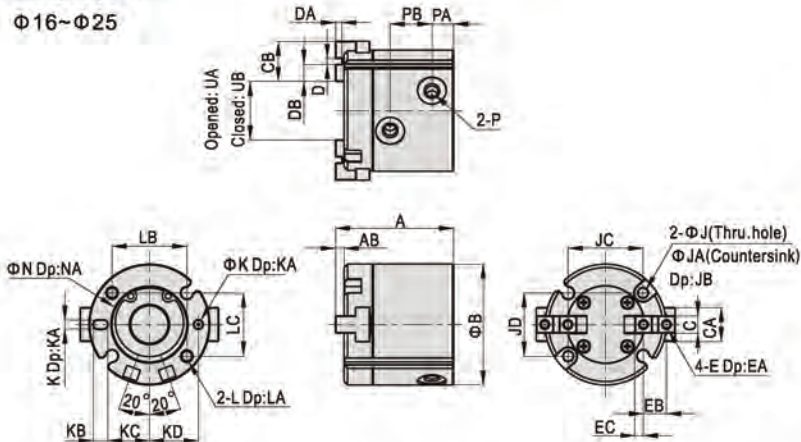
# Air gripper(parallel open/close style)

## HFC Series

### Dimensions

#### Two grippers

Φ16~Φ25

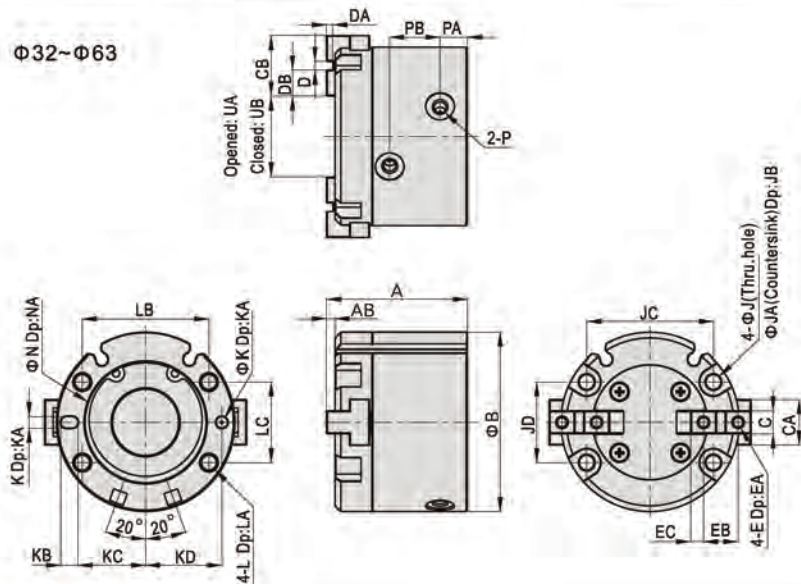


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI16	35	3	30	$5^{+0.01}_{-0.03}$	8	10	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	4	M3×0.5	5
HFCI20	39	3	36	$6^{+0.01}_{-0.03}$	10	12	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	5	M3×0.5	5
HFCI25	41	3	42	$6^{+0.01}_{-0.03}$	12	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI16	6	2	3.4	6	6	18	16	$2^{+0.04}_{+0.01}$	2	3	11	12.5
HFCI20	7	2.5	3.4	6	6	24	18	$2^{+0.04}_{+0.01}$	2	3	13	14.5
HFCI25	8	3	3.4	6	6	26	22	$3^{+0.04}_{+0.01}$	3	5	14.5	17

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI16	M4×0.7	8	18	16	$17^{+0.05}_{0}$	1.5	M3×0.5	7	10	14	10
HFCI20	M4×0.7	8	24	18	$21^{+0.05}_{0}$	1.5	M5×0.8	7	13	16	12
HFCI25	M4×0.7	8	26	22	$26^{+0.05}_{0}$	1.5	M5×0.8	7.5	14.5	20	14

Φ32~Φ63

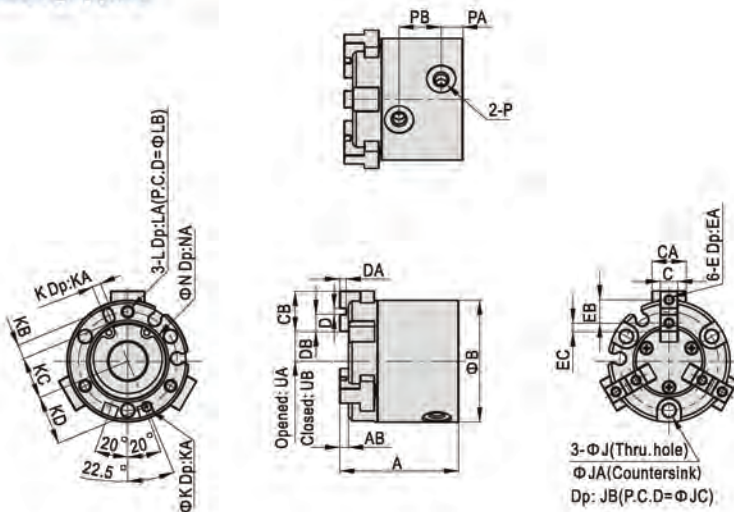


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI32	45	3	55	$8^{+0.01}_{-0.03}$	14	20	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCI40	49	3	62	$8^{+0.01}_{-0.03}$	16	21	$3^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCI50	57	3	70	$10^{+0.01}_{-0.03}$	18	24	$4^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	10	M5×0.8	9
HFCI63	68	4	86	$12^{+0.01}_{-0.03}$	24	28	$6^{+0.04}_{+0.01}$	$3^{+0.2}_{0}$	11	M5×0.8	9

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI32	11	4.5	4.2	8	9	38	25	$3^{+0.04}_{+0.01}$	3	5	20.5	23
HFCI40	12	4.5	5.2	9.5	9	44	28	$4^{+0.04}_{+0.01}$	4	6	23.5	26.5
HFCI50	14	5	5.2	9.5	12	52	34	$4^{+0.04}_{+0.01}$	4	6	28	31
HFCI63	17	5.5	5.2	9.5	14	66	38	$5^{+0.04}_{+0.01}$	5	7	34.5	38

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI32	M5×0.8	10	38	25	$34^{+0.05}_{0}$	2	M5×0.8	8.5	16	24	16
HFCI40	M6×1.0	12	44	28	$42^{+0.05}_{0}$	2	M5×0.8	9.5	17.5	28	20
HFCI50	M6×1.0	12	52	34	$52^{+0.05}_{0}$	2	M5×0.8	9.5	21	34	22
HFCI63	M6×1.0	12	66	38	$65^{+0.05}_{0}$	2.5	M5×0.8	12	24	46	30

#### Three grippers



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCY16	35	3	30	$5^{+0.01}_{-0.03}$	8	10	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	4	M3×0.5	5
HFCY20	39	3	36	$6^{+0.01}_{-0.03}$	10	12	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	5	M3×0.5	5
HFCY25	41	3	42	$6^{+0.01}_{-0.03}$	12	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5
HFCY32	45	3	52	$8^{+0.01}_{-0.03}$	14	20	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCY40	49	3	62	$8^{+0.01}_{-0.03}$	16	21	$3^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCY50	57	3	70	$10^{+0.01}_{-0.03}$	18	24	$4^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	10	M5×0.8	9
HFCY63	68	4	86	$12^{+0.01}_{-0.03}$	24	28	$6^{+0.04}_{+0.01}$	$3^{+0.2}_{0}$	11	M5×0.8	9

Model\Item	EB	EC	J	JA	JB	JC	K	KA	KB	KC	KD	L
HFCY16	6	2	3.4	6	6	25	$2^{+0.04}_{+0.01}$	2	3	11	12.5	M3×0.5
HFCY20	7	2.5	3.4	6	6	29	$2^{+0.04}_{+0.01}$	2	3	13	14.5	M3×0.5
HFCY25	8	3	4.5	8	9	34	$3^{+0.04}_{+0.01}$	3	5	14.5	17	M4×0.7
HFCY32	11	4.5	4.5	8	9	44	$3^{+0.04}_{+0.01}$	3	5	19.5	22	M4×0.7
HFCY40	12	4.5	5.5	9.5	9	53	$4^{+0.04}_{+0.01}$	4	6	23.5	26.5	M5×0.8
HFCY50	14	5	5.5	9.5	12	62	$4^{+0.04}_{+0.01}$	4	6	28	31	M5×0.8
HFCY63	17	5.5	6.6	11	14	76	$5^{+0.04}_{+0.01}$	5	7	34.5	38	M6×1.0

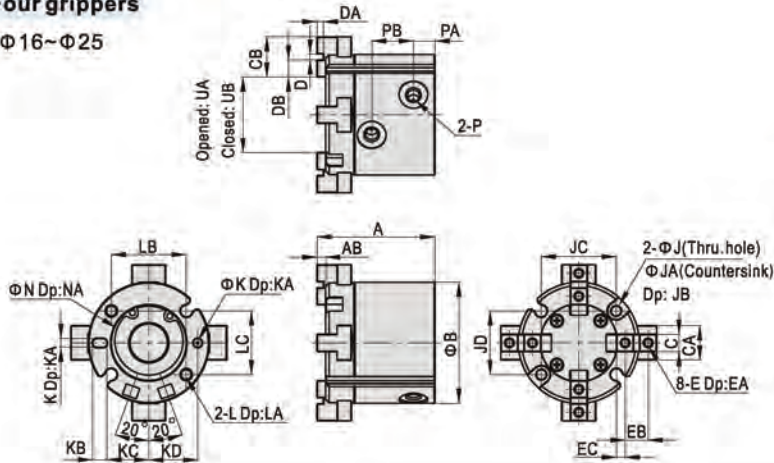
Model\Item	LA	LB	N	NA	P	PA	PB	UA	UB
HFCY16	6	25	$17^{+0.05}_{0}$	1.5	M3×0.5	7	10	7	5
HFCY20	6	29	$21^{+0.05}_{0}$	1.5	M5×0.8	7	13	8	6
HFCY25	8	34	$26^{+0.05}_{0}$	1.5	M5×0.8	7.5	14.5	10	7
HFCY32	8	44	$34^{+0.05}_{0}$	2	M5×0.8	8.5	16	12	8
HFCY40	10	53	$42^{+0.05}_{0}$	2	M5×0.8	9.5	17.5	14	10
HFCY50	10	62	$52^{+0.05}_{0}$	2	M5×0.8	9.5	21	17	11
HFCY63	12	76	$65^{+0.05}_{0}$	2.5	M5×0.8	12	24	23	15

# Air gripper(parallel open/close style)

## HFC Series

### Four grippers

Φ16~Φ25

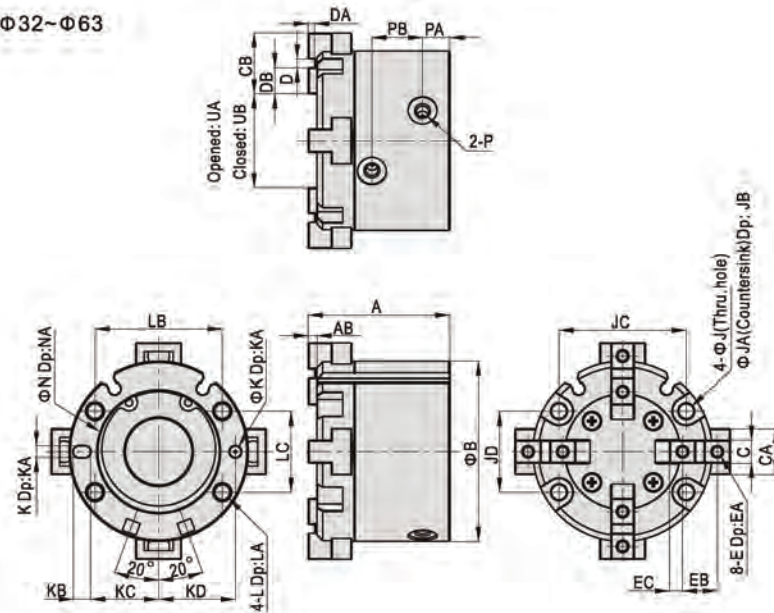


Model\Item	A	AB	B	C	CACB	D	DA	DB	E	EA	
HFCX16	35	3	30	5 <sup>-0.01</sup> <sub>-0.03</sub>	8	10	2 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	4	M3×0.5	5
HFCX20	39	3	36	6 <sup>-0.01</sup> <sub>-0.03</sub>	10	12	2 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	5	M3×0.5	5
HFCX25	41	3	42	6 <sup>-0.01</sup> <sub>-0.03</sub>	12	14	2 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	6	M3×0.5	5

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX16	6	2	3.4	6	6	18	16	2 <sup>+0.05</sup> <sub>0</sub>	2	3	11	12.5
HFCX20	7	2.5	3.4	6	6	24	18	2 <sup>+0.05</sup> <sub>0</sub>	2	3	13	14.5
HFCX25	8	3	3.4	6	6	26	22	3 <sup>+0.05</sup> <sub>0</sub>	3	5	14.5	17

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX16	M4×0.7	8	18	16	17 <sup>+0.05</sup> <sub>0</sub>	1.5	M3×0.5	7	10	17	13
HFCX20	M4×0.7	8	24	18	21 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	7	13	19	15
HFCX25	M4×0.7	8	26	22	26 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	7.5	14	26	20

Φ32~Φ63



Model\Item	A	AB	B	C	CACB	D	DA	DB	E	EA	
HFCX32	45	3	55	8 <sup>-0.01</sup> <sub>-0.03</sub>	14	20	2 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	9	M4×0.7	8
HFCX40	49	3	62	8 <sup>-0.01</sup> <sub>-0.03</sub>	16	21	3 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	9	M4×0.7	8
HFCX50	57	3	70	10 <sup>-0.01</sup> <sub>-0.03</sub>	18	24	4 <sup>+0.04</sup> <sub>-0.01</sub>	2 <sup>+0.2</sup> <sub>0</sub>	10	M5×0.8	9
HFCX63	68	4	86	12 <sup>-0.01</sup> <sub>-0.03</sub>	24	28	6 <sup>+0.04</sup> <sub>-0.01</sub>	3 <sup>+0.2</sup> <sub>0</sub>	11	M5×0.8	9

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX32	11	4.5	4.2	8	9	38	25	3 <sup>+0.04</sup> <sub>-0.01</sub>	3	5	20.5	23
HFCX40	12	4.5	5.2	9.5	9	44	28	4 <sup>+0.04</sup> <sub>-0.01</sub>	4	6	23.5	26.5
HFCX50	14	5	5.2	9.5	12	52	34	4 <sup>+0.04</sup> <sub>-0.01</sub>	4	6	28	31
HFCX63	17	5.5	5.2	9.5	14	66	38	5 <sup>+0.04</sup> <sub>-0.01</sub>	5	7	34.5	38

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX32	M5×0.8	10	38	25	34 <sup>+0.05</sup> <sub>0</sub>	2	M5×0.8	8.5	16	28	20
HFCX40	M6×1.0	12	44	28	42 <sup>+0.05</sup> <sub>0</sub>	2	M5×0.8	9.5	17.5	32	24
HFCX50	M6×1.0	12	52	34	52 <sup>+0.05</sup> <sub>0</sub>	2	M5×0.8	9.5	21	38	26
HFCX63	M6×1.0	12	66	38	65 <sup>+0.05</sup> <sub>0</sub>	2.5	M5×0.8	12	24	51	35

## How to select product

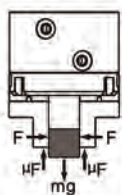
Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force

② the confirmation of the gripping point

### 1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10~20 times of the mass of the gripped objects.



The work-pieces as shown in the left :

n: number of gripper  
 F: Gripping force (N)  
 μ: friction coefficient between fittings and work-pieces.  
 m: mass of work-pieces  
 g: acceleration of gravity (=9.8m/s<sup>2</sup>)

The condition that the work-pieces won't drop is:  $n \times \mu F > mg$

$$\text{so: } F > \frac{mg}{n \times \mu}$$

Safety coefficient is a, so F is:

$$F = \frac{mg}{n \times \mu} \times a$$

μ=0.2

$$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$$

10 times of the mass of the gripped objects

μ=0.1

$$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$$

20 times of the mass of the gripped objects

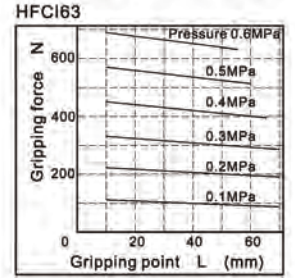
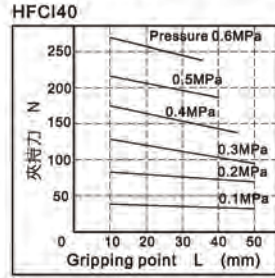
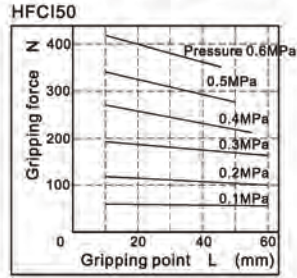
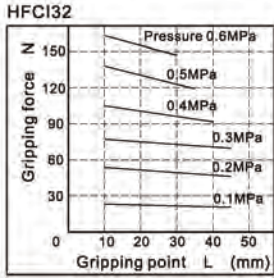
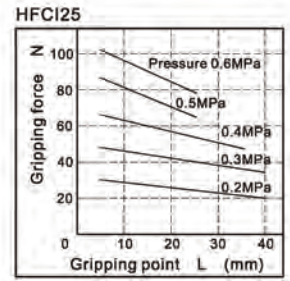
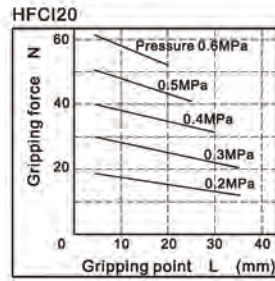
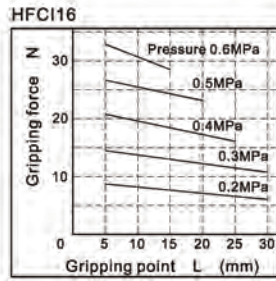
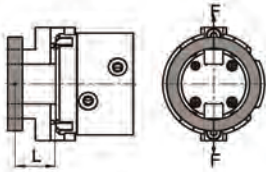
Note) If the friction coefficient μ > 0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

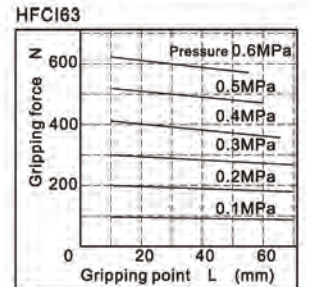
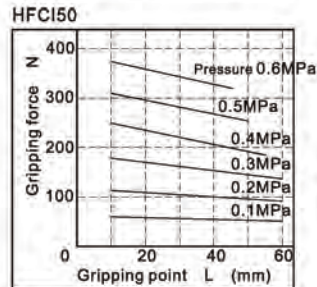
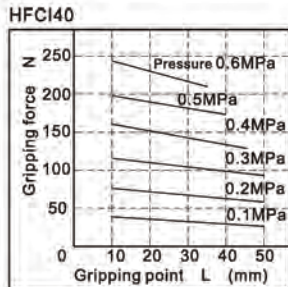
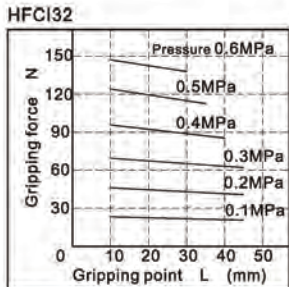
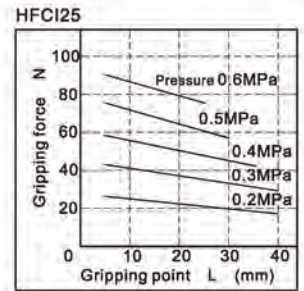
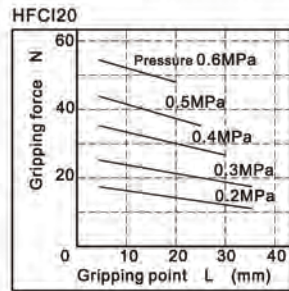
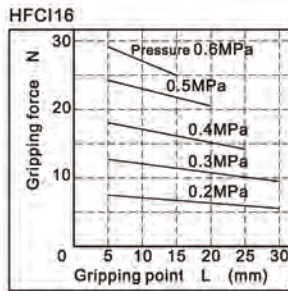
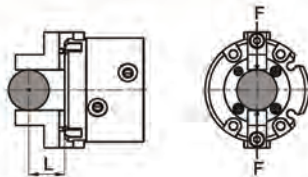
# Air gripper(parallel open/close style)

## HFC Series

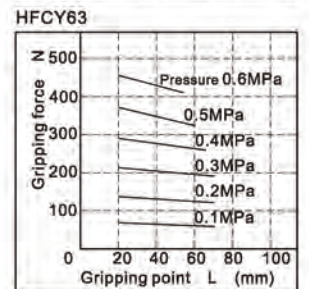
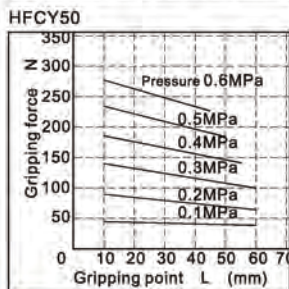
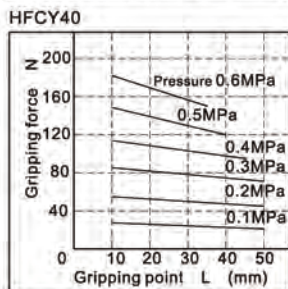
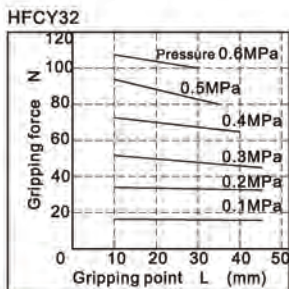
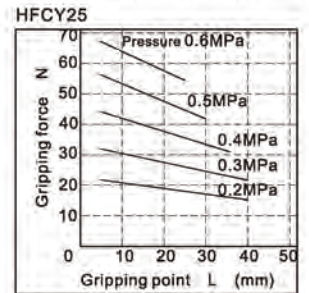
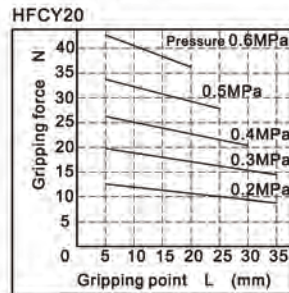
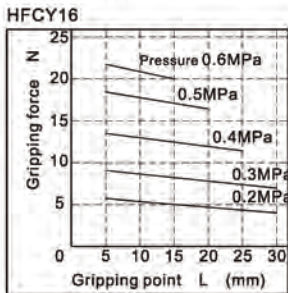
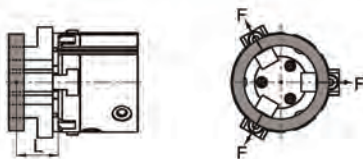
### Opened gripping force(I Type)



### Closed gripping force(I Type)



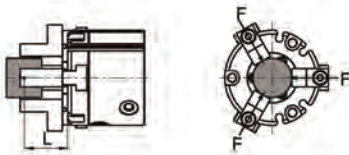
### Opened gripping force(Y Type)



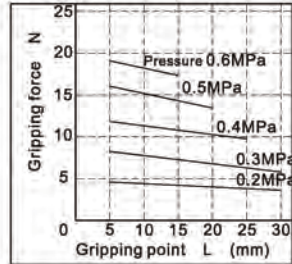
# Air gripper(parallel open/close style)

## HFC Series

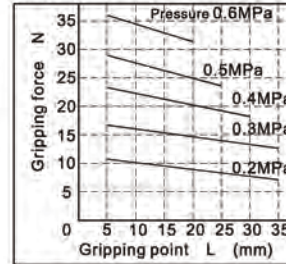
### Closed gripping force(Y Type)



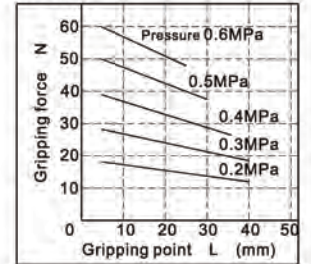
HFCY16



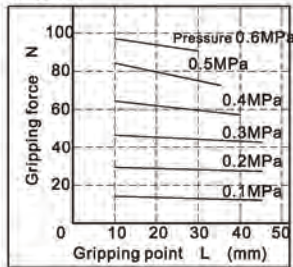
HFCY20



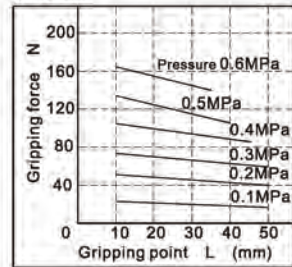
HFCY25



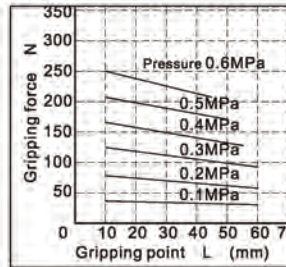
HFCY32



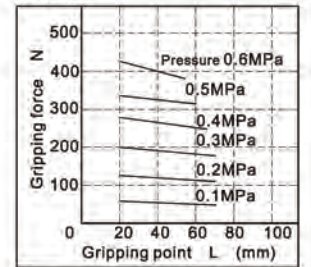
HFCY40



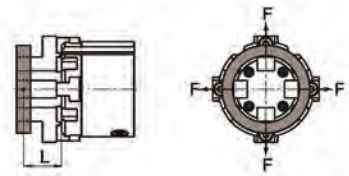
HFCY50



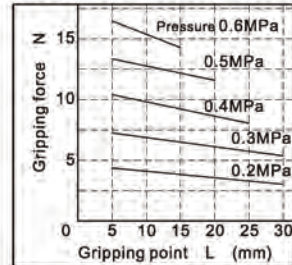
HFCY63



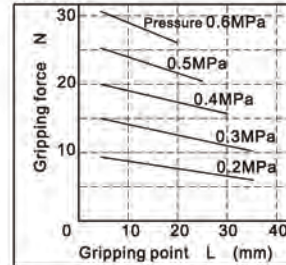
### Opened gripping force(X Type)



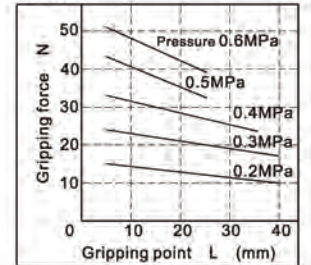
HFCX16



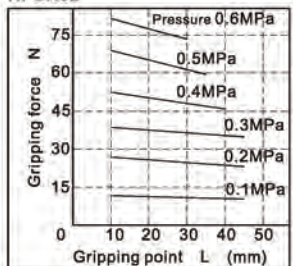
HFCX20



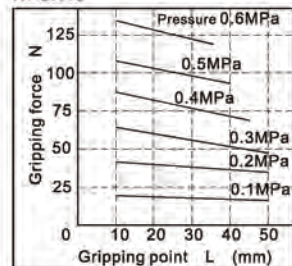
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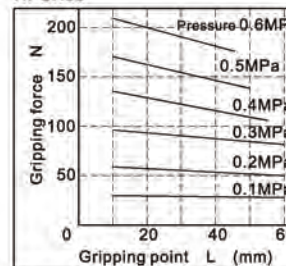
HFCX32



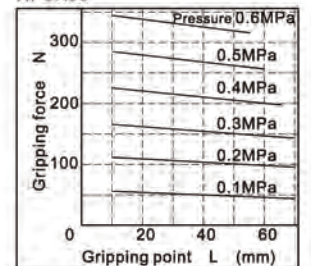
HFCX40



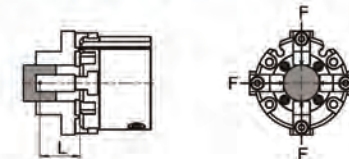
HFCX50



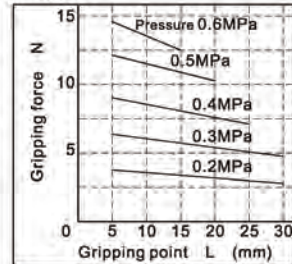
HFCX63



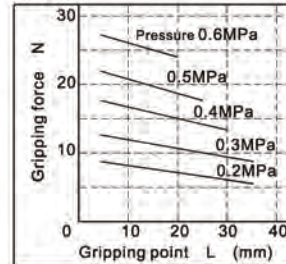
### Closed gripping force(X Type)



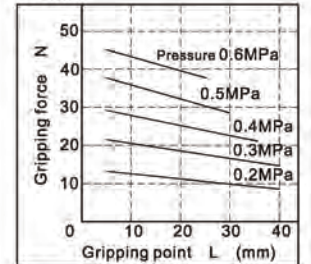
HFCX16



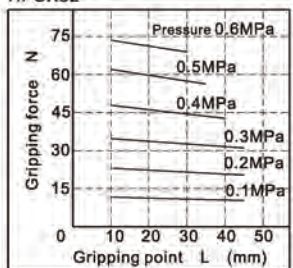
HFCX20



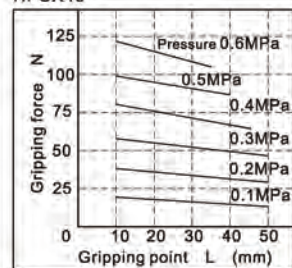
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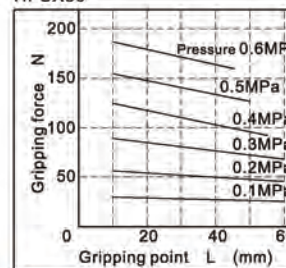
HFCX32



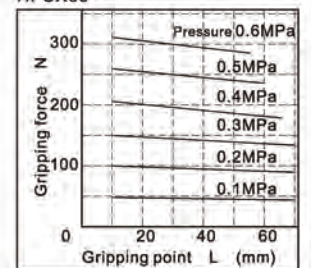
HFCX40



HFCX50



HFCX63

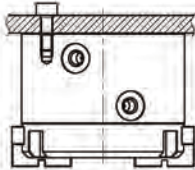


## HFC Series

### Installation and application

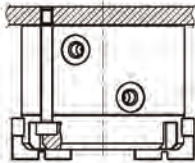
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



Model	Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
HFCI HFCX	16	M4×0.7	2.1	8	Φ17 <sup>+0.05</sup> <sub>0</sub>	1.5
	20	M4×0.7	2.1	8	Φ21 <sup>+0.05</sup> <sub>0</sub>	1.5
	25	M4×0.7	2.1	8	Φ26 <sup>+0.05</sup> <sub>0</sub>	1.5
	32	M5×0.8	4.3	10	Φ34 <sup>+0.05</sup> <sub>0</sub>	2
	40	M6×1.0	7.3	12	Φ42 <sup>+0.05</sup> <sub>0</sub>	2
	50	M6×1.0	7.3	12	Φ52 <sup>+0.05</sup> <sub>0</sub>	2
HFCY	63	M6×1.0	7.3	12	Φ65 <sup>+0.05</sup> <sub>0</sub>	2.5
	16	M3×0.5	0.88	6	Φ17 <sup>+0.05</sup> <sub>0</sub>	1.5
	20	M3×0.5	0.88	6	Φ21 <sup>+0.05</sup> <sub>0</sub>	1.5
	25	M4×0.7	2.1	8	Φ26 <sup>+0.05</sup> <sub>0</sub>	1.5
	32	M4×0.7	2.1	8	Φ34 <sup>+0.05</sup> <sub>0</sub>	2
	40	M5×0.8	4.3	10	Φ42 <sup>+0.05</sup> <sub>0</sub>	2
	50	M5×0.8	4.3	10	Φ52 <sup>+0.05</sup> <sub>0</sub>	2
	63	M6×1.0	7.3	12	Φ65 <sup>+0.05</sup> <sub>0</sub>	2.5

#### The installation of the front through hole

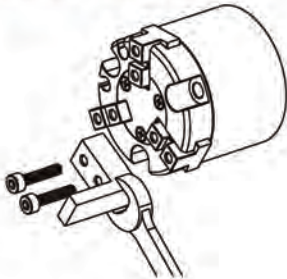


Model	Bore size	The bolts type	Max. locking moment(Nm)
HFCI HFCX	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M3×0.5	0.88
	32	M4×0.7	2.1
	40	M5×0.8	4.3
	50	M5×0.8	4.3
HFCY	63	M5×0.8	4.3
	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M4×0.7	2.1
	32	M4×0.7	2.1
	40	M5×0.8	4.3
	50	M5×0.8	4.3
	63	M6×1.0	7.3

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

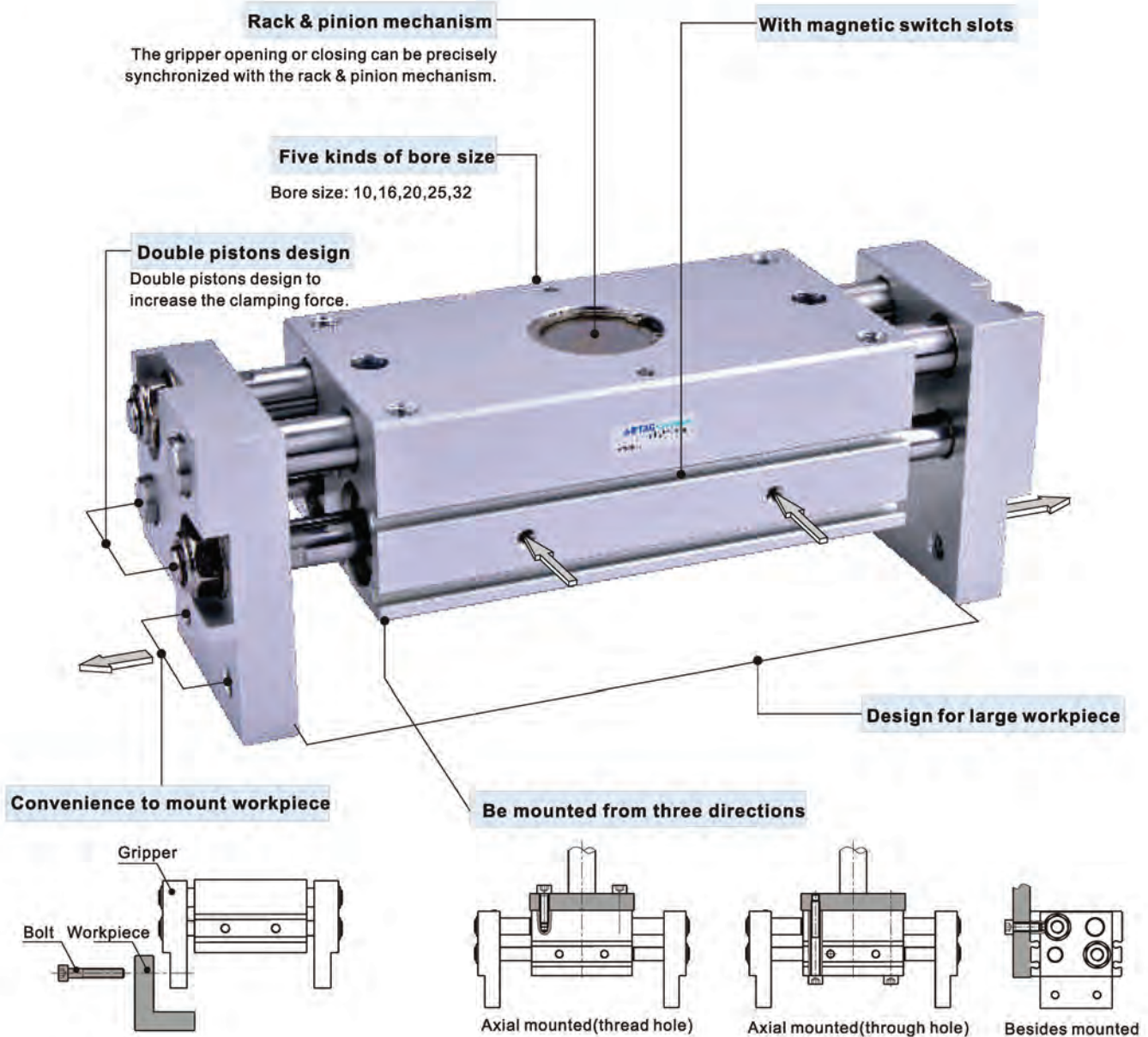
#### Install the gripping jaw fittings



Bore size	The bolts type	Max. locking moment(Nm)
16	M3×0.5	0.59
20	M3×0.5	0.59
25	M3×0.5	0.59
32	M4×0.7	1.4
40	M4×0.7	1.4
50	M5×0.8	2.8
63	M5×0.8	2.8



## Compendium of HFT Series

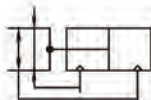


# Air gripper(wide style)

## HFT Series



### Symbol



### Product feature

1. Design for large workpiece.
2. Double pistons design to increase the clamping force.
3. Magnet is included in the standard configuration.
4. The gripper opening or closing can be precisely synchronized with the rack & pinion mechanism.

### Specification

Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40 μm filter element)				
Operating pressure	0.25~0.7MPa(35~100psi)		0.15~0.7MPa(22~100psi)		
Proof pressure	1.2MPa(175psi)				
Temperature	-20~70℃				
Lubrication	Cylinder: No necessary				
Cushion type	Bumper				
Repeatability	±0.1mm				
Gripping force (N)[Note1]	14	45	74	131	228
Max. frequency	40 cycle/minute				20 cycle/minute
Port size	M5×0.8				1/8"

[Note1] Pressure 0.5MPa and gripping length 40mm(∅10 ~ ∅25) or 80mm(∅32).

Add) Refer to P353 for detail of sensor switch.

### Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)
10	20 30 40 60	60
16	30 40 60 80	80
20	40 60 80 100	100
25	40 60 80 100	100
32	60 80 100 150	150

[Note] Consult us for non-standard stroke.

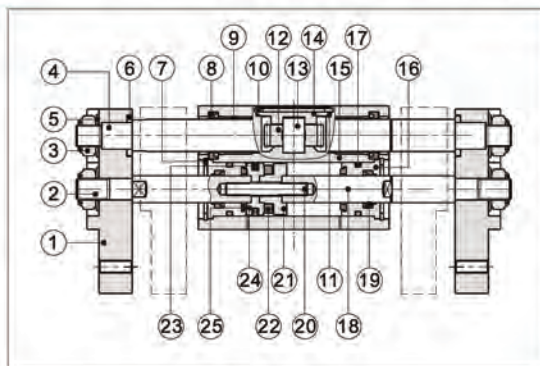
### Ordering code

**HFT 10 × 20 S □**

① ② ③ ④ ⑤

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Thread type
HFT: Wide air gripper (Double acting)	10	20 30 40 60	S: With magnet	No this code  Blank: PT G: G T: NPT
	16	30 40 60 80		
	20	40 60 80 100		
	25	40 60 80 100		
	32	60 80 100 150		

### Inner structure and material of major parts



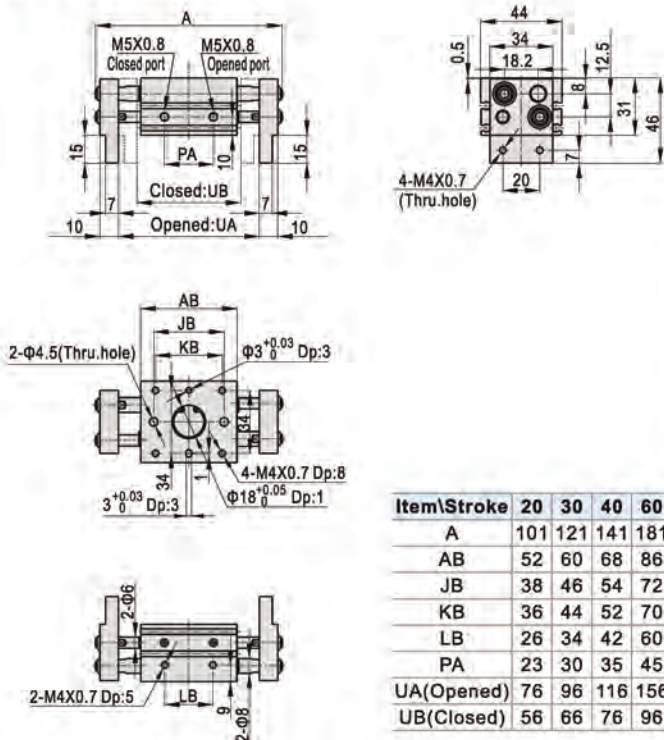
NO.	Item	Material	NO.	Item	Material
1	Faceplate	Aluminum alloy	14	Gear cover	Carbon steel
2	Piston rod A	Stainless steel	15	Body	Aluminum alloy
3	Locknut	Carbon steel	16	Front cover	Aluminum alloy
4	Leader	Stainless steel	17	O-ring	NBR
5	Washer	Spring steel	18	Piston rod B	Stainless steel
6	Gasket	Carbon steel	19	O-ring	NBR
7	C clip	Spring steel	20	Joint bole	Stainless steel
8	Dustproof ring	TPU	21	Magnet seat	Brass/Aluminum alloy
9	Bearing	Wear resistant material	22	Magnet	Sintered metal (Neodymium-iron-boron)
10	C clip	Spring steel	23	Piston O-ring	NBR
11	O-ring	NBR	24	Piston	Brass/Aluminum alloy
12	Gear	Chrome molybdenum steel	25	Bumper	TPU
13	Gear axes	Bearing steel			

# Air gripper(wide style)

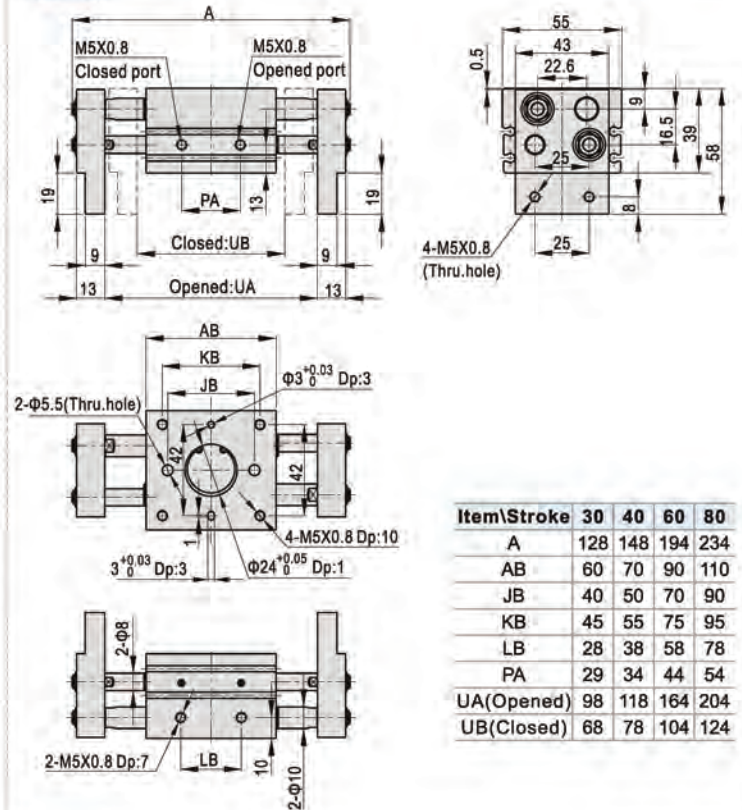
## HFT Series

### Dimensions

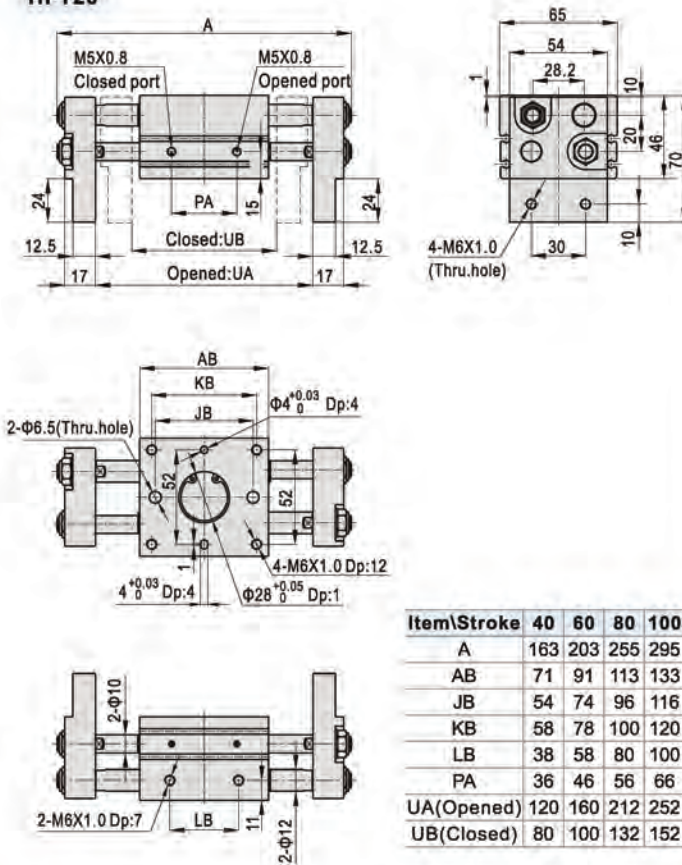
#### HFT10



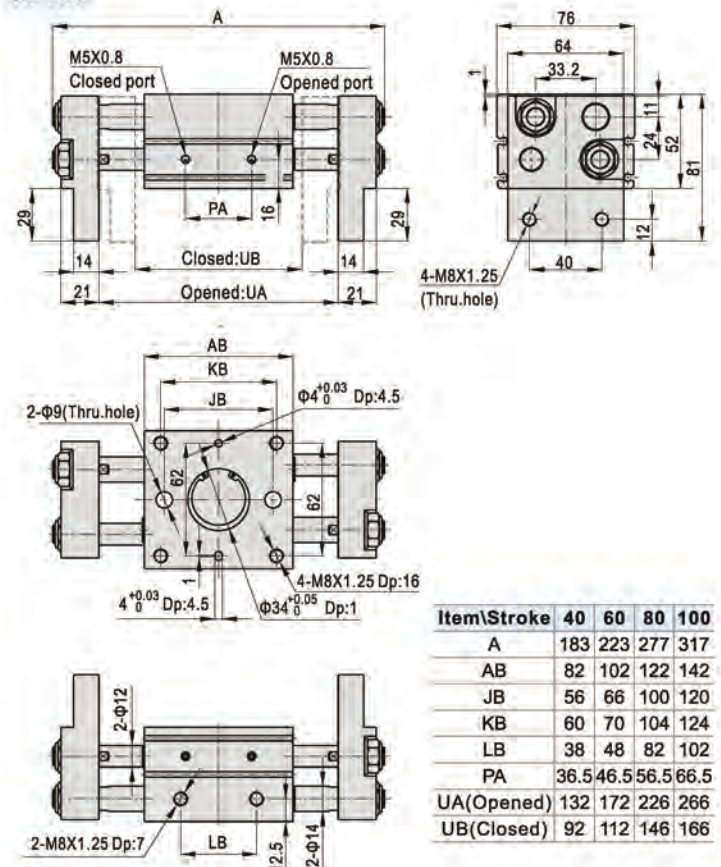
#### HFT16



#### HFT20

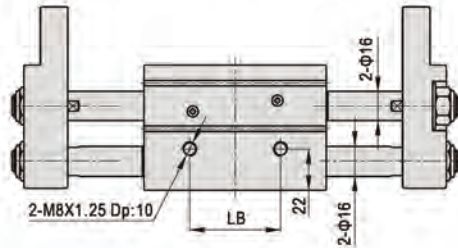
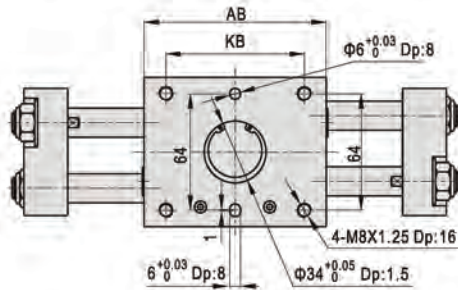
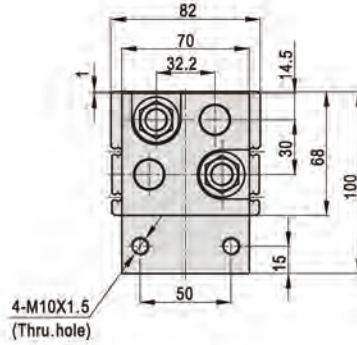
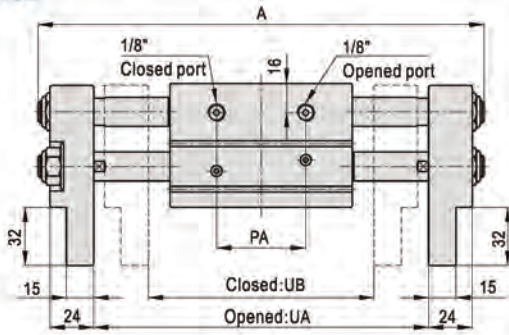


#### HFT25



## HFT Series

### HFT32



Item\Stroke	A	AB	KB	LB	PA	UA(Opened)	UB(Closed)
60	245	100	76	50	48	184	124
80	285	120	86	60	58	224	144
100	343	158	134	108	68	282	182
150	443	208	184	158	93	382	232

## How to select product

1. Please select pneumatic finger according to the following steps:

Confirmation of conditions

Select possible type according to the work length

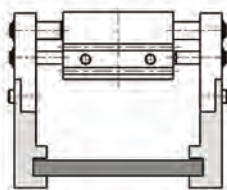
Calculation of required gripping force

Selection of model by gripping force graph

Work form  
Diameter x Length  
200 mm x 20 mm plate

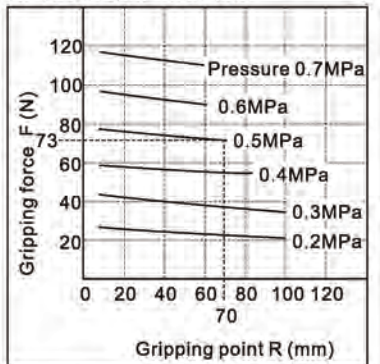
Work length: From the dimensions of models that have an opening width of 200 mm or more  
HFT16×80  
HFT20×80/HFT20×100  
HFT25×80/HFT25×100

Work mass: 0.3 kg



1. Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.  
2. Further allowance should be provided when great acceleration or impact is expected during workpiece transfer.  
Example: For setting the gripping force to be at least 20 times the workpiece mass:  
Required gripping force =  $0.3\text{kg} \times 20 \times 9.8 \text{ m/s}^2 \approx 60 \text{ N}$

HFT20×80/HFT20×100



Gripping point R = 70 mm

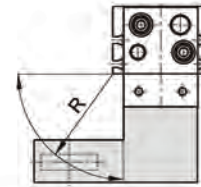
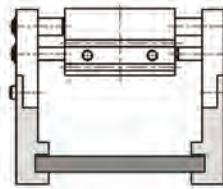
Operating pressure: 0.5 MPa

1. Selecting the HFT20×80 A gripping force of 73 N is obtained from the intersection point of gripping point position R = 70 and a pressure 0.5 MPa.
2. The gripping force is 24 times greater than the workpiece mass, and therefore satisfies a gripping force setting value of 20 times or more.

