

Compact Design 21MPa Hydraulic Cylinder

- ◆ Magnetic switches can be mounted on 40mm to 80mm bore.
- ◆ Light weight and compact design compared to our conventional model 210H-3.
- ◆ Compact design, bring reliability to save space design.
- ◆ New design of cushion realizes high performance.
- ◆ Over size rod (A) is available for standard variation.
- ◆ Double rod type and additional bore size 180mm to 250mm are available.

NEW CAT. A11-537



Innovation of design scrutinized carefully the excess of conventional model 210H-3.

Here new coming of 210C-1 series.

Key words are the light weight, compactness and high speed.

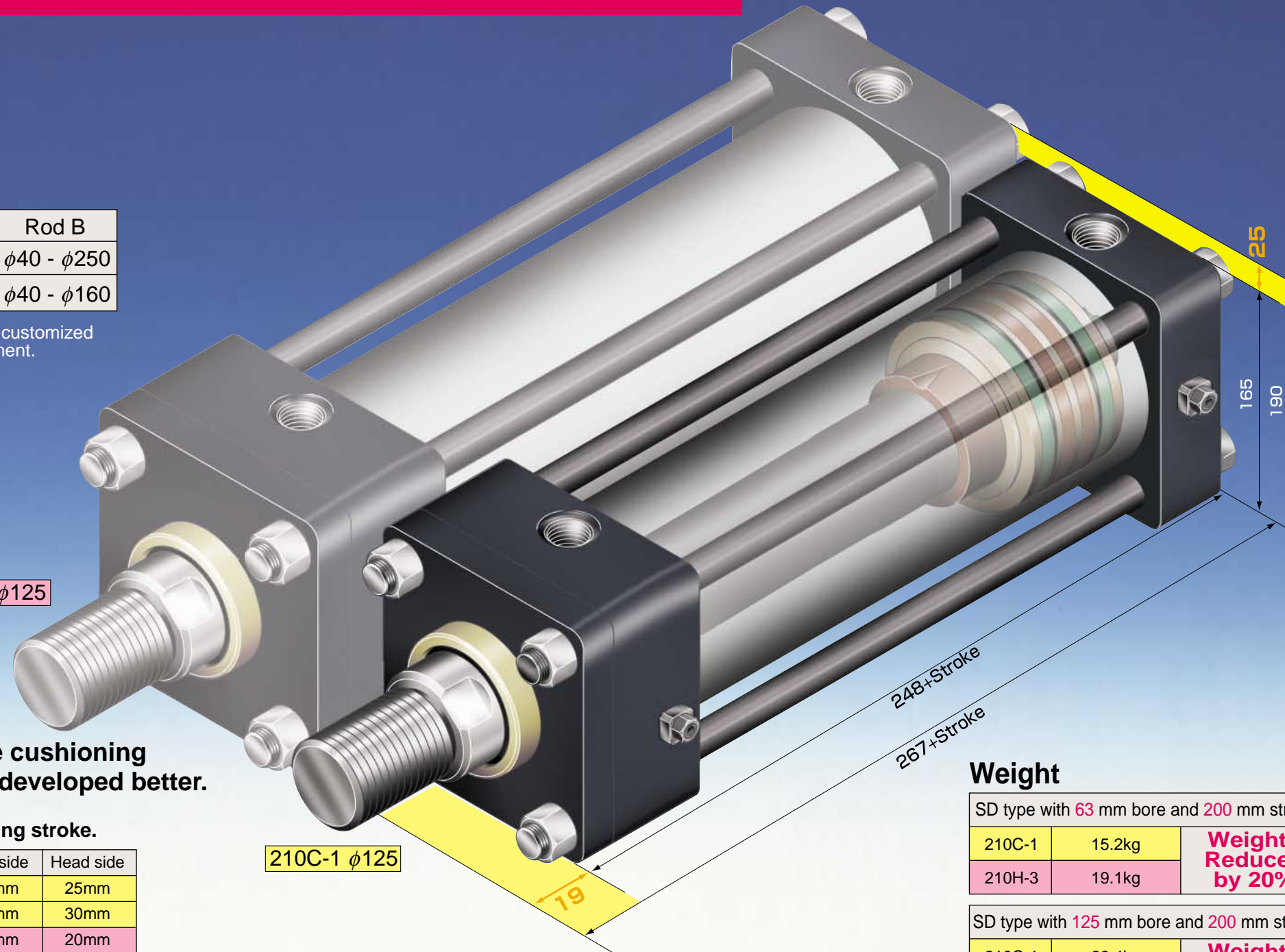
Suggestion of new hydraulic cylinder era

- Compact design 21MPa Hydraulic Cylinder as Taiyo standard.
- High performance cushion as standard model.
- Enhance measure of safety.
- Oversized rod as standard
- Quick delivery production

Lines

Series	Rod A	Rod B
210C-1	φ40 - φ160	φ40 - φ250
210H-3	—	φ40 - φ160

*Rod end shape could be customized according to the requirement.