## HFT Series

### 2. Gripping Point

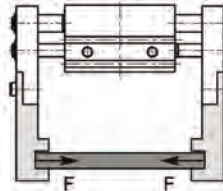
- 2.1) The workpiece gripping point distance should be within the gripping force ranges given for each pressure in the effective gripping force graphs below.
- 2.2) If operated with the workpiece gripping point beyond the indicated ranges, the load that will be applied to the fingers or the guide will become excessively unbalanced. As a result, the fingers could become loosened and adversely affect the service life of the unit.



R: Gripping position (mm)

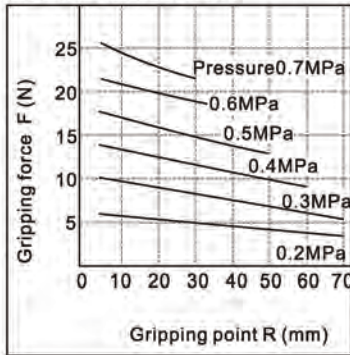
### 3. Effective Gripping Force

The gripping force shown in the tables represents the gripping force of one finger when all fingers and attachments are in contact with the work.

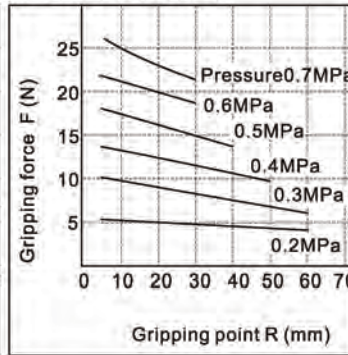


F = one finger thrust.

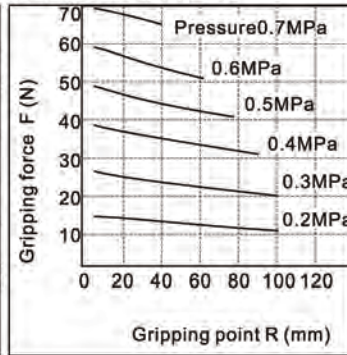
HFT10×20/HFT10×30



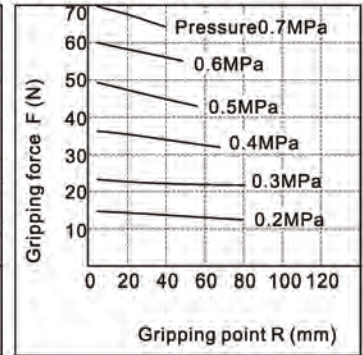
HFT10×40/HFT10×60



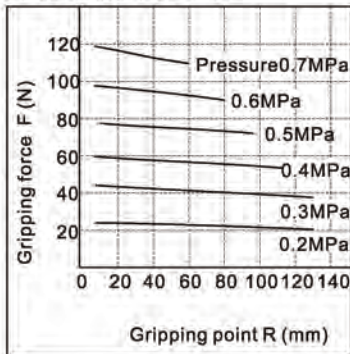
HFT16×30/HFT16×40



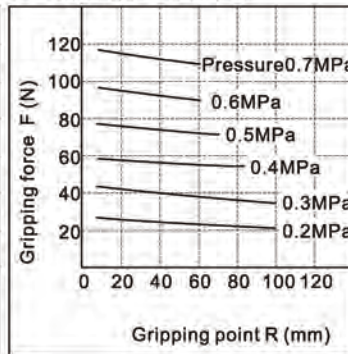
HFT16×60/HFT16×80



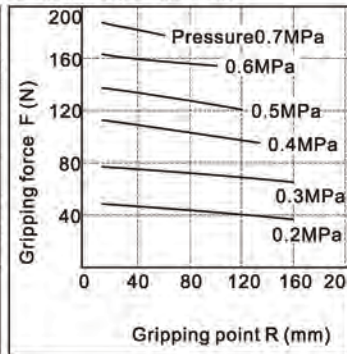
HFT20×40/HFT20×60



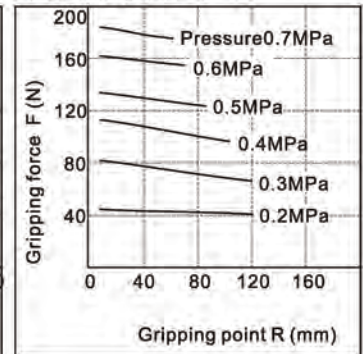
HFT20×80/HFT20×100



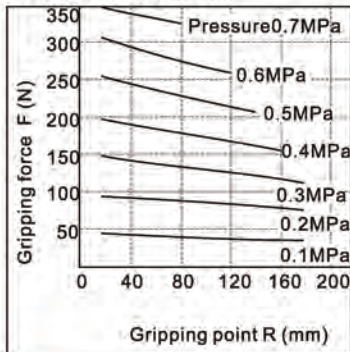
HFT25×40/HFT25×60



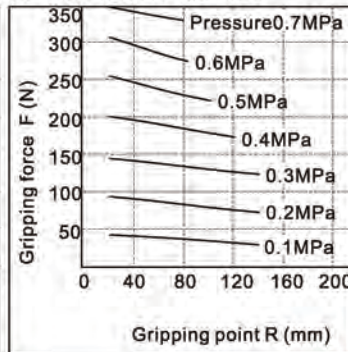
HFT25×80/HFT25×100



HFT32×60/HFT32×80

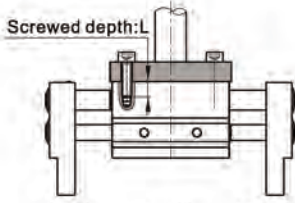


HFT32×100/HFT32×150

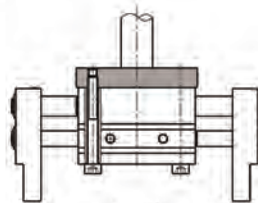


### Installation and application

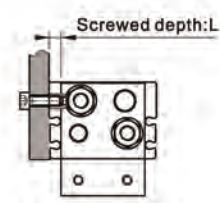
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.



Axial mounted(thread hole)



Axial mounted(through hole)



Besides mounted

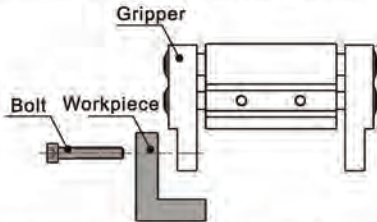
Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	2.1	8
16	M5×0.8	4.3	10
20	M6×1.0	7.3	12
25	M8×1.25	17.7	16
32	M8×1.25	17.7	16

Bore size	The bolts type	Max. locking moment (Nm)
10	M4×0.7	2.1
16	M5×0.8	4.3
20	M6×1.0	7.3
25	M8×1.25	17.7
32	No Axial mounted(through hole)	

Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	1.4	5
16	M5×0.8	2.8	7
20	M6×1.0	4.8	7
25	M8×1.25	12	7
32	M8×1.25	12	10

#### 6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

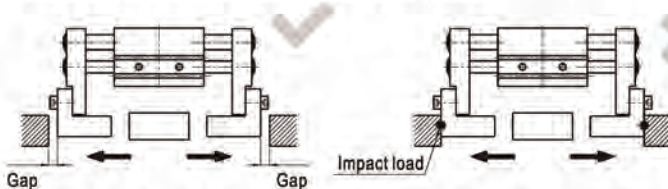


Bore size	The bolts type	Max. locking moment(Nm)
10	M4×0.7	1.4
16	M5×0.8	2.8
20	M6×1.0	4.8
25	M8×1.25	12
32	M10×1.5	24

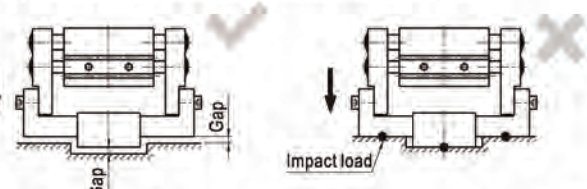
#### 7. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

##### 7.1) The end of stroke under the open state of air gripper



##### 7.2) The end of stroke under the move state of air gripper



#### 8. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



#### 9. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.

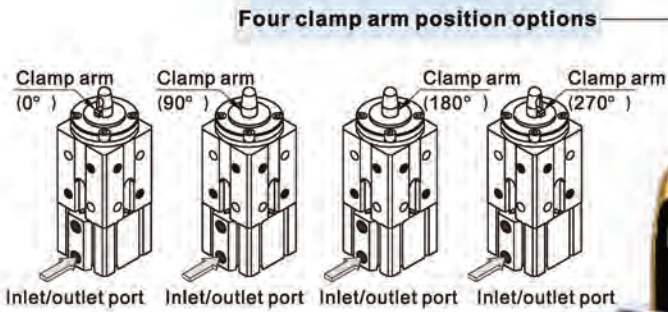
#### 10. People can not enter the movement path of air gripper and articles can not be placed on the path too.

#### 11. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



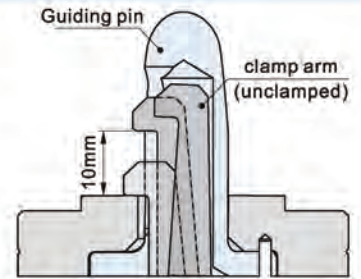
# Pin clamp cylinder—AQK Series

## Compendium of AQK Series



### With positioning and clamping function

Pin diameter located, built-in clamp arm fastened



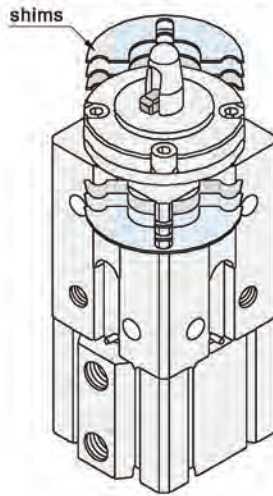
Multiple pin diameter are applicable to various workpiece port size.

Guiding pin diameter(mm)	Workpiece port size(mm)
Φ14.□ (Note)	Φ15
Φ15.□	Φ16
Φ17.□	Φ18
Φ19.□	Φ20
Φ24.□	Φ25

(Note) "□" represents 1-9.

### Clamp position is adjustable by select shims

Adjustable range: 0.5~2mm  
Attach with a 1mm and 2 of 0.5mm shims  
(one side : 3 shims/ two sides : 6 shims)



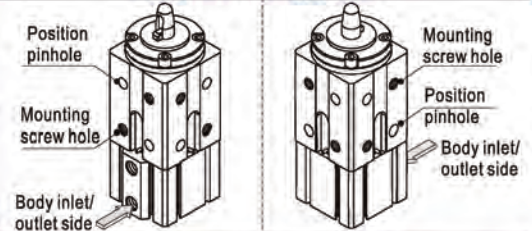
### With sensor groove

With sensor groove around cylinder body

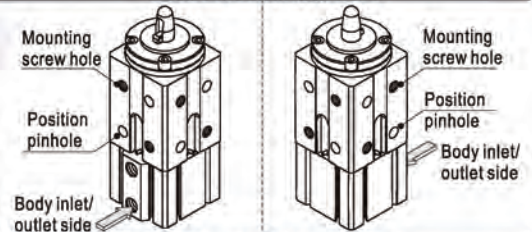
### Mounting diversity

All four sides are equipped with positioning pinhole and mounting screw hole. Specific configuration in the following options

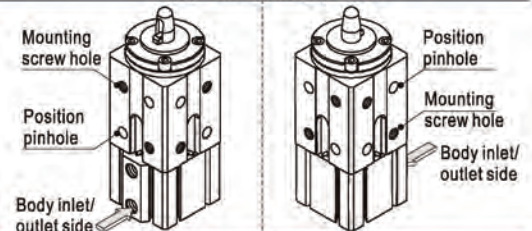
#### A type mounting groove



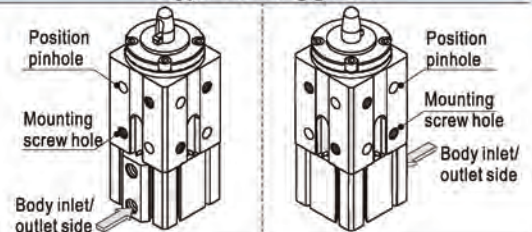
#### B type mounting groove



#### C type mounting groove



#### D type mounting groove



## Installation instructions (general)



1. Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris inside the pipe.
2. operating fluid need to be filtered by 40μm filter element.
3. During low temperature environment, cryogenic measures should be taken to prevent freezing water in the system.
4. Beware of the surface rust on the cylinder after disassemble for a long time. Dust cover should be added on inlet port and apply anti-rust oil on rod and action part.
5. Please attach a meter-out controller at the port to protect product life of cylinder and jig.



# Pin clamp cylinder

AQK Series



## Specification

Bore size (mm)	50	
Acting type	Double acting	
Fluid	Air (to be filtered by 40 μm filter element)	
Operating pressure	0.15~1.0MPa (22~145psi)	
Proof pressure	1.5MPa (215psi)	
Temperature °C	-20~70	
Cushion type	Bumper	
Clamp stroke	Without shims: 10 <sup>0</sup> <sub>-0.5</sub> mm	With shims: 10~12mm
Port size [Note]	1/4"	

[Note] PT thread is available.  
Please refer to page 353 for sensor applications.

## Product feature

1. According to JIS standards
2. Pin surface adopted titanium alloy processing to enhance friction resistance.
3. Part of cylinder front cover has equipped with metallic rod wiper that can effectively remove slag and debris etc.
4. Possible to mount on 4 surfaces.
5. With sensor groove around cylinder body, easy to mount sensors.

## Ordering code

AQK50 S A A A □ □ -177X340

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

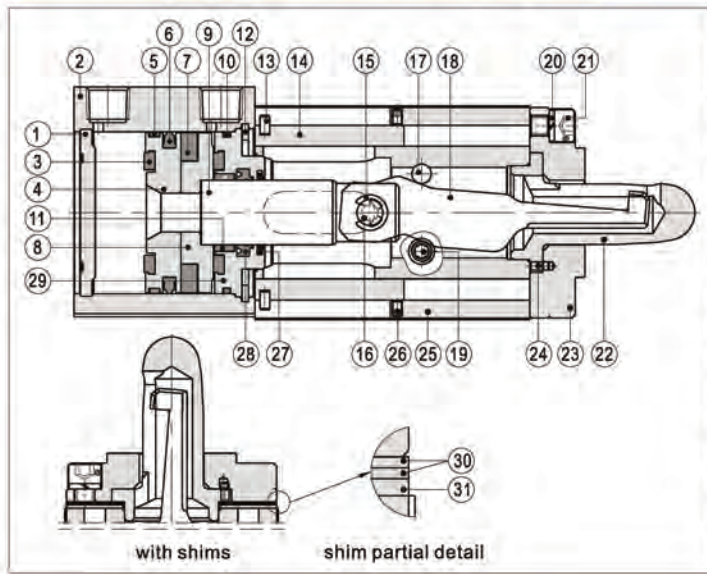
① Model	AQK: Pin clamp cylinder					
② Bore size	50					
③ Magnet	S: With magnet					
④ Install dim.	A: Mounting screws M10X1.5/ pinhole diameter Φ10		B: Mounting screws M12X1.75/ pinhole diameter Φ10			
⑤ The relative position of screw surface and pinhole	A: A type mounting groove	B: B type mounting groove	C: C type mounting groove	D: D type mounting groove		
⑥ Clamp arm position	A: Clamp arm same side with inlet port	B: Clamp arm at 90° with inlet port	C: Clamp arm at 180° with inlet port	D: Clamp arm at 270° with inlet port		
⑦ Adjusting shims	Blank: Without adjustable shims		2: With adjusting shim 2mm (2 of 0.5mm+1 of 1mm)			
⑧ Thread code	Blank: PT1/4					
⑨ Guide pin specification code	Code [Note]	Pin height (without shims)	Code	Pin height (with shims)	Pin diameter	Workpiece port size
	14□ X290	29	14□ X310	31	Φ14.□	Φ15
	15□ X290	29	15□ X310	31	Φ15.□	Φ16
	17□ X340	34	17□ X360	36	Φ17.□	Φ18
	19□ X340	34	19□ X360	36	Φ19.□	Φ20
24□ X340	34	24□ X360	36	Φ24.□	Φ25	

[Note] "□" means 1-9. Take 177X340 for example, 177 means pinhole diameter 17.7mm, 340 means guiding pin height 34mm.

# Pin clamp cylinder

## AQK Series

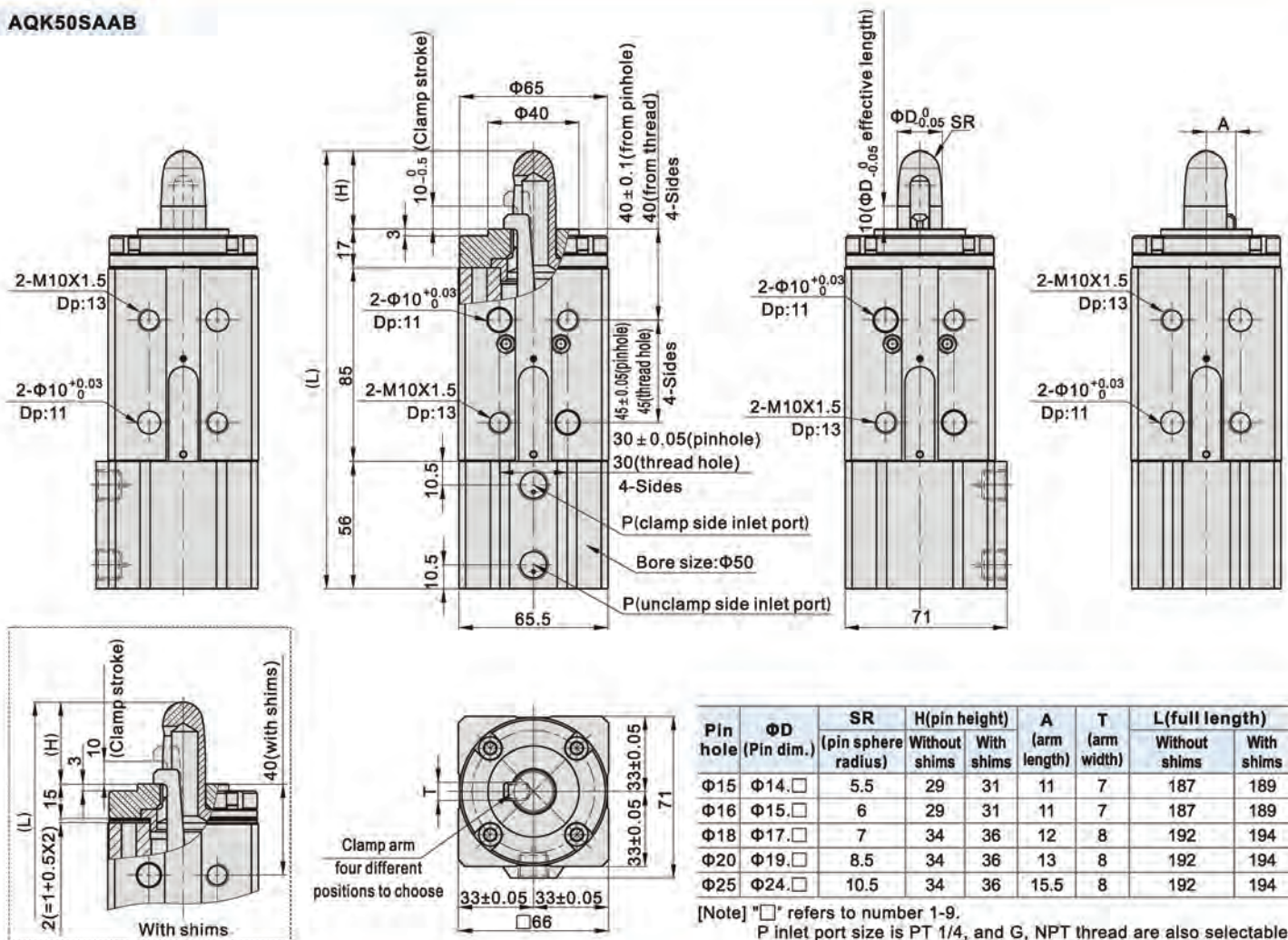
### Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	back cover	Aluminum alloy	17	guiding pin	Alloy steel
2	body	Aluminum alloy	18	lever	die steel
3	Bumper	NBR	19	socket set screws	Alloy steel
4	Piston	Aluminum alloy	20	spring washer	Spring steel
5	wear ring	Wear resistant material	21	screws	Alloy steel
6	Piston packing	NBR	22	pin	Stainless steel
7	magnet	plastic	23	cap	Alloy steel
8	magnet holder	Aluminum alloy	24	Pin	Stainless steel
9	rod	S45C hard chrome plating bar	25	pin body	Aluminum alloy
10	o ring	NBR	26	socket set screws	Alloy steel
11	bushing	Wear resistant material	27	wiper ring	Stainless steel
12	C clip	Spring steel	28	spool packing	NBR
13	Pin	Stainless steel	29	front cover	Aluminum alloy
14	dedust gate	Aluminum alloy	30	gasket 1	Stainless steel
15	E clip	Spring steel	31	gasket 2	Stainless steel
16	PIN	S45C grinded bar			

### Dimensions

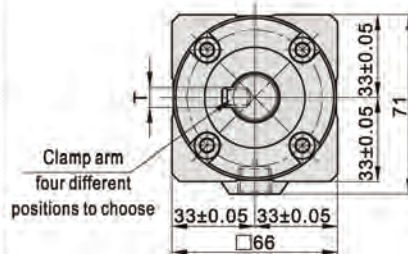
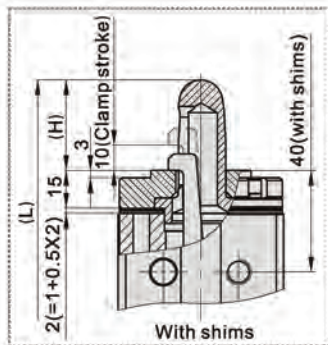
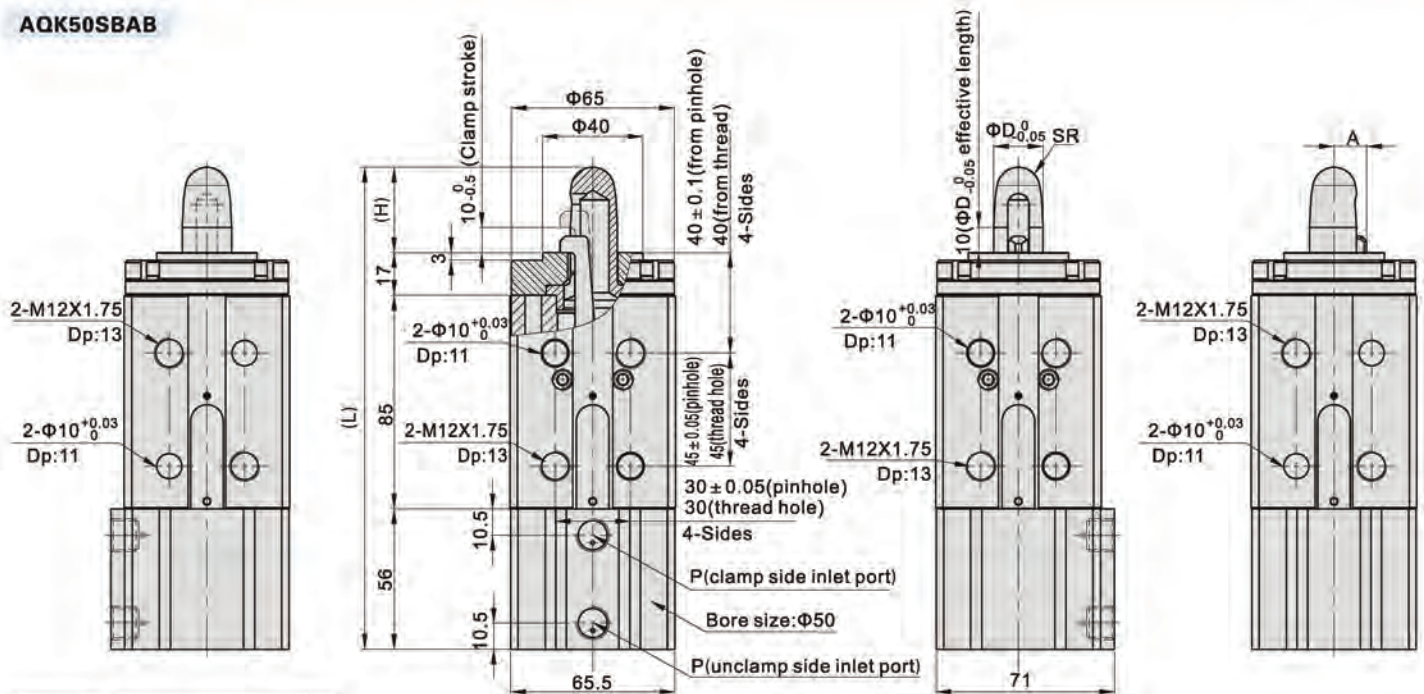
#### AQK50SAAB



# Pin clamp cylinder

## AQK Series

### AQK50SBAB



Pin hole	ΦD (Pin dim.)	SR (pin sphere radius)	H (pin height)		A (arm length)	T (arm width)	L (full length)	
			Without shims	With shims			Without shims	With shims
Φ15	Φ14.□	5.5	29	31	11	7	187	189
Φ16	Φ15.□	6	29	31	11	7	187	189
Φ18	Φ17.□	7	34	36	12	8	192	194
Φ20	Φ19.□	8.5	34	36	13	8	192	194
Φ25	Φ24.□	10.5	34	36	15.5	8	192	194

[Note] "□" refers to number 1-9.  
P inlet port size is PT 1/4, and G, NPT thread are also selectable.

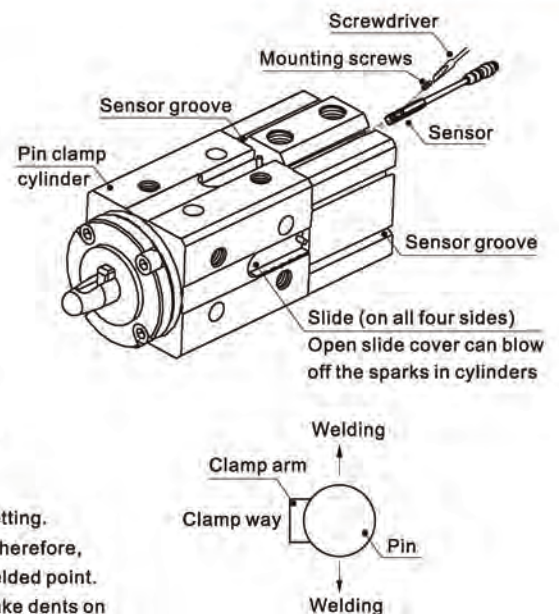
## Installation instruction

### 1. Sensor options and mounting:

Applicable sensors for AQK series are CMSG(DMSG). Those sensors can easily fix on the cylinder as the right figure, other accessories are not needed. Loosen the mounting screws on sensor, import it to mounting groove to the suitable position and it can be fixed after tighten screws.

Also: in the power magnetic environment, you should choose the anti-interference sensor, the specific selection of the reference P334 page.

- Since the cylinder performs both positioning and clamping simultaneously, any other application may cause an accident or damage to the cylinder.
- The thickness of clamping workpiece should be under 10mm, the clamping cylinder with shim can clamp up to 12 mm (with all shims removed).
- Only apply to the workpiece has flat side, do not clamp without setting the workpiece.
- Please attach a speed controller and adjust the cylinder speed by meter-out.
- prevent any foreign material ,such as machining chips, from entering into internal cylinder. And the opening part of a guide pin should not face in the same direction as oncoming spatter. If the spatter enters the cylinder from the opening part of the guide pin, it will shorten the product life and cause a malfunction.
- Consider the welding point of the guide pin when determining the direction of the clamp arm setting. The clamp arm will be damaged if clamping is performed at the welded point of the guide pin. Therefore, set the clamping directions as illustrated right figure to prevent the clamping damaged from welded point.
- If sparks enters the cylinder body, remove it by first detaching the covers. Do not scratch or make dents on the sliding parts of the piston rod by striking it or grasping them with other objects. Or it may cause seal damage and leakage.





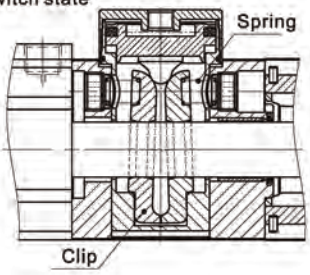
# Pin clamp cylinder(Lock type)——BAQK Series

## Compendium of BAQK Series

**Bidirectional locked**  
Both stretch and retract can lock cylinder equivalently unrelated to piston action

**Applicable with AQK series pin clamp cylinder**  
Same instructions as AQK series

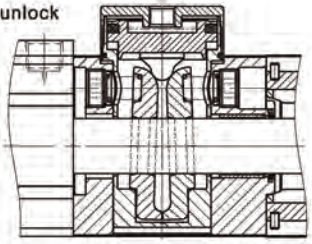
**Spring + Clip clamping device**  
Simple structure, fast and effective unlock, stable switch state



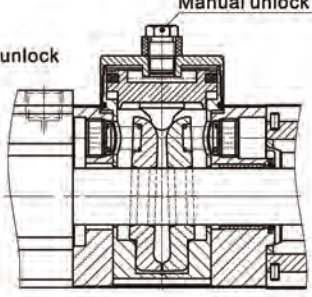
**General pin specification with AQK series**

**Multiple unlock options**  
Pneumatic and manual unlock options

**Pneumatic unlock**  
compressed air



**Manual unlock**  
Manual unlock screw

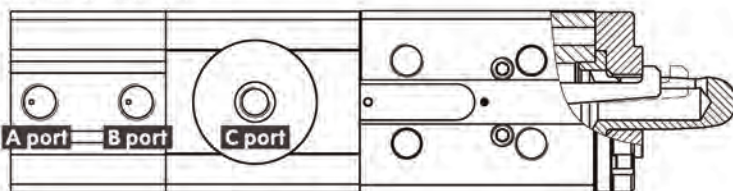


**Applicable with AQK series pin clamp cylinder**

## Installation instructions (general)



- Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris inside the pipe.
- operating fluid need to be filtered by 40 $\mu$ m filter element.
- During low temperature environment, cryogenic measures should be taken to prevent freezing water in the system.
- Beware of the surface rust on the cylinder after disassemble for a long time.  
Dust cover should be added on inlet port and apply anti-rust oil on rod and action part.
- Please attach a meter-out controller at the port to protect product life of cylinder and jig.
- The locking device can only work when cylinder stops, do not activate the rod under working condition.  
It's necessary to take extra measures if the control system has safety requirement.
- The locking device can be released only when the force on both sides of the piston reaches equilibrium or the cylinder stops, otherwise it may cause accident by rod sudden action.
- application example.



Circulation	Inlet			Acting	
	A port	B port	C port		
	no	no	yes	clamp machine unlocked	0~0.5S
	no	yes	yes	Clamp arm fastened workpiece	0~0.5S
	no	no	no	clamp machine locked	0.5S above
	no	no	yes	clamp machine unlocked	0~0.5S
	yes	no	yes	clamp arm loosen workpiece	0~0.5S



# Pin clamp cylinder—Lock type

## BAQK Series



### Specification

Bore size(mm)	50	
Acting type	Double acting	
Fluid	Air(to be filtered by 40 μ m filter element)	
Operating pressure	0.15~1.0MPa(22~145psi)	
Proof pressure	1.5MPa(215psi)	
Temperature °C	-20~70	
Cushion type	Bumper	
Clamp stroke	Without shims: 10 <sup>0</sup> / <sub>-0.5</sub> mm	With shims: 10~12mm
Unlock pressure	0.3~0.7MPa(45~100psi)	
Static retention	1400N	
Port size	Cylinder	1/4"
[Note]	Clamp device	G1/8

[Note] PT thread is available.  
Please refer to page 353 for sensor applications.

### Product feature

1. According to JIS standards
2. Pin surface adopted titanium alloy processing to enhance friction resistance.
3. Part of cylinder front cover has equipped with metallic rod wiper that can effectively remove slag and debris etc.
4. Possible to mount on 4 surfaces.
5. With sensor groove around cylinder body, easy to mount sensors.

### Ordering code

BAQK50 S A A A □ □-177X340

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

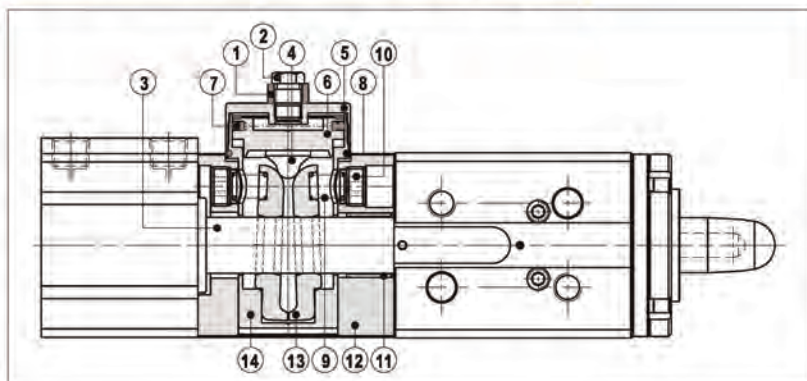
① Model	BAQK: Pin clamp cylinder(lock type)					
② Bore size	50					
③ Magnet	S: With magnet					
④ Install dim.	A: Mounting screws M10X1.5/ pinhole diameter Φ10			B: Mounting screws M12X1.75/ pinhole diameter Φ10		
⑤ The relative position of screw surface and pinhole	A:A type mounting groove	B:B type mounting groove	C:C type mounting groove	D:D type mounting groove		
	Refer to AQK series ordering code for specific mounting groove					
⑥ Clamp arm position	A: Clamp arm same side with inlet port	B: Clamp arm at 90° with inlet port	C: Clamp arm at 180° with inlet port	D: Clamp arm at 270° with inlet port		
	The relation between clamp arm and inlet port please refer to AQK series ordering code content					
⑦ Adjusting shims	Blank: Without adjustable shims			2: With adjusting shim 2mm (2 of 0.5mm+1 of 1mm)		
⑧ Thread code	Blank: PT1/4					
⑨ Guide pin specification code	Code [Note]	Pin height (without shims)	Code	Pin height (with shims)	Pin diameter	Workpiece port size
	14□ X290	29	14□ X310	31	Φ14.□	Φ15
	15□ X290	29	15□ X310	31	Φ15.□	Φ16
	17□ X340	34	17□ X360	36	Φ17.□	Φ18
	19□ X340	34	19□ X360	36	Φ19.□	Φ20
24□ X340	34	24□ X360	36	Φ24.□	Φ25	

[Note] "□" means 1-9. Take 177X340 for example, 177 means pinhole diameter 17.7mm, 340 means guiding pin height 34mm.

# Pin clamp cylinder—Lock type

## BAQK Series

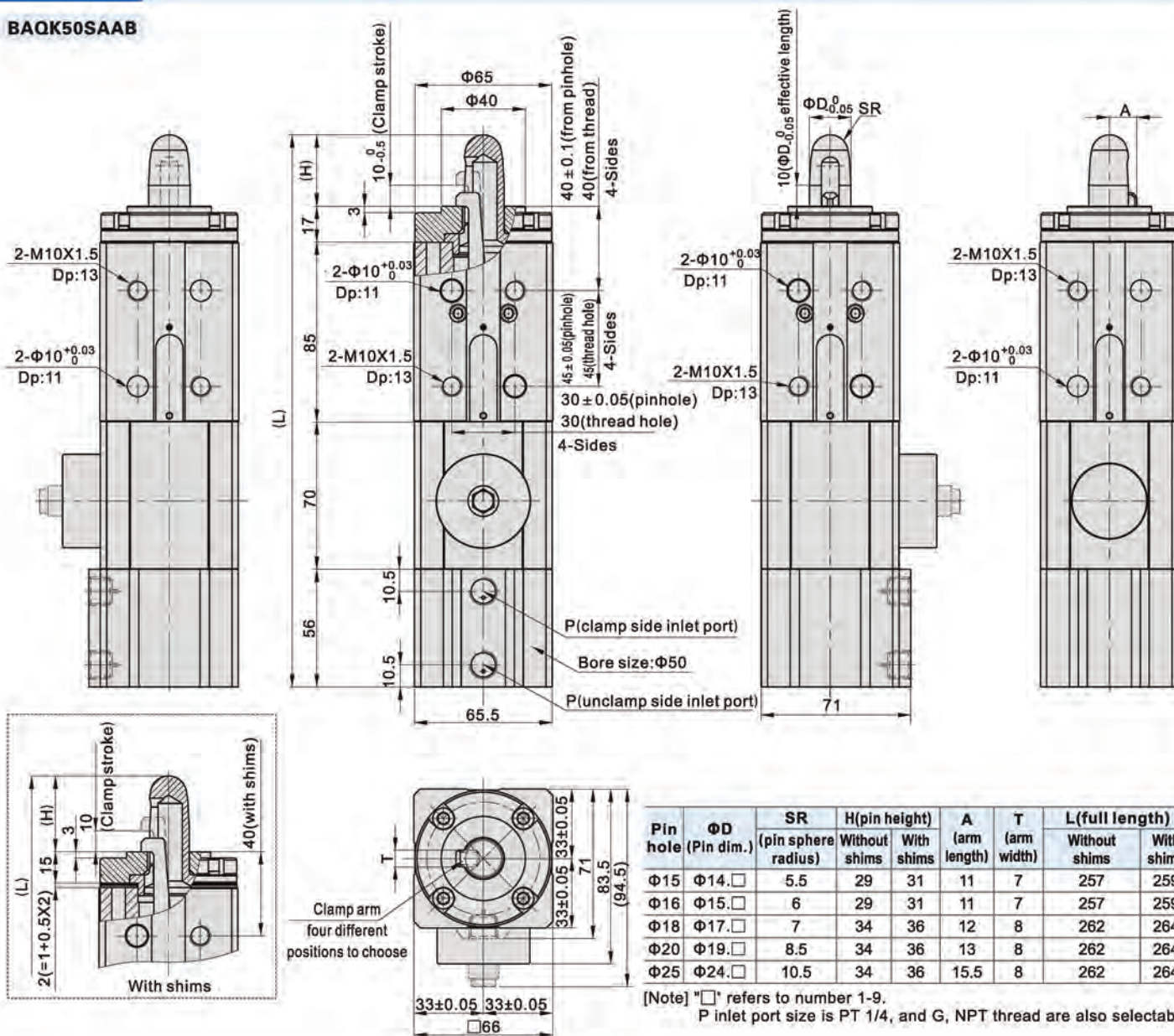
### Inner structure and material of major parts



NO.	Item	Material
1	Spacer	POM
2	Unlock screws	Cutting steel
3	Rod	S45C hard chrome plating bar
4	Unlocker	Wear resistant material
5	Cap	Aluminum alloy
6	Unlock piston	Aluminum alloy
7	Piston packing	NBR
8	O ring	NBR
9	Spring	Spring steel
10	Spring fixed screws	Low carbon steel
11	Bimetal bearing	Low carbon steel+silleon bronze
12	Fixed holder	Aluminum alloy
13	Air gripper	Aluminium Bronze
14	Sleeve	Aluminum alloy

### Dimensions

#### BAQK50SAAB



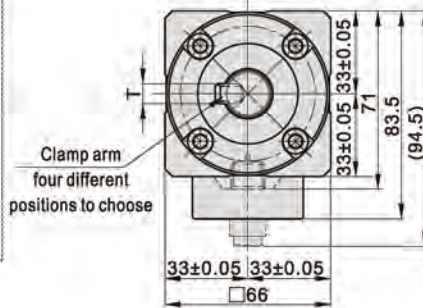
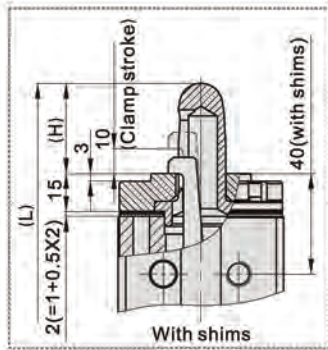
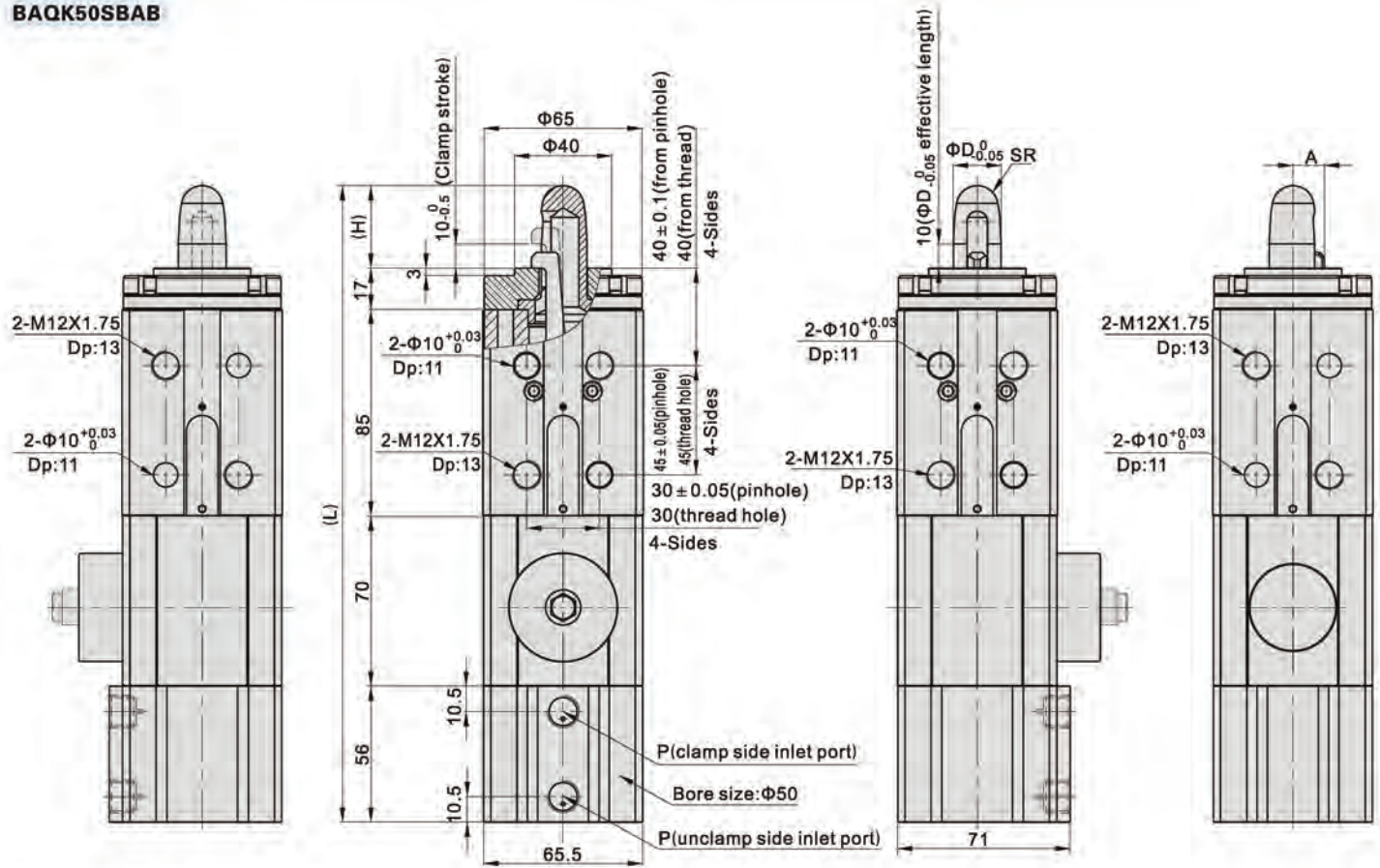
Pin hole	$\Phi D$ (Pin dim.)	SR (pin sphere radius)	H (pin height)		A (arm length)	T (arm width)	L (full length)	
			Without shims	With shims			Without shims	With shims
$\Phi 15$	$\Phi 14$	5.5	29	31	11	7	257	259
$\Phi 16$	$\Phi 15$	6	29	31	11	7	257	259
$\Phi 18$	$\Phi 17$	7	34	36	12	8	262	264
$\Phi 20$	$\Phi 19$	8.5	34	36	13	8	262	264
$\Phi 25$	$\Phi 24$	10.5	34	36	15.5	8	262	264

[Note] "□" refers to number 1-9.  
P inlet port size is PT 1/4, and G, NPT thread are also selectable.

# Pin clamp cylinder—Lock type

## BAQK Series

### BAQK50SBAB



Pin hole	ΦD (Pin dim.)	SR (pin sphere radius)	H(pin height)		A (arm length)	T (arm width)	L(full length)	
			Without shims	With shims			Without shims	With shims
Φ15	Φ14.□	5.5	29	31	11	7	257	259
Φ16	Φ15.□	6	29	31	11	7	257	259
Φ18	Φ17.□	7	34	36	12	8	262	264
Φ20	Φ19.□	8.5	34	36	13	8	262	264
Φ25	Φ24.□	10.5	34	36	15.5	8	262	264

[Note] "□" refers to number 1-9.  
P inlet port size is PT 1/4, and G, NPT thread are also selectable.

## Installation instruction

BAQK series mounting dimensions are equivalent to AQK series, please refer to AQK series for specific mounting groove.



# Horizontal rotary clamp cylinder—QDK Series

## Compendium of QDK Series



### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
20	12	IN(Clamp)	-	20.1	40.2	60.3	80.4	100.5	120.6	140.7
25	12	IN(Clamp)	17.7	55.5	93.3	131.1	168.9	206.7	244.5	282.3
32	12	IN(Clamp)	43.1	111.2	181.3	250.4	319.5	388.6	457.7	526.8
40	16	IN(Clamp)	75.2	180.7	286.2	391.7	497.2	602.7	708.2	813.7

### Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.
5. To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.



# Horizontal rotary clamp cylinder

## QDK Series



### Specification

Bore size(mm)	20	25	32	40
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.15~1.0MPa(22~145psi)			
Proof pressure	1.5MPa(220psi)			
Temperature	-20~70℃			
Rotation angle	90°			
Repeatability	±2°			
Rotation direction	Turn left or turn right			
Rotation stroke(mm)	0(Horizontal rotary)			
Clamping stroke (mm)	5			
Cushion type	Bumper			
Port size	M5×0.8			1/8"

Add) please refer to Page 353 for the specific content of sensor switch.

### Symbol



### Product feature

1. Complete rotation on horizontal plane, so more save space compare with QCK series.
2. Boss front end cap and flush front end cap are available.
3. Double pins in the rotation guide groove to increase stability.
4. There are magnetic switch slots around the cylinder body convenient to install inducting switch.

### Ordering code

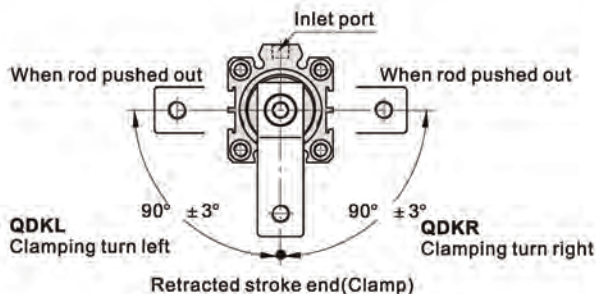
QDK L 32×5 S U □

① ② ③ ④ ⑤ ⑥ ⑦

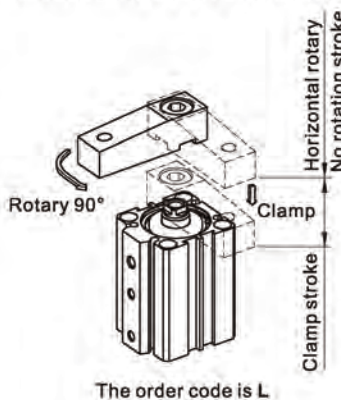
① Model	② Rotation direction	③ Bore size	④ Clamping stroke	⑤ Magnet	⑥ Front cover type	⑦ Thread type [Note1]
QDK: Horizontal rotary clamp cylinder	L: Push and turn left R: Push and turn right	20 25 32 40	5: 5mm	S: With magnet	Blank: Boss front end cap U: Flush front end cap	Blank: PT G: G

[Note1] When the thread is standard, the code is blank.

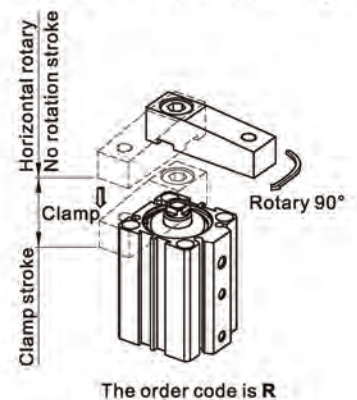
### The definition of rotation direction and angle



**Levorotary(QDKL):**  
When the piston of cylinder moves downward, the swivel arms moves anticlockwise, this is call edlevorotary.



**Dextrorotary(QDKR):**  
When the piston of cylinder moves downward, the swivel arms moves clockwise. this is called dextrorotary.

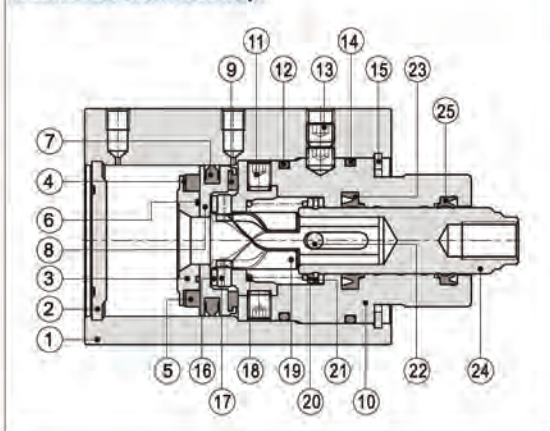


# Horizontal rotary clamp cylinder

## QDK Series

### Inner structure and material of major parts

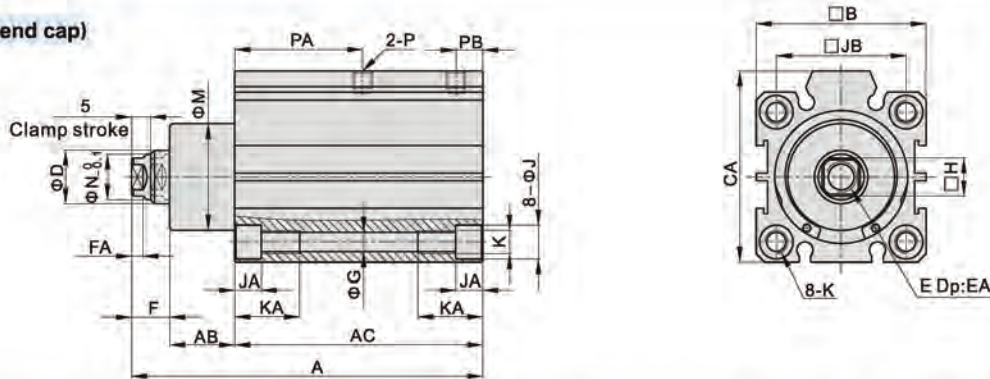
QDK(Boss front end cap)



NO.	Item	Material	NO.	Item	Material
1	Body	Aluminum alloy	13	Fixing screw	Carbon steel
2	Back cover	Aluminum alloy	14	O-ring	NBR
3	Magnet holder	Aluminum alloy	15	C clip	Spring steel
4	Magnet washer	NBR	16	Middle seat	SCr440
5	Magnet	Sintered metal	17	Pin	SUJ2
		(Neodymium-iron-boron)	18	Spring	Stainless steel
6	O-ring	NBR	19	Rotary axis	Scr440
7	Piston seal	NBR	20	Stop flake	Stainless steel
8	Piston	Aluminum alloy(Φ40)/brass(Other)	21	C clip	Spring steel
9	Bumper	TPU	22	Pin	SUJ2
10	Front cover	Aluminum alloy	23	Front cover parking	NBR
11	Fixing screw	Carbon steel	24	Piston rod	Scr440
12	O-ring	NBR	25	Front cover parking	NBR

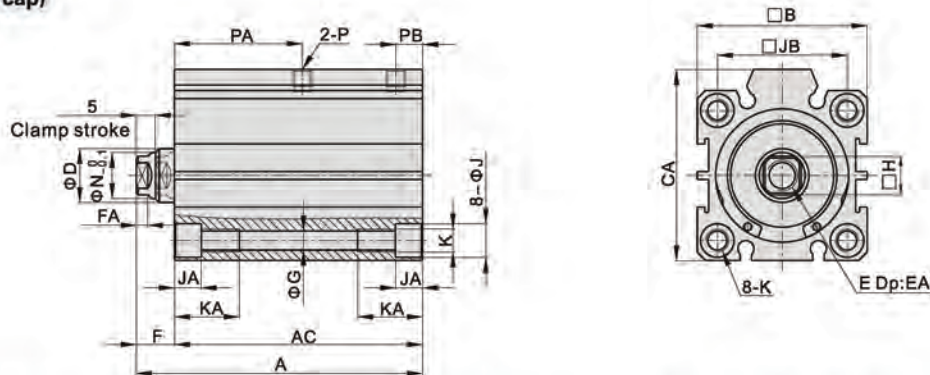
### Dimensions

QDK(Boss front end cap)



Bore size\Item	A	AB	AC	B	CA	D	E	EA	F	FA	G	H	J	JA	JB	K	KA	M	N	P	PA	PB
20	86.5	16.5	60	34	-	12	M6X1.0	7.5	10	3	4.2	8	7.3	4.5	24	M5X0.8	14	24	10	M5X0.8	31.5	7
25	86.5	16.5	60	40	-	12	M8X1.25	8	10	3	5.2	10	9	5.5	28	M6X1.0	17	26	-	M5X0.8	31	7
32	92	17	65	44.5	50	14	M8X1.25	10	10	3	5.2	10	9	5.5	34	M6X1.0	17	28	12	M5X0.8	33.5	7
40	98	18	70	52	58.5	16	M8X1.25	10	10	3	6.8	14	10.5	6.5	40	M8X1.25	20	30	-	1/8"	35	9

QDK-U(Flush front end cap)



Bore size\Item	A	AC	B	CA	D	E	EA	F	FA	G	H	J	JA	JB	K	KA	N	P	PA	PB
20	70	60	34	-	12	M6X1.0	7.5	10	3	4.2	8	7.3	4.5	24	M5X0.8	14	10	M5X0.8	31.5	7
25	70	60	40	-	12	M8X1.25	8	10	3	5.2	10	9	5.5	28	M6X1.0	17	-	M5X0.8	31	7
32	75	65	44.5	50	14	M8X1.25	10	10	3	5.2	10	9	5.5	34	M6X1.0	17	12	M5X0.8	33.5	7
40	80	70	52	58.5	16	M8X1.25	10	10	3	6.8	14	10.5	6.5	40	M8X1.25	20	-	1/8"	35	9

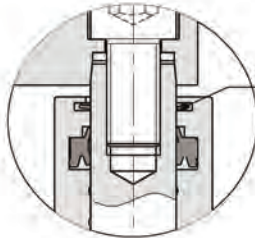


# Rotary clamp cylinder—QCK Series

## Compendium of QCK Series

### Dustproof and welding slag out design

The front cover with stainless steel dust scraping ring, can keep the dust and welding slag out, and protect cylinder internal parts.



Stainless steel dust scraping ring

### Two kinds of rod type

Taper type (with clamp arm)



Across flat position rod type (without clamp arm)

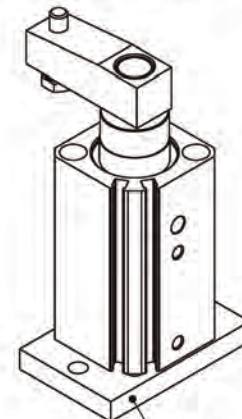


### Be used on welding fixfure

It can be used on welding fixfure, the QPQ surface treatment prevent piston rod damage by welding slag; better than chrome plated piston rod.

### Better commonness

The mounting dimension of body is the same as ACQ series, can use ACQ series' accessories.



ACQ series' accessories

### Magnetic switch slots around the cylinder body

There are magnetic switch slots around the cylinder body convenient to install inducting switch.

## Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
12	6	IN(Clamp)	8.5	17.0	25.4	33.9	42.4	50.9	59.4	67.9
		OUT(Release)	11.3	22.6	33.9	45.2	56.5	67.9	79.2	90.4
16	8	IN(Clamp)	15.1	30.2	45.2	60.3	75.4	90.5	105.6	120.6
		OUT(Release)	20.1	40.2	60.3	80.4	100.5	120.6	140.7	160.8
20	12	IN(Clamp)	20.1	40.2	60.3	80.4	100.5	120.6	140.7	160.8
		OUT(Release)	31.4	62.8	94.2	125.7	157.1	188.5	219.9	251.3
25	12	IN(Clamp)	37.8	75.6	113.3	151.1	188.9	226.7	264.4	302.2
		OUT(Release)	49.1	98.2	147.3	196.3	245.4	294.5	343.6	392.7
32	16	IN(Clamp)	60.3	120.6	181.0	241.3	301.6	361.9	422.2	482.5
		OUT(Release)	80.4	160.8	241.3	321.7	402.1	482.5	563.0	643.4
40	16	IN(Clamp)	105.6	211.1	316.7	422.2	527.8	633.3	738.9	844.5
		OUT(Release)	125.7	251.3	377.0	502.7	628.3	754.0	879.6	1005.3
50	20	IN(Clamp)	164.9	329.9	494.8	659.7	824.7	989.6	1154.5	1319.5
		OUT(Release)	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4	1570.8
63	20	IN(Clamp)	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2	2242.5
		OUT(Release)	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1	2493.8

## Installation and application



1. Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40 μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface. Anti-dust jam cap shall be added in air inlet and outlet ports.
5. To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.



# Rotary clamp cylinder

## QCK Series



### Specification

<b>Bore size(mm)</b>	12	16	20	25	32	40	50	63	
<b>Acting type</b>	Double acting								
<b>Fluid</b>	Air(to be filtered by 40 μm filter element)								
<b>Operating pressure</b>	0.15~1.0MPa(22~145psi)(1.5~10bar)								
<b>Proof pressure</b>	1.5MPa(215psi)(15bar)								
<b>Temperature</b>	-20~70℃								
<b>Speed range</b>	50~200mm/s								
<b>Rotation angle</b>	90°								
<b>Repeatability</b>	±2°								
<b>Rotation direction</b>	Turn left or turn right								
<b>Rotation stroke(mm)</b>	7.5		9.5		15		19		
<b>Clamping stroke (mm)</b>	10	20	10	20	30	10	20	30	50
<b>Stroke tolerance</b>	+1.0 0								
<b>Cushion type</b>	Bumper								
<b>Port size [Note1]</b>	M5×0.8				1/8"		1/4"		

[Note1]PT thread, G thread are available.

Add) QCK series are all attached with magnet, please refer to Page 353 for the specific content of sensor switch.

### Symbol



### Product feature

1. It can be used on welding fixture, the QPQ surface treatment prevent piston rod damage by welding slag; better than chrome plated piston rod.
2. The front cover with stainless steel dust scraping ring, can keep the dust and welding slag out, and protect cylinder internal parts.
3. The mounting dimension of body is the same as ACQ series, can use ACQ series' accessories.

### Ordering code

QCK L 32 × 10 S M FB □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

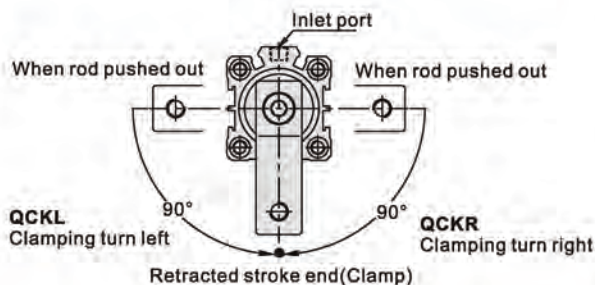
① Model	② Rotation direction	③ Bore size	④ Clamping stroke	⑤ Magnet	⑥ Rod type	⑦ Mounting type [Note1]	⑧ Thread type [Note2]
QCK: Rotary clamp cylinder	L: Push and turn left R: Push and turn right	12	10 20	S: With magnet	Blank: Taper type (with clamp arm) M: Across flat position type (without clamp arm)	Blank: No bracket FB: FB type	Blank: PT G: G
		16	10 20 30				
		20					
		25					
		32					
		40	10 20 30 50				
50							
63							

[Note1] Back flange is same as ACQ series (please refer right table), if need front flange, please contact us.

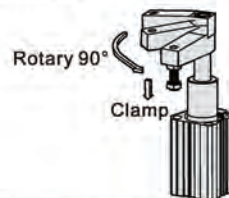
[Note2] When the thread is standard, the code is blank.

Bore size\Accessories	FB	Material	Bore size\Accessories	FB	Material
12	F-ACQ12FA	Aluminum alloy	32	F-ACQ32FA	Aluminum alloy
16	F-ACQ16FA		40	F-ACQ40FA	
20	F-ACQ20FA		50	F-ACQ50FA	
25	F-ACQ25FA		63	F-ACQ63FA	

### The definition of rotation direction and angle

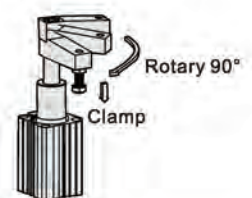


**Levorotatory(QCKL):**  
When the piston of cylinder moves downward, the swivel arms moves anticlockwise, this is called levorotatory.



The order code is L

**Dextrorotatory(QCKR):**  
When the piston of cylinder moves downward, the swivel arms moves clockwise, this is called dextrorotatory.



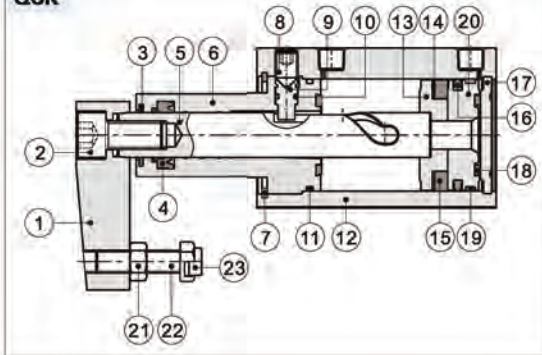
The order code is R

# Rotary clamp cylinder

## QCK Series

### Inner structure and material of major parts

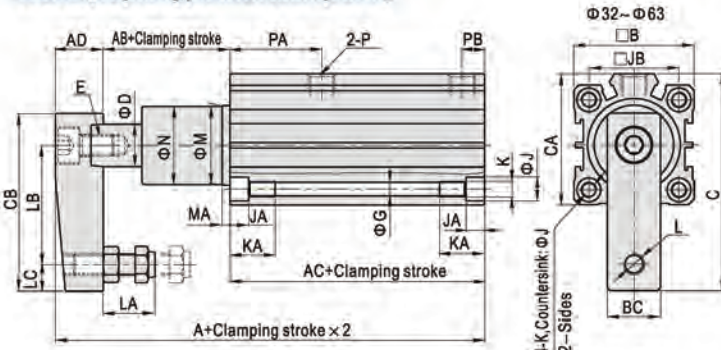
QCK



NO.	Item	Material	NO.	Item	Material
1	Rocker	Carbon steel	14	Magnet washer	NBR
2	Screw	Carbon steel	15	Magnet	Sintered metal (Neodymium-iron-boron(Φ12~Φ25)) Plastic(Others)
3	Dust scraping ring	No(Φ12, Φ16) Stainless steel(Others)			
4	Front cover packing	NBR			
5	Piston rod	Scr440	16	Piston seal	NBR
6	Front cover	Aluminum alloy	17	Back cover	Aluminum alloy
7	C Clip	Spring steel	18	Bumper	TPU(Φ12~Φ25)\NBR(Others)
8	Screw	Carbon steel	19	Wear ring	No(Φ12~Φ32) Wear resistant material(Others)
9	Operating screw	SCR440			
10	O-ring	NBR	20	Piston	Brass(Φ12, Φ16) Aluminum alloy(Others)
11	O-ring	NBR	21	Screw	Carbon steel
12	Body	Aluminum alloy	22	Fixing screw	Carbon steel
13	Magnet holder	Brass(Φ12, Φ16) Aluminum alloy(Others)	23	Bumper	PTFE(Φ12~Φ40)\POM(Others)

### Dimensions

#### QCK□ (Taper type with clamp arm)

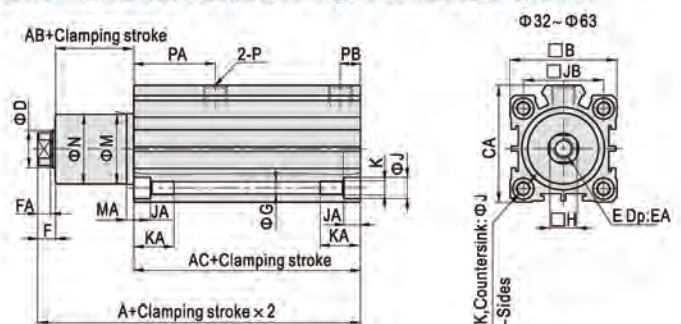


Bore size\Item	A	AB	AC	AD	B	BC	C	CA	CB	D
12	55	10.5	35.5	9	25	9	36.5	-	29	6
16	59	10.5	35.5	13	29	11	44.5	-	36	8
20	86	8	62	16	36	16	60	-	51	12
25	87	8	63	16	40	16	62	-	51	12
32	108	17.5	71.5	19	45	19	82	49.5	67	16
40	109	25	65	19	53	19	85.5	57	67	16
50	133	31	76.5	25.5	64	25.5	114	71	88	20
63	136	30.5	80	25.5	77	25.5	120.5	84	88	20

Bore size\Item	E	G	J	JA	JB	JC	K
12	M3×0.5	3.3	6	3.5	15.5	22	M4×0.7
16	M5×0.8	3.3	6	3.5	20	28	M4×0.7
20	M8×1.25	5	9	5.5	25.5	36	M6×1.0
25	M8×1.25	5	9	5.5	28	40	M6×1.0
32	M10×1.5	5	9	5.5	34	-	M6×1.0
40	M10×1.5	5	9	5.5	40	-	M6×1.0
50	M12×1.75	6.5	10.5	6.5	50	-	M8×1.25
63	M12×1.75	8.5	14	9	60	-	M10×1.5

Bore size\Item	KA	L	LA	LB	LC	M	MA	N	P	PA	PB
12	11	M4×0.7	7~13	20	4	11	3	10.8	M5×0.8	13.5	5.5
16	11	M4×0.7	7~13	25	5	14	3	13.8	M5×0.8	15	5.5
20	17	M6×1.0	9.5~20.5	35	7	18	3	17.8	M5×0.8	30	6
25	17	M6×1.0	9.5~20.5	35	7	23	6	22.5	M5×0.8	30	7
32	17	M8×1.25	13.5~25.5	45	10	30	7	29.5	1/8"	34.5	8.5
40	17	M8×1.25	13.5~25.5	45	10	30	3	29.5	1/8"	26.5	9
50	22	M10×1.5	14.5~30	65	10	37	3.5	36.5	1/4"	34	11.5
63	28.5	M10×1.5	14.5~30	65	10	48	3.5	47.5	1/4"	34.5	11.5

#### QCK□M (Across flat position type without clamp arm)



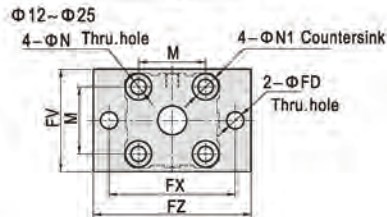
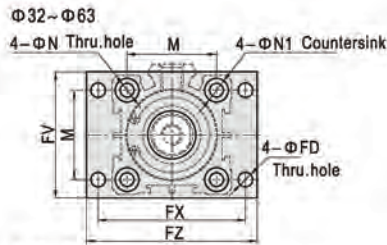
Bore size\Item	A	AB	AC	B	CA	D	F	FA
12	48	9.5	35.5	25	-	6	3	2.5
16	48	9.5	35.5	29	-	8	3	2.5
20	72.5	6.5	62	36	-	12	4	3
25	73.5	6.5	63	40	-	12	4	3
32	93.5	15.5	71.5	45	49.5	16	6.5	5.5
40	94.5	23	65	53	57	16	6.5	5.5
50	112	28	76.5	64	71	20	7.5	5.5
63	115	27.5	80	77	84	20	7.5	5.5

Bore size\Item	H	E	EA	G	J	JA
12	5	M3×0.5	6	3.3	6	3.5
16	7	M5×0.8	7	3.3	6	3.5
20	10	M8×1.25	13	5	9	5.5
25	10	M8×1.25	13	5	9	5.5
32	14	M10×1.5	15	5	9	5.5
40	14	M10×1.5	15	5	9	5.5
50	17	M12×1.75	20	6.5	10.5	6.5
63	17	M12×1.75	20	8.5	14	9

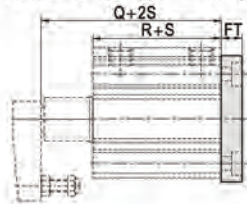
Bore size\Item	JB	JC	K	KA	M	MA	N	P	PA	PB
12	15.5	22	M4×0.7	11	11	3	10.8	M5×0.8	13.5	5.5
16	20	28	M4×0.7	11	14	3	13.8	M5×0.8	15	5.5
20	25.5	36	M6×1.0	17	18	3	17.8	M5×0.8	30	6
25	28	40	M6×1.0	17	23	6	22.5	M5×0.8	30	7
32	34	-	M6×1.0	17	30	7	29.5	1/8"	34.5	8.5
40	40	-	M6×1.0	17	30	3	29.5	1/8"	26.5	9
50	50	-	M8×1.25	22	37	3.5	36.5	1/4"	34	11.5
63	60	-	M10×1.5	28.5	48	3.5	47.5	1/4"	34.5	11.5

## QCK Series

### QCK-FB(With flange)



### QCK□-FB(Taper type with clamp arm)



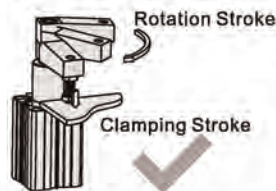
### QCK□M-FB(Across flat position rod without clamp arm)



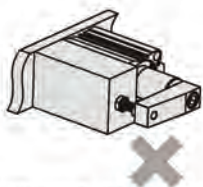
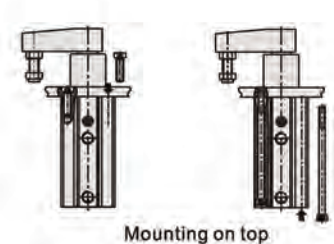
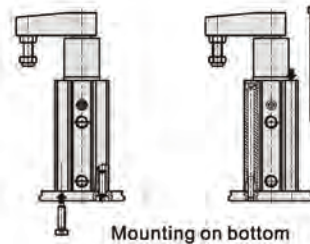
Bore size\Item	R	Q(QCK□)	Q(QCK□M)	M	N	N1	FD	FT	FV	FX	FZ
12	35.5	46	48	15.5	4.5	7.5	4.5	5.5	25	45	55
16	35.5	46	48	20	4.5	7.5	4.5	5.5	30	45	55
20	62	70	72.5	25.5	6.5	10.5	6.5	8	39	48	60
25	63	71	73.5	28	6.5	10.5	6.5	8	42	52	64
32	71.5	89	93.5	34	6.5	10.5	5.5	8	48	56	65
40	65	90	94.5	40	6.5	10.5	5.5	8	54	62	72
50	76.5	107.5	112	50	8.5	13.5	6.5	9	67	76	89
63	80	110.5	115	60	10.5	16.5	9	9	80	92	108

## Installation and operation

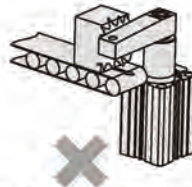
- To insure the life-span of cylinder and jig, please use flow control valve to control the speed of cylinder.
- The method of installation are mounted by flange on top or bottom.
- Before the cylinder is connected to pipeline sundries in the pipe must be eliminated, or may cause leakage.
- Please clean the piston-rod and dust scraping ring to protect the cylinder.
- The cylinder using normal magnet ring can use the same sensor as ACQ series. For the cylinder using strong magnet ring we suggest using AirTAC's CS1-69AM sensor.
- Because the rotary force is strong when the cylinder's acting, we suggest using flow control valve to control the speed to protect cylinder.
- Please install the cylinder following the right diagram.
- The installation method as the diagram below is wrong, and will injure the cylinder and shorten the cylinder life.



Only can clamping in clamping stroke.



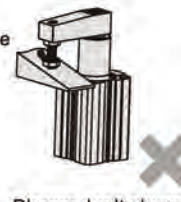
Don't installed horizontally



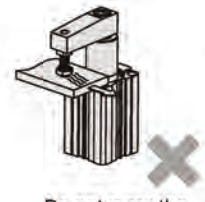
Don't exert horizontally load or force



Please don't clamp when rotating.



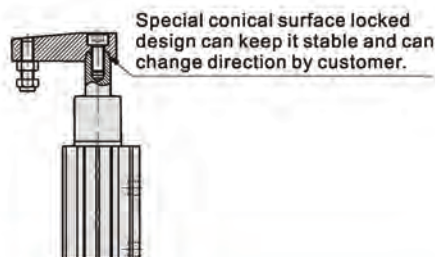
Please don't clamp on bevel



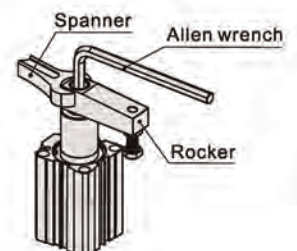
Do not more the workpiece when clamped

### 9. Rocker

- The design of rocker can keep it stable and can change direction by customer.
- Please follow the diagram below on right side to assemble/disassemble the rocker by spanner and allen wrench; don't hold the body to assemble/disassemble rocker, or will damage the cylinder.
- If need customize rocker, please contact us.



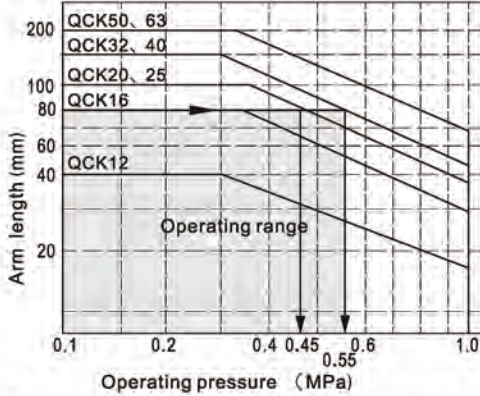
Special conical surface locked design can keep it stable and can change direction by customer.



## QCK Series

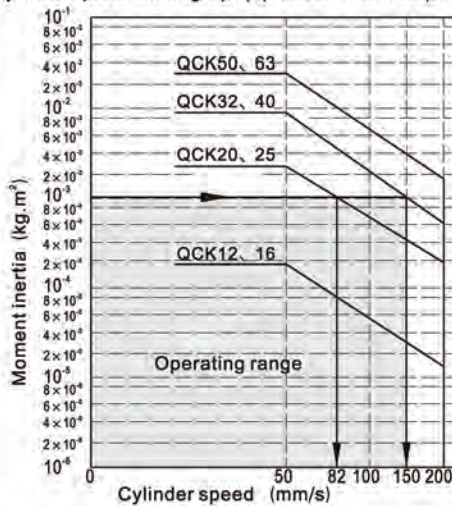
### How to select product

- When arms are to be made separately, their length and weight should be within the following range.
- Allowable bending moment:  
Use the arm length and operating pressure within graph(1) for allowable bending moment loaded piston rod.



Example: When arm length is 80mm, pressure should be less than  
QCK20/25:0.45MPa  
QCK32/40:0.55MPa

- Moment of inertia:  
When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph(2) based on arm requirements.



Example: When arm's moment of inertia is 10⁻³Kg·m², cylinder speed should be less than  
QCK20/25:82mm/s  
QCK32/40:150mm/s

Note) The average speed of piston=the highest speed of piston/1.6

- Moment of inertia of cylinder's arm when rotating based on its rotary axis, shown in graph(3).

Model	Moment of inertia(Kg·m²)
QCK12	3.555 × 10 <sup>-8</sup>
QCK16	1.053 × 10 <sup>-5</sup>
QCK20/25	5.257 × 10 <sup>-5</sup>
QCK32/40	1.653 × 10 <sup>-4</sup>
QCK50/63	7.387 × 10 <sup>-4</sup>

- Calculation reference:

5.1)Moment of inertia of arm (I<sub>1</sub>) : Refer to the graph(3) after the cylinder bore diameter is determined.

5.2)Moment of inertia of jig (I<sub>2</sub>) : According to shape of the jig and the next item 6 "Calculation for moment of inertia" , pick out a proper formula for calculation.  
The jig shown on the right graph is a cylinder ,its formula of moment of inertia is:

$$I_2 = (m_2 * D^2 * D) / 8 + m_2 * L^2 * L$$

When QCK32 is selected: L=0.045m (arm length);

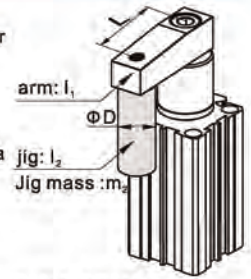
If D=0.04m m<sub>2</sub>=0.4kg

From graph(3): I<sub>1</sub>=1.653 × 10<sup>-4</sup>(Kg·m²)

By Calculation : I<sub>2</sub>=(m<sub>2</sub>\*D²\*D)/8+m<sub>2</sub>\*L³=L³=(0.4\*0.04²\*0.04)/8+0.4\*0.045³\*0.045=8.9 × 10<sup>-4</sup>(Kg·m²)

Total value: I=I<sub>1</sub>+I<sub>2</sub>=10.553 × 10<sup>-4</sup>=1.0553 × 10<sup>-3</sup>(Kg·m²)

According to graph(2),the highest speed of the cylinder should be less than 150 mm/s;  
According to graph(1),it can be used under a pressure of 0.9Mpa. The average speed of piston=the highest speed of piston/1.6=94 mm/s.



- Calculation for moment of inertia

Diagram	Calculation formula of moment of inertia
<p>1. Thin bar</p> <p>Position of rotary axis: Vertical to the bar and through the end</p>	$I = \frac{m_1 a_1^2 + m_2 a_2^2}{3}$
<p>2. Thin bar</p> <p>Position of rotary axis: Vertical to the bar and through the center of gravity</p>	$I = \frac{m a^2}{12}$
<p>3. Load at the end of lever arm</p>	$I = m_1 \times \frac{a_1^2}{3} + m_2 \times a_2^2 + k$ $k = m_2 \times \frac{2r^2}{5}$
<p>4. Thin rectangular plate (Rectangular parallelepiped)</p> <p>Position of rotary axis: Parallel to side b and through the center of gravity</p>	$I = \frac{m a^2}{12}$
<p>5. Thin rectangular plate (Rectangular parallelepiped)</p> <p>Position of rotary axis: Vertical to the plate and through the end</p>	$I = m_1 \times \frac{4a_1^2 + b^2}{12} + m_2 \times \frac{4a_2^2 + b^2}{12}$
<p>6. Thin rectangular plate (Rectangular parallelepiped)</p> <p>Position of rotary axis: Through the center of gravity and vertical to the plate (Same as also thick rectangular plate)</p>	$I = \frac{m a^2 + m b^2}{12}$

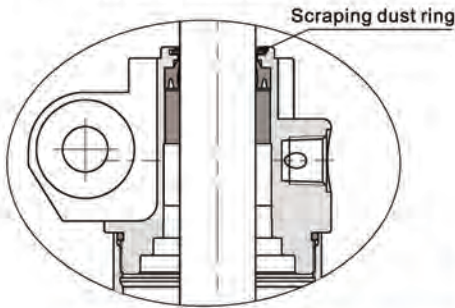


# Clamping cylinder—MCK Series

## Compendium of MCK Series

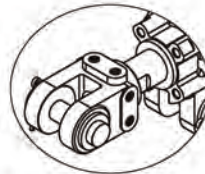
### Dustproof and welding slag out design

There is a scraping dust ring in front cover, and it is firm and durable that can avoid dust and splashed welding slag breaking cylinders. It is more reliable than dust helmet.

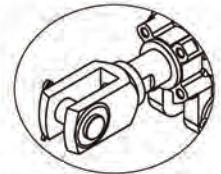


Scraping dust ring

### Y knuckle is available



Y: With M6 thread hole



YW: Without M6 thread hole

### Two orifice models air available

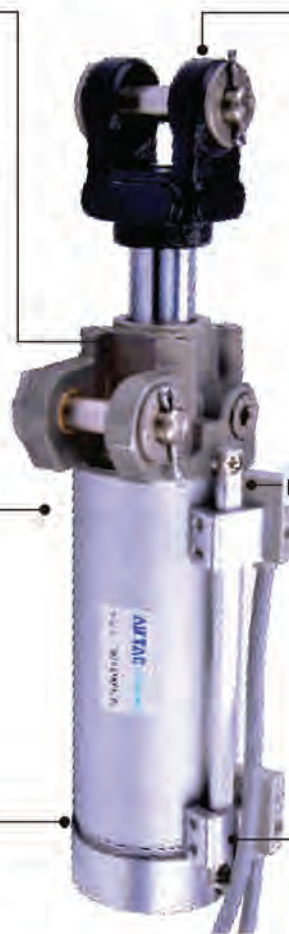
Back cover and barrel adopt riveted rolling packed structure to form a reliable connection.

### Rolling packed structure

### Buffer adjustment and speedlimit adjustment are built-in

### With sensor switches fixed frame

Various types of sensor switches are available.

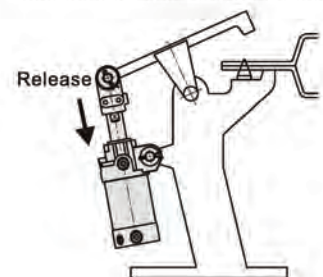
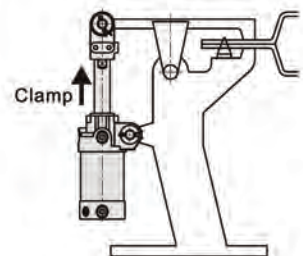


## Theoretical clamping force

Unit: Newton(N)

Bore size	Rod size	Acting type	Operating pressure(MPa)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
25	12	Double acting Push side	49.1	98.2	147.3	196.4	245.5	294.6	343.7	392.8
		Pull side	37.8	75.6	113.4	151.2	189.0	226.8	264.6	302.4
32	12	Double acting Push side	80.4	160.8	241.2	321.6	402.0	482.4	562.8	643.2
		Pull side	69.1	138.2	207.3	276.4	345.5	414.6	483.7	552.8
40	20	Double acting Push side	125.6	251.2	376.8	502.4	628.0	753.6	879.2	1004.8
		Pull side	94.2	188.4	282.6	376.8	471.0	565.2	659.4	753.6
50	20	Double acting Push side	196.3	392.6	588.9	785.2	981.5	1177.8	1374.1	1570.4
		Pull side	164.9	329.8	494.7	659.6	824.5	989.4	1154.3	1319.2
63	20	Double acting Push side	311.7	623.4	935.1	1246.8	1558.5	1870.2	2181.9	2493.6
		Pull side	280.3	560.6	840.9	1121.2	1401.5	1681.8	1962.1	2242.4
80	25	Double acting Push side	502.6	1005.2	1507.8	2010.4	2513.0	3015.6	3518.2	4020.8
		Pull side	453.6	907.2	1360.8	1814.4	2268.0	2721.6	3175.2	3628.8

## Application examples



## Installation and application



1. In normal situation such as: edge packing, installation, jig test...and so on. Standard cylinder is suggested.
2. In case of high-magnetic field generated by welding in the vicinity, anti-magnetic welding clamp cylinder shall be used and corresponding anti-magnetic sensor switch shall be matched.
3. Before cylinder connecting, the dust must be eliminated to avoid it entering in the cylinder.
4. The medium used by cylinder shall be filtered to 40 μm or below.
5. Under high temperature environment, the cylinder of high-temperature resistance shall be selected. Anti-freezing measure shall be adopted under low temperature environment to prevent the water freezing in cylinder.
6. If cylinder is not used for a long time, please advert the surface to get rusty. Inlet and outlet ports should be have anti-dust caps and also spread the oil to avoid getting rusty on piston rod.



# Clamping cylinder

## MCK Series



### Symbol



### Stroke

Bore size(mm)	Standard stroke(mm)	Available stroke
25, 32, 40, 50, 63, 80	50 75 100 125 150	150

Remark) Consult us for non-standard stroke.

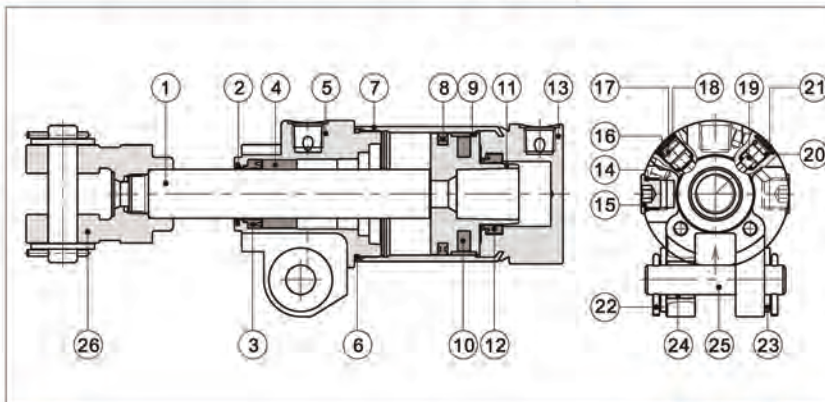
### Ordering code

MCK A 50 × 75 S □ Y □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Orifice model	③ Bore size	④ Stroke	⑤ Magnet	⑥ Mounting type	⑦ Mounting type	⑧ Thread type
MCK: Clamping cylinder (Double acting)	A: Orifice model A	25	Refer to Stroke table for detail	Blank: Without magnet S: With normal magnet[Note1]	E: One group air port in the front and back cover(No variable cushion)	Blank: Without Y knuckle YW: With Y knuckle (No M6 thread hole)	Blank: PT G: G
		32			Air port( One group)		
		40			Blank: Three groups air port in the front and back cover (Variable cushion for back and front cover)	Blank: Without Y knuckle	
		50			Air port( Three groups)		
	63	Variable cushion for back cover and front cover			Y: With Y knuckle (With M6 thread hole) YW: With Y knuckle (No M6 thread hole)		
No this code	80	E: One group air port in the front and back cover(Variable cushion for back cover)	Air port( One group)				

[Note1] In powerful magnetic field, sensor switch for high-magnet shall be matched. Please refer to Page 334 for option.

### Inner structure and material of major parts



No.	Item	Material	No.	Item	Material
1	Piston rod	Carbon steel	15	Stop screw	S35C
2	Scraping dust ring	Stainless steel	16	O-ring	NBR
3	Spool packing	NBR	17	Cush controlled screw	Aluminum alloy
4	Sliding bushing	Aluminum alloy	18	Bead flange	Spring steel
5	Front cover	Aluminum alloy	19	Speed controlled screw	Aluminum alloy
6	O-ring	NBR	20	O-ring	NBR
7	Barrel	Aluminum alloy	21	Bead flange	Spring steel
8	Piston O-ring	NBR	22	Orifice Pin	Midl steel
9	Wear ring	Wear resistant material	23	Cover blade	SPCC
10	Magnet	Magnetism material	24	Sliding bushing	Wear resistant material
11	Piston	Aluminum alloy	25	Pin	S45C
12	Cushion O-ring	TPU	26	Y knuckle	Nodular cast iron
13	Back cover	Aluminum alloy			
14	O-ring	NBR			

### Specification

Bore size(mm)	25	32	40	50	63	80
Acting type	Double acting					
Fluid	Air(to be filtered by 40 μm filter element)					
Operating pressure	0.15~1.0MPa(22~145psi)					
Proof pressure	1.5MPa(215psi)					
Temperature	-20~70 °C					
Speed range	50~500mm/s					
Cushion type	Bumper	Variable cushion for back cover or front cover(optional)				
Speed controlled valve	No	Standard setting for covers				
Lubrication	Not required					
Installation type	Double hinged-supports					
Port size [Note1]	1/8"		1/4"			3/8"

[Note1]PT thread, G thread are available.

### Product feature

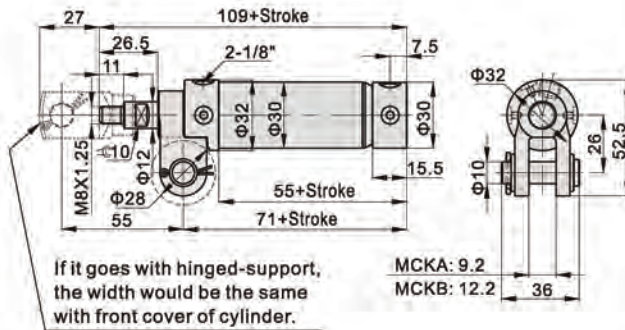
1. It suits for workshops that make automation welding.
2. There is a scraping dust ring in front cover, and it is firm and durable that can avoid dust and splashed welding slag breaking cylinders. It is more reliable than dust helmet.
3. It fits the working environment where has strong magnetic field, if it uses the sensor switch which is with strong magnet and anti-strong magnetic field.
4. Inlet interface are optional on three sides; buffer adjustment and speed limit adjustment are built-in.
5. Various types of sensor switches are available.

# Clamping cylinder

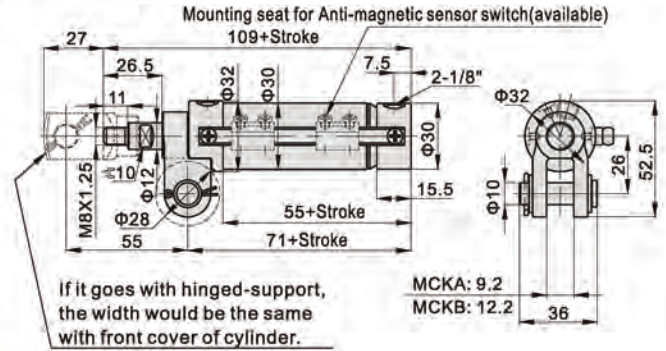
## MCK Series

### Dimensions

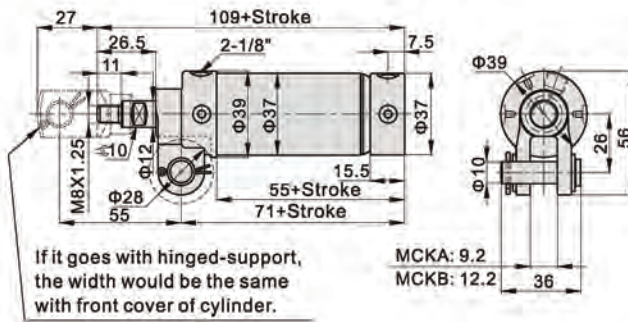
#### Φ25(Without magnet)



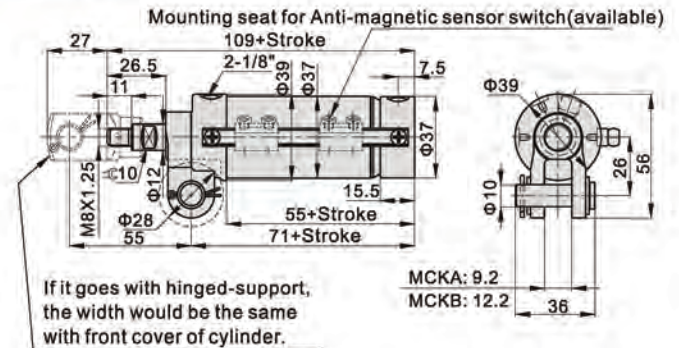
#### Φ25(With magnet)



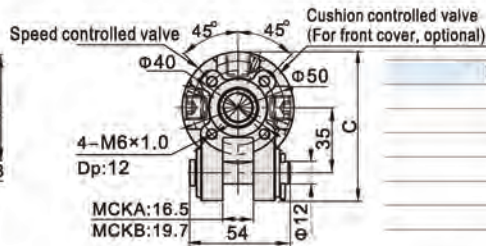
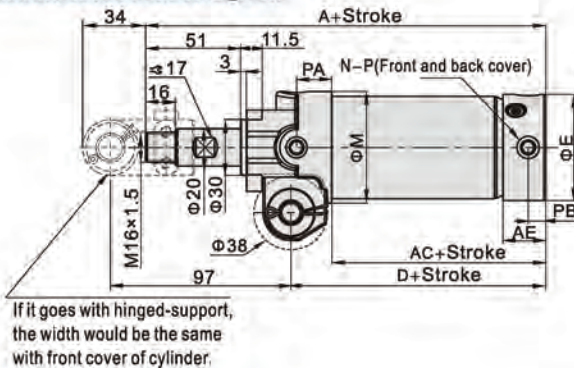
#### Φ32(Without magnet)



#### Φ32(With magnet)

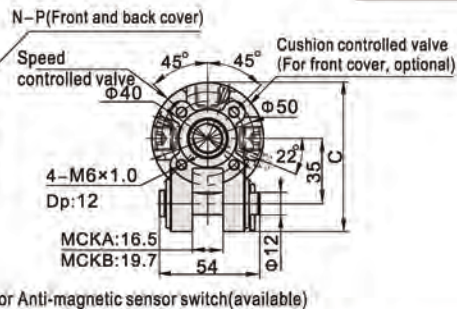
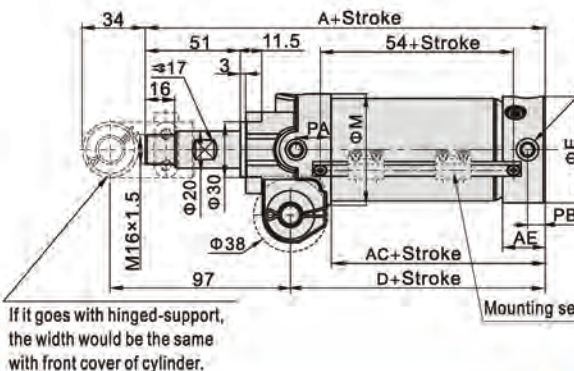


#### Φ40/50/63(Without magnet)



Item\Bore size		40	50	63
A		162	165	167
AC		59	65	67
AE		20	22	23
C		76	80	87
D		84	87	89
E		47	57	70
M		52	60	74
N (Number of hole)	Variable cushion for back and front cover	6	6	6
	Variable cushion for back cover	2	2	2
P(Inlet and out let port)		1/4"		
	PA	20	19	19
	PB	9	9.5	9.5

#### Φ40/50/63(With magnet)

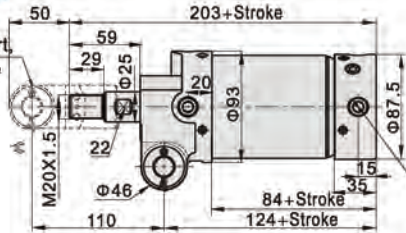


# Clamping cylinder

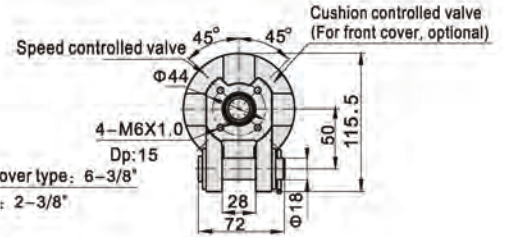
## MCK Series

### Φ80(Without magnet)

If it goes with hinged-support, the width would be the same with front cover of cylinder.

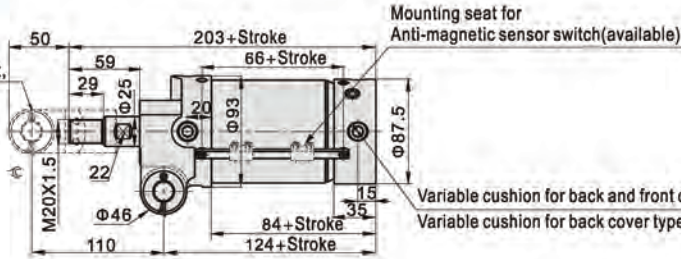


Variable cushion for back and front cover type: 6-3/8"  
Variable cushion for back cover type: 2-3/8"

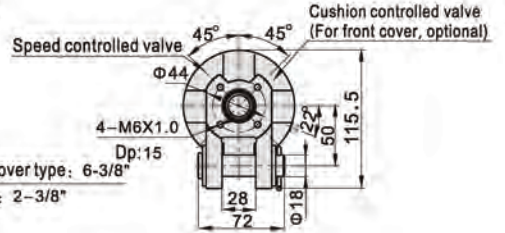


### Φ80(With magnet)

If it goes with hinged-support, the width would be the same with front cover of cylinder.

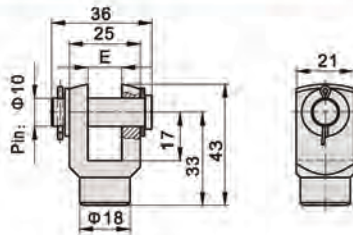


Variable cushion for back and front cover type: 6-3/8"  
Variable cushion for back cover type: 2-3/8"



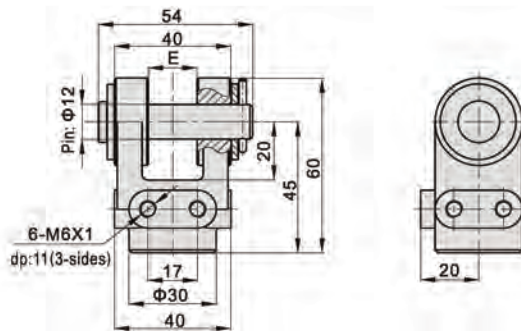
## Specifications and ordering codes of Y knuckle

### Φ25/32



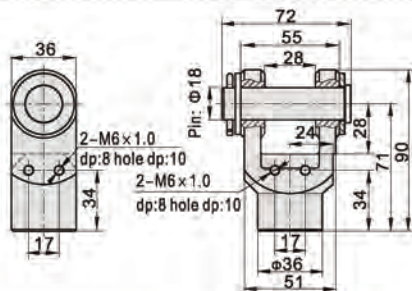
Model	Ordering code	Applicable bore size	E
MCKA	MCKA25-YW	25\32	9
MCKB	MCKB25-YW	25\32	12

### Φ40/50/63



Model	Ordering code	Applicable bore size	E
MCKA	MCKA50-Y	40\50\63	16.5
MCKB	MCKB50-Y	40\50\63	19.5

### Φ80



Model	Ordering code	Applicable bore size
MCK	MCK80-Y	80

# Clamping cylinder

## Sensor switch—DS1-69AM Series



### Feature

DS1-69AM series are anti-magnetic sensor switch, which are for AC magnetic environment.

### Ordering code

#### DS1-69AM

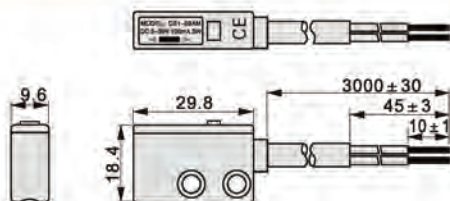
① ②

① Number of sensor switch	② Code
	69AM: Anti-magnetic sensor switch (AC resistant welder)

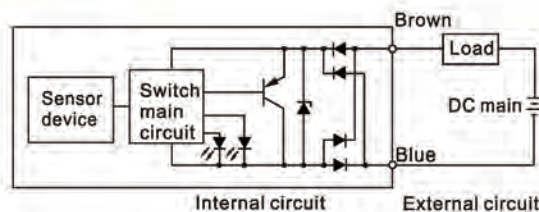
### Specification

Item\Type	DS1-69AM
Switch logic	Transistor without contact, normally opened type
Sensor type	Transistor, two-line, nonpolarity
Operating voltage (V)	10~30V/DC
Max. Switching current	100mA Max.
Switching Rating (W)	3W Max.
Anti-magnetic current	AC 17000A
Voltage drop	4.8V Max. @100mA DC
Leakage current	0.6mA Max. @30V DC
Min. working current	3mA Min.
Indicator	Stable range:Green LED ; Non-table range:Red LED
Cable	Φ5.3/0.5SQ × 2C × 3m/oil resistant, Flame retarded, flexion/gravy PVC
Sensitivity	30~40 Gauss
Max. Frequency	8Hz
Temperature range	-10~70°C
Shock	50m/s <sup>2</sup>
Vibration	9m/s <sup>2</sup>
Protection	IP 67(EN60529)
Protection circuit	Transistor without contact, surge suppression
Fire retardant grade	UL94-V0

### Dimensions



### Wiring diagram

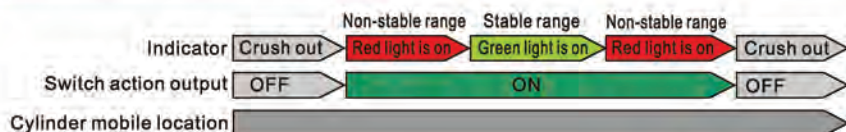


### Mounting

In powerful magnetic field, sensor switch for high-magnet shall be matched, and the anti-magnetic bracket (F-MCK40H for MCK series or F-AQK50H for AQK50 Series) must be ordered separately, the ordering code, dimensions and the mounting method are below:

Ordering code	Dimensions	Mounting
F-MCK40H (For MCK Series)		
F-AQK50H (For AQK50 Series)		

### Indicator action illustration





# Power clamp cylinder—JCK Series

## Compendium of JCK Series

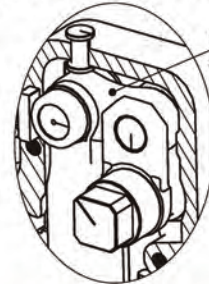
### 4 Arm styles are available

4 Arm styles AM1, AM2, AM3 and AM4 each with 3 specifications R, C and L for uses in different situations.

### Rod-crank-slider structure

Rod-crank-slider structure made of high-strength, highly-wear-resisting material is adopted.

- a) Stable and reliable structure which can produce large clamping force at low working pressure.
- b) Self-lock mechanism is adopted at clamping position which can still provide clamping force even after compressed air is off.



Rod-crank-slider structure

### 4 sides are to be mounted

With dimensions subject to DIN standard.

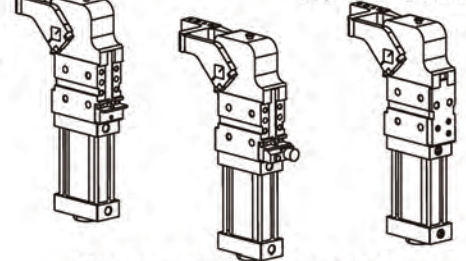
### Designed as a whole

Mechanism and cylinder designed as a whole.

### Electrical or Air inductive approaching sensor

No sensor

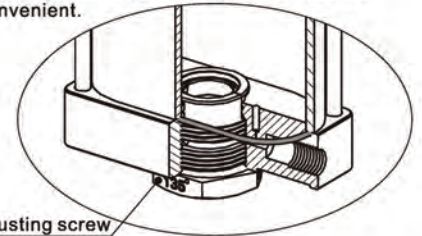
Air Inductive approaching sensor



Electrical Inductive approaching sensor (PNP/NPN type to be chosen)

### Opening angle adjustment is easy and convenient

Opening angle adjustment by changing adjusting screw is easy and convenient.



Adjusting screw

### Oval-shaped cylinder which is space efficient

## Application



# Power clamp cylinder

## JCK Series—Standard type



### Specification

Model	JCK40	JCK50	JCK63	JCK80
Output torque (0.5MPa)	120N.m	160N.m	380N.m	800N.m
Acting type	Double acting			
Fluid	Air(to be filtered by 40 μm filter element)			
Operating pressure	0.3~0.8MPa(43~116psi)			
Proof pressure	1.2MPa(175psi)			
Temperature	-10~60 °C			
Opening angle	15°/30°/45°/60°/75°/90°/105°/120°/135°			
Minimum opening and closure time	1 second clamping, 1 second opening			
Position sensing	Electrical or air Inductive approaching sensor			
Cushion type	Air buffer			
Weight (135°) [Note1]	2.2kg	4.0kg	5.5kg	13.0kg
Port size [Note2]	1/8"		1/4"	

[Note1] This weight includes 15mm offset clamping arm;

[Note2] PT thread, G thread are available.

### Ordering code

JCK □ 63 × 135 AM1R K □

① ② ③ ④ ⑤ ⑥ ⑦

①Model	②Clamping arm position	③Bore size	④Opening angle	⑤Clamping arm [Note2]	⑥Sensor switch[Note3]	⑦Thread type
JCK: Power clamp cylinder (Double acting)	Blank: horizontal 	40(circular)	15 30 45 60 75 90 105 120 135 [Note1]	Blank: No clamping arm	Blank: No sensor switch	Blank: PT G: G
	V: Vertical 			AM1: Offset 15mm 		
				AM3: Offset 45mm 		
				Blank: No clamping arm	K: With electrical sensor switch(PNP)	
				AM1: Offset 15mm 	KN: With electrical sensor switch(NPN)	
				AM3: Offset 45mm 	KA: With air sensor switch	
				AM2: Offset 15mm 		
				AM4: Offset 45mm 		

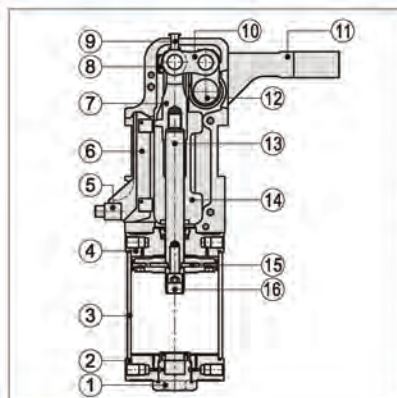
[Note1] Please refer to the right table for details of max. opening angle.

[Note2] Please refer to the drawing for detailed dimensions of clamping arm.

[Note3] K/KA type sensor switch can be ordered separately and please refer to relative contents.

KA type sensor switch can't be ordered separately and 80 size no KA type.

### Inner structure and material of major parts



NO.	Item	Material
1	Adjusting screw	Free machining steel
2	Back cover	Aluminum alloy
3	Aluminum barrel	Aluminum alloy
4	Front cover	Aluminum alloy
5	Sensor switch	
6	Sensor switch fix	Plastic
7	Y knuckle	Alloy steel
8	Strengthen steel plate	Alloy steel
9	Retaining pin	Carbon steel
10	Connecting rod	Alloy steel
11	Clamping arm	Cast steel
12	Pivot	Alloy steel
13	Piston rod	Carbon steel
14	End cap	Aluminum alloy
15	Piston	NBR
16	Cushion body	Aluminum alloy

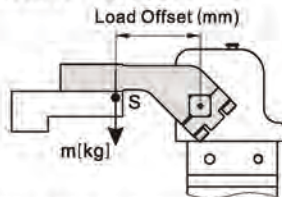
Bore size	Arm position	Arm type	Maximum opening angle
40	horizontal	AM1	135°
		AM3	105°
	Vertical(V)	AM1	120°
		AM3	105°
50 63 80	horizontal	AM1, AM3 AM2, AM4	135°
	Vertical(V)	AM1, AM3 AM2, AM4	105°

# Power clamp cylinder

## JCK Series—Standard type

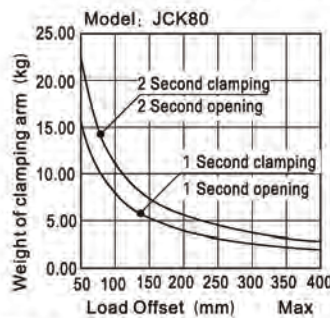
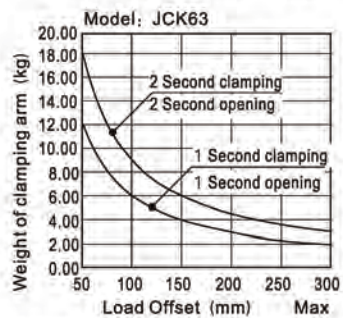
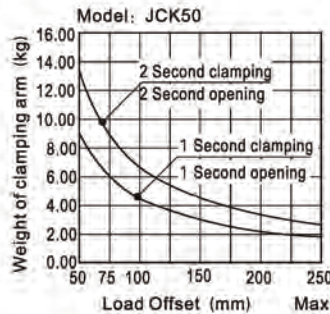
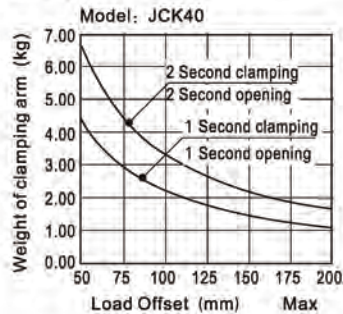
### How to select product

1. Please design appropriate fixture according to "Allowable Arm Load-Load Offset curve" diagram.



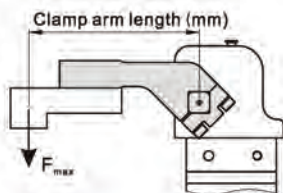
Bore size	Maximum load torque	
	1 second period	2 second period
40	2.2Nm	3.3Nm
50	4.5Nm	6.7Nm
63	6.0Nm	9.0Nm
80	8.0Nm	11.2Nm

S: distance from pivot point to center of mass of clamping arm  
m: weight of clamping arm



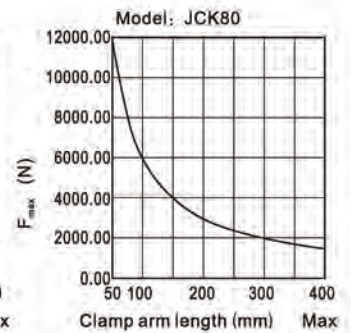
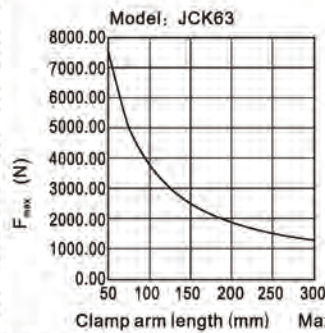
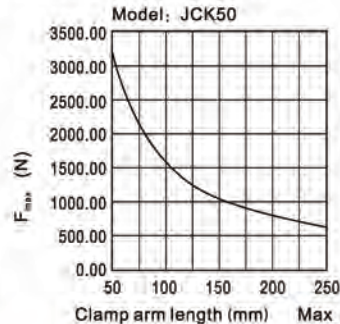
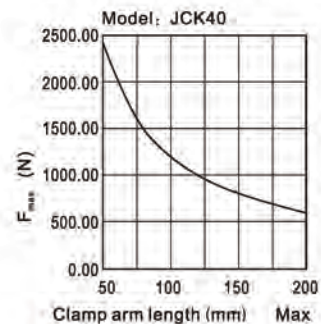
Attention: Please use with speed control valve.

2. Please choose appropriate clamping position according to "Torque-Clamping Arm Length curve" diagram. Note: For clamping force is produced by elbow mechanism, maximum torque is only reached at final clamping arm position.



Bore size	Maximum holder torque
40	380Nm
50	800Nm
63	1500Nm
80	2500Nm

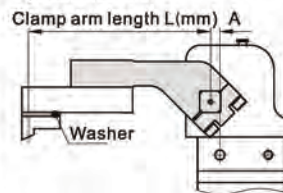
Bore size	Maximum clamp torque					
	0.3MPa	0.4MPa	0.5MPa	0.6MPa	0.7MPa	0.8MPa
40	72Nm	95Nm	120Nm	143Nm	167Nm	191Nm
50	99Nm	132Nm	165Nm	198Nm	230Nm	264Nm
63	230Nm	307Nm	384Nm	460Nm	537Nm	614Nm
80	482Nm	643Nm	803Nm	964Nm	1124Nm	1285Nm



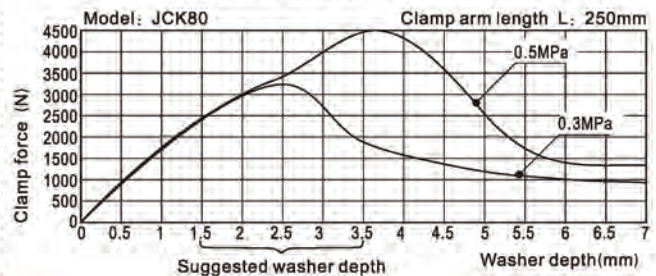
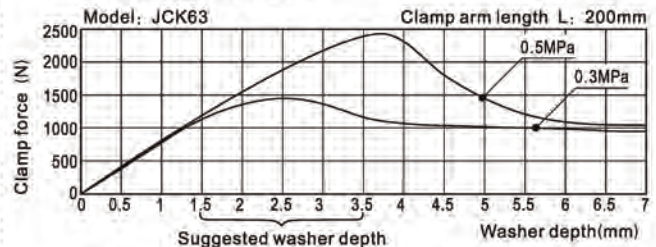
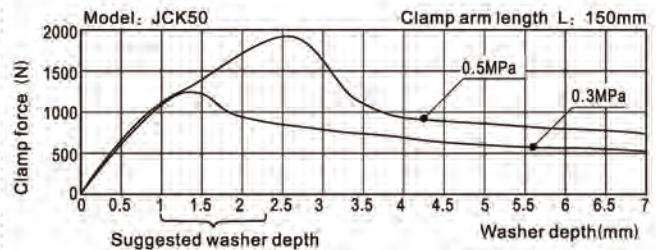
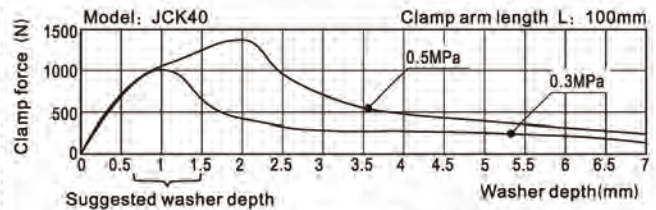
3. Please choose appropriate washer according to "Torque-Spacer thickness curve" diagram.

Note: Inserted washer exceeding maximum clamping torque position may lead to self-lock failure. Take safety issue into account when considering thickness of spacer inserted.

Besides, clamping arm length L represents distance from pivot point to clamping position. For distance from mounting base locating hole to pivot A, please refer to the following table.



Bore size	A(mm)
40	12
50	10
63	10
80	15

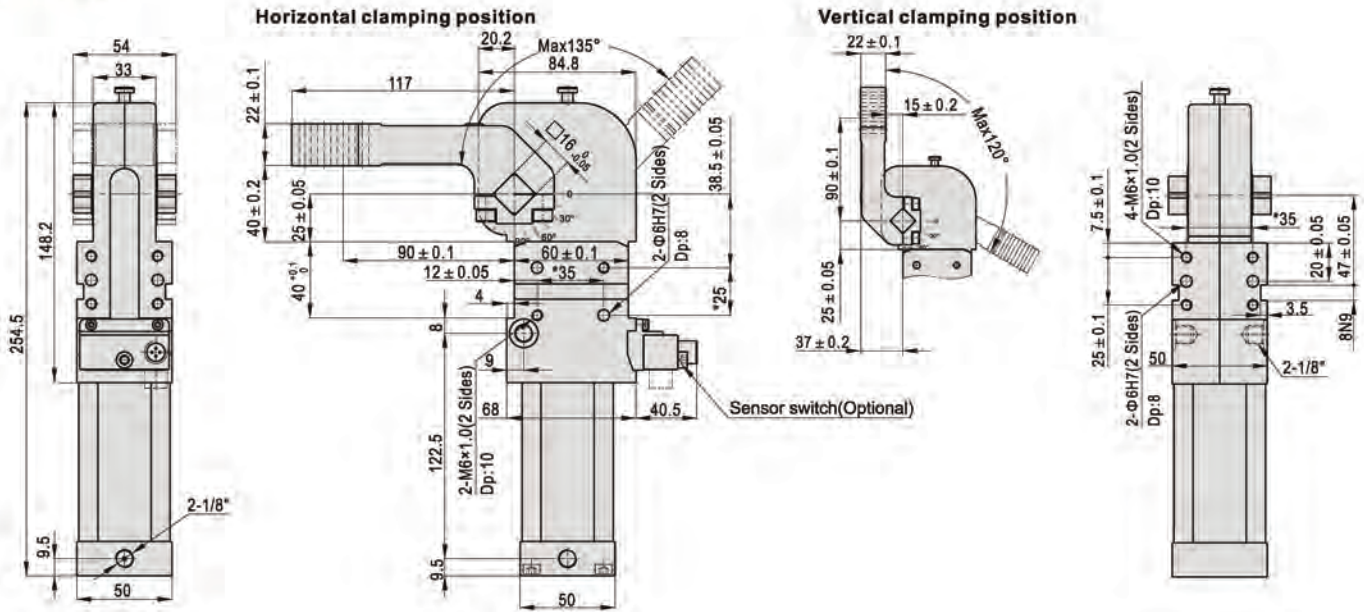


# Power clamp cylinder

## JCK Series — Standard type

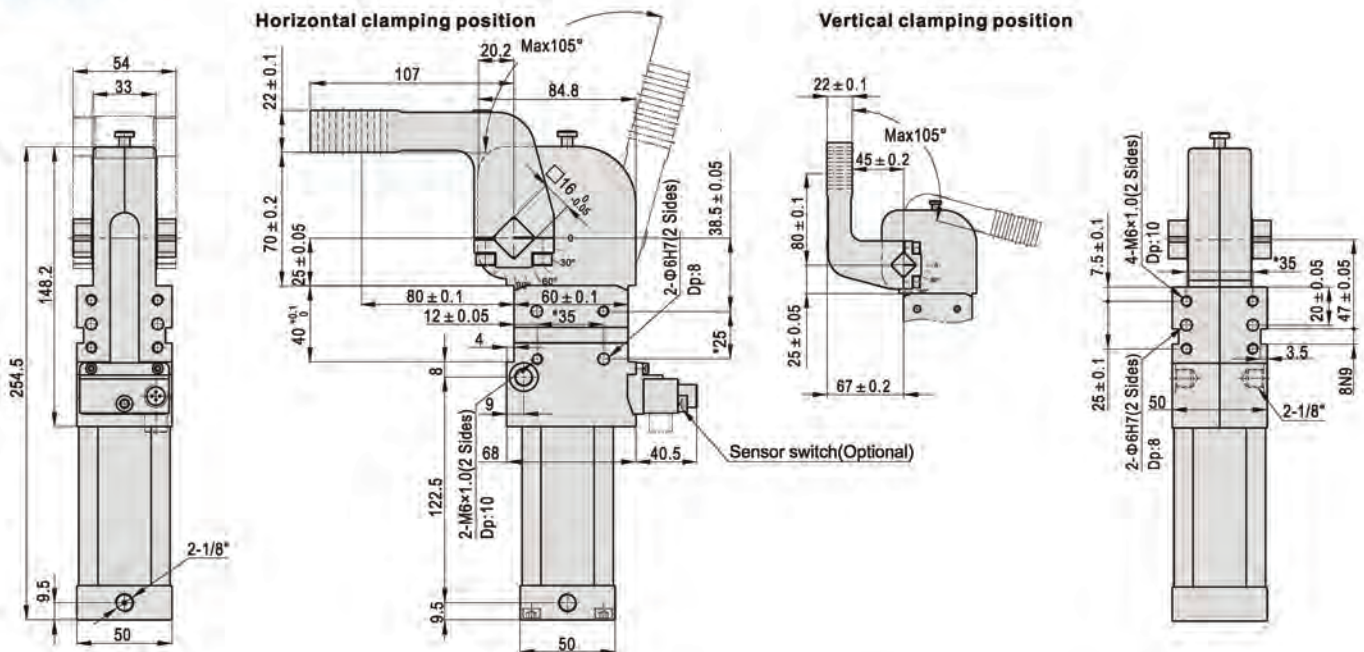
### Dimensions

#### JCK40AM1



With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

#### JCK40AM3

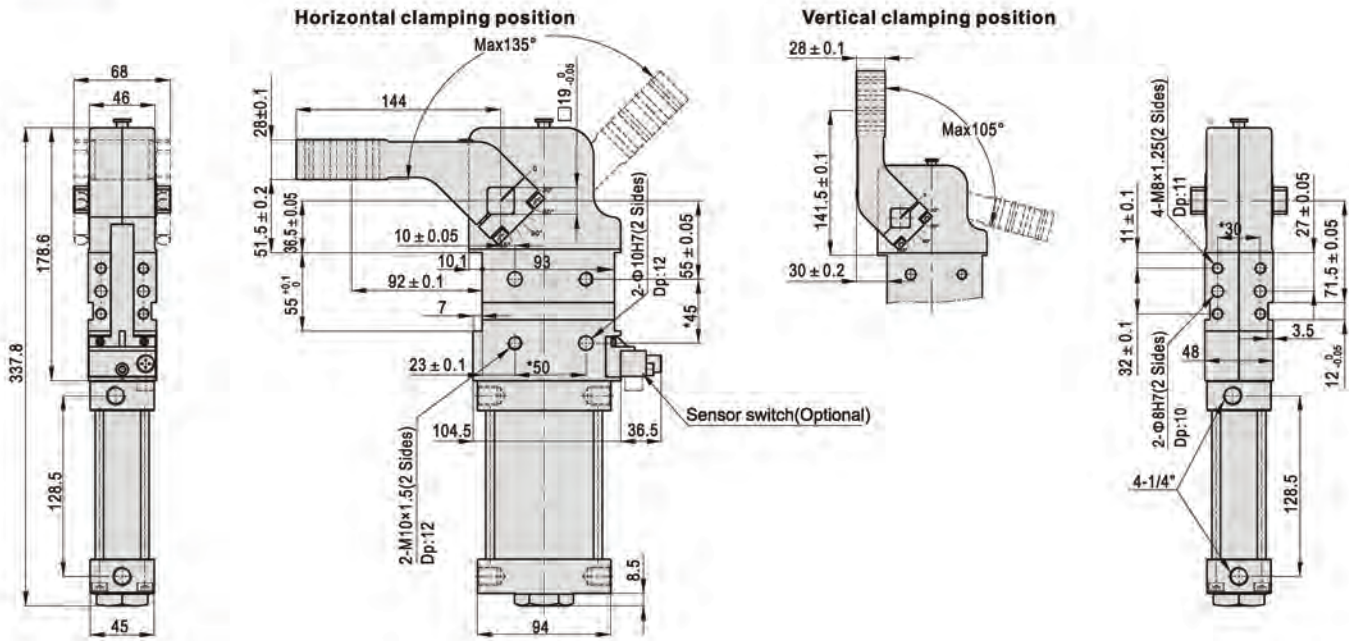


With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

# Power clamp cylinder

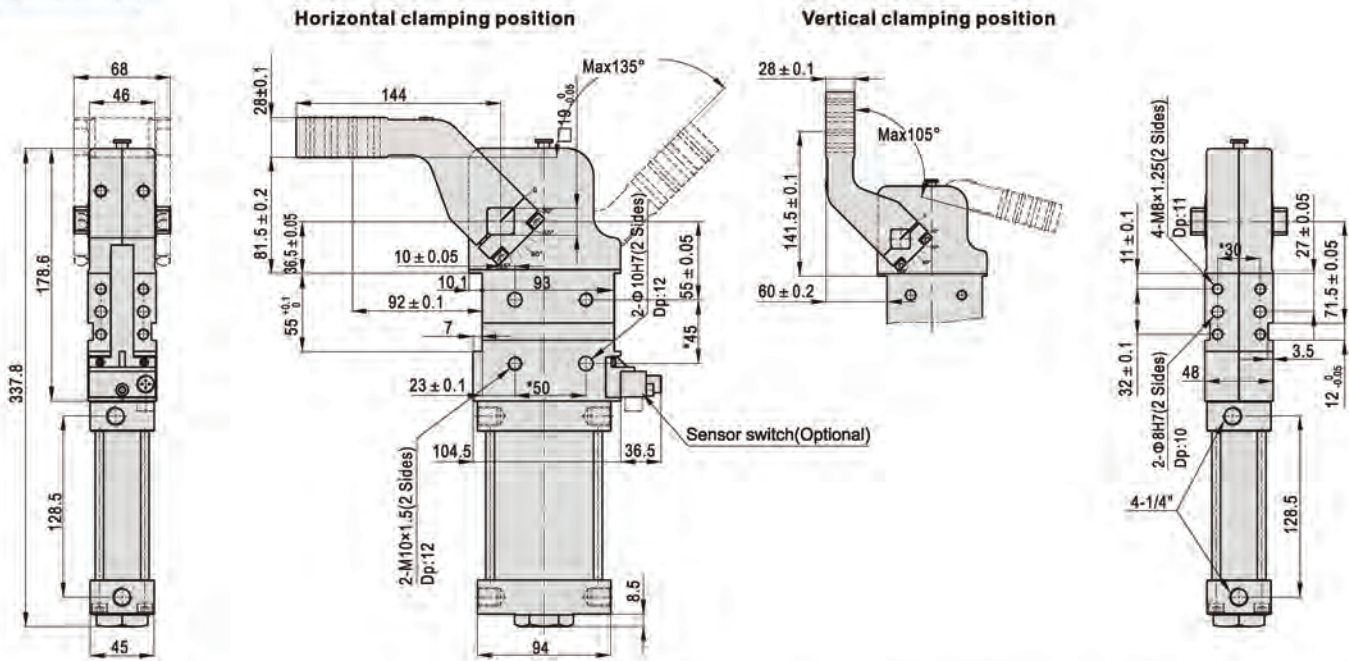
## JCK Series — Standard type

### JCK50AM1(2)



With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

### JCK50AM3(4)

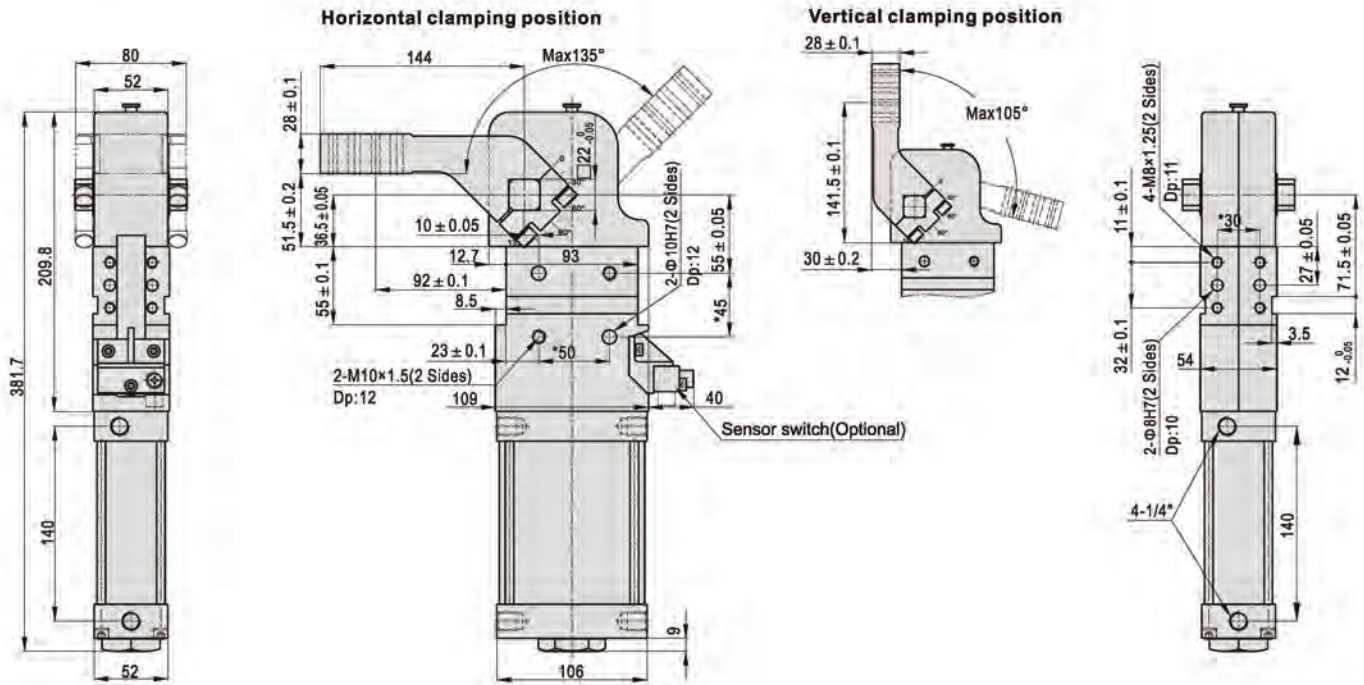


With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

# Power clamp cylinder

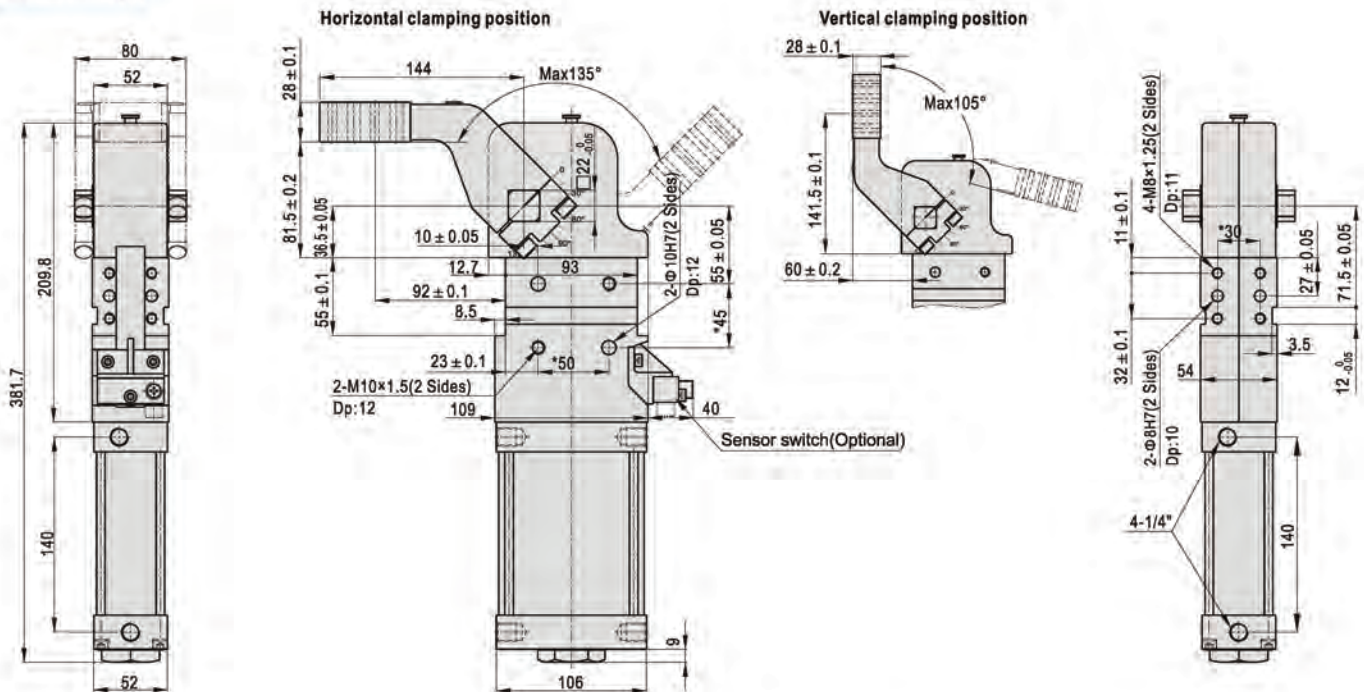
## JCK Series — Standard type

### JCK63AM1(2)



With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

### JCK63AM3(4)

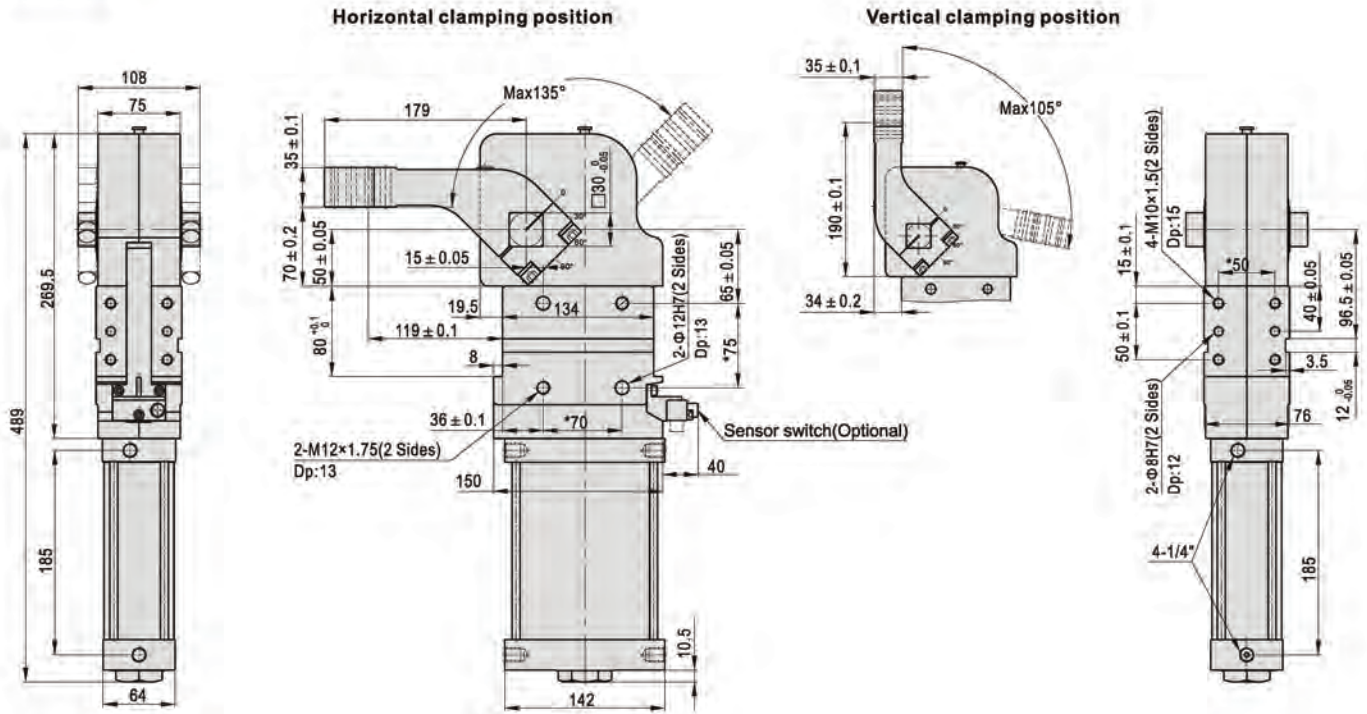


With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

# Power clamp cylinder

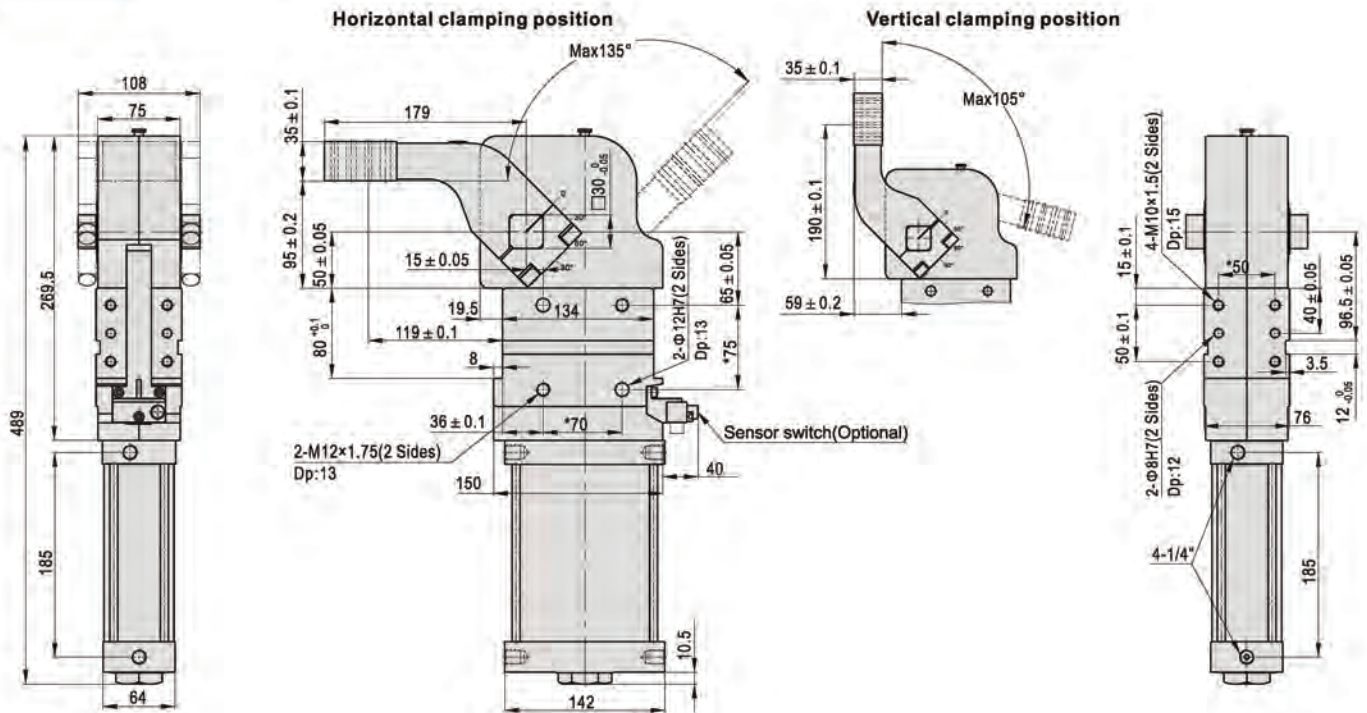
## JCK Series—Standard type

### JCK80AM1(2)



With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

### JCK80AM3(4)



With \* dimension: pin hole position tolerance: ±0.02. Thread hole position tolerance: ±0.1.

# Power clamp cylinder

## JCK Series—Air Inductive approaching sensor type



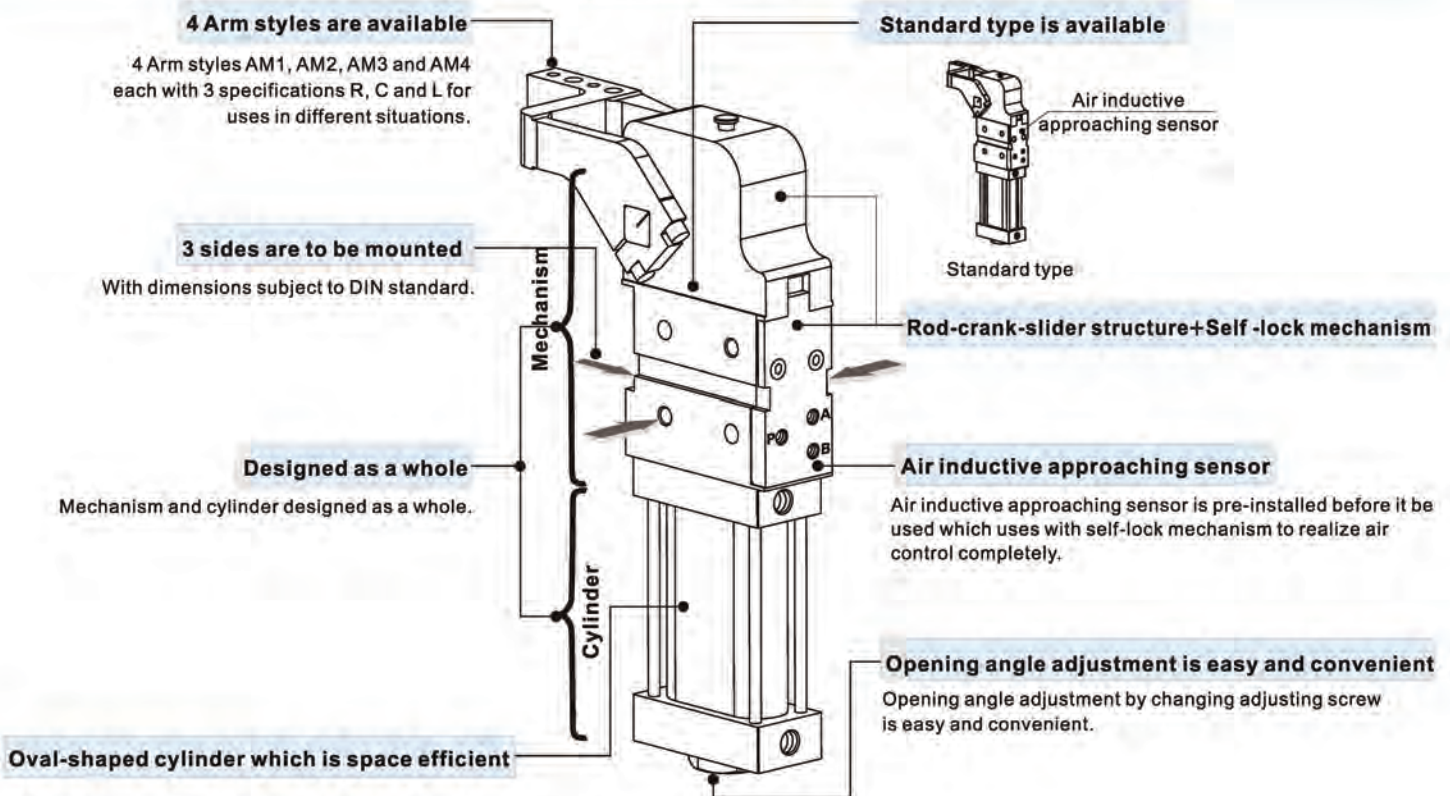
### Specification

Model	JCK40□KA	JCK50□KA	JCK63□KA
Output torque (0.5MPa)	120N.m	160N.m	380N.m
Acting type	Double acting		
Fluid	Air(to be filtered by 40 μm filter element)		
Operating pressure	0.3~0.8MPa(43~116psi)		
Proof pressure	1.2MPa(175psi)		
Temperature	-10~60 °C		
Opening angle	15°/30°/45°/60°/75°/90°/105°/120°/135°		
Minimum opening and closure time	1 second clamping, 1 second opening		
Position sensing	Air Inductive approaching sensor		
Cushion type	Air buffer		
Weight (135°) [Note1]	2.2kg	4.0kg	5.5kg
Port size [Note2]	1/8"		1/4"

[Note1] This weight includes 15mm offset clamping arm;

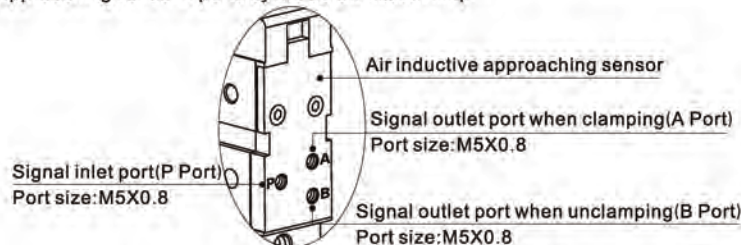
[Note2] PT thread, G thread are available.

### Compendium of JCK(Air inductive approaching sensor type) Series



### Installation and application

1. Can be mounted from three sides.
2. Air inductive approaching sensor is obturated completely which avoid dust and splashed welding slag breaking cylinders.
3. Adapt to air control loop's equipment. Main signal export to self-lock mechanism to check clamp or unclamp's position by air pressure signal.
4. Please connect air inductive approaching sensor's ports by the below sketch map.



# Power clamp cylinder

## JCK Series—Clamp arm and Adjusting screw



### How to select clamp arm and adjusting screw

Accessories\Cylinder type		JCK40	JCK50	JCK63	JCK80
Adjusting screw	F-JCK□□X15LM	●	●	●	●
	F-JCK□□X45LM	●	●	●	●
	F-JCK□□X75LM	●	●	●	●
	F-JCK□□X105LM	●	●	●	●
	F-JCK□□X135LM	●	●	●	●
Clamp arm	F-JCK□□AM1R	●	●	●	●
	F-JCK□□AM1C	●	●	●	●
	F-JCK□□AM1L	●	●	●	●
	F-JCK□□AM2R	●	●	●	●
	F-JCK□□AM2C	●	●	●	●
	F-JCK□□AM3R	●	●	●	●
	F-JCK□□AM3C	●	●	●	●
	F-JCK□□AM3L	●	●	●	●
	F-JCK□□AM4R	●	●	●	●
	F-JCK□□AM4C	●	●	●	●
	F-JCK□□AM4L	●	●	●	●

### Adjusting screw ordering code

F-JCK 63X135 LM


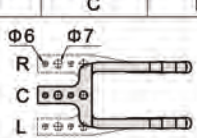

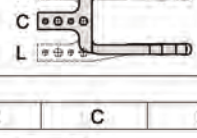
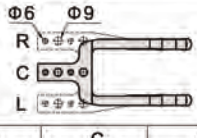

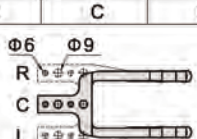

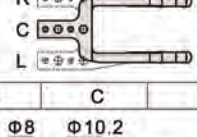

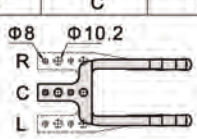


① ② ③ ④ ⑤

①Accessory code	②Cylinder type	③Bore size	④Adjusting angle	⑤Adjusting screw code
	JCK: Power clamp cylinder (Double acting)	40: $\Phi$ 40mm 50: $\Phi$ 50mm 63: $\Phi$ 64mm 80: $\Phi$ 80mm	15: 15° 30: 30° 45: 45° 60: 60° 75: 75° 90: 90° 105: 105° 120: 120° 135: 135°	LM: Adjusting screw

### Clamp arm ordering code

F-JCK 63 AM1C

① ② ③ ④

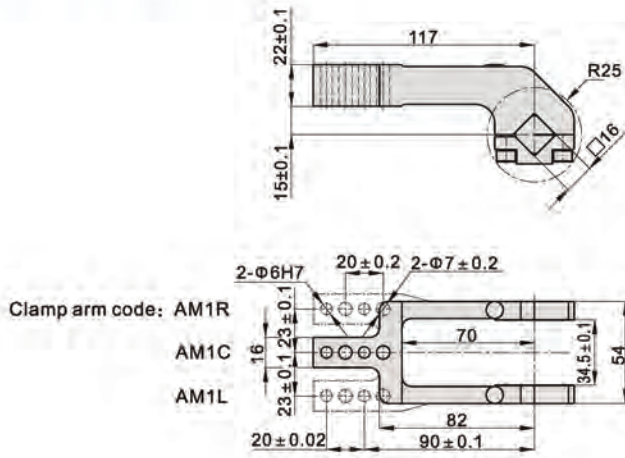
①Accessory code	②Cylinder type	③Bore size	④Clamping arm	
	JCK: Power clamp cylinder (Double acting)	40: $\Phi$ 40mm	Blank: No clamping arm	
			AM1: Offset 15mm 	R C L 
			AM3: Offset 45mm 	R C L 
			Blank: No clamping arm	R C L 
		50: $\Phi$ 50mm 63: $\Phi$ 64mm 80: $\Phi$ 80mm	AM1: Offset 15mm 	R C L 
			AM3: Offset 45mm 	R C L 
			AM2: Offset 15mm 	R C L 
			AM4: Offset 45mm 	R C L 

# Power clamp cylinder

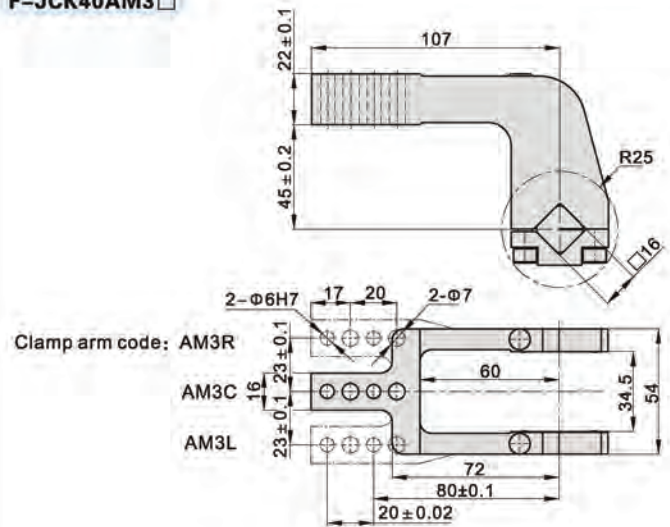
## JCK Series—Clamp arm and Adjusting screw

### Dimensions of clamp arm

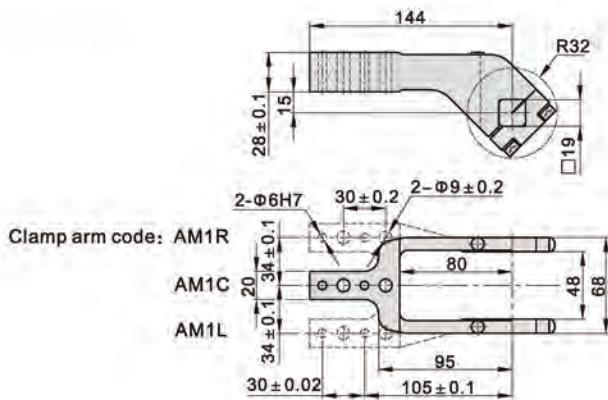
F-JCK40AM1



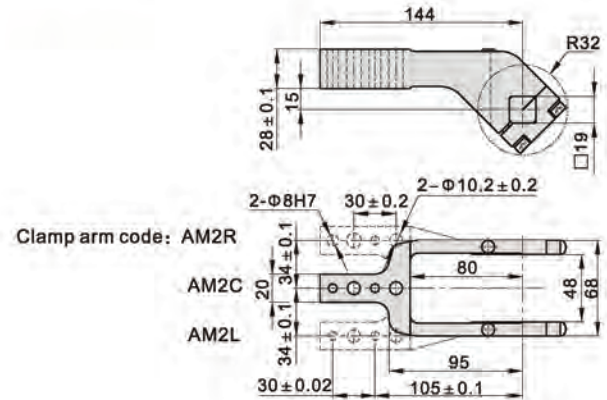
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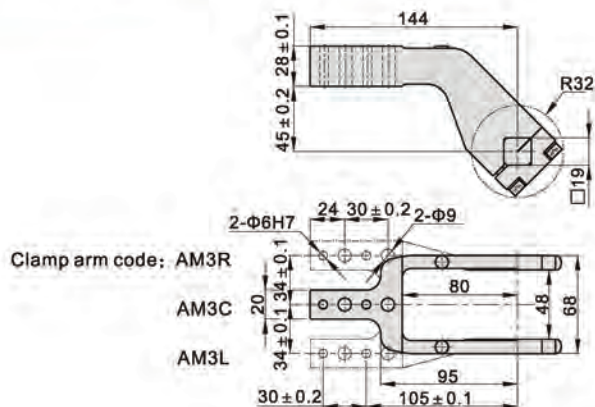
F-JCK50AM1



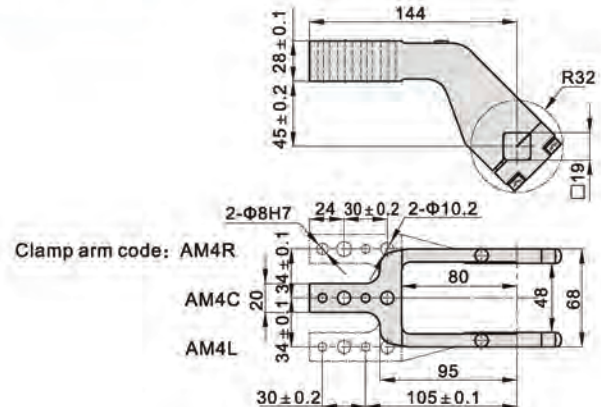
F-JCK50AM2



F-JCK50AM3



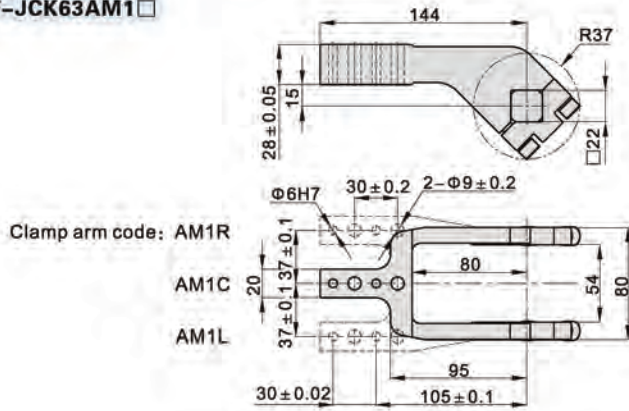
F-JCK50AM4



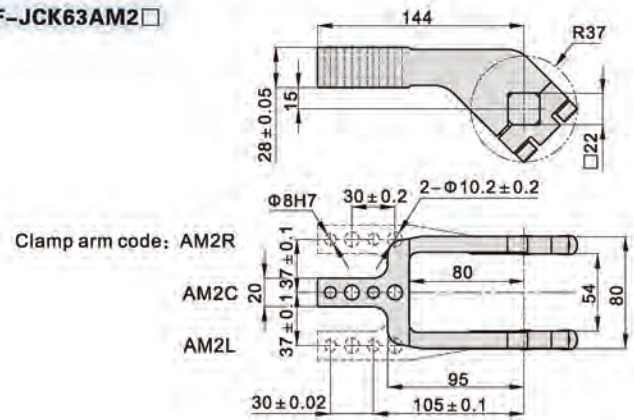
# Power clamp cylinder

## JCK Series — Clamp arm and Adjusting screw

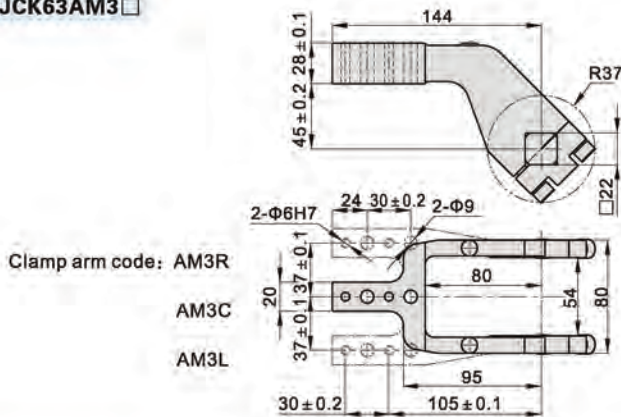
F-JCK63AM1 □



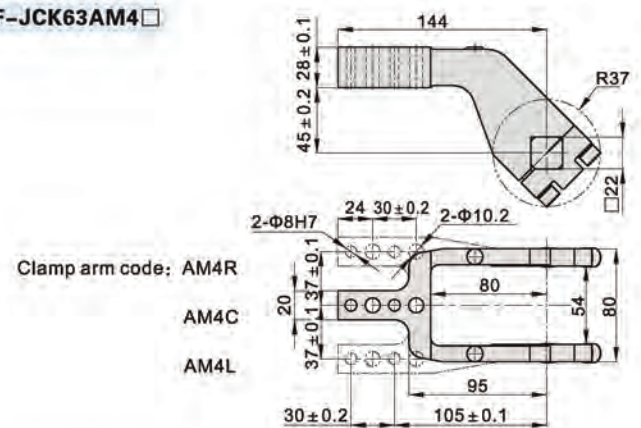
F-JCK63AM2 □



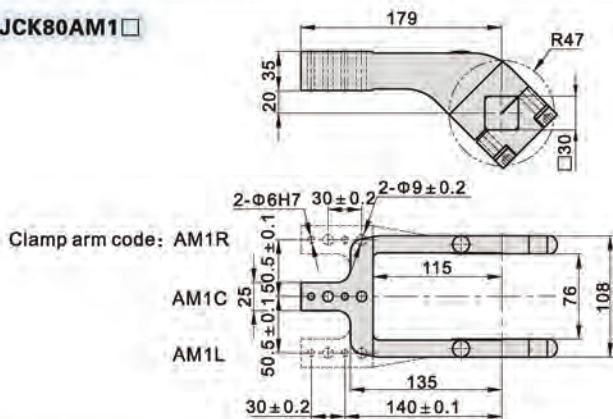
F-JCK63AM3 □



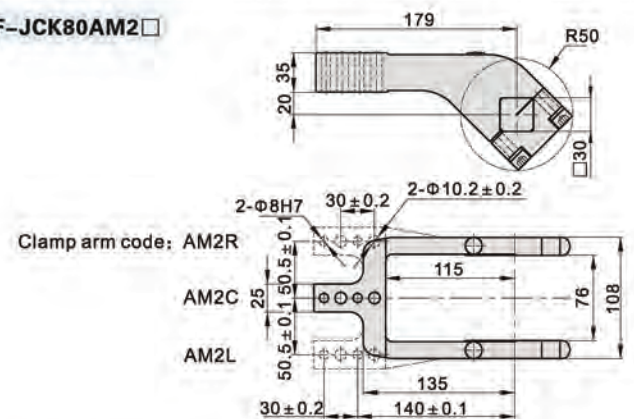
F-JCK63AM4 □



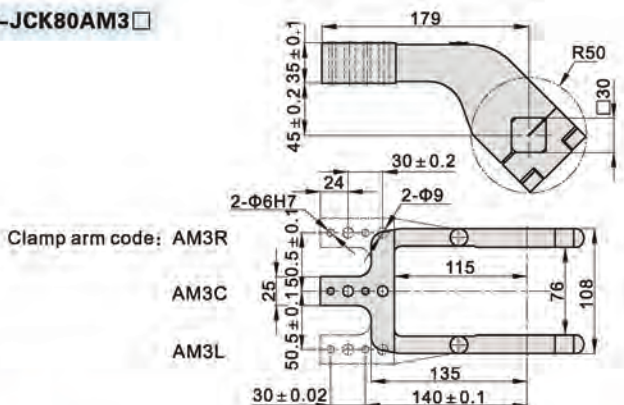
F-JCK80AM1 □



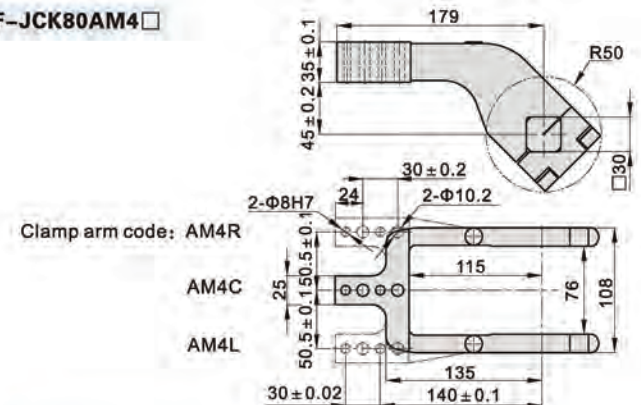
F-JCK80AM2 □



F-JCK80AM3 □



F-JCK80AM4 □



# Power clamp cylinder

## JCK Series—Sensor switch



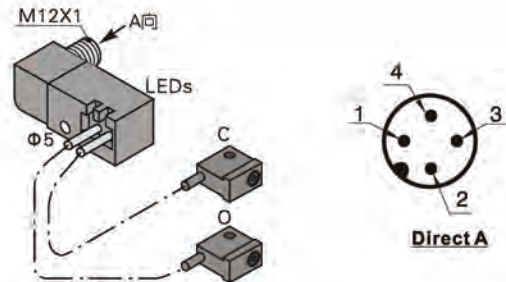
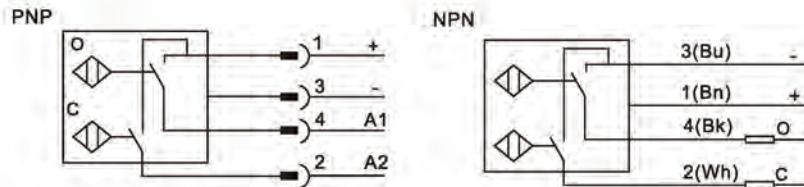
### Specification

Operating range	2mm
Voltage range	10~30V DC
Output type	N.O., PNP, NPN
Rated DC	150mA(max)
Switch frequency	30Hz
Shell material	PBT
Switch status indication	Clamping: Red Operating: Yellow
Voltage indication	Green

### Ordering code

<b>DS1 KP 63</b>		
<b>① Model</b>	<b>② Output type</b>	<b>③ Bore size</b>
DS1:	KP: PNP	63(Bore size: 40, 50, 63)
Sensor switch	KN: NPN	80(Bore size: 80)

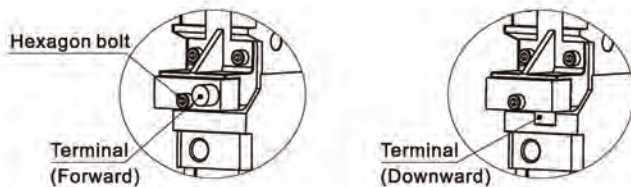
### Hookup



### Installation and application of sensor switch

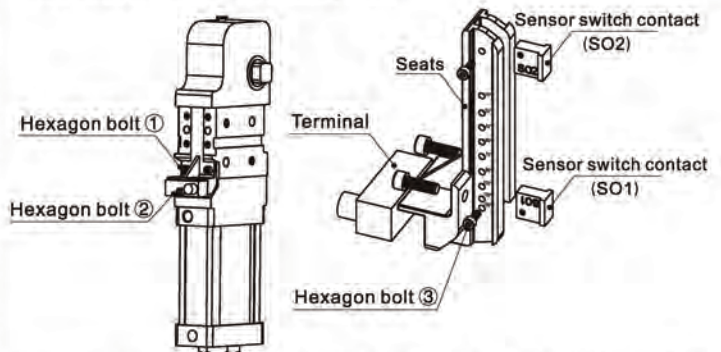
1. Sensor switch is well assembled before leaving factory which is free of adjusting. If you need to change terminals' wiring direction, change new sensor or rearrange angle, please do as follows:

1.1) Steps of changing terminals' wiring direction:



(See figure above.) Unscrew the hexagon bolt→dismount sensor's Terminal→change terminals' wiring direction as you need→remounting→screw up the hexagon bolt.

1.2) Steps of change new sensor switch:



(See figure above.) unscrew two hexagon bolts ①→dismount sensor seats as a whole→unscrew two hexagon bolts ③→dismount two sensor switch contacts(SO1\SO2)→unscrew hexagon bolt ②→remove the sensor switch→choose new sensor switch→replace new sensor switch contact and screw up hexagon bolt ②→replace new wiring box and screw up hexagon bolt ①→finished.

Recommended lock torque of hexagon bolt is listed in the following table:

Ecommended lock torque of hexagon bolt ①		Ecommended lock torque of hexagon bolt ②		Ecommended lock torque of hexagon bolt ③		
Bore size	Hexagon bolt type	Lock torque(N.m)	Hexagon bolt type	Lock torque(N.m)	Hexagon bolt type	Lock torque(N.m)
40, 50	M3×0.5	1.2~1.5	M5×0.8	4.0~5.0	M3×0.5	1.2~1.5
63, 80	M5×0.8	4.0~5.0				

1.3) Steps of readjusting angle: For more details, see latter contents.

1.4) Sensor switch's connection:

Sensor switch's connection need to use relevant male connector, which have separate male connector, and with wire male connector to be choosed.

The ordering code as below:

<b>Name: On end cable(3 meters length)</b>	<b>Name: L shape cable(3 meters length)</b>	<b>Name: On end connector(rotundity)</b>	<b>Name: L shape connector (rotundity)</b>
Ordering code: X-F-PPVCS	Ordering code: X-F-PPVCL	Ordering code: X-F-PPVCV	Ordering code: X-F-PPVCH

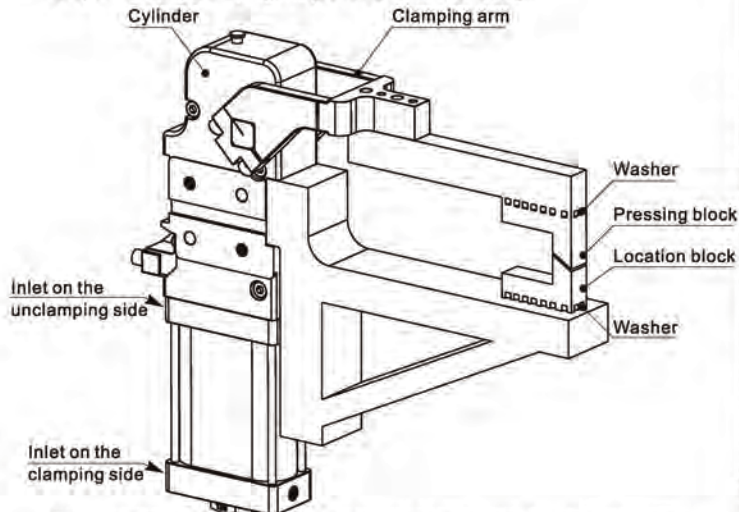


## JCK Series

### Installation and application

1. Mount the cylinder at desired place with bolts and locating pin after choosing a mounting surface. Connect the cylinder and control valve with joint and rubber hose. To adjust the opening and closure speed, our pneumatic power welding clamp is equipped with return stroke air buffering. Buffering cannot function well if the clamping arm is over-weighted so that clamping arm's weight must be within the allowable limit;
2. Using clamping arm beyond the listed in this catalog is forbidden.
3. Workpiece mounting method:

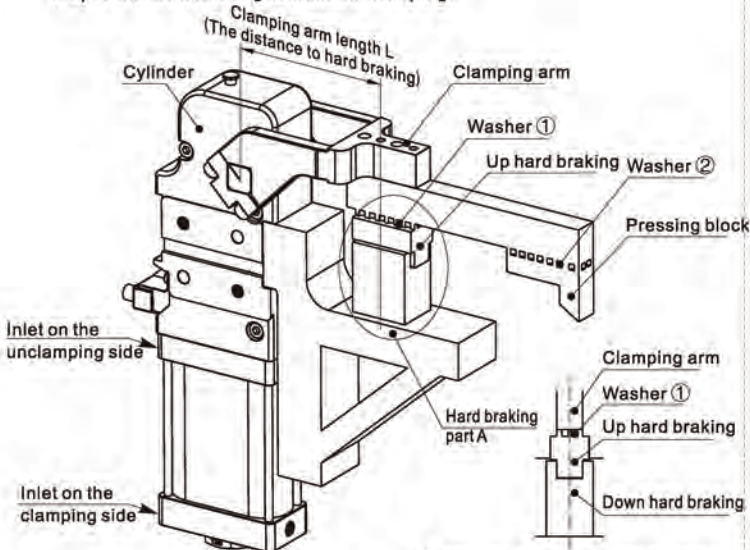
3.1) When only clamping torque is used for clamping:



Please follow the steps to mount the workpiece onto the clamping arm:

- A) Clamping the arm: supply compressed air through the inlet on the clamping side to keep the arm and pressing block at the closure position simultaneously. Make sure the arm is locked up.
- B) Adjusting the clamping gap: adjust the spacer under the mentioned state to make the pressing block in line with the workpiece's thickness. (At this moment no clamping torque is produced theoretically.)
- C) Applying clamping torque: Insert the spacer furthermore under the mentioned state until the gap is smaller than the workpiece's thickness and desired clamping torque is produced. (Make sure the mechanism passes the dead position to produce self-locking i.e. the retaining pin is pushed out.)

3.2) When hard braking is used for clamping:



Detail drawing of hard braking part A

Please follow the steps to mount the workpiece onto the clamping arm:

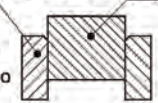
- A) clamping the arm: supply compressed air through the inlet on the closure side to keep the arm and the braking block at the clamping position simultaneously. Make sure the arm is locked up;

- B) Adjusting the clamping gap: Adjust washer ① under the mentioned state until the gap between the upside braking block and downside one. (At this moment no clamping torque is produced theoretically.)
- C) Applying clamping torque: insert the washer ① furthermore under the mentioned state to produce desired clamping torque. (Make sure the mechanism passes the dead position to produce self-locking i.e. the retaining pin is pushed out.)
- D) Adjust washer ② under the state mentioned in C to make the pressing block in contact with the workpiece.

Side guide plate Clamping arm

3.3) When side guide plate is mounted:

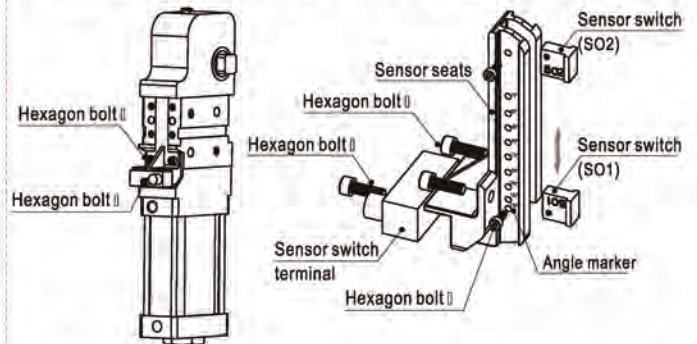
Side guide plate is mounted on the clamping arm to prevent transverse movement and make sure that no transverse load is applied and that the arm would not be stuck.



4. Angle adjusting method:

Standard adjusting angle range of the pneumatic clamp is 15°~135°. Opening angle can be changed via changing cylinder's stroke distance or the sensor's position;

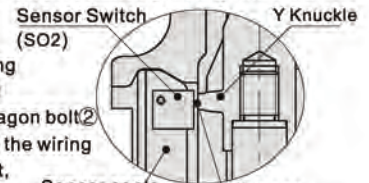
4.1) Step 1 of adjusting angle--change of sensor's position:



- A) Unscrew hexagon bolt ① with inner hexagon wrench to take out the sensor seats;
- B) Unscrew hexagon bolt ③ with inner hexagon wrench to take out sensor SO1 and align it to your desired angle indication position and re-screw up hexagon bolt ③. (Note: when mounting sensor SO1, the number "SO1" should point downward except 15°.)
- C) After the sensor's position is adjusted, replace the sensor seats by screwing up hexagon bolt ① with inner hexagon wrench (lock-up torque by related contents).

Note: 1) sensor SO2 controls the cylinder's end stroke position and its mounting position is well set when leaving factory and is not changeable.

- 2) the sensor wiring box is provided with two outgoing orientations: forward and downward. Unscrew hexagon bolt ② and then you can change the wiring box orientation. After that, screw up hexagon bolt ②.
- 3) When remounting the sensor fix to its original position, the gap between the sensor and Y-knuckle should be less than 1.5mm. Otherwise, the sensor may not function well.



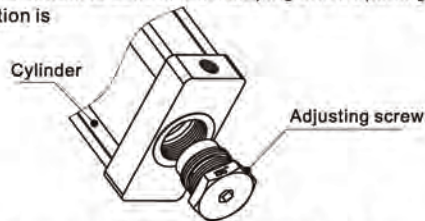
4.2) Step 2 of adjusting angle--change of the cylinder's stroke distance: The relation between the opening angle of clamping arm and cylinder's stroke distance is listed as follows:

Opening angle\Type	JCK40	JCK50	JCK63	JCK80
15°	20.2	21.8	23.1	36.1
30°	28.1	30.2	33.4	50.5
45°	34.8	37.5	41.6	62.7
60°	41.4	44.6	49.7	74.5
75°	48.0	51.8	57.5	86.3
90°	54.8	59.2	65.7	98.1
105°	61.5	66.4	73.8	109.6
120°	67.4	72.7	81.0	119.5
135°	71.6	77.3	86.2	126.4

## JCK Series

During actual operation, the cylinder's stroke can be changed by changing the adjusting screw at the bottom to control the clamping arm's opening angle. Detailed description is

as follows:



- A) Unscrew original adjusting screw with inner hexagon wrench
- B) Choose suitable adjusting screw according to actual need (the bottom is marked with corresponding opening angle).
- C) Screw up new adjusting screw into the cylinder's end cap.

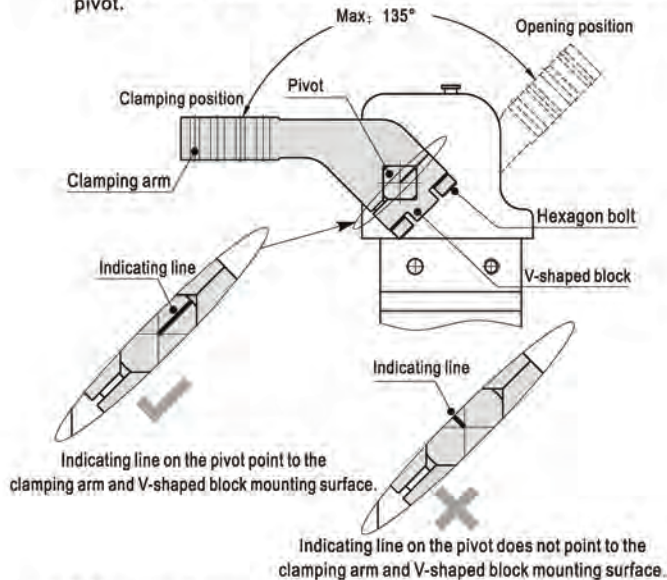
### 5. Mounting clamping arm:

The clamping arm is already mounted when leaving factory which can be remounted by yourself horizontally or vertically according to your actual need.

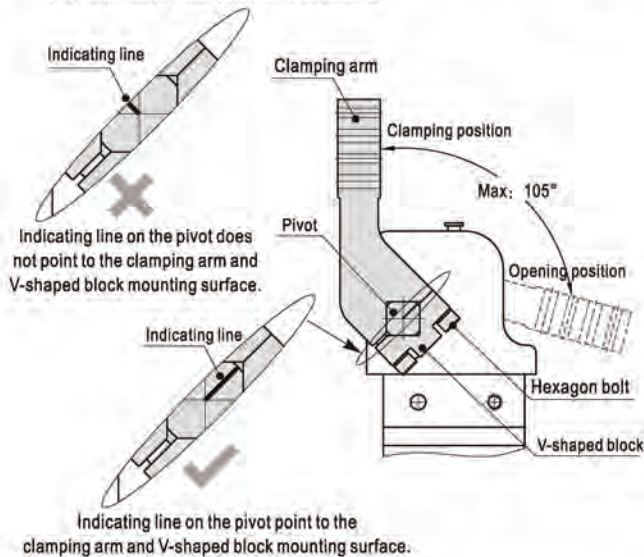
#### 5.1) Mounting clamping arm horizontally:

Unscrew 4 hexagon bolts on both sides of the clamping arm to remove V-shaped block and then the clamping arm for substituting your desired one.

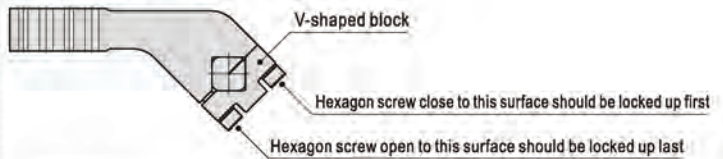
When mounting, please note the direction of the indicating line on the pivot.



#### 5.2) Mounting clamping arm vertically:



#### 5.3) V-shaped block mounting:



#### 5.4) Holding torque of clamping arm (recommended):

When holding clamping arm, please choose recommended value in the following list:

Bore size	Bolt type	Holding torque (N.m)
40	M6 × 1.0	13.8
50	M6 × 1.0	13.8
63	M8 × 1.25	33.0
80	M10 × 1.5	66.0

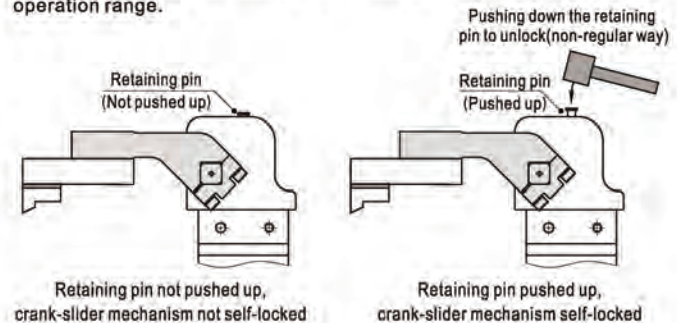
#### 6. Self-lock function:

At the end of stroke, the crank-slider mechanism passes the dead point and gets self-locked up. The retaining pin gets pushed up at this moment. Even when compressed air is off, the cylinder can remain at closure state for safety. To open self-locking of the crank-slider mechanism, push down the retaining pin when compressed air is off.

#### Warning:

Pushing down the retaining pin may cause clamping arm to spring off at closure state.

So when using the pin, please get yourself away from the clamping arm's operation range.



## I Knuckle



### Ordering code

**F-M16X150 I**



①Accessories code	②Screw thread	③Thread pitch	④Code
	M3: M3	050: 0.5mm	I: I Knuckle
	M4: M4	070: 0.7mm	
	M5: M5	080: 0.8mm	
	M6: M6	100: 1.0mm	
	M8: M8		
	M10: M10	125: 1.25mm	
	M12: M12		
	M14: M14		
	M16: M16		
	M18: M18		
	M20: M20	150: 1.5mm	
	M22: M22		
	M26: M26		
	M27: M27		
	M36: M36	200: 2.0mm	
	M42: M42		

### Table for I knuckle and cylinder

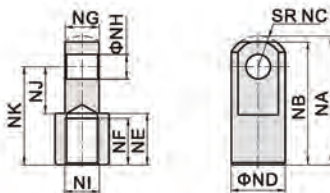
Cylinder Accessory	SE						SAI									
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125I	●							●								
F-M12X125I		●							●							
F-M16X150I			●	●						●	●					
F-M20X150I					●	●						●	●			
F-M27X200I							●							●		
F-M36X200I															●	●

Cylinder Accessory	SGC				SC/SAU				SC				JSI								
	125	160	200	250	32	40	50	63	80	100	125	160	200	250	32	40	50	63	80	100	125
F-M10X125I																					
F-M12X125I																					
F-M14X150I																					
F-M16X150I																					
F-M18X150I																					
F-M20X150I																					
F-M22X150I																					
F-M26X150I																					
F-M27X200I																					
F-M36X200I																					
F-M42X200I																					

Cylinder Accessory	MI				MPG								
	8	10	12	16	20	25	32	40	6	8	10	12	16
F-M3X050I													
F-M4X070I	●	●											
F-M5X080I													
F-M6X100I													
F-M8X125I													
F-M10X125I													
F-M12X125I													

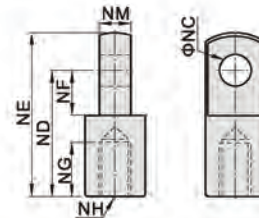
### Dimensions

#### M14\M18\M22\M26



Type\Item	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NI
F-M14X150I	52.5	50	12.5	22	21	19	13.8	10	19	40	M14×1.5
F-M18X150I	66.5	64	16.5	28	27	24	19.8	14	24	50	M18×1.5
F-M22X150I	83.5	80	23.5	40	29	26	29.8	22	34	60	M22×1.5
F-M26X150I	83.5	80	23.5	40	29	26	29.8	22	34	60	M26×1.5

#### Others



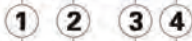
Type\Item	NC	ND	NE	NF	NG	NH	NM
F-M3x050I	3	12	15.5	5	5	M3×0.5	3
F-M4x070I	4	16	21	6.8	8	M4×0.7	4
F-M5x080I	5	25	32	14.1	7.5	M5×0.8	6.3
F-M6x100I	6	21	28	8.5	8	M6×1.0	6
F-M8x125I	8	30	40	11	15	M8×1.25	8
F-M10x125I	10	40	50	15	20	M10×1.25	10
F-M12x125I	12	48	62	24	20	M12×1.25	12
F-M16x150I	16	64	82	32	23	M16×1.5	16
F-M20x150I	20	80	102	40	30	M20×1.5	20
F-M27x200I	30	110	139	51	45	M27×2.0	30
F-M36x200I	35	144	181	65	55	M36×2.0	35
F-M42x200I	40	168	211	85	62	M42×2.0	40

## Y Knuckle



### Ordering code

F-M16X150 Y



①Accessories code	②Screw thread	③Thread pitch	④Code
	M3: M3	050: 0.5mm	
	M4: M4	070: 0.7mm	
	M5: M5	080: 0.8mm	
	M6: M6	100: 1.0mm	
	M8: M8		
	M10: M10	125: 1.25mm	
	M12: M12		
	M14: M14		
	M16: M16		
	M18: M18		
	M20: M20	150: 1.5mm	
	M22: M22		
	M26: M26		
	M27: M27		
	M36: M36	200: 2.0mm	
	M42: M42		

Y:Y Knuckle

Table for Y knuckle and cylinder

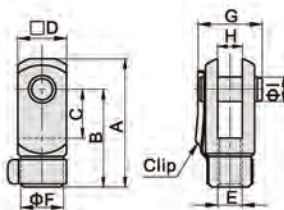
Cylinder Accessory	SE						SAI									
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125Y	●							●								
F-M12X125Y		●							●							
F-M16X150Y			●	●						●	●					
F-M20X150Y					●	●						●	●			
F-M27X200Y							●							●		
F-M36X200Y															●	
F-M36X200Y																●

Cylinder Accessory	SGC				SC/SAU				SC				JSI								
	125	160	200	250	32	40	50	63	80	100	125	160	200	250	32	40	50	63	80	100	125
F-M10X125Y						●										●					
F-M12X125Y							●														
F-M14X150Y								●													
F-M16X150Y									●	●											
F-M18X150Y																					
F-M20X150Y																					
F-M22X150Y																					
F-M26X150Y																					
F-M27X200Y																					
F-M36X200Y																					
F-M42X200Y																					

Cylinder Accessory	MI						MPG						
	8	10	12	16	20	25	32	40	6	8	10	12	16
F-M3X050Y													
F-M4X070Y	●	●									●	●	
F-M5X080Y												●	●
F-M6X100Y				●	●								
F-M8X125Y						●							
F-M10X125Y							●	●					
F-M12X125Y								●					

### Dimensions

#### M10 and below

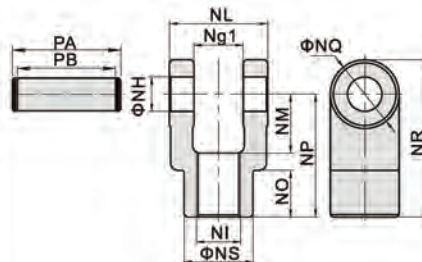


Type/Item	A	B	C	D	F
F-M3X050Y	15.5	12	5	6	6
F-M4X070Y	22	16	8	8	7
F-M5X080Y	28	21	10.2	12	10
F-M6X100Y	32	24	12	12	10
F-M8X125Y	42	32	16	16	14
F-M10X125Y	52	40	20	19	18

Type/Item	E	G	H	I
F-M3X050Y	M3×0.5	9	3	3
F-M4X070Y	M4×0.7	11.5	4	4
F-M5X080Y	M5×0.8	15.5	6.5	5
F-M6X100Y	M6×1.0	16	6	6
F-M8X125Y	M8×1.25	21	8	8
F-M10X125Y	M10×1.25	25	10	10

#### M14\M18\M22\M26

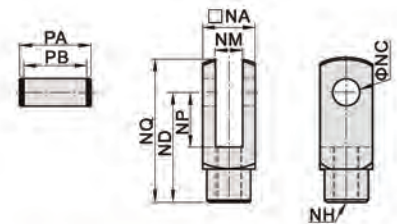


Type/Item	NG1	NH	NI	NL	NM
F-M14X150Y	14.2	10	M14×1.5	27.8	19
F-M18X150Y	20.2	14	M18×1.5	39.8	24
F-M22X150Y	30.2	22	M22×1.5	59.8	34
F-M26X150Y	30.2	22	M26×1.5	59.8	34

Type/Item	NO	NP	NQ	NR	NS	PA	PB
F-M14X150Y	17	40	22	51	22	34.6	28.8
F-M18X150Y	19	50	28	64	28	47	40.8
F-M22X150Y	20	65	40	85	40	69.2	60.8
F-M26X150Y	20	65	40	85	40	69.2	60.8

#### Others



Type/Item	NA	NC	ND	NP	NQ
F-M12X125Y	25.4	12	48	24	62
F-M16X150Y	32	16	64	32	80
F-M20X150Y	44.4	20	80	40	102
F-M27X200Y	54	30	110	55	139
F-M36X200Y	70	35	144	73	179
F-M42X200Y	85	40	168	86	211

Type/Item	NM	NH	PA	PB
F-M12X125Y	12	M12×1.25	32.4	26.2
F-M16X150Y	16	M16×1.5	39	32.8
F-M20X150Y	20	M20×1.5	53.4	45.2
F-M27X200Y	30	M27×2.0	64.2	54.8
F-M36X200Y	35	M36×2.0	80.2	70.8
F-M42X200Y	40.3	M42×2.0	115	93



## Universal Joint



### Ordering code

**F-M10X125 U**



①Accessories code	②Screw thread	③Thread pitch	④Code
	M4: M4	070: 0.7mm	U: Universal joint
	M5: M5	080: 0.8mm	
	M6: M6	100: 1.0mm	
	M8: M8		
	M10: M10	125: 1.25mm	
	M12: M12		
	M14: M14		
	M16: M16		
	M18: M18	150: 1.5mm	
	M20: M20		
	M26: M26		
	M27: M27	200: 2.0mm	
	M36: M36		

### Table for universal joint and cylinder

Cylinder Accessory	SE						SAI						SAI/SC			
	32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200
F-M10X125U	●							●								
F-M12X125U		●							●							
F-M16X150U			●	●						●	●					
F-M20X150U					●	●						●	●			
F-M27X200U							●							●		
F-M36X200U															●	●

Cylinder Accessory	SGC				SC/SAU						JSI						
	125	160	200	250	32	40	50	63	80	100	32	40	50	63	80	100	125
F-M10X125U																	
F-M12X125U																	
F-M14X150U																	
F-M16X150U																	
F-M18X150U																	
F-M20X150U																	
F-M26X150U																	
F-M27X200U																	
F-M36X200U																	

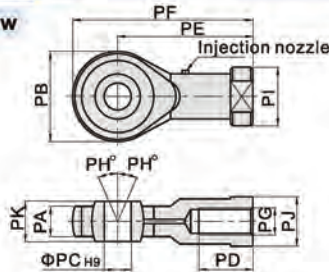
Cylinder Accessory	ACQ									
	12	16	20	25	32	40	50	63	80	100
F-M5X080U	●									
F-M6X100U		●								
F-M8X125U			●							
F-M10X125U				●						
F-M12X125U					●	●				
F-M14X150U							●	●		
F-M16X150U									●	
F-M18X150U										●
F-M20X150U										
F-M26X150U										

Cylinder Accessory	MA				MF				MBL								
	16	20	25	32	40	50	63	20	25	32	40	20	25	32	40	50	63
F-M6X100U	●																
F-M8X125U		●															
F-M10X125U			●	●													
F-M12X125U					●												
F-M14X150U						●	●										

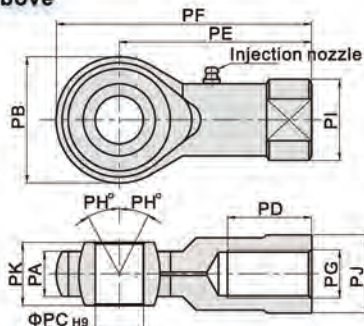
Cylinder Accessory	PB				MI								
	4	6	10	12	16	8	10	12	16	20	25	32	40
F-M4X070U													
F-M5X080U													
F-M6X100U													
F-M8X125U													
F-M10X125U													
F-M12X125U													

### Dimensions

#### M8 and below



#### M10 and above



Type/Item	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK
F-M4X070U	6	18	5	10	27	36	M4×0.7	13	12.5	10	8
F-M5X080U	6	18	5	10	27	36	M5×0.8	13	12.5	10	8
F-M6X100U	6.8	20	6	12	30	40	M6×1.0	13	13	11	9
F-M8X125U	9	24	8	16	36	48	M8×1.25	13	16	14	12
F-M10X125U	11	26	10	20	43	56	M10×1.25	13	19	17	14
F-M12X125U	12	32	12	22	50	66	M12×1.25	13	22	19	16
F-M14X150U	14	36	14	28	57	75	M14×1.5	13	25	22	19
F-M16X150U	15	40	16	28	64	84	M16×1.5	15	27	22	21
F-M18X150U	16.5	46	18	30	71	94	M18×1.5	15	31	27	23
F-M20X150U	18	46	20	33	77	100	M20×1.5	15	34	30	25
F-M26X150U	22	60	25	48	94	124	M26×1.5	15	42	36	31
F-M27X200U	25	70	30	51	110	145	M27×2.0	15	50	41	37
F-M36X200U	27.5	80	35	56	125	165	M36×2.0	15	57.5	50	43



## Compendium of DMS\CMS Series

**Two types of sensors**

DMS: Solid State Sensor (Gray)	DMS: Waterproof type of Solid State Sensor (Yellow)
CMS: Reed Sensor (Blue)	CMS: Heat resistant of Reed Sensor (Red)

**Vibration resistance, impact resistance**

**Six types of cross section**

<b>G Type</b>	
<b>GS Type</b> [Note1]	
<b>H Type</b>	
<b>HS Type</b> [Note2]	
<b>E Type</b>	
<b>J Type</b>	

**Bending resistance**

**SR: bending resistance**

**Two kinds of accessories**

DMSG/CMSG, Each size of the cylinder has its corresponding accessory.

DMSG / CMSG	F-MQ□
	<b>F-SC□SH</b>

[Note1] GS type is the mini type of G type, and it can be used for short stroke cylinder.  
 [Note2] HS type is the mini type of H type, and it can be used for short stroke cylinder.

### DMS Specifications

Item	DMS		
	2-wire	NPN	PNP
Power supply voltage	10V ~ 28V DC	5V ~ 30V DC	
Switching current	2.5mA ~ 100mA	30V/200mA Max.	
Contact capacity	2.8W Max.	6.0W Max.	
Current consumption	3mA Max.	5mA Max.	
Internal voltage drop	2.7V Max.	0.7V Max.	
Leakage current	0.05mA Max.	0.01mA Max.	
Switching frequency	1000Hz		
Impact resistance	50G		
Circuit protection	Reverse polarity protection Surge protection		
Operating Temp.	-10°C ~ 70°C		
Enclosure	IP64/IP68		
Standard	CE marking, RoHS		

### CMS Specifications

Item	CMS	
	General	Heat resistant
Power supply voltage	5V ~ 240V AC/DC	
Switching current	100mA	
Contact capacity	10W Max.	
Current consumption	N/A	
Internal voltage drop	2.5V Max. @100mA DC	N/A
Leakage current	N/A	
Switching frequency	200Hz	
Impact resistance	50G	
Circuit protection	N/A	
Operating Temp.	-10°C ~ 70°C	-10°C ~ 125°C
Enclosure	IP64	
Standard	CE marking, RoHS	

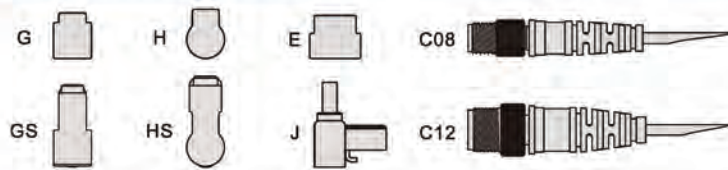


## DMS, CMS Series

### Ordering code for DMS

DMS G - □ 020 - □

① ② ③ ④ ⑤



① Model	DMS: Solid State Sensor					
② Specifications	G	GS	H	HS	E	J
③ Output type	Blank: 2 wire			N: NPN		P: PNP
④ Lead wire length	020: 2m		030: 3m	050: 5m	100: 10m	
⑤ Additional specification	C08: 150mm with M8 plug connector			C12: 150mm with M12 plug connector		
	Blank: General type			W: Waterproof type IP68 [note1]		

[Note 1] There is no waterproof type for C08 / C12 & J/GS/HS.  
The sockets of C08 and C12 need additional order. Please check on page 362.

### Ordering code for CMS

CMS G - 020 - □

① ② ③ ④

① Model	CMS: Reed Sensor					
② Specifications	G	H	E	J		
③ Lead wire length	020: 2m		030: 3m	050: 5m	100: 10m	
④ Additional specification	C08: 150mm with M8 plug connector			C12: 150mm with M12 plug connector		
	Blank: General type			H: Heat resistant [note2]		

[Note 2] There is no heat resistant type for C08 & C12.  
The sockets of C08 and C12 need additional order. Please check on page 362.

### Ordering code for accessories

F - MQ □ Cylinder Accessory

① ② ③



① Category	F: Accessory								
② Model	MQ: Cylinder Accessory								
③ Cylinder	Aluminum alloy			Aluminum alloy (Thick type)			Stainless steel		
	Code	For series	For bore size	Code	For series	For bore size	Code	For series	For bore size
	A20: Φ20mm	MCK	Φ20	A32T: Φ32mm	TWG	Φ32	S06: Φ6mm	PB/PBR MI MF MG MA/MAC	Φ6
	A25: Φ25mm		Φ25	A40T: Φ40mm		Φ40	S08: Φ8mm		Φ8
	A32: Φ32mm		Φ32	A50T: Φ50mm		Φ50	S10: Φ10mm		Φ10
	A40: Φ40mm		Φ40				S12: Φ12mm		Φ12
	A50: Φ50mm	MBL	Φ50			S16: Φ16mm	Φ16		
	A63: Φ63mm		Φ63			S20: Φ20mm	Φ20		
	A80: Φ80mm		Φ80			S25: Φ25mm	Φ25		
						S32: Φ32mm	Φ32		
					S40: Φ40mm	Φ40			
					S50: Φ50mm	Φ50			
					S63: Φ63mm	Φ63			

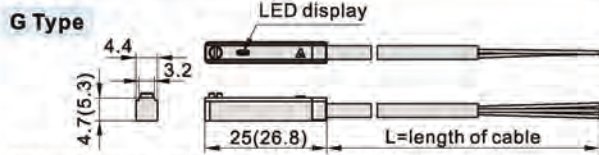
F - SC □ SH Tie Rod Cylinder Accessory

① ② ③ ④

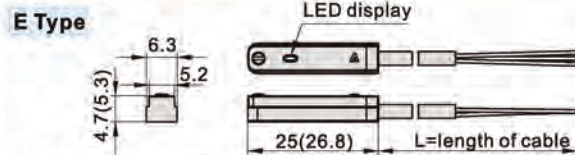


① Category	F: Accessory		
② Model	SC: Tie Rod Cylinder Accessory		
③ Cylinder	Code	For series	For bore size
	32	SC SGC	Φ32, Φ40, Φ50
	63		Φ63
	80		Φ80, Φ100
	125		Φ125
	160		Φ160, Φ200
250	Φ250		
④ Attached			

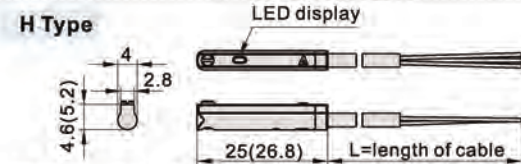
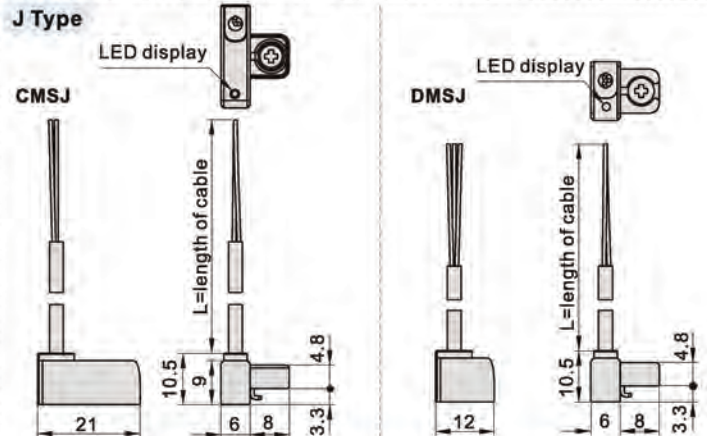
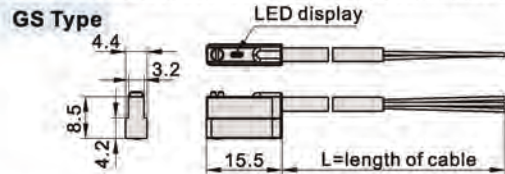
### Dimensions



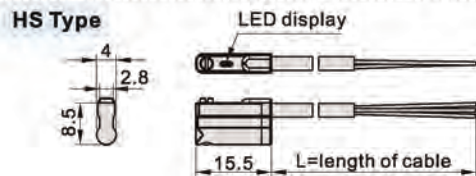
Note: a number in the bracket is the dimension of CMSG.



Note: a number in the bracket is the dimension of CMSE.



Note: a number in the bracket is the dimension of CMSH.

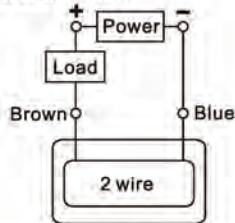


length of cable specification	length of cable(L)
020 Type	2000mm
030 Type	3000mm
050 Type	5000mm

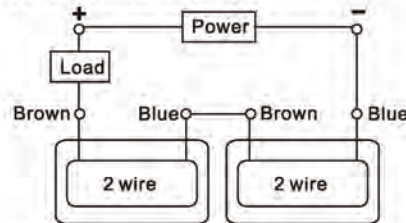
### Connection method

#### 2 wire, reed sensor connection

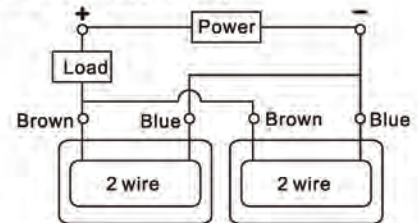
##### 1. General connection



##### 2. Series connection(And)

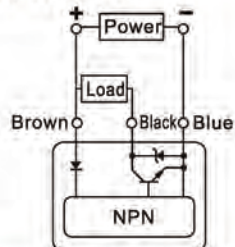


##### 3. Parallel connection(OR)



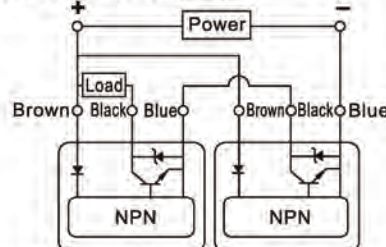
#### 3 wire, solid state NPN connection

##### 1. General connection

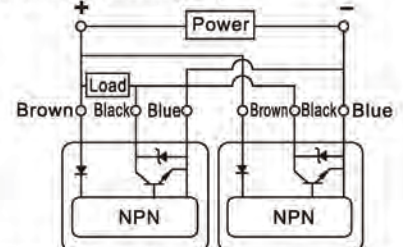


Note: The indicator lights will light up when both auto switches are turned NO.

##### 2. Series connection(And)

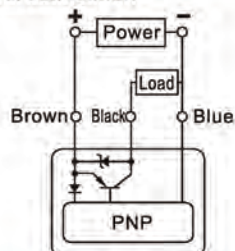


##### 3. Parallel connection(OR)



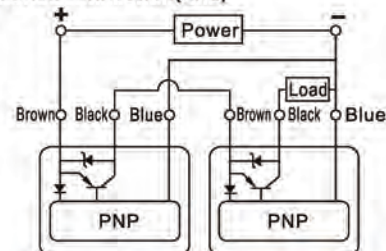
#### 3 wire, solid state PNP connection

##### 1. General connection

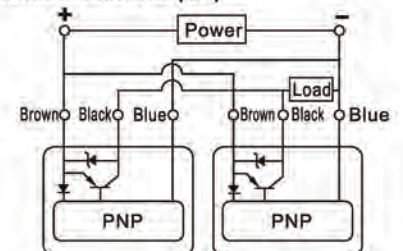


Note: The indicator lights will light up when both auto switches are turned NO.

##### 2. Series connection(And)



##### 3. Parallel connection(OR)



### The selection of sensor

DMSG(S)	CMSG	HFKL		HFKP				ACQ/TACQ												SDA															
		10	16	20	25	10	16	20	25	32	40	12	16	20	25	32	40	50	63	80	100	125	140	160	12	16	20	25	32	40	50	63	80	100	
		●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		HFK				TCL/TCM								QCK				TR																	
		10	16	20	25	32	40	6	10	12	16	20	25	32	40	50	63	80	100	12	16	20	25	32	40	50	63	6	10	16	20	25	32		
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		SAU				HFZ				HFY				HFP				MD/MK				AQK/BAQK													
		32	40	50	63	80	100	6	10	16	20	25	32	40	6	10	16	20	25	32	10	16	20	25	32	6	10	16	20	25	32	50			
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

		Stainless steel																														
		PB/PBR				MI								MF				MG				MA/MAC										
		6	8	10	12	16	8	10	12	16	20	25	32	40	20	25	32	40	20	25	32	40	50	63	16	20	25	32	40	50	63	
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		Aluminum alloy												It needs an accessory to mount a sense on a cylinder																		
		MBL						MCK																								
		20	25	32	40	50	63	25	32	40	50	63	80																			
		●	●	●	●	●	●	●	●	●	●	●	●	●																		
		SC						SGC						It needs an accessory to mount a sense on a cylinder																		
		32	40	50	63	80	100	125	160	200	250	125	160													200	250					
		●	●	●	●	●	●	●	●	●	●	●	●													●	●	●	●	●		

DMSJ	CMSJ	ACQ/TACQ						SDA						QCK				QDK				TN								
		32	40	50	63	80	100	12	16	20	25	32	40	50	63	80	100	32	40	50	63	20	25	32	40	10	16	20	25	32
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

DMSH(S)	CMSH	ACQ/TACQ			TC	HFZ				HFY	HFP	HFR				HFC				HFT													
		125	140	160	6	10	6	10	16	20	25	32	40	6	32	10	16	20	25	32	16	20	25	32	40	50	63	10	16	20	25	32	
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		QDK		HLQ/HLQL				HLS/HLSL				MU				HLH				MPG													
		20	25	32	40	6	8	12	16	20	25	6	8	12	16	20	25	6	8	10	12	16	20	6	10	16	20	6	8	10	12	16	
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		HRQ				HFK				HLF				HGS				RMH				HFD											
	2	3	7	10	20	30	50	70	100	200	10	16	20	25	32	40	8	12	16	20	6	8	10	12	10	16	20	25	8	12	16	20	25
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	HFKL				HFKP				HFCQ																								
	10	16	20	25	10	16	20	25	32	40	16	20	25	32	40	50	63																
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●																

DMSE	CMSE	SE/BSE						SAI						ACE														
		32	40	50	63	80	100	125	32	40	50	63	80	100	125	160	200	12	16	20	25	32	40	50	63	80	100	125
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Replacement

New		Previous	
DMSG / DMSGs / CMSG		DS1-G / CS1-G	
DMSG(S)-020	DS1G020	DMSG(S)-030	DS1G030
DMSG(S)-050	DS1G050	DMSG(S)-C08	DS1GC08
DMSG(S)-C12	DS1GC12	DMSG(S)-020-W	-
DMSG(S)-030-W	-	DMSG(S)-030-W	-
DMSG(S)-050-W	-	DMSG(S)-050-W	-
DMSG(S)-N020(-W)	DS1GN020(No Waterproof type)	DMSG(S)-N030(-W)	DS1GN030(No Waterproof type)
DMSG(S)-N050(-W)	DS1GN050(No Waterproof type)	DMSG(S)-N050(-W)	DS1GN050(No Waterproof type)
DMSG(S)-NC08	DS1GNC08	DMSG(S)-NC08	DS1GNC08
DMSG(S)-NC12	DS1GNC12	DMSG(S)-NC12	DS1GNC12
DMSG(S)-P020(-W)	DS1GP020(No Waterproof type)	DMSG(S)-P030(-W)	DS1GP030(No Waterproof type)
DMSG(S)-P030(-W)	DS1GP030(No Waterproof type)	DMSG(S)-P050(-W)	DS1GP050(No Waterproof type)
DMSG(S)-P050(-W)	DS1GP050(No Waterproof type)	DMSG(S)-PC08	DS1GPC08
DMSG(S)-PC08	DS1GPC08	DMSG(S)-PC12	DS1GPC12
DMSG(S)-PC12	DS1GPC12	CMSG-020	CS1G020
CMSG-020	CS1G020	CMSG-030	CS1G030
CMSG-030	CS1G030	CMSG-050	CS1G050
CMSG-050	CS1G050	CMSG-C08	CS1GC08
CMSG-C08	CS1GC08	CMSG-C12	CS1GC12
CMSG-C12	CS1GC12	CMSG-020-H	CS1G020HT
CMSG-020-H	CS1G020HT	CMSG-030-H	CS1G030HT
CMSG-030-H	CS1G030HT	CMSG-050-H	CS1G050HT
CMSG-050-H	CS1G050HT	-	CS1GC08HT
-	CS1GC08HT	-	CS1GC12HT
-	CS1GC12HT	-	CS1GC12HT

New		Previous	
DMSJ / CMSJ		DS1-J / CS1-J	
DMSJ-020	DS1J020	DMSJ-030	DS1J030
DMSJ-050	DS1J050	DMSJ-C08	DS1JC08
DMSJ-C12	DS1JC12	DMSJ-020-W	-
DMSJ-020-W	-	DMSJ-030-W	-
DMSJ-030-W	-	DMSJ-050-W	-
DMSJ-050-W	-	DMSJ-N020(-W)	DS1JN020(No Waterproof type)
DMSJ-N020(-W)	DS1JN020(No Waterproof type)	DMSJ-N030(-W)	DS1JN030(No Waterproof type)
DMSJ-N030(-W)	DS1JN030(No Waterproof type)	DMSJ-N050(-W)	DS1JN050(No Waterproof type)
DMSJ-N050(-W)	DS1JN050(No Waterproof type)	DMSJ-NC08	DS1JNC08
DMSJ-NC08	DS1JNC08	DMSJ-NC12	DS1JNC12
DMSJ-NC12	DS1JNC12	DMSJ-P020(-W)	DS1JP020(No Waterproof type)
DMSJ-P020(-W)	DS1JP020(No Waterproof type)	DMSJ-P030(-W)	DS1JP030(No Waterproof type)
DMSJ-P030(-W)	DS1JP030(No Waterproof type)	DMSJ-P050(-W)	DS1JP050(No Waterproof type)
DMSJ-P050(-W)	DS1JP050(No Waterproof type)	DMSJ-PC08	DS1JPC08
DMSJ-PC08	DS1JPC08	DMSJ-PC12	DS1JPC12
DMSJ-PC12	DS1JPC12	CMSJ-020	CS1J020
CMSJ-020	CS1J020	CMSJ-030	CS1J030
CMSJ-030	CS1J030	CMSJ-050	CS1J050
CMSJ-050	CS1J050	CMSJ-C08	CS1JC08
CMSJ-C08	CS1JC08	CMSJ-C12	CS1JC12
CMSJ-C12	CS1JC12	CMSJ-020-H	CS1J020HT
CMSJ-020-H	CS1J020HT	CMSJ-030-H	CS1J030HT
CMSJ-030-H	CS1J030HT	CMSJ-050-H	CS1J050HT
CMSJ-050-H	CS1J050HT	-	CS1JC08HT
-	CS1JC08HT	-	CS1JC12HT
-	CS1JC12HT	-	CS1JC12HT

New		Previous	
DMSE / CMSE		DS1-E / CS1-E	
DMSE-020	DS1E020	DMSE-030	DS1E030
DMSE-030	DS1E030	DMSE-050	DS1E050
DMSE-050	DS1E050	DMSE-C08	DS1EC08
DMSE-C08	DS1EC08	DMSE-C12	DS1EC12
DMSE-C12	DS1EC12	DMSE-020-W	-
DMSE-020-W	-	DMSE-030-W	-
DMSE-030-W	-	DMSE-050-W	-
DMSE-050-W	-	DMSE-N020(-W)	DS1EN020(No Waterproof type)
DMSE-N020(-W)	DS1EN020(No Waterproof type)	DMSE-N030(-W)	DS1EN030(No Waterproof type)
DMSE-N030(-W)	DS1EN030(No Waterproof type)	DMSE-N050(-W)	DS1EN050(No Waterproof type)
DMSE-N050(-W)	DS1EN050(No Waterproof type)	DMSE-NC08	DS1ENC08
DMSE-NC08	DS1ENC08	DMSE-NC12	DS1ENC12
DMSE-NC12	DS1ENC12	DMSE-P020(-W)	DS1EP020(No Waterproof type)
DMSE-P020(-W)	DS1EP020(No Waterproof type)	DMSE-P030(-W)	DS1EP030(No Waterproof type)
DMSE-P030(-W)	DS1EP030(No Waterproof type)	DMSE-P050(-W)	DS1EP050(No Waterproof type)
DMSE-P050(-W)	DS1EP050(No Waterproof type)	DMSE-PC08	DS1EPC08
DMSE-PC08	DS1EPC08	DMSE-PC12	DS1EPC12
DMSE-PC12	DS1EPC12	CMSE-020	CS1E020
CMSE-020	CS1E020	CMSE-030	CS1E030
CMSE-030	CS1E030	CMSE-050	CS1E050
CMSE-050	CS1E050	CMSE-C08	CS1EC08
CMSE-C08	CS1EC08	CMSE-C12	CS1EC12
CMSE-C12	CS1EC12	CMSE-020-H	CS1E020HT
CMSE-020-H	CS1E020HT	CMSE-030-H	CS1E030HT
CMSE-030-H	CS1E030HT	CMSE-050-H	CS1E050HT
CMSE-050-H	CS1E050HT	-	CS1EC08HT
-	CS1EC08HT	-	CS1EC12HT
-	CS1EC12HT	-	CS1EC12HT

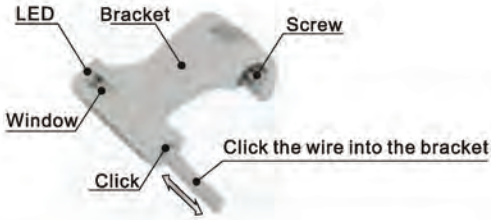
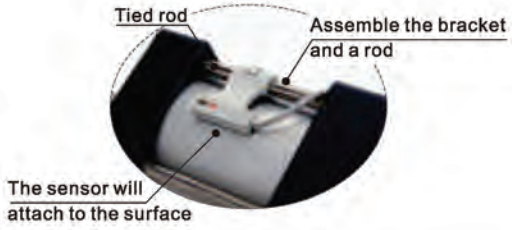

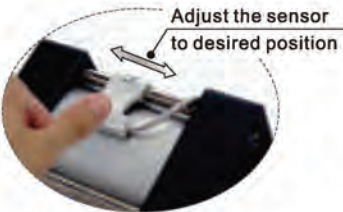

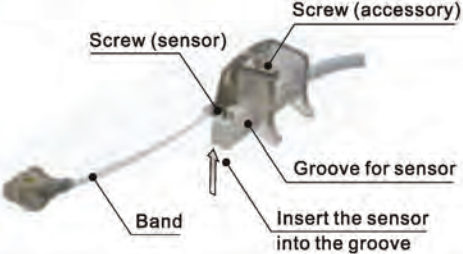
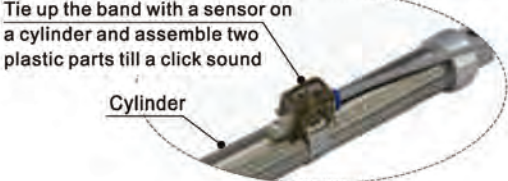

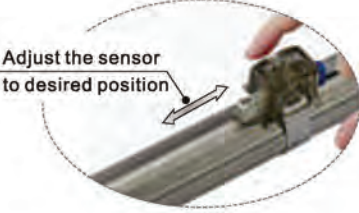
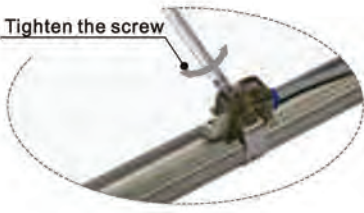
New		Previous	
DMSH / DMSHS / CMSH		DS1-H / CS1-H	
DMSH(S)-020	DS1H020	DMSH(S)-030	DS1H030
DMSH(S)-030	DS1H030	DMSH(S)-050	DS1H050
DMSH(S)-050	DS1H050	DMSH(S)-C08	DS1HC08
DMSH(S)-C08	DS1HC08	DMSH(S)-C12	DS1HC12
DMSH(S)-C12	DS1HC12	DMSH(S)-020-W	-
DMSH(S)-020-W	-	DMSH(S)-030-W	-
DMSH(S)-030-W	-	DMSH(S)-050-W	-
DMSH(S)-050-W	-	DMSH(S)-N020(-W)	DS1HN020(No Waterproof type)
DMSH(S)-N020(-W)	DS1HN020(No Waterproof type)	DMSH(S)-N030(-W)	DS1HN030(No Waterproof type)
DMSH(S)-N030(-W)	DS1HN030(No Waterproof type)	DMSH(S)-N050(-W)	DS1HN050(No Waterproof type)
DMSH(S)-N050(-W)	DS1HN050(No Waterproof type)	DMSH(S)-NC08	DS1HNC08
DMSH(S)-NC08	DS1HNC08	DMSH(S)-NC12	DS1HNC12
DMSH(S)-NC12	DS1HNC12	DMSH(S)-P020(-W)	DS1HP020(No Waterproof type)
DMSH(S)-P020(-W)	DS1HP020(No Waterproof type)	DMSH(S)-P030(-W)	DS1HP030(No Waterproof type)
DMSH(S)-P030(-W)	DS1HP030(No Waterproof type)	DMSH(S)-P050(-W)	DS1HP050(No Waterproof type)
DMSH(S)-P050(-W)	DS1HP050(No Waterproof type)	DMSH(S)-PC08	DS1HPC08
DMSH(S)-PC08	DS1HPC08	DMSH(S)-PC12	DS1HPC12
DMSH(S)-PC12	DS1HPC12	CMSH-020	CS1H020
CMSH-020	CS1H020	CMSH-030	CS1H030
CMSH-030	CS1H030	CMSH-050	CS1H050
CMSH-050	CS1H050	CMSH-C08	CS1HC08
CMSH-C08	CS1HC08	CMSH-C12	CS1HC12
CMSH-C12	CS1HC12	CMSH-020-H	CS1H020HT
CMSH-020-H	CS1H020HT	CMSH-030-H	CS1H030HT
CMSH-030-H	CS1H030HT	CMSH-050-H	CS1H050HT
CMSH-050-H	CS1H050HT	-	CS1HC08HT
-	CS1HC08HT	-	CS1HC12HT
-	CS1HC12HT	-	CS1HC12HT

### Replacement of previous sensor

New sensor + Tie Rod Cylinder Accessory		Previous sensor + Accessory																																																																																										
DMSG/CMSG	F-SC□SH	previous sensor		previous sensor + Accessory																																																																																								
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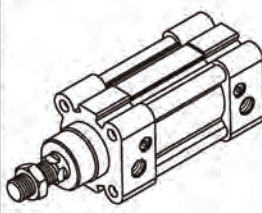

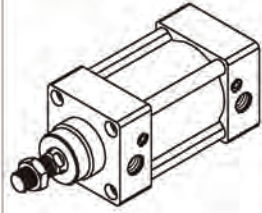


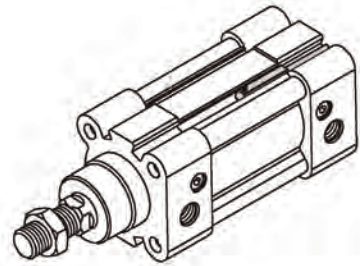
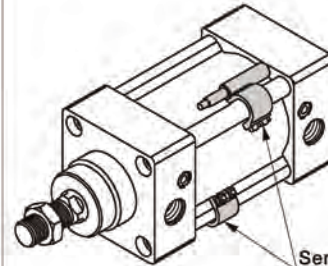
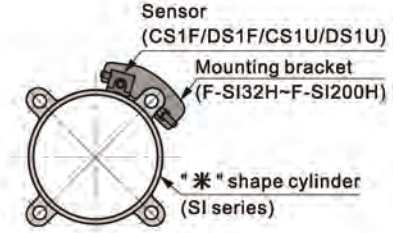
### Installation

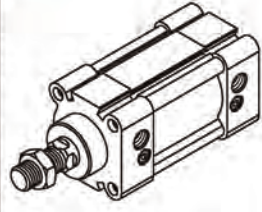

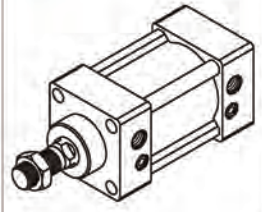


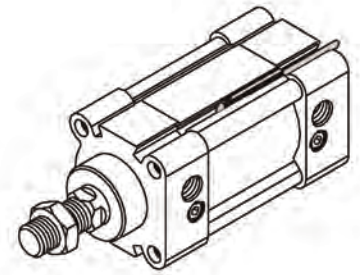
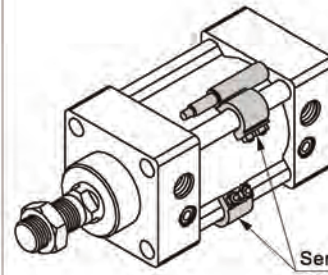
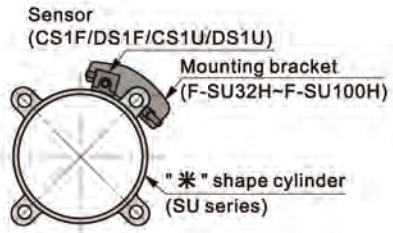
Sensor model	Procedure		
<b>DMSG(S)/CMSG</b> 	<b>1</b> loose the screw  Screw Sensor The screw should NOT protrude the bottom Bottom of the sensor	<b>2</b> Insert the sensor into the slot and adjust it to desired position  Slot	<b>3</b> Tighten the screw 
<b>DMSE/CMSE</b> 	<b>1</b> loose the screw  Screw Sensor The screw should NOT protrude the bottom Bottom of the sensor	<b>2</b> Insert the sensor into the slot and adjust it to desired position  Slot	<b>3</b> Tighten the screw 
<b>DMSH(S)/CMSH</b> 	<b>1</b> loose the screw  Screw Sensor The screw should NOT protrude the bottom Bottom of the sensor	<b>2</b> Insert the sensor into the slot and adjust it to desired position  Slot	<b>3</b> Tighten the screw 
<b>DMSJ/CMSJ</b> 	<b>1</b> loose the screw  Sensor Screw Bottom of the sensor Adjust the metal part till the lateral shape can fit the slot of the cylinder	<b>2</b> Insert the sensor into the slot and adjust it to desired position  Slot	<b>3</b> Tighten the screw 

Sensor model	Procedure	
DMSG+(F-SC□SH) CMSG+(F-SC□SH)	1 	2 
	3 	4 
DMSG+(F-MQ□) CMSG+(F-MQ□)	1 	2 
	3 	4 

### Sensor for "米" shape cylinder

SAI, SAU series will substitute for SI, SU series. And the corresponding sensors have some adjustments as the chart below.

New type(SAI)		Previous type(SI)	
Cylinder and accessory	<p><b>Cylinder</b></p>  <p><b>Sensor</b></p>  <p>CMSE \ DMSE</p>	Cylinder and accessory	<p><b>Cylinder</b></p>  <p><b>Sensor</b></p>  <p>CS1B1 / DS1B1 CS1B2 / DS1B2 CS1B3 / DS1B3 CS1B4 / DS1B4 CS1B5 / DS1B5 CS1B6 / DS1B6 CS1B7 / DS1B7</p>  <p>CS1F/DS1F/CS1U/DS1U + F-SI32H/F-SI40H F-SI50H/F-SI63H F-SI80H/F-SI100H F-SI125H/F-SI160H F-SI200H</p>
Installation		Installation	  <p>Sensor (CS1F/DS1F/CS1U/DS1U) Mounting bracket (F-SI32H-F-SI200H) "米" shape cylinder (SI series) Sensor (CS1B1~B7/DS1B1~B7)</p>

New type(SAU)		Previous type(SU)	
Cylinder and accessory	<p><b>Cylinder</b></p>  <p><b>Sensor</b></p>  <p>CMSG \ DMSG</p>	Cylinder and accessory	<p><b>Cylinder</b></p>  <p><b>Sensor</b></p>  <p>CS1B1 / DS1B1 CS1B2 / DS1B2 CS1B3 / DS1B3 CS1B4 / DS1B4</p>  <p>CS1F/DS1F/CS1U/DS1U + F-SU32H/F-SU40H F-SU50H/F-SU63H F-SU80H/F-SU100H</p>
Installation		Installation	  <p>Sensor (CS1F/DS1F/CS1U/DS1U) Mounting bracket (F-SU32H-F-SU100H) "米" shape cylinder (SU series) Sensor (CS1B1~B4/DS1B1~B4)</p>

### Socket

#### Ordering code

F - DMS C08 2 020

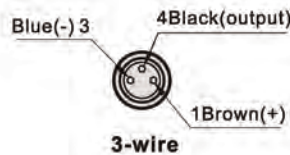
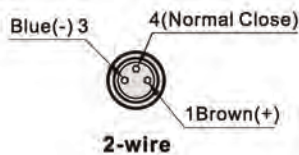
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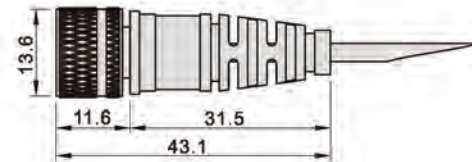
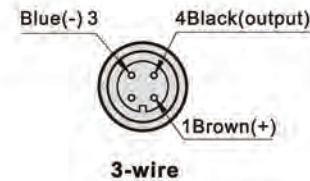
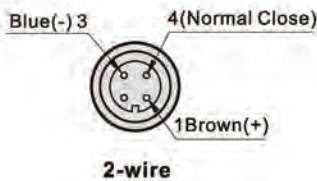
① Category code	F: Accessory			
② Specification code	DMS: Digital Magnetic Sensor			
③ Socket type	C08:M8 socket	C12:M12 socket		
④ Wire type	2: 2-wire type	3: 3-wire type		
⑤ Wire length	020: 2 meters	030: 3 meters	050: 5 meters	100: 10 meters

#### Appearance

##### M8 socket



##### M12 socket



### Instruction

- Sensor shall not fall down or bear great impact when it is installed.
- The wire of the Sensor shall not move with the action of cylinder.
- Clamping torque shall be within the allowable scope when the Sensor is installed(0.15~0.2Nm).
- Sensor shall be installed in the middle position of the action scope.
- Sensor wiring:
  - The wire is unable to bear repetitive torsion and tension. Please wire an external load before switch the power on.
  - No poor insulation in wire.
  - Do not wire with power line, high voltage line or use one wiring pipe.
  - Please wire the circuit correctly base on the circuit diagram.
- Execute scheduled maintenance by the following guidelines:
  - Make sure the sensor is firmly fixed.
  - Make sure the wire is intact.
  - Make sure that LED indicate the movement of cylinder correctly.
- Application of environment:
  - It is Not allow to use the sensor in the environment with explosive gas.
  - Magnetic sensor shall not be used in the environment with external magnetism.
  - Magnetic sensor shall not be used in the environment that is always eroded by water.
  - Magnetic sensor shall not be used in the environment with oil moisture or chemical substance.
  - Magnetic sensor shall not be used in the environment with periodically changing temperature.
  - Magnetic sensor shall not be used in the environment with excessively great impact.
  - Magnetic sensor shall not be used in the environment with sources of electrical pulse.
  - Avoid the environment with accumulated iron powder and dense magnetic objects.



# Shock absorber—ACA, ACJ Series

## Compendium of ACA/ACJ Series

### Excellent and stable deceleration and shock absorbing

If impacted by load, the resistance will automatically adjust.

### Three kinds of prevention crash cap



### Three kinds of impact speed

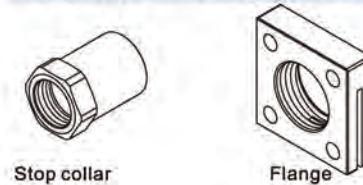
High speed(Light load)  
Middle speed(Middle load)  
Low speed(Heavy load)

### All threaded outer body

It is easy to install and adjust and has good heat dissipation.

### Integrated structure

### Two kinds of mounting accessories



### Two kinds of type

ACA: Self-compensation type shock absorber  
ACJ: Adjustable type shock absorber



## Specification

Model	Stroke (mm)	Max. energy absorbed (Nm)	Max. energy absorbed/hour(Nm/h)	Max. effective mass(kg)			Max. impact speed(m/s)			Weight (g)
				High speed	Middle speed	Low speed	High speed	Middle speed	Low speed	
ACA0806	6	3	5400	5	20	25	4	2	1	12
ACA1007	7	6	14500	10	40	50	4	2	1	26
ACA1210	10	10	30000	18	60	80	4	2	1	40
ACA1215	15	14	35000	25	90	115	4	2	1	48
ACA1412	12	18	36000	30	110	150	4	2	1	70
ACA1416	16	22	39000	40	140	180	4	2	1	78
ACA1420	20	25	45000	45	155	200	4	2	1	85
ACA1616	16	35	43000	60	220	285	4	2	1	105
ACA1620	20	40	47000	70	250	325	4	2	1	115
ACA1625	25	45	51000	80	280	365	4	2	1	125
ACA2020	20	60	50000	240	660	960	4	2	1	175
ACA2025	25	65	54000	260	720	1040	4	2	1	185
ACA2030	30	70	58000	280	780	1120	4	2	1	210
ACA2040	40	80	65000	320	890	1280	4	2	1	225
ACA2525	25	100	75000	400	1100	1600	4	2	1	290
ACA2550	50	150	85000	600	1650	2400	4	2	1	370
ACA2725	25	140	85000	560	1550	2240	4	2	1	372
ACA2750	50	250	95000	1000	2780	4000	4	2	1	475
ACA3325	25	180	100000	720	2000	2880	4	2	1	596
ACA3350	50	300	120000	1200	3300	4800	4	2	1	750
ACA3625	25	220	135000	880	2400	3500	4	2	1	702
ACA3650	50	350	150000	1400	2500	5600	4	2	1	889

Model	Stroke(mm)	Max. energy absorbed (Nm)	Max. energy absorbed/hour(Nm/h)	Max. effective mass(kg)	Max. impact speed(m/s)	Weight(g)
ACJ1007	7	6	14500	50	4	28
ACJ1210	10	10	30000	80	4	43
ACJ1412	12	20	36000	160	4	75
ACJ2020	20	60	50000	960	4	189
ACJ2525	25	100	75000	1600	4	308
ACJ2550	50	150	85000	2400	4	395
ACJ2725	25	140	85000	2240	4	396
ACJ2750	50	250	95000	4000	4	510
ACJ3325	25	180	100000	2880	4	540
ACJ3350	50	300	110000	4800	4	800
ACJ3625	25	220	125000	2500	4	750
ACJ3650	50	350	130000	5600	4	950
ACJ4225	25	350	150000	5600	4	1150
ACJ4250	50	700	180000	11200	4	1420
ACJ4275	75	1050	210000	16800	4	1720



## ACA, ACJ Series



### Product feature

1. Excellent and stable deceleration and shock absorbing; if impacted by load, the resistance will automatically adjust.
2. Outer body of integrated structure is treated by QPQ, which has optimum corrosion and wear resistance and can withstand high pressure; it is easy to install and adjust for all threaded outer body which has good heat dissipation.
3. With high hardness stainless steel shaft, the shock absorber has better impact and corrosion resistance, and it can work under adverse conditions.
4. Special oiling process leads to stable shock absorbing.
5. Compact structure and high max. absorbed energy.
6. We use Special lubricants as buffer medium, which adapts to wide temperature range and ensures stable cushioning.

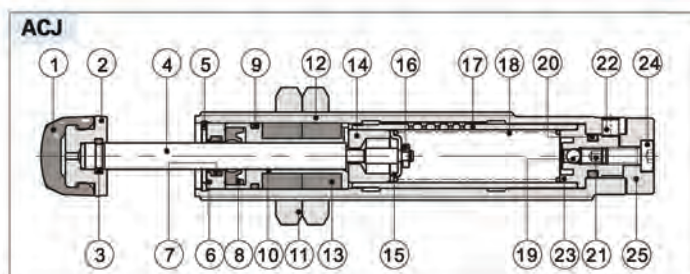
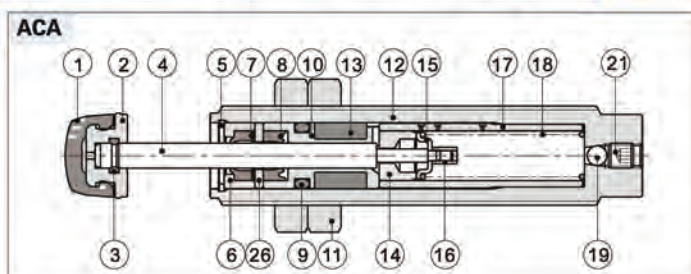
### Ordering code

ACA 20 20 - 1 N



①Model	②Body male thread	③Stroke	④Impact speed	⑤Prevention crash cap
ACA: Self-compensation type shock absorber	08:M8	The pecification for detail	1: High speed(Light load) 2: Middle speed(Middle load) 3: Low speed(Heavy load)	Blank: Plastic cap N: No cap
	10:M10			Blank: Plastic cap F: Iron cap N: No cap
	12:M12			
	14:M14			
	16:M16			
	20:M20			
	25:M25			
	27:M27			
33:M33	Not this code		Blank: Plastic cap F: Iron cap	
36:M36			Blank: Plastic cap N: No cap	
10:M10				
12:M12				
14:M14				
20:M20				
25:M25				
27:M27				
33:M33	Blank: Plastic cap F: Iron cap			
36:M36				
42:M42				

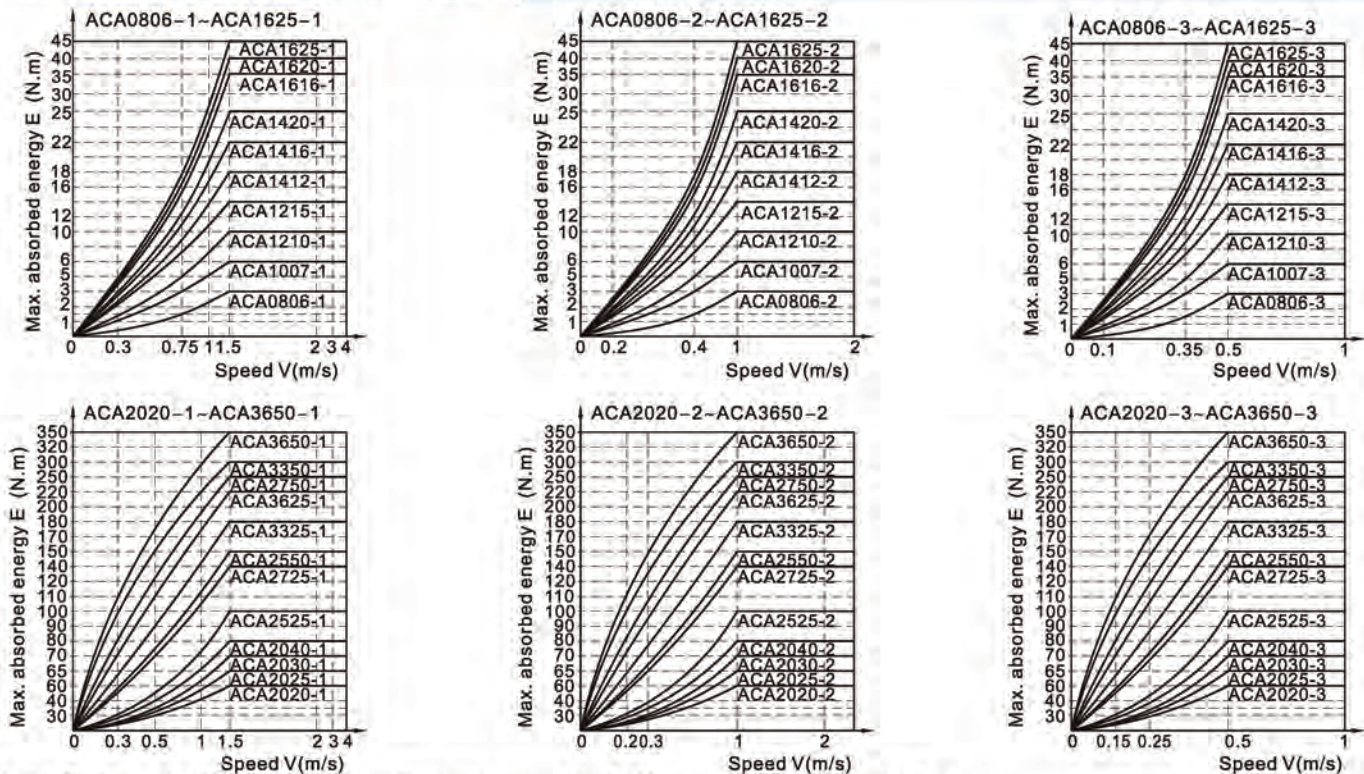
### Inner structure and material of major parts



No.	Item	Material	No.	Item	Material
1	Bump cap	PA66(M8)\TPU(M10~M14)\TPU or S45C(M20~M42)	14	Piston	Brass
2	Bump cap(core)	No(M8)\Cutting steel(Othres)	15	Spring seat	Spring steel
3	O-ring	NBR	16	Busher	Brass(M8~M12)\Aluminum(M20~M27)
4	Piston rod	Stainless steel(M8~M27)\S45C(M33~M42)	17	Inlet body	Cutting steel(M8~M14)\Seamless steel tube(M20~M42)
5	Clip	No(M8~M10)\Spring steel(M12~M42)	18	Spring	SWPB
6	Front cover	Brass(M8)\Cutting steel(M10)\Aluminum(M12~M42)	19	Ball	GCr15
7	Front cover gasket	No(M8)\TPU(M10~M42)	20	O-ring	NBR
8	Front cover gasket	NBR	21	Set screw	Low alloy steel
9	O-ring	NBR	22	Set screw	Low alloy steel
10	Correcting body	Brass	23	Back cover	Brass
11	Nut	SS41	24	Screw	Low alloy steel
12	Body	Cutting steel	25	Knob	Aluminum alloy
13	Accumulator	Foamex	26	Washer	SUS304(M10~M14)\No(Othres)

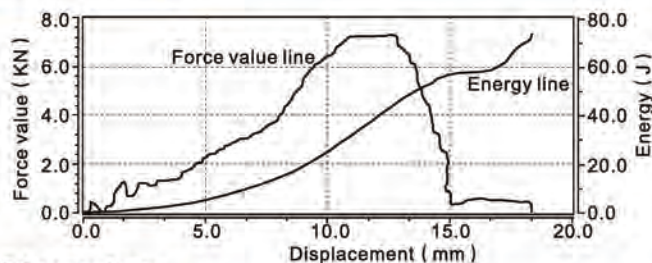
## ACA, ACJ Series

### Max. absorbed energy and speed curve



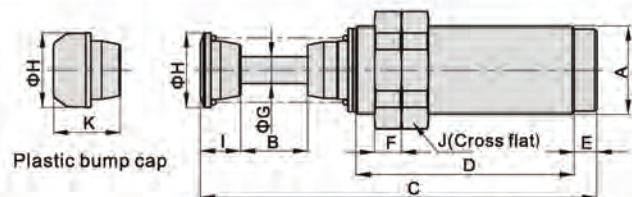
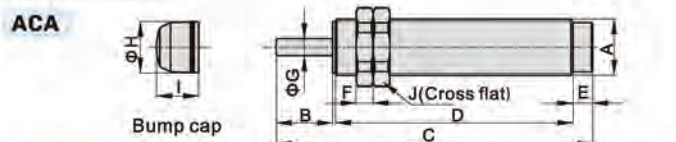
Note 1. The interval under the red line shows the energy range absorbed by corresponding shock absorber.  
 2. It is better to use 20%-80% of the Max. absorbed energy.

### Buffer curve



Note: As the chart shows, energy is absorbed by a lower reaction force at the beginning of the stroke, then by a smooth linear deceleration. It decelerates smoothly at last.

### Dimensions



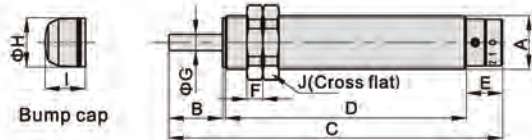
Model/Item	A	B	C	D	E	F	G	H	I	J
ACA0806	M8×1.0	6	46	32	5	4	3	6.5	6	11
ACA1007	M10×1.0	7	56	41	5	4	3	8.5	7.5	14
ACA1210	M12×1.0	10	63	47	5	4	3	10	7.5	17
ACA1215	M12×1.0	15	79	58	5	4	3	10	7.5	17
ACA1412	M14×1.5	12	80.5	62.5	5	6	4	12	12	19
ACA1416	M14×1.5	16	92.5	70.5	5	6	4	12	12	19
ACA1420	M14×1.5	20	103	77	5	6	4	12	12	19
ACA1616	M16×1.5	16	100.5	78.5	5	6	5	14	12	21
ACA1620	M16×1.5	20	109	83	5	6	5	14	12	21
ACA1625	M16×1.5	25	125	94	5	6	5	14	12	21
ACA2020	M20×1.5	20	112.5	84.5	7	6	6	18	15	26
ACA2025	M20×1.5	25	122.5	89.5	7	6	6	18	15	26
ACA2030	M20×1.5	30	142	104	7	6	6	18	15	26
ACA2040	M20×1.5	40	167.5	119.5	7	6	6	18	15	26
ACA2525	M25×1.5	25	123	89	8	6	6	23	16	32
ACA2550	M25×1.5	50	183	124	8	6	6	23	16	32
ACA2725	M27×1.5	25	127	93	8	6	8	24.5	17	36
ACA2750	M27×1.5	50	192	133	8	6	8	24.5	17	36

Model/Item	A	B	C	D	E	F	G	H	I	J	K
ACA3325	M33×1.5	25	148	81.5	8.5	10	10	27.8	15	41	25
ACA3350	M33×1.5	50	213	121.5	8.5	10	10	27.8	15	41	25
ACA3625	M36×1.5	25	148	81.5	8.5	10	10	27.8	15	46	25
ACA3650	M36×1.5	50	213	121.5	8.5	10	10	27.8	15	46	25



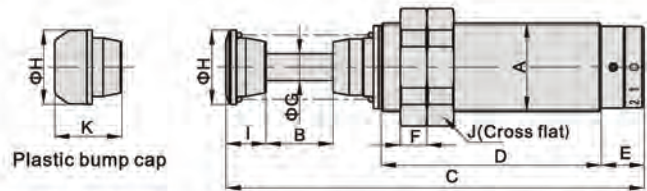
## ACA, ACJ Series

### ACJ



Bump cap

Model\Item	A	B	C	D	E	F	G	H	I	J
ACJ1007	M10×1.0	7	67	45.5	11	4	3	8.5	7.5	14
ACJ1210	M12×1.0	10	74	52	11	4	3	10	7.5	17
ACJ1412	M14×1.5	12	91	66.5	11.5	6	4	12	12	19
ACJ2020	M20×1.5	20	124.5	90	13.5	6	6	18	15	26
ACJ2525	M25×1.5	25	132.5	92	14.5	6	6	23	16	32
ACJ2550	M25×1.5	50	192.5	127	14.5	6	6	23	16	32
ACJ2725	M27×1.5	25	137	96.5	14.5	6	8	24.5	17	36
ACJ2750	M27×1.5	50	202	136.5	14.5	6	8	24.5	17	36

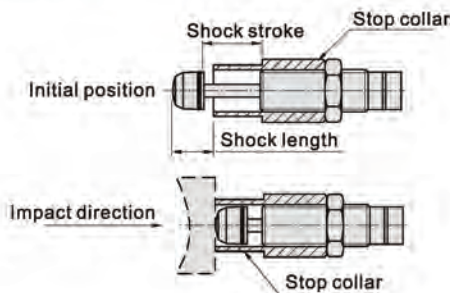


Plastic bump cap

Model\Item	A	B	C	D	E	F	G	H	I	J	K
ACJ3325	M33×1.5	25	156	82	16	10	10	27.8	15	41	25
ACJ3350	M33×1.5	50	221	122	16	10	10	27.8	15	41	25
ACJ3625	M36×1.5	25	156	82	16	10	10	27.8	15	46	25
ACJ3650	M36×1.5	50	221	122	16	10	10	27.8	15	46	25
ACJ4225	M42×1.5	25	161.5	85.5	16	12	12	34.8	15	50	25
ACJ4250	M42×1.5	50	226.5	125.5	16	12	12	34.8	15	50	25
ACJ4275	M42×1.5	75	291.5	165.5	16	12	12	34.8	15	50	25

## Accessories

### How to set stop collar

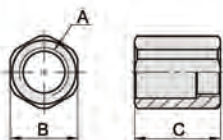


### Ordering code

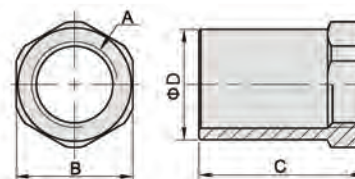
#### F - ACA 08 LM

①Accessory	②Model	③Female thread size	④Accessories type
		08: M8	LM: Stop collar
		10: M10	
		12: M12	
		14: M14	
		16: M16	
		20: M20	
		25: M25	
		27: M27	
		33: M33	
		36: M36	
		42: M42	LM: Stop collar \ FA: Flange
			FA: Flange

### Dimensions

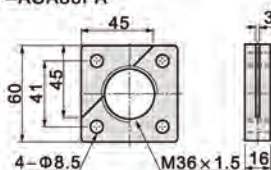


Model\Item	A	B	C
F-ACA08LM	M8×1.0	11	14
F-ACA10LM	M10×1.0	14	16
F-ACA12LM	M12×1.0	17	20

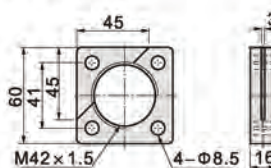


Model\Item	A	B	C	D
F-ACA14LM	M14×1.5	19	27	18
F-ACA16LM	M16×1.5	21	32	20
F-ACA20LM	M20×1.5	26	35	25
F-ACA25LM	M25×1.5	32	45	31
F-ACA27LM	M27×1.5	36	50	35
F-ACA33LM	M33×1.5	41	80	40
F-ACA36LM	M36×1.5	46	80	45

#### F-ACA36FA



#### F-ACA42FA



### Selecting list

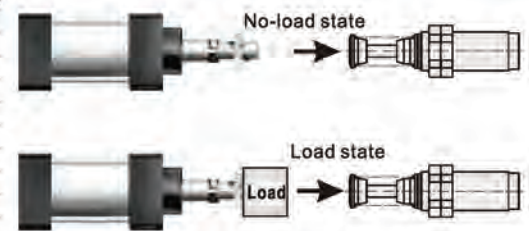
Model	Compatible absorber
F-ACA08LM	ACA0806
F-ACA10LM	ACA1007, ACJ1007
F-ACA12LM	ACA1210, ACA1215, ACJ1210
F-ACA14LM	ACA1412, ACA1416, ACA1420, ACJ1412
F-ACA16LM	ACA1616, ACA1620, ACA1625
F-ACA20LM	ACA2020, ACA2025, ACA2030, ACA2040, ACJ2020
F-ACA25LM	ACA2525, ACA2550, ACJ2525, ACJ2550
F-ACA27LM	ACA2725, ACA2750, ACJ2725, ACJ2750
F-ACA33LM	ACA3325, ACA3350, ACJ3325, ACJ3350
F-ACA36LM	ACA3625, ACA3650, ACJ3625, ACJ3650
F-ACA36FA	ACA3625, ACA3650, ACJ3625, ACJ3650
F-ACA42FA	ACJ4225, ACJ4250, ACJ4275

## ACA, ACJ Series

### How to select

Theoretical energy parameter table for cylinders under no-load state Unit: J ( N.m)

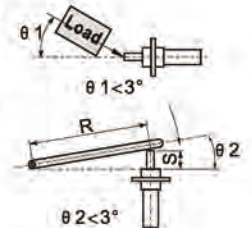
Stroke(mm)	6	7	10	12	15	16	20	25	30	40	50	75	
Bore size (mm)	6	0.102	0.119	0.170	0.203	0.254	0.271	0.339	0.424	0.509	0.678	0.848	1.27
	8	0.181	0.211	0.301	0.362	0.452	0.482	0.603	0.754	0.904	1.21	1.51	2.26
	10	0.283	0.330	0.471	0.565	0.707	0.754	0.942	1.18	1.413	1.88	2.36	3.53
	12	0.407	0.475	0.678	0.814	1.017	1.085	1.36	1.70	2.035	2.71	3.39	5.09
	16	0.723	0.844	1.21	1.45	1.809	1.929	2.41	3.01	3.617	4.82	6.03	9.04
	20	1.13	1.32	1.88	2.26	2.826	3.014	3.77	4.71	5.652	7.54	9.42	14.13
	25	1.77	2.06	2.94	3.53	4.416	4.710	5.89	7.36	8.831	11.8	14.7	22.1
	32	2.89	3.38	4.82	5.79	7.235	7.717	9.65	12.1	14.47	19.3	24.1	36.2
	40	4.52	5.28	7.54	9.04	11.3	12.06	15.1	18.8	22.6	30.1	37.7	56.5
	50	7.07	8.24	11.8	14.1	17.7	18.84	23.6	29.4	35.33	47.1	58.9	88.3
	63	11.2	13.1	18.7	22.4	28.0	29.91	37.4	46.7	56.08	74.8	93.5	140.2
	80	18.1	21.1	30.1	36.2	45.2	48.23	60.3	75.4	90.43	120.6	150.7	226.1
	100	28.3	33.0	47.1	56.5	70.7	75.36	94.2	117.8	141.3	188.4	235.5	353.3
	125	44.2	51.5	73.6	88.3	110.4	117.8	147.2	184.0	220.8	294.3	368.0	552.0
	160	72.3	84.4	120.6	144.7	180.9	192.9	241.2	301.4	361.7	482.3	602.9	904.3
	200	113.0	131.9	188.4	226.1	282.6	301.4	376.8	471.0	565.2	753.6	942.0	1413.0
250	176.6	206.1	294.4	353.3	441.6	471.0	588.5	735.9	883.1	1177.5	1471.9	2207.8	
320	289.4	337.6	482.3	578.8	723.5	771.7	964.6	1205.8	1446.9	1929.2	2411.5	3617.3	



For example:  
When the pressure is 0.6MPa, bore size of  $\phi 40$  under no-load state plus shock stroke of 12mm can produce energy of 9.04 N.m. Refer to the specification table, you will find ACA1412 fits.  
Note: Cylinders under full-load state can produce as twice as the energy shown above.

### Installation and Operation

- The scale range of adjustable shock absorbers is 0 to 9 (8). Factory set is at 6 (4) position. 0 means the softest, while 9 means the hardest;
- Correct selection of shock absorbers can ensure a smooth deceleration and good shock absorbing properties;
- If there exists rebounding at the beginning of the stroke, it shows the effective weight is too high. In this case, self-compensation type shall be replaced by high speed type (-1), while adjustable type shall be adjusted to softer, that is closer to 0;
- If there exists rebounding at the end of the stroke, it shows the effective weight is too low. In this case, self-compensation type shall be replaced by low speed type (-3), while adjustable type shall be adjusted to harder, that is closer to 9;
- In the work process, lateral load should be avoided as possible as one can. Eccentric angle must be controlled within  $3^\circ$ . Shock absorbers shall be securely locked;
- The operating temperature range shall be  $-10$  to  $80^\circ\text{C}$ ;
- To extend the service life, piston shall be stopped 1mm before reaching the end. It is better to install set screw with positioning and precise adjustment;
- If two or more shock absorbers are installed at the same side, please make sure that they act synchronously;
- No painting, welding or cleaning with corrosive substance on the body as well as the piston rod.
- When installed the absorber, the moment forced on absorber can't be out of the range given in below list or may cause the absorber damage.



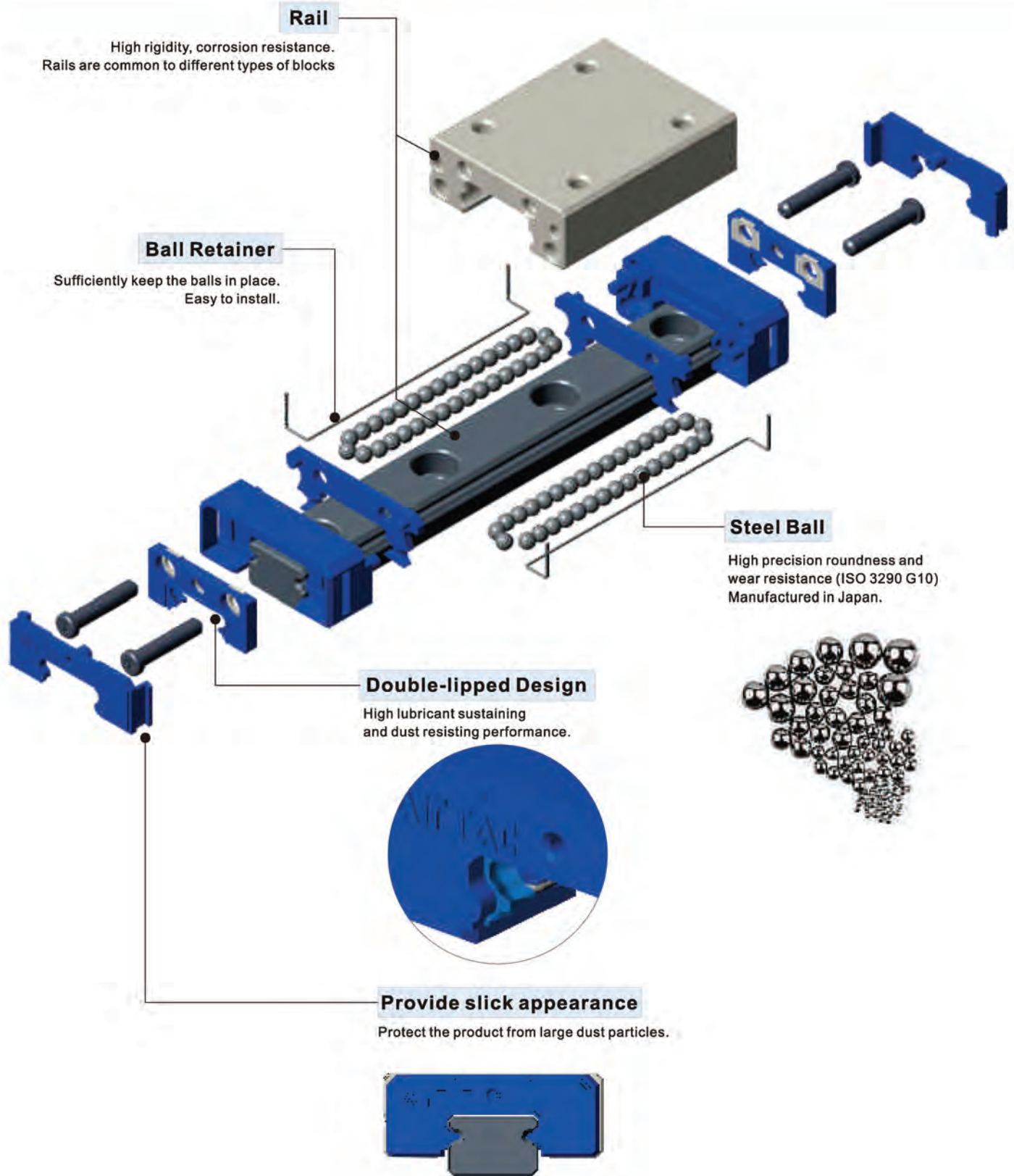
Compatible absorber	Male thread Spec(of body)	Max. Assembly Force on bsorber(N.m)
ACA0806	M8 x 1.0	2.0
ACA1007, ACJ1007	M10 x 1.0	3.5
ACA1210, ACA1215, ACJ1210	M12 x 1.0	8.0
ACA1412, ACA1416, ACA1420, ACJ1412	M14 x 1.5	11.0
ACA1616, ACA1620, ACA1625	M16 x 1.5	15.0
ACA2020, ACA2025, ACA2030, ACA2040, ACJ2020	M20 x 1.5	24.0
ACA2525, ACA2550, ACJ2525, ACJ2550	M25 x 1.5	40.0
ACA2725, ACA2750, ACJ2725, ACJ2750	M27 x 1.5	63.0

### Calculation of energy under load state

Horizontal impact			Vertical impact			Rotation impact		
1)Horizontal impact			1)Free fall			1) Rocker		
Impact weight (kg): m			Impact weight (kg): m			Impact weight (kg): m		
Impact speed (m/s): v			Impact speed (m/s): v			Impact speed (m/s): $v=R \times \omega$		
Kinetic energy (J(N.m)): $E1 = \frac{m \times v^2}{2}$			Kinetic energy (J(N.m)): $E1 = m \times g \times h$			Kinetic energy (J(N.m)): $E1 = \frac{I \times \omega^2}{2}$		
Propelling energy(J(N.m)): $E2=0$			Propelling energy(J(N.m)): $E2=m \times g \times L$			Propelling energy(J(N.m)): $E2 = \frac{T \times L}{R}$		
Gross energy (J(N.m)): $E=E1+E2$			Gross energy (J(N.m)): $E=E1+E2$			Gross energy (J(N.m)): $E=E1+E2$		
2)Horizontal impact with cylinder thrust			2)Push-down by cylinder			2)Rotation		
Impact weight (kg): m			Impact weight (kg): m			Impact weight (kg): m		
Impact speed (m/s): v			Impact speed (m/s): v			Impact speed (m/s): $v=R \times \omega$		
Kinetic energy (J(N.m)): $E1 = \frac{m \times v^2}{2}$			Kinetic energy (J(N.m)): $E1 = \frac{m \times v^2}{2}$			Kinetic energy (J(N.m)): $E1 = \frac{I \times \omega^2}{2}$		
Propelling energy(J(N.m)): $E2=F \times L$			Propelling energy(J(N.m)): $E2=(m \times g + F) \times L$			Propelling energy(J(N.m)): $E2 = \frac{T \times L}{R}$		
Gross energy (J(N.m)): $E=E1+E2$			Gross energy (J(N.m)): $E=E1+E2$			Gross energy (J(N.m)): $E=E1+E2$		
Code	Explanation	Unit	Code	Explanation	Unit	Code	Explanation	Unit
m	Impact weight	kg	F	Thrust( $\pi \times D^2 \times P/4$ )	N	N	Round per Minute	rpm
v	Impact speed	m/s	D	Nore size	mm	R	Distance from rotation center to impact point	m
E	Gross energy	J(N.m)	P	Air pressure	MPa	I	Moment of Inertia ( $I = m r^2/2$ )	$\text{kg} \times \text{m}^2$
E1	Kinetic energy(Potential energy)	J(N.m)	L	Shock stroke	m	$\omega$	Angular velocity( $\omega = 2\pi \text{ N}/60$ ) ( $90^\circ = 1.57 \text{ rad/s}$ )	rad/s
E2	Propelling energy	J(N.m)	h	Height	m			
g	Gravity acceleration	$9.8(\text{m/s}^2)$	T	Torque	N.m			



## Product Introduction



## LRM Series



### Order Information

LRM 7 N 1 X 40 AA A H

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

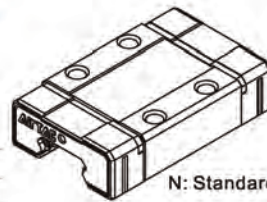
① Model Code	LRM : Miniature Linear Guide			
② Rail Width	5: 5mm	7: 7mm	9: 9mm	12: 12mm 15: 15mm
③ Rail Length	N: Standard L: Long			
④ Number of Block	1: One	2: Two	[Note: Amount of block on a single set of linear guide]	
⑤ Length of Rail	40: 40mm..... [Refer to rail spec. table for detail]			
⑥ Starting /End rail mounting hole positions	AA: Standard distance from the center of the last hole to the edge			
	AS□ : One side with customized distance from the center of the last hole to the edge [Take LRM12 as example: AS12 — One side mounting hole position is 12mm, and the other is standard(10mm)]			
	S□E□ : Both sides with customized distance from the center of the last hole to the edge [Take LRM12 as example: S6E12 — One side mounting hole position is 6mm, and the other is 12mm]			
⑦ Preload	A: Standard clearance		B: Light Preloaded	
⑧ Accuracy	H : High		P : Precision	

### Block Ordering Information

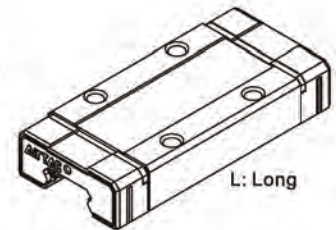
LRM 7 N

① ② ③

① Model Code	LRM : Miniature Linear Guide			
② Width of rail	7: 7mm	9: 9mm	12: 12mm	15: 15mm
③ Block Type	N: Standard		L: Long	



N: Standard



L: Long

### Rail Ordering Information

LRM 7 X 40 AA

① ② ③ ④

① Model Code	LRM : Miniature Linear Guide			
② Width of rail	7: 7mm	9: 9mm	12: 12mm	15: 15mm
③ Length of Rail	40: 40mm..... [Refer to rail spec. table for detail]			
④ Starting /End rail mounting hole positions	AA: Standard distance from the center of the last hole to the edge			
	AS□ : One side with customized distance from the center of the last hole to the edge [Take LRM12 as example: AS12 — One side mounting hole position is 12mm, and the other is standard(10mm)]			
	S□E□ : Both sides with customized distance from the center of the last hole to the edge [Take LRM12 as example: S6E12 — One side mounting hole position is 6mm, and the other is 12mm]			

### Uncut Rail Order Information

LRM 7X985 AA

① ② ③ ④

① Model Code	LRM : Miniature Linear Guide			
② Width of rail	7:7mm	9:9mm	12:12mm	15:15mm
③ Length of Rail [Note]	985:985mm	995:995mm	995:995mm	990:990mm
④ Starting /End rail mounting hole positions	AA: Standard distance from the center of the last hole to the edge			

[Note] Rail length is the standard length for uncut rail corresponding to each width length.

## LRM Series

### Rail Specification

AA: Standard distance from the center of the last hole to the edge



AS□: One side with customized distance from the center of the last hole to the edge



S□□: Both sides with customized distance from the center of the last hole to the edge



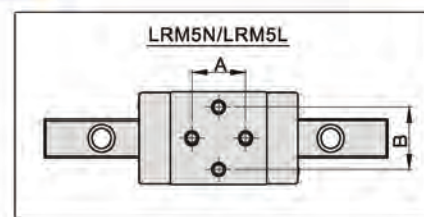
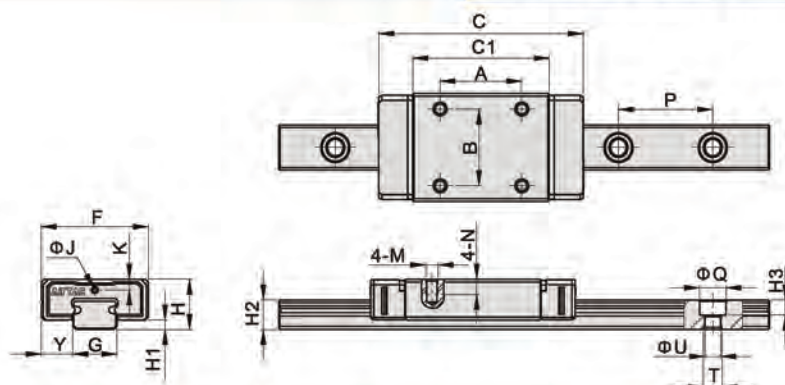
Model	Standard rail length(L)	Maximum length(L max)
LRM5	40 55 70 85 100 115 130 145	490
LRM7	40 55 70 85 100 115 130 145 160 175 190 205 220 235 250	985
LRM9	55 75 95 115 135 155 175 195 215 235 255 275 295 315 335 355 375 395	995
LRM12	70 95 120 145 170 195 220 245 270 295 320 345 370 395 420 445 470 495	995
LRM15	70 110 150 190 230 270 310 350 390 430 470 510	990

Model	Pitch(P)	Standard rail mounting hole position(A)	Min. rail mounting hole position(S/E min)	Max. rail mounting hole position(S/E max)
LRM5	15	5	3	10
LRM7	15	5	3	10
LRM9	20	7.5	4	15
LRM12	25	10	4	20
LRM15	40	15	4	35

[Note] More than one rails need to be connected, if the required rail length exceeds Lmax.

Unit: mm

### Specifications and Dimensions



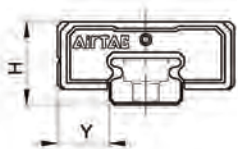
Unit: mm

Model	External Dimension				Block Dimension							Rail Dimension							
	H	H1	F	Y	C	C1	A	B	M	N	K	ΦJ	G	H2	P	ΦQ	ΦU	H3	T
LRM5N	6	1	12	3.5	17.8	9.6	-	8	M2	1.5	1.3	0.7	5	3.5	15	3.5	2.2	1.1	M2.5X0.45
LRM5L	6	1	12	3.5	20.8	12.6	7	8	M2	1.5	1.3	0.7	5	3.5	15	3.5	2.2	1.1	M2.5X0.45
LRM7N	8	1.5	17	5	24.3	13.5	8	12	M2	2.5	1.7	0.7	7	4.7	15	4.2	2.4	2.4	M3X0.5
LRM7L	8	1.5	17	5	32.5	21.7	13	12	M2	2.5	1.7	0.7	7	4.7	15	4.2	2.4	2.4	M3X0.5
LRM9N	10	2	20	5.5	31	18.9	10	15	M3	3	2.2	1	9	5.6	20	6	3.4	3.4	M4X0.7
LRM9L	10	2	20	5.5	42.1	30	16	15	M3	3	2.2	1	9	5.6	20	6	3.4	3.4	M4X0.7
LRM12N	13	3	27	7.5	37.6	21.7	15	20	M3	4.5	3	1.5	12	7.5	25	6	3.4	4.4	M4X0.7
LRM12L	13	3	27	7.5	48.4	32.5	20	20	M3	4.5	3	1.5	12	7.5	25	6	3.4	4.4	M4X0.7
LRM15N	16	3.5	32	8.5	48	28	20	25	M3	5.5	3.7	M3	15	9.5	40	6	3.4	4.4	M4X0.7
LRM15L	16	3.5	32	8.5	65	45	25	25	M3	5.5	3.7	M3	15	9.5	40	6	3.4	4.4	M4X0.7

Model	Mounting Screw	Load Rating (kN)		Static Rated Moment (N.m)			Weight	
		C <sub>1000</sub>	C <sub>0</sub>	M <sub>r</sub>	M <sub>p</sub>	M <sub>v</sub>	Block(kg)	Rail(kg/m)
LRM5N	M2	0.33	0.55	1.68	0.99	0.99	0.0035	0.114
LRM5L	M2	0.48	0.9	2.4	2.08	2.08	0.004	0.114
LRM7N	M2	1.02	1.53	5.42	3.17	3.17	0.009	0.22
LRM7L	M2	1.43	2.45	9.27	7.96	7.96	0.014	0.22
LRM9N	M3	1.97	2.6	11.84	8.19	8.19	0.018	0.315
LRM9L	M3	2.61	4.11	19.73	18.94	18.94	0.027	0.315
LRM12N	M3	3.04	3.86	23.63	12.57	12.57	0.037	0.602
LRM12L	M3	3.96	5.9	40.96	32.57	32.57	0.053	0.602
LRM15N	M3	4.27	5.7	45.05	23.05	23.05	0.054	0.981
LRM15L	M3	6.53	9.53	70.08	63.69	63.69	0.088	0.981

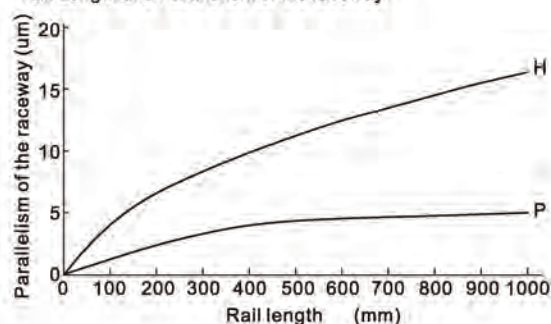
### Accuracy Classes

LRM miniature linear guide comes with 2 kinds of accuracy levels.



Accuracy Standards (mm)		
Accuracy classes	H: High	P: Precision
Dimensional tolerance of H	±0.02	±0.01
Variation of heights ΔH	0.015	0.007
Dimensional tolerance of Y	±0.025	±0.015
Variation of widths ΔY	0.02	0.01

Rail Length and Parallelism of the raceway



### Preload Classes

The LRM Miniature Linear Guide has two preload categories: A and B.

Adding appropriate preload levels would enhance rigidity, precision and torsion resistant performance of the linear guide.

Preload Level	Code	Preload Clearance (um)					Application
		5	7	9	12	15	
Clearance	A	+3~0	+4~0	+4~0	+5~0	+6~0	Smooth operation
Light Preloaded	B	0~-1	0~-3	0~-4	0~-5	0~-6	High Precision

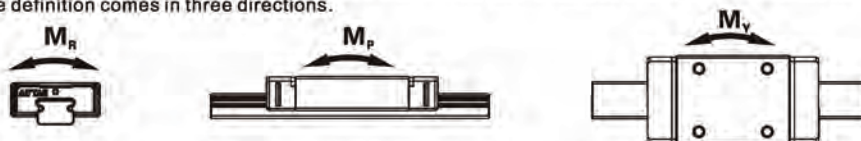
### Load Capacity and Rating Life

#### 1. Static Load Rating(C<sub>0</sub>)

The magnitude of static load that results in total permanent deformation of ball and raceway equals to 0.0001 times of ball diameter.

#### 2. Static Permissible Moment(M<sub>0</sub>)

When the steel ball subjected to the maximum stress in the slider reaches a static rated load condition, this loading moment is called the "Static permissible moment". The definition comes in three directions.



#### 3. Static Safety Factor(S<sub>0</sub>)

Impact, vibration and inertial loading during start and stop moment lead to unexpected load on the linear guide way. Therefore, when calculating the static load, safety factors must be considered.

Load Condition	S <sub>0</sub>
Normal Load	1.0~2.0
Load with Impacts or Vibrations	2.0~3.0

$$S_0 = \frac{C_0}{P} = \frac{M_0}{M}$$

S<sub>0</sub> : Static safety factor  
 C<sub>0</sub> : Static load rating (kN)  
 M<sub>0</sub> : Static permissible moment (kN.m)  
 P : Calculated working load (kN)  
 M : Calculated applying moment (kN.m)

#### 4. Load Factor(f<sub>w</sub>)

The loads acting on a linear guide way include the weight of block, the inertia load at the times of start and stop, and the moment loads caused by overhanging. Therefore, the load on a linear guide way should be divided by the empirical factor.

Loading condition	Service speed	f <sub>w</sub>
No impacts & vibration	V ≤ 15m/min	1~1.2
Small impacts	15m/min < V ≤ 60m/min	1.2~1.5
Normal load	60m/min < V ≤ 120m/min	1.5~2.0
With impacts & vibration	V > 120m/min	2.0~3.5

#### 5. Dynamic Load Rating(C<sub>100B</sub>)

C<sub>100B</sub>: (According to ISO 14728-1) As the direction and magnitude remains the same, C<sub>100B</sub> is the maximum workload for the product to maintain its nominal life at 100km of operation.

## LRM Series

### 6. Calculation of Nominal Life(L)

Recognizing that nominal life of a linear guide is affected by the actual working loads, the general calculation of the nominal life excluding the environmental factors is carried out as follow: :

$$L = \left( \frac{C_{1000}}{f_w \times P} \right)^3 \times 10^6$$

L = Nominal Life (m)

$C_{1000}$  = Dynamic Load Rating (N)

$f_w$ : Load Factor

P = Equivalent load (N)

Taking LRM9N for example, its  $C_{1000}$  is 1.97kN. Therefore, when the product bears a 1.5kN equivalent load P,  $f_w=1$ , its theoretical rated life can be calculated as follows:

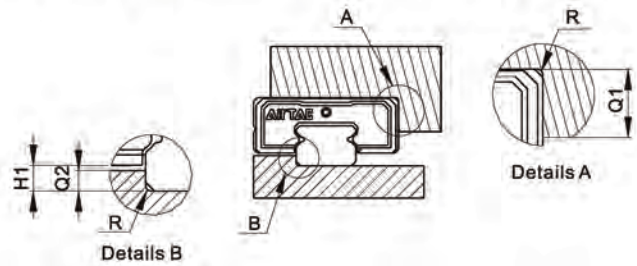
$$L = \left( \frac{C_{1000}}{f_w \times P} \right)^3 \times 10^6 = \left( \frac{1.97}{1 \times 1.5} \right)^3 \times 10^6 = 226529 \text{ m} = 226.5 \text{ km}$$

## Installation Illustration

### 1. Height and Chamfer of Reference Edge

In order to ensure accurate assembly of LRM Linear Guide system, the corners of the datum edges can not exceed the recommended value in the following table.

Model	Q1	Q2	H1	R
LRM5	1.4	0.7	1	0.2
LRM7	5.5	1.2	1.5	0.2
LRM9	7	1.7	2	0.3
LRM12	9	2.7	3	0.4
LRM15	10	3.2	3.5	0.5



### 2. Screw Fastening Torque

Screw size	Screw fastening torque(N.m)	
	Stainless Steel	Carbon steel
M2	0.31	0.6
M3	1.1	1.3
M4	2.5	2.9

### 3. Datum plane

- The datum plane should be grounded or finely milled to ensure the promised accuracy.
- Rail : Both sides can be used as the datum plane.
- Block : Both sides can be used as the datum plane.
- In order to better achieve the walking accuracy, working with the same datum plane is recommended when mounting more than one blocks onto the rail

### 4. Lubrication

When the linear guide works in a good state of lubrication, it can reduce wear significantly and increase the rating life.

Lubricants have the following effects :

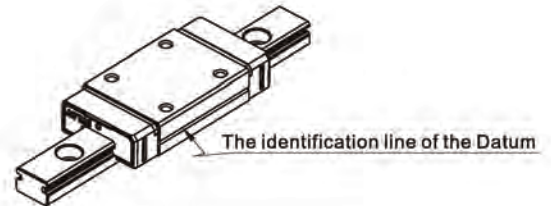
- Reduce the friction between the rolling element and the contact surface to minimize the wear.
- The formation of oil film between the contact surfaces can extend the rolling fatigue life.
- Prevent rust.

### 5. Lubrication Method

1. Please refer to the following table for oiling.
2. After greasing, move the blocks back and forth to distributes the oil evenly.
3. Lubrication can be done either manually or automatically.

Model	Initial lubrication (cm <sup>3</sup> )	Lubricant supplement (cm <sup>3</sup> )
LRM5N	0.02	0.01
LRM5L	0.03	0.015
LRM7N	0.1	0.05
LRM7L	0.13	0.07
LRM9N	0.2	0.1
LRM9L	0.28	0.14
LRM12N	0.34	0.17
LRM12L	0.45	0.23
LRM15N	0.72	0.36
LRM15L	1.0	0.50

lubrication Note: In order to prevent deterioration, please avoid mixing different types of oil.

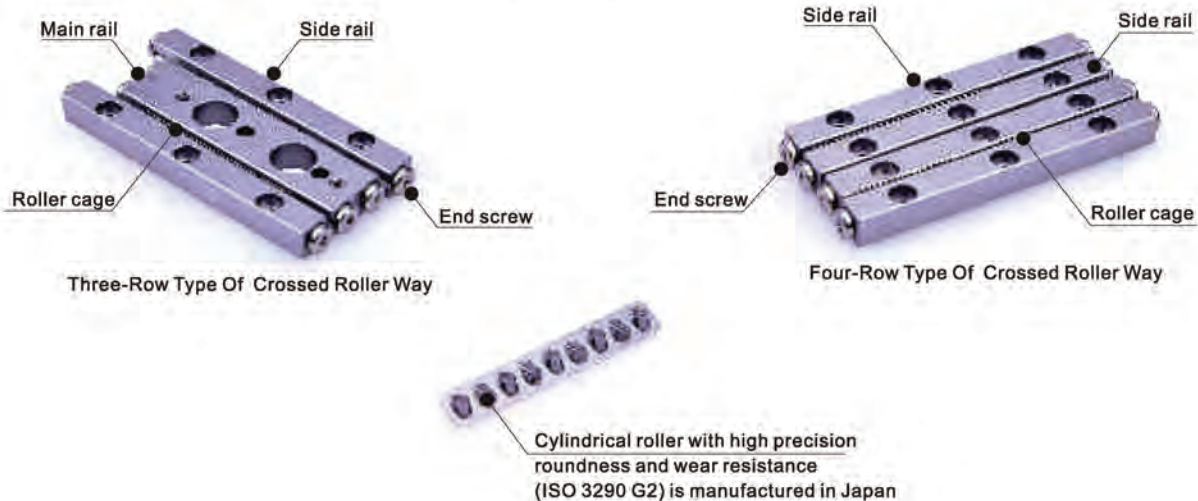




# LGC Series Crossed Roller Way

## Product Introduction

Crossed roller way provides non-cyclic linear motion with high rigidity and high accuracy. By alternately arranging the cylindrical rollers in an orthogonal manner, it reduces the friction between rolling medium. With a highly rigidified rail structure, the crossed roller way is advanced in working under higher loads and precision environment. The crossed roller way is widely used in high accuracy equipment and measuring instruments such as printer circuit board, distilling machine, optic measuring machines, optical stages and X-ray machines



## Order Information

LGC 3 A 200 R25 - H

① ② ③ ④ ⑤ ⑥



① Model Code	LGC : Crossed Roller Way
② Roller Diameter	1: $\Phi$ 1.5mm 2: $\Phi$ 2.0mm 3: $\Phi$ 3.0mm 4: $\Phi$ 4.0mm 6: $\Phi$ 6.0mm
③ Type [Note]	A: three-row type [Note] B: Four-row type
④ Rail dimension	200: rail length 200X100: main rail length is 200mm/side rail length is 100mm [Reference to spec. table for detail]
⑤ The number of rollers in each roller cage	R25: 25 rollers ..... [Reference to spec. table for detail]
⑥ Accuracy class	H : High-accuracy grade P : Precision grade

[Note] LGC6: only for type B.



### Cross Reference Table for Maximun Stroke & Roller numbers

LGC1 Max. Stroke (mm)	The quantity of rollers in one roller cage									
	R6	R7	R8	R9	R10	R11	R13	R16	R19	
Shortest length of rails (mm)	20	12	7	-	-	-	-	-	-	
	30	-	-	22	17	12	7	-	-	
	40	-	-	-	-	-	27	17	-	
	50	-	-	-	-	-	-	37	22	
	60	-	-	-	-	-	-	-	42	
	70	-	-	-	-	-	-	-	-	47
	80	-	-	-	-	-	-	-	-	67

The standard quantity of rollers

Alternative options of the quantity of rollers

LGC3 Max. Stroke (mm)	The quantity of rollers in one roller cage															
	R7	R8	R9	R10	R11	R13	R16	R19	R22	R25	R28	R32	R36	R40		
Shortest length of rails (mm)	50	34	24	14	-	-	-	-	-	-	-	-	-	-		
	75	-	-	-	54	44	24	-	-	-	-	-	-	-		
	100	-	-	-	-	-	74	44	-	-	-	-	-	-		
	125	-	-	-	-	-	-	94	64	-	-	-	-	-		
	150	-	-	-	-	-	-	-	114	84	54	-	-	-		
	175	-	-	-	-	-	-	-	-	134	104	74	-	-		
	200	-	-	-	-	-	-	-	-	-	154	124	84	-		
	225	-	-	-	-	-	-	-	-	-	-	174	134	94		
	250	-	-	-	-	-	-	-	-	-	-	-	184	144	104	
	275	-	-	-	-	-	-	-	-	-	-	-	-	234	194	154
	300	-	-	-	-	-	-	-	-	-	-	-	-	-	244	204

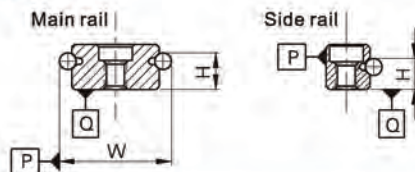
LGC2 Max. Stroke (mm)	The quantity of rollers in one roller cage														
	R6	R7	R8	R9	R10	R11	R13	R16	R19	R22	R25	R28	R32	R36	
Shortest length of rails (mm)	30	16	8	-	-	-	-	-	-	-	-	-	-	-	
	45	-	-	30	22	14	-	-	-	-	-	-	-	-	
	60	-	-	-	-	-	36	20	-	-	-	-	-	-	
	75	-	-	-	-	-	-	50	26	-	-	-	-	-	
	90	-	-	-	-	-	-	-	56	32	-	-	-	-	
	105	-	-	-	-	-	-	-	-	62	38	-	-	-	
	120	-	-	-	-	-	-	-	-	-	68	44	-	-	
	135	-	-	-	-	-	-	-	-	-	98	74	50	-	
	150	-	-	-	-	-	-	-	-	-	-	104	80	48	
	165	-	-	-	-	-	-	-	-	-	-	-	110	78	45
	180	-	-	-	-	-	-	-	-	-	-	-	-	140	108

LGC4 Max. Stroke (mm)	The quantity of rollers in one roller cage															
	R8	R9	R10	R11	R13	R16	R19	R22	R25	R28	R32	R36	R40	R45		
Shortest length of rails (mm)	80	54	40	26	-	-	-	-	-	-	-	-	-	-		
	120	-	-	-	92	64	-	-	-	-	-	-	-	-		
	160	-	-	-	-	-	102	60	-	-	-	-	-	-		
	200	-	-	-	-	-	-	140	98	56	-	-	-	-		
	240	-	-	-	-	-	-	-	178	136	94	-	-	-		
	280	-	-	-	-	-	-	-	-	216	174	118	-	-		
	320	-	-	-	-	-	-	-	-	-	254	198	142	86		
	360	-	-	-	-	-	-	-	-	-	-	278	222	166	96	
	400	-	-	-	-	-	-	-	-	-	-	-	358	302	246	176
	440	-	-	-	-	-	-	-	-	-	-	-	-	382	326	256
	480	-	-	-	-	-	-	-	-	-	-	-	-	-	406	336

LGC6 Max. Stroke (mm)	The quantity of rollers in one roller cage														
	R8	R9	R11	R13	R16	R19	R22	R25	R28	R32	R36	R40	R45		
Shortest length of rails (mm)	100	62	44	-	-	-	-	-	-	-	-	-	-		
	150	-	-	108	72	-	-	-	-	-	-	-	-		
	200	-	-	-	-	118	64	-	-	-	-	-	-		
	250	-	-	-	-	-	164	110	56	-	-	-	-		
	300	-	-	-	-	-	-	210	156	102	-	-	-		
	350	-	-	-	-	-	-	-	256	202	130	-	-		
	400	-	-	-	-	-	-	-	-	302	230	158	-		
	450	-	-	-	-	-	-	-	-	-	330	258	186		
	500	-	-	-	-	-	-	-	-	-	-	358	286	196	
	550	-	-	-	-	-	-	-	-	-	-	-	458	386	296
	600	-	-	-	-	-	-	-	-	-	-	-	-	486	396

### Accuracy Class of Raceway

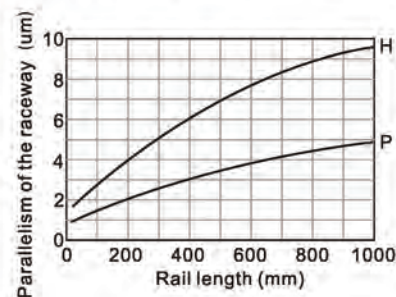
#### Accuracy Class



Unit: mm

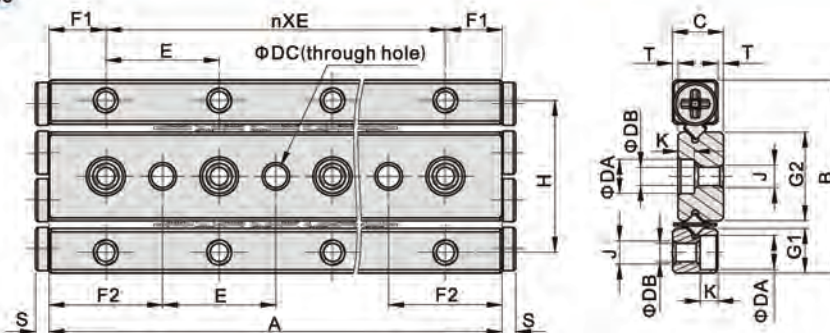
Item	High-accuracy grade(H)	Precision grade(P)
Dimensional tolerance of height H	±0.02	±0.01
Variation of heights H	0.01	0.005
Dimensional tolerance of width W	±0.02	±0.01

#### Rail Length and Parallelism of The Raceway



### Specification Table

#### Dimensions of Three-row Type

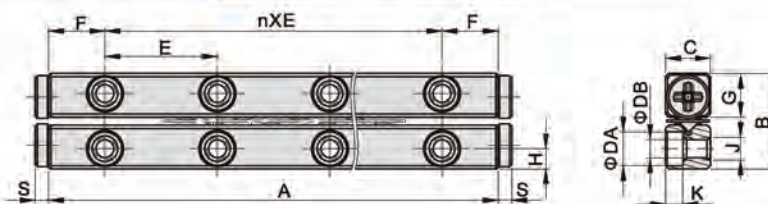


Model\Item	A	B	C	φDA	φDB	φDC	nXE	F1	F2	G1	G2	H	J	K	S	T
LGC1A20	20	17	4.5	3.0	1.6	2 <sup>+0.01</sup>	1X10	5	10	3.9	7.8	13.4	M2X0.4	1.4	1.2	0.5
LGC1A30	30						2X10									
LGC1A40	40						3X10									
LGC1A50	50						4X10									
LGC1A60	60						5X10									
LGC1A70	70						6X10									
LGC1A80	80						7X10									
LGC2A30	30	24	6.5	4.4	2.5	3 <sup>+0.01</sup>	1X15	7.5	15	5.5	11	19	M3X0.5	2.1	1.5	0.5
LGC2A45	45						2X15									
LGC2A60	60						3X15									
LGC2A75	75						4X15									
LGC2A90	90						5X15									
LGC2A105	105						6X15									
LGC2A120	120						7X15									
LGC2A135	135						8X15									
LGC2A150	150						9X15									
LGC2A165	165						10X15									
LGC2A180	180						11X15									
LGC3A50	50	36	8.5	6.0	3.3	4 <sup>+0.012</sup>	1X25	12.5	25	8.3	16.6	29	M4X0.7	3.2	2	0.5
LGC3A75	75						2X25									
LGC3A100	100						3X25									
LGC3A125	125						4X25									
LGC3A150	150						5X25									
LGC3A175	175						6X25									
LGC3A200	200						7X25									
LGC3A225	225						8X25									
LGC3A250	250						9X25									
LGC3A275	275						10X25									
LGC3A300	300						11X25									
LGC4A80	80	44	11.5	7.5	4.3	5 <sup>+0.012</sup>	1X40	20	40	10	20	35	M5X0.8	4.2	2	0.5
LGC4A120	120						2X40									
LGC4A160	160						3X40									
LGC4A200	200						4X40									
LGC4A240	240						5X40									
LGC4A280	280						6X40									
LGC4A320	320						7X40									
LGC4A360	360						8X40									
LGC4A400	400						9X40									
LGC4A440	440						10X40									
LGC4A480	480						11X40									

[Note] One set includes one main rail, two side rails, two roller cages, and the corresponding screws for mounting.

### Specification Table

Dimensions of Four-row Type



Model/Item	A	B	C	φDA	φDB	nXE	F	G	H	J	K	S
LGC1B20	20	8.5	4	3.0	1.6	1X10	5	3.9	1.8	M2X0.4	1.4	1.2
LGC1B30	30					2X10						
LGC1B40	40					3X10						
LGC1B50	50					4X10						
LGC1B60	60					5X10						
LGC1B70	70					6X10						
LGC1B80	80					7X10						
LGC2B30	30	12	6	4.4	2.5	1X15	7.5	5.5	2.5	M3X0.5	2.1	1.5
LGC2B45	45					2X15						
LGC2B60	60					3X15						
LGC2B75	75					4X15						
LGC2B90	90					5X15						
LGC2B105	105					6X15						
LGC2B120	120					7X15						
LGC2B135	135					8X15						
LGC2B150	150					9X15						
LGC2B165	165					10X15						
LGC2B180	180					11X15						
LGC3B50	50	18	8	6.0	3.3	1X25	12.5	8.3	3.5	M4X0.7	3.2	2
LGC3B75	75					2X25						
LGC3B100	100					3X25						
LGC3B125	125					4X25						
LGC3B150	150					5X25						
LGC3B175	175					6X25						
LGC3B200	200					7X25						
LGC3B225	225					8X25						
LGC3B250	250					9X25						
LGC3B275	275					10X25						
LGC3B300	300					11X25						
LGC4B80	80	22	11	7.5	4.3	1X40	20	10	4.5	M5X0.8	4.2	2
LGC4B120	120					2X40						
LGC4B160	160					3X40						
LGC4B200	200					4X40						
LGC4B240	240					5X40						
LGC4B280	280					6X40						
LGC4B320	320					7X40						
LGC4B360	360					8X40						
LGC4B400	400					9X40						
LGC4B440	440					10X40						
LGC4B480	480					11X40						
LGC6B100	100	31	15	9.5	5.2	1X50	25	14.7	6	M6X1.0	5.2	3
LGC6B150	150					2X50						
LGC6B200	200					3X50						
LGC6B250	250					4X50						
LGC6B300	300					5X50						
LGC6B350	350					6X50						
LGC6B400	400					7X50						
LGC6B450	450					8X50						
LGC6B500	500					9X50						
LGC6B550	550					10X50						
LGC6B600	600					11X50						

[Note] One set includes four side rails, two roller cages, and the corresponding screws for mounting.

### Roller Cage Ordering Information

LGC 3 R25



① Model Code	LGC : Crossed Roller Way
② Roller Diameter	1: $\Phi$ 1.5mm 2: $\Phi$ 2.0mm 3: $\Phi$ 3.0mm 4: $\Phi$ 4.0mm 5: $\Phi$ 6.0mm
③ The number of rollers	R25:25 rollers .... [Reference to spec. table for detail]

### Specification Table

#### Informations of Roller Cage



Model\Item	P	R	Basic Dynamic Load Rating (C1)	Basic Static Load Rating (C0)	Allowable Load (F0)	Model\Item	P	R	Basic Dynamic Load Rating (C1)	Basic Static Load Rating (C0)	Allowable Load (F0)
LGC1R6		6	125N per roller	120N per roller	39N per roller	LGC4R8		8	1230N per roller	1170N per roller	390N per roller
LGC1R7		7				LGC4R9		9			
LGC1R8		8				LGC4R10		10			
LGC1R9		9				LGC4R11		11			
LGC1R10	2.5	10				LGC4R13		13			
LGC1R11		11				LGC4R16		16			
LGC1R13		13				LGC4R19		19			
LGC1R16		16				LGC4R22	7	22			
LGC1R19		19				LGC4R25		25			
LGC2R6		6	292N per roller	290N per roller	97N per roller	LGC4R28		28	3175N per roller	2550N per roller	810N per roller
LGC2R7		7				LGC4R32		32			
LGC2R8		8				LGC4R36		36			
LGC2R9		9				LGC4R40		40			
LGC2R10		10				LGC4R45		45			
LGC2R11		11				LGC6R8		8			
LGC2R13		13				LGC6R9		9			
LGC2R16	4	16				LGC6R11		11			
LGC2R19		19				LGC6R13		13			
LGC2R22		22				LGC6R16		16			
LGC2R25		25				LGC6R19		19			
LGC2R28		28				LGC6R22	9	22			
LGC2R32		32				LGC6R25		25			
LGC2R36		36				LGC6R28		28			
LGC3R7		7	640N per roller	610N per roller	203N per roller	LGC6R32		32			
LGC3R8		8				LGC6R36		36			
LGC3R9		9				LGC6R40		40			
LGC3R10		10				LGC6R45		45			
LGC3R11		11									
LGC3R13		13									
LGC3R16		16									
LGC3R19	5	19									
LGC3R22		22									
LGC3R25		25									
LGC3R28		28									
LGC3R32		32									
LGC3R36		36									
LGC3R40		40									

### User Manual

#### Load Rating

Load direction	Vertical load		Lateral load	
Type	Three-Row type	Four-Row type	Three-Row type	Four-Row type
Schematic				
Basic dynamic load rating - Ca (N)	$Ca = \left\{ 2P \times \left( \frac{R}{2} - 1 \right) \right\}^{\frac{1}{36}} \times \left( \frac{R}{2} \right)^{\frac{3}{4}} \times C1$ * Effective roller number R/2: rounded to the nearest whole number (EX: 5/2=2.5, take 2)		$Ca = \left\{ 2P \times \left( \frac{R}{2} - 1 \right) \right\}^{\frac{1}{36}} \times \left( \frac{R}{2} \right)^{\frac{3}{4}} \times 2^{\frac{7}{9}} \times C1$ * Effective roller number R/2: rounded to the nearest whole number (EX: 5/2=2.5, take 2)	
Basic Static load rating - Ca0 (N)	Ca0=R × C0		Ca0=R × C0	
Allowable load-Fa0 (N)	Fa0=R × F0		Fa0=R × F0	

P: Inter-pitch dimensions of cylindrical rollers (mm)  
 R: The number of cylindrical rollers incorporated in a roller cage  
 C1: Basic dynamic load rating per cylindrical roller (N)  
 C0: Basic static load rating per cylindrical roller (N)  
 F0: Allowable load per cylindrical roller (N)

Ex: Calculate LGC3A180R25 basic load rating  
 From specification table (Information of Roller Cage)  
 Inter-pitch dimensions of cylindrical rollers: P = 5 mm  
 The number of cylindrical rollers incorporated in a roller cage: R = 25  
 Basic dynamic load rating per cylindrical roller: C1 = 640 N  
 Basic static load rating per cylindrical roller: C0 = 610 N  
 Allowable load per cylindrical roller: F0 = 203 N  
 Effective roller number R/2 = 12.5, take 12  
 Take these parameters into calculation, we can get  
 For upward and downward load: Basic dynamic load rating Ca = 4,701.88 N;  
 Basic Static load rating Ca0 = 15,250 N;  
 Allowable load Fa0 = 5,075 N;  
 For Lateral load: Basic dynamic load rating Ca = 8,061.31 N;  
 Basic Static load rating Ca0 = 15,250 N;  
 Allowable load Fa0 = 5,075 N.

#### Static Safety Factor(S<sub>0</sub>)

Realizing that for any unexpected start or stop caused by external forces when the crossed roller way is at rest or in motion, it is necessary to consider a static safety factors against the work loads.

Load Condition	S <sub>0</sub>
Normal Load	1.0~1.3
Load with Impacts or Vibrations	2.0~3.0

$$S_0 = \frac{Ca0}{F}$$
  
 S<sub>0</sub>: Static safety factor  
 Ca0: Basic static load rating (kN)  
 F: Calculated working load (kN)

#### Nominal Life(L)

Nominal life is calculated as follow:

$$L = \left( \frac{f_t}{f_w} \cdot \frac{C}{F} \right)^{\frac{10}{3}} \times 100$$

L: Nominal life (km)  
 C: Basic dynamic load rating (kN)  
 F: Calculated working load (kN)  
 f<sub>t</sub>: Temperature factor (Reference to Temperature Factor Chart)  
 f<sub>w</sub>: Load factor (Reference to Load Factor Table)

#### Calculating the Service Life Time(L<sub>n</sub>)

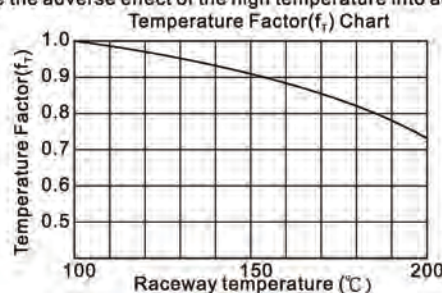
Based on the calculated nominal life, the Service Life Time is obtained through the following equation as if the stroke length and the value of reciprocations per minutes remain constant.

$$L_n = \frac{L \times 10^4}{2 \times \iota \times m \times 60}$$

L<sub>n</sub>: Service life time (h)  
 ι: Stroke length (mm)  
 m: Number of reciprocations per minute (min<sup>-1</sup>)

#### Temperature Factor(f<sub>t</sub>)

If the environmental temperature exceeds 100°C, take the adverse effect of the high temperature into account by multiplying the basic load ratings by the temperature factor.



## LGC Series

### Load Factor( $f_w$ )

In general, reciprocating machines tend to involve vibrations or impact during operation. It is extremely difficult to accurately determine the impact caused by high-speed motion or frequent start and stop motion. However, the calibrated load can be expected by experience. The basic load rating( $C_a$  or  $C_{a0}$ ) divide into load factor( $f_w$ ) in the following table to calibrate from speed effect and vibrations.

Load Factor Table		
Vibrations/Impact	Speed(V)	$f_w$
Faint	$V \leq 0.25\text{m/s}$	1~1.2
Weak	$0.25 < V \leq 1\text{m/s}$	1.2~1.5

### Stroke

When the crossed roller way is in motion, the roller cage will move about half the travel distance of the work platform in the same direction at the same time. The distance from the loading center to the center of roller cage will change based on the work load of the platform.

Therefore, in order to maintain the stability and accuracy of the crossed roller way, please follow the instructions in Cross Reference Table for Max. stroke & Roller Numbers.

EX : Roller diameter is 6 mm, High-accuracy grade, the length of rails are 300mm and 200mm, and the required working stroke length is 50mm.

According to the specification (Cross Reference Table for Max. Stroke & Roller Numbers), The admissible numbers of roller are 16 and 19 with the shortest length of rails in 200 mm. Then, the maximum stroke length, 118 mm and 64 mm, are both longer than working stroke length which is 50mm.

→ Satisfying user requirement.

### Mounting Screw

Tightening torque for fixing screw

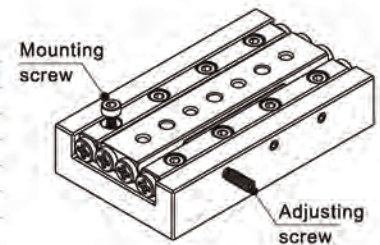
Identification number	Bolt size	Tightening torque(N.m)
LGC1	M1.4X0.3PX6L	0.14
LGC2	M2.0X0.4PX8L	0.40
LGC3	M3.0X0.5PX9.5L	1.40
LGC4	M4.0X0.7PX16L	3.20
LGC6	M5.0X0.8PX20L	6.60

※High strength screw is preferred.

### Adjusting Screw

Tightening torque for fixing screw

Identification number	Bolt size	Tightening torque(N.m)
LGC1	M2	0.008
LGC2	M3	0.012
LGC3	M4	0.05
LGC4	M4	0.08
LGC6	M5	0.2



## Precautions on use

#### 1. Handle with caution:

Dropping the crossed roller way may cause damages on the rolling surface, hence affects the accuracy or smooth motion.

#### 2. Adjustment:

Fail to adjust the preload or mounting surfaces correctly will affect the product lifetime and accuracy. Make sure to assemble, install, and adjust the product with care. Appropriate preload will help with rigidity and accuracy; yet overloading the crossed roller way will result in damages and deformation. On installation, please follow the installation procedure and recommended torque.

#### 3. Use as a Set:

The accuracy of the rails has been matched within each set. The accuracy will differ when combining products of different sets

#### 4. Allowable Load:

The allowable load is a load under which the sum of elastic deformations of the rolling element and the raceway in the contact area subject to the maximum contact stress is small enough to guarantee smooth rolling movement. When very smooth and highly accurate linear motion is required, make sure to use the product within the allowable load.

#### 5. Cage Slippage:

The roller cage can slip under high speed motion, vertical application, unbalanced-loading, and vibrating conditions.

It is advised to avoid excessive workloads. Also, setting the stroke within its maximum allowance with safety factors taken into account will help avoid extrusion and damages on the product.



## Summary of actuator components

To make system realize the best performance, advanced actuator components are necessary. AirTAC has many types of actuator components for your choice:

NO.	Sort name	Series name								
1	Standard cylinder	SE Series	SAI Series	SGC Series	SAU Series	SC Series	JSI Series			
2	Mini cylinder	MI Series	PB Series	MF Series	MG Series	MA Series	MBL Series			
3	Compact cylinder	ACE Series	ACQ Series	SDA Series						
4	Multi-mounting cylinder	MU Series	MD Series	MK Series						
5	Plate Cylinder	MPG Series								
6	Threaded Cylinder	MPE Series								
7	Twin-rod cylinder	TN Series	TR Series							
8	Multi-rod cylinder	TCL Series	TCM Series							
9	Slide table cylinder	HGS Series	HLH Series	HLQ Series	HLS Series	HLF Series				
10	Rodless magnetic cylinder	RMS Series	RMT Series	RMTL Series	RMH Series					
11	Rotary table cylinder	HRQ Series								
12	Air gripper	HFT Series	HFZ Series	HFK Series	HFP Series	HFY Series	HFR Series	HFC Series	HFCQ Series	HFD Series
		HFKL Series	HFKP Series							
13	Rotary clamp cylinder	QCK Series	QDK Series							
14	Camping cylinder	MCK Series	JCK Series							
15	Pin camping cylinder	AQK Series	BAQK Series							
16	Cylinder joint accessory	I Knuckle	Y Knuckle	Floating joint	Universal joint					
17	Shock absorber	ACA Series	ACJ Series							
18	Sensor switch	DMSG Series	DMSH Series	DMSE Series	DMSJ Series	CMSG Series	CMSH Series	CMSE Series	CMSJ Series	

## Product selection

### ① Confirm the internal diameter of the cylinder

- A) Axial load thrust of the cylinder shall be confirmed according to the actual load situation of the required cylinder.
- B) Load rate  $\eta$  of the cylinder shall be confirmed according to the action situation of the load.  
 Load rate has relationship with action speed of the cylinder, which is generally recommended as:  
 Under static load or low speed:  $\eta \leq 0.7$   
 Speed 50~500mm/s:  $\eta \leq 0.5$   
 When speed > 500mm/s:  $\eta \leq 0.3$
- C) Working pressure of the cylinder shall be confirmed according to the condition of air supply.

### ② Confirm the cylinder stroke

The stroke of the cylinder is pre-selected upon the operation distance of the cylinder and the stroke ratio of transmission mechanism. To facilitate installing and debugging, the calculated stroke shall be with a proper margin. Standard strokes which can guarantee quick supply and low cost shall be selected as possible as you can.

### ⑤ Confirm whether the cylinder has magnet

Whether the cylinder has sensor switch shall be confirmed according to the actual situation and relative inducting switch shall be selected.

### ④ Selection of buffer way of the cylinder

There are different buffer devices equipped to the cylinders made by our company. Customer shall choose them according to the action situation of actual load. If both of the load and speed are higher, it is difficult to absorb the impact only by the buffer of the cylinder. Therefore, buffer circuit must be designed or use external buffer to release the impact.

### ③ Confirm the cylinder type

The variety of the cylinder shall be selected according to the specific requirements of application and installation of the cylinder.

### ⑥ Selection of installation mode of the cylinder

Installation mode of the cylinder shall be selected according to the application and installation requirements of the cylinder.

### ⑦ Selection of connecting mode of piston rod of the cylinder

After the cylinder is pre-selected, it is necessary to check the stability of piston rod (especially the piston rod is thinner, longer and larger) of the cylinder according to different installation modes and the air consumption under actual application condition shall be checked.

## Maintenance and Service

1. There should be no damage in the sliding parts of the cylinder and piston rod to prevent the air leakage caused by poor action of the cylinder and damage of seal parts of piston rod;
2. If the cylinder is not used for a long time, it shall be regularly actuated and shall be coated with oil to prevent rusting;
3. Please read the relevant content in this manual for the requirement of the cylinder to air quality and application condition, pipeline connection and lubrication.



**Attention**





## Debugging

1. Speed control valve shall be installed at the two sides of the cylinder.

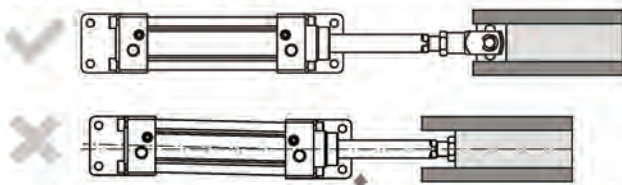
- Check valve shall be opened gradually from completely closed state when the cylinder is debugged and the drive speed of the cylinder shall be gradually and slowly adjusted to the required value.
- There are two ways for installing check valve, including exhaust throttle and inlet throttle. Exhaust throttle is mostly adopted in pneumatic system since cylinder will produce back pressure during work through exhaust throttle and make the moving speed or the adjustment of the speed steady and will avoid impact on cylinder cover caused by sudden and quick propulsion of piston rod when starting.

2. When the cylinder with buffer function is debugged, the cushion valve on the cylinder cover shall be adjusted to the state that the cylinder has no rebound from low to high level according to load and speed. What shall be noticed is not to adjust the buffer to dead state in debugging the stroke, otherwise there will be poor buffer or damage of seals caused by piston under high-speed situation.

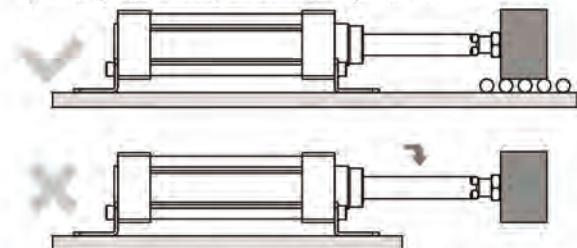


## Installation and Use

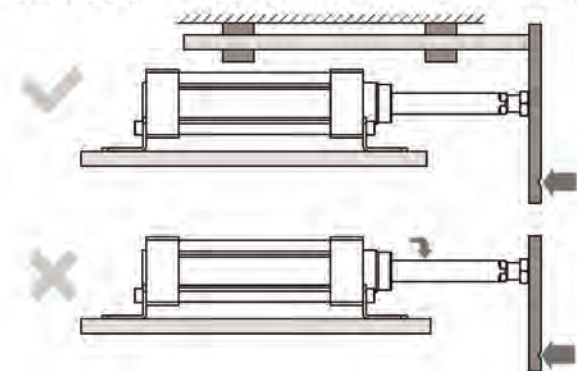
① The axes of piston rod shall accord with the moving direction of load (coaxial). Piston rod and cylinder will produce opposite force which can easily damage the internal surface of the cylinder, guide sleeve, the surface of piston rod and seals.



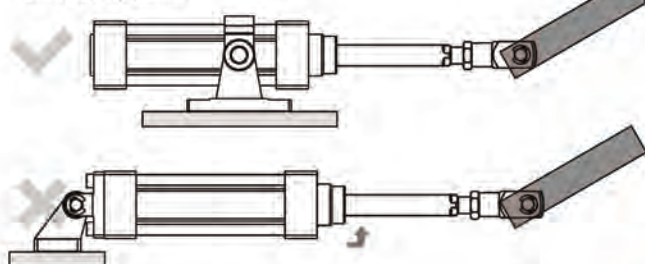
② Avoid direct connection of piston rod and vertical gravity: add idler wheel to support the rail. Piston rod and cylinder will produce opposite force which can easily bend piston rod and damage the internal surface of the cylinder, guide sleeve, the surface of piston rod and seals.



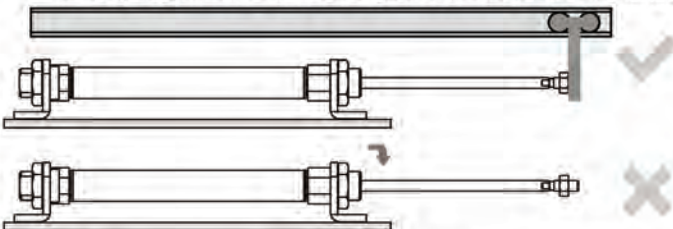
③ If back activity hinge is far from force supply point, piston rod will be influenced by torque force. To prevent that, middle action support shall be used to shorten the distance between support point and force supply point.



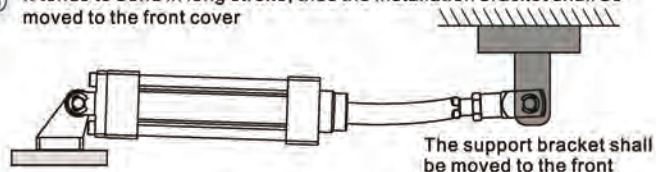
④ To prevent that back activity hinge is far from force supply point, thus the piston rod will be influenced by torque force and change to use middle action support to shorten the long distance between support point and force supply point.



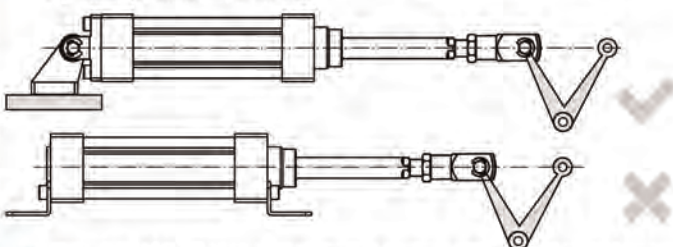
⑤ Long-stroke cylinder shall set middle guide support to prevent natural droop of piston rod and to prevent the damage on piston rod caused by the droop of piston rod, bend of the cylinder, vibration and external load.



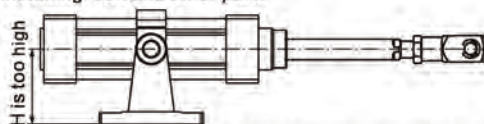
⑥ It tends to bend in long stroke, thus the installation bracket shall be moved to the front cover



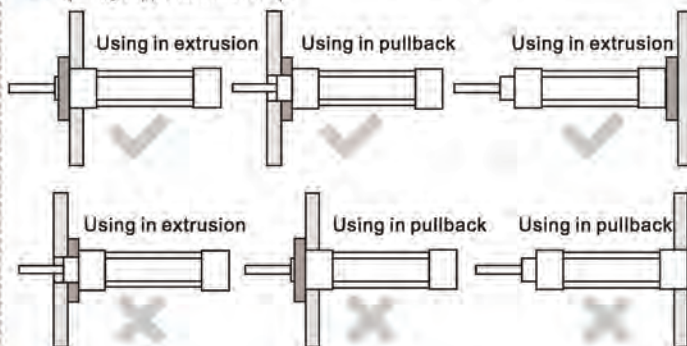
⑦ The fixed cylinder shall not be connected with the rocker carrying out circular action (LB fixation). At this time, it shall be connected with swing cylinder (CA\CB\TC fixation)



⑧ If the height (H) between installation surface of bearing bracket and the position of bearing is too great, when cylinder works, the installation part of the support will produce great torque force, which may cause damage to installing bolt and other parts



⑨ Proper installation shall be adopted considering the direction of load (flange type installation)





# Technology information about actuator

## Cylinder bore size, theory basic speed and corresponding valves list

Bore size (mm)	Theory basic speed (mm/s)	Necessary orifice size (mm <sup>2</sup> )	Corresponding valves				Corresponding accessories		Corresponding tube	
			Single solenoid valve	Double solenoid valve	Single air control valve	Double air control valve	Speed control valve	Silencer		
Φ6	500	0.1								
Φ10	500	0.2								
Φ12	500	0.3								
Φ16	500	0.5								
Φ20	300	0.5								
	400	0.7								
	500	0.8	5V110M5	5V120M5	4A110M5	4A120M5	PTLM5 PSLM5 PSSM5	BSLM5 BSLMM5	Φ4XΦ2.5 tube	
	600	1.0	4V110M5/4V11006 4M110M5/4M11006	4V120M5/4V12006 4M120M5/4M12006	4A110M5 4A11006	4A120M5 4A12006	PTL01 PSL01 PSS01 ASC10006	BSL01 BSLM01 BESL01 PAL01 PALM01		
	700	1.2								
	800	1.3								
Φ25	300	0.8								Φ6XΦ4 tube
	400	1.0								
	500	1.3								
	600	1.5	5V110M5/5V11006 4V110M5/4V11006 4M110M5/4M11006	5V120M5/5V12006 4V120M5/4V12006 4M120M5/4M12006	4A110M5 4A11006	4A120M5 4A12006	PTLM5 PSLM5 PSSM5 PTL01 PSL01 PSS01 ASC10006	BSLM5 BSLMM5 BSL01 BSLM01 BESL01 PAL01 PALM01	Φ8XΦ5 tube	
Φ32	700	1.8								
	800	2.0								
	300	1.3							Φ6XΦ4 tube	
	400	1.7								
Φ40	500	2.1								
	600	2.5	5V11006/5V21006 4V11006/4V21006 4M11006/4M21006	5V12006/5V22006 4V12006/4V22006 4M12006/4M22006	4A11006 4A21006	4A12006 4A22006	PTL01/PSL01 PSS01 ASC10006	BSL(M)01 BESL01 PAL(M)01	Φ8XΦ5 tube	
	700	2.9								
	800	3.4								
Φ50	300	2.0							Φ6XΦ4 tube	
	400	2.6	5V11006/5V21006 5V21008	5V12006/5V22006 5V22008	4A11006	4A12006	PTL01/PSL01 PSS01 ASC10006	BSL01/02 BSLM01/02	Φ8XΦ5 tube	
	500	3.3	4V11006/4V21006 4V21008/4M11006 4M21006/4M21008	4V12006/4V22006 4V22008/4M12006 4M22006/4M22008	4A21006 4A21008	4A22006 4A22008	PTL02/PSL02 PSS02 ASC20008	BESL01/02 PAL01/02 PALM01/02	Φ10XΦ6.5 tube	
	600	3.9								
	700	4.6								
Φ63	800	5.2								
	300	3.1							Φ8XΦ5 tube	
	400	4.1								
	500	5.1	5V21008 4V21008 4M21008	5V22008 4V22008 4M22008	4A21008	4A22008	PTL02 PSL02 PSS02 ASC20008	BSL02 BSLM02 BESL02 PAL02 PALM02	Φ10XΦ6.5 tube	
Φ80	600	6.1								
	700	7.2								
	800	8.3								
	300	4.9	5V21008/5V31008 5V31010	5V22008/5V32008 5V32010	4A21008	4A22008	PTL02 PSL02 PSS02 ASC20008	BSL02/03 BSLM02/03	Φ8XΦ5	
	400	6.5	4V21008/4V31008 4V31010/4M21008 4M31008/4M31010	4V22008/4V32008 4V32010/4M22008 4M32008/4M32010	4A31008 4A31010	4A32008 4A32010	BESL02/03 PAL02/03 PALM02/03	Φ10XΦ6.5 tube		
Φ100	500	8.1								
	600	9.7	5V31008/5V31010 4V31008/4V31010 4M31008/4M31010	5V32008/5V32010 4V32008/4V32010 4M32008/4M32010	4A31008 4A31010	4A32008 4A32010	PTL03 PSL03 PSS03 ASC30010	BESL02/03 PAL02/03 PALM02/03	Φ16XΦ11 tube	
	700	11.4								
	800	13.0								
	300	7.9							Φ10XΦ6.5 tube	
Φ160	400	10.5								
	500	13.1	5V31010 4V31010 4M31010	5V32010 4V32010 4M32010	4A31010	4A32010	PTL03 PSL03 PSS03 ASC30010	BSL03 BSLM03 BESL03 PAL03 PALM03	Φ16XΦ11 tube	
	600	15.7								
	700	18.3								
	800	20.9								
Φ200	300	12.3								
	400	16.4	5V31010 5V41015 4V31010 4V41015 4M31010	5V32010 5V42015 4V32010 4V42015 4M32010	4A31010 4A41015	4A32010 4A42015	PTL03/PSL03 PSS03 ASC30010 PTL04/PSL04 PSS04 ASC30015	BSL03/04 BSLM03/04 BESL03/04 PAL03/04 PALM03/04	Φ16XΦ11 tube	
	500	20.4								
	600	24.5								
	700	28.6								
800	32.7									





# Technology information about actuator

## Production weight(Standard cylinder)

[Unit: g]

SC Series							SGC Series						
Bore size (mm)		32	40	50	63	80	100	Bore size (mm)		125	160	200	250
Without magnet	Weight when stroke is zero	488	611	890	1235	2151	2732	Weight when stroke is zero		7250	13140	17860	30460
With magnet	Weight when stroke is zero	496	624	909	1262	2190	2782	Add weight of per 1mm stroke		13.51	22.12	23.82	36.66
Add weight of per 1mm stroke		2.29	3.15	4.25	5.08	7.92	8.43						

## BSC Series

Series name	BSC Series							BSCD Series								
Bore size (mm)		32	40	50	63	80	100	125		32	40	50	63	80	100	125
Weight when stroke is 25mm		952.7	1191.2	1965.6	2568.8	5399.7	6969.0	11137.2		1069.5	1369.5	2266.4	2864.1	5958.7	7537.6	12134.3
Weight of per 5mm stroke		11.4	15.2	21.8	25.6	39.4	39.6	67.3		15.9	23.2	33.8	37.7	48.4	58.6	98.7
Add weight when with magnet		7.2	12.0	17.4	26.4	36.6	48.0	45.0		7.2	12.0	17.4	26.4	36.6	48.0	45.0

## BSE Series

Series name	BSE Series							BSED Series								
Bore size (mm)		32	40	50	63	80	100	125		32	40	50	63	80	100	125
Weight when stroke is 25mm		1204.6	1451.2	2434.5	3195.1	5985.9	7971.0	13230.7		1315.5	1640.7	2771.9	3537.2	6633.4	8685.8	14672.6
Weight of per 5mm stroke		16.2	23.0	32.5	38.1	53.4	60.7	84.0		20.6	30.8	44.8	50.4	72.5	79.9	115.4
Add weight when with magnet		7.2	12.0	17.4	26.4	36.6	48.0	45.0		7.2	12.0	17.4	26.4	36.6	48.0	45.0

## Production weight(Mini cylinder)

[Unit: g]

### PB Series

Bore size (mm)		4	6	10	12	16	
Without magnet	R	Weight when stroke is zero	10.8	15.4	27.8	38.2	50.2
		Add weight of per 1mm stroke	0.12	0.14	0.23	0.37	0.44
	CB	Weight when stroke is zero	-	-	26.4	43.2	54.3
		Add weight of per 1mm stroke	-	-	0.28	0.38	0.45
With magnet	U	Weight when stroke is zero	-	-	29.9	39.0	47.6
		Add weight of per 1mm stroke	-	-	0.28	0.36	0.44
	R	Weight when stroke is zero	-	24.2	24.2	39.0	48.2
		Add weight of per 1mm stroke	-	0.12	0.23	0.34	0.40
With magnet	CB	Weight when stroke is zero	-	-	27.4	42.4	56.6
		Add weight of per 1mm stroke	-	-	0.22	0.40	0.39
	U	Weight when stroke is zero	-	-	15.6	38.4	47.1
		Add weight of per 1mm stroke	-	-	0.28	0.36	0.44

### MF Series

Bore size (mm)		20	25	32	40
Without magnet	CM	137	204	265	573
	U	126	185	247	538
	CA	136	201	246	576
	CA	140	208	270	538
With magnet	U	129	190	252	548
	CA	139	205	252	586
	Add weight of per 1mm stroke				
		0.68	0.88	1.56	2.16

### MA Series

Bore size (mm)		16	20	25	32	40
With magnet	CA	96	164	219	298	460
	CM	105	181	243	346	520
	U	90	148	203	276	421
	Add weight of per 1mm stroke					
	0.50	0.70	1.10	1.70	2.50	

### MAR Series

Bore size (mm)		20	25	32	40	50	63
Without magnet	F	169.2	246.2	340.4	578.8	806.5	1127.2
	U	171.2	247.6	335.2	581.6	1052.1	1478.8
Add weight of per 1mm stroke		0.75	1.06	1.52	2.43	2.77	3.15

### MBL Series

Series name	MBL/MBLC Series						MSBL/MTBL Series				MBLD/MBLCD Series						MBLJ/MBLCJ Series						
Bore size (mm)		20	25	32	40	50	63	20	25	32	40	20	25	32	40	50	63	20	25	32	40	50	63
U Type without magnet	Stroke=5mm	-	-	-	-	-	-	156.7	197.0	302.3	572.3	-	-	-	-	-	-	-	-	-	-	-	-
	Stroke=10mm	144	181	275	532	769	1055	-	-	-	-	203.6	266.7	352.6	711.6	1025	1299	-	-	-	-	-	-
	Stroke=55mm	-	-	-	-	-	-	212.4	274.7	425.9	740.9	-	-	-	-	-	-	-	-	-	-	-	-
	Stroke=105mm	-	-	-	-	-	-	267.9	351.1	536.5	905.3	-	-	-	-	-	-	-	-	-	-	-	-
Adj. stroke=10mm	Stroke=10mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	252.3	339.5	428.2	850	1164	1437
Add weight of per 5mm stroke		4.4	5.9	7.9	12.2	13.4	15.0	4.4	5.9	7.9	12.2	6.0	6.8	12.5	20.2	21.5	28.7	6.0	6.8	12.5	20.2	21.5	28.7
Add weight when with magnet		4.0	4.8	6.9	11.7	17.3	26.4	4.0	4.8	6.9	11.7	4.0	4.8	6.9	11.7	17.3	26.4	4.0	4.8	6.9	11.7	17.3	26.4
Add weight when CA type		14.9	14.6	10.5	31.4	40.2	37.4	14.9	14.6	10.5	31.4	-	-	-	-	-	-	-	-	-	-	-	-
Add weight of per 10mm adj.stroke		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.8	31.2	33.7	61.4	61.4	61.4





# Technology information about actuator

## Production weight(Compact cylinder)

[Unit: g]

### SDA Series

Bore size (mm)				12	16	20	25	32	40	50	63	80	100
SDA	Without magnet	Female thread	Weight when stroke is zero	29	44	61	70	112	170	273	442	870	1618
		Male thread		32	49	65	79.5	131	215	361	538	-	-
	With magnet	Female thread		48	68	89	109	163	242	379	614	1119	1941
		Add weight of per 1mm stroke			1.3	1.7	2.3	2.9	3.5	5.0	7.2	8.9	13.7

### ACQ Series

Bore size (mm)				12	16	20	25	32	40	50	63	80	100
ACQ	Without magnet	Female thread	Weight when stroke is zero	39	40	56	75.5	106	196	299	498	975	1480
		Male thread		1.5	1.9	2.9	3.5	4.3	5.1	7.5	9.0	14.6	20.6
	With magnet	Female thread		47	76.3	103	122.7	159	269.3	402	683	1168	2177
		Add weight of per 1mm stroke			1.4	1.9	2.8	3.4	4.3	5.1	7.5	9.0	14.6

## Production weight(Multi-mounting cylinder)

[Unit: g]

### MU4 Series

Stroke		4	6	8	10	15	20
Double acting	No thread	6	7	8	9	10	11
	Male thread	7	8	9	10	11	13
Single acting	No thread	6	7	-	-	-	-
	Male thread	7	8	-	-	-	-

### MD Series

Bore size (mm)			10	16	20	25	32
MD	Without magnet	Weight when stroke is zero	31	43	87	165.5	278
	With magnet		32	58	118	211	349
	Add weight of per 1mm stroke		0.8	1.2	2.0	3.2	4.6

### MU6~20 Series

Bore size (mm)		6	8	10	12	16	20	6	8	10	12	16	20	6	8	10	12	16	20	
Stroke		4				5 (Transverse mounting)			Add weight of per 2mm stroke			Add weight of per 5mm stroke			Add weight of per 5mm stroke			Add weight for axial mounting		
Double acting	Female thread	Without magnet	10	12	14	23	37	50	1	1	1.5	5	7	11	2.5	2.5	3	1	1.5	2.5
		With magnet	11	14	16	31	44	67												
	Male thread	Without magnet	11	14	17	26	41	59												
		With magnet	12	16	19	34	49	76												
Single acting	Female thread	Without magnet	11	13	15	30	46	64	1	1	1.5	5	7	11	2.5	2.5	3	1	1.5	2.5
		With magnet	12	14	17	38	54	81												
	Male thread	Without magnet	12	15	18	33	51	73												
		With magnet	13	16	20	41	59	90												

## Production weight(Air gripper)

[Unit: g]

### HFT Series

Bore size	10				16				20				25				32			
Stroke	20	30	40	60	30	40	60	80	40	60	80	100	40	60	80	100	60	80	100	150
Weight	305	340	380	465	585	660	805	950	1020	1225	1460	1660	1615	1890	2190	2480	2750	3130	3685	4650

### HFY Series

Bore size	6	10	16	20	25	32
HFY	23.5	44.5	97.9	172.6	299.4	424.5
HFTY	24.3	44	106	170.5	295	430.5

### HFZ Series

Bore size	6	10	16	20	25	32	40
HFZ	27.5	60	132.4	246.7	460.7	757.5	1350.3
HFTZ	28	60.6	133.4	247	465.5	795	1418.5
HFSZ	27.9	58.5	122.5	234	445	815.1	1445

### HFK Series

Bore size	10	16	20	25	32	40
HFK	58.3	124.4	243.5	456.0	751.0	1335.5
HFTK	60.6	133.3	254.0	466.1	804.7	1431.1
HFSK	60.8	132.7	254.7	465.9	813.1	1446.9

### HFC Series

Bore size	16	20	25	32	40	50	63
HFCI	60	97	138.5	257	355	524.5	927.5
HFCY	60.5	99	139.5	240.5	363	541.5	954
HFCX	65.5	107	154	284	388	573	1027.5





# Technology information about actuator

## Production weight(Rotary clamp cylinder)

[Unit: g]

QCK Series									QDK Series			
Stroke\ Bore size(mm)	12	16	20	25	32	40	50	63	QDK Series		QDK-U Series	
10	75	105	235	300	455	540	920	1350	QDK20	210	QDK20-U	185
20	90	135	280	355	525	635	1060	1540	QDK25	270	QDK25-U	240
30	-	165	330	410	600	730	1200	1725	QDK32	365	QDK32-U	325
50	-	-	-	-	810	915	1480	2100	QDK40	505	QDK40-U	460
Add weight when with clamping arm	15	30	75	75	140	140	340	340				

## Production weight(Twin-rod cylinder and Slide table cylinder)

[Unit: g]

TN Series						TR Series								
Bore size (mm)		10	16	20	25	32	Bore size (mm)		6	10	16	20	25	32
TN	Weight when stroke is zero	121	221	353	534	1291	TR	Weight when stroke is zero	67	137	224	373	575	1085
	Add weight of per 1mm stroke	1.75	2.56	3.52	4.84	8.90		Add weight of per 1mm stroke	1.43	1.98	2.68	3.69	5.43	8.69



## Singapore Branch Office



Name: AIRTAC INTERNATIONAL(SINGAPORE) PTE LTD  
 Add: 12 Gul Drive, Singapore 629463  
 Tel: +65-6933-7676  
 Fax: +65-6863-9030  
 Zip code: 629463

## Headquarter, Sales Companies and Production Bases



Name: AirTAC International Group Taiwan Branch (CayMan)  
 Office: 4F., No.129, Sec.3, Minsheng E. Rd., Songshan Dist.,  
 Taipei City 10596, Taiwan (R.O.C.)  
 Tel: +886-2-2719-7538  
 Fax: +886-2-2719-7539  
 Zip code: 10596  
 Factory: No.28, Kanxi Rd., Xinshi Dist., Tainan City 74148, Taiwan (R.O.C.)  
 Tel: +886-6-5896-889  
 Fax: +886-6-5898-589  
 Zip code: 74148



Name: Ningbo AirTAC Automatic Industrial Co., Ltd.  
 Add: No.88, Siming E. Rd., High Tech Area of Fenghua City, Zhejiang, China  
 Tel: +86-574-8895-0001  
 Fax: +86-574-8895-0066  
 Zip code: 315500



Name: Guangdong AirTAC Automatic Industrial Co., Ltd.  
 Add: No. 7, Kaixuan Rd., Songxia Industrial Park, Shishan Town,  
 Nanhai District, Foshan, Guangdong, China  
 Tel: +86-757-8521-7188  
 Fax: +86-757-8521-7841  
 Zip code: 528234



Johor: No 20, Jalan Tiong Emas 1, Kawasan Perindustrian Tiong Nam,  
 81100 Johor Bahru, Johor.  
 Tel no:+607-358 7969 Fax no: +607-358 7971  
 Selangor: No 25 & 27, Jalan Gitar 33/3, Perindustrian Elite Seksyen 33,  
 40460 Shah Alam, Selangor.  
 Tel no:+603-5131 4669 Fax no: +603-5131 4748  
 Penang: No 303-1-24, Krystal Point, Jalan Sultan Azlan Shah,  
 11900 Sungai Nibong, Penang.  
 Tel no: +604-641 3669 Fax no: +604-641 5671  
 Email address: sales\_my@airtac.com



Name: AirTAC Industrial Co.,Ltd.  
 Add: 11/12 M00 9, Bangchalong, Bangplee, Samutprakarn, 10540 Thailand.  
 Tel: +66-2-023-3515  
 Fax: +66-2-023-3518  
 Zip code: 10540



Name: Airtac Co., Ltd.  
 Add: 3-6-3, Kusune, Higashiosaka-shi, Osaka, Japan  
 Tel: +81-6-4307-6039  
 Fax: +81-6-4307-6038  
 Zip code: 577-0006



Name: ATC (Italia) S.R.L.  
 Add: Via Manzoni 20, 20020 Magnago (MI), Italy  
 Tel: +39-0331-307204  
 Fax: +39-0331-307208  
 Zip code: 20020



Name: AirTAC USA Corportation  
 Add: 21201 Park Row Drive, Katy, Texas, 77449, USA  
 Tel: +1-281-394-7177  
 Fax: +1-281-394-7199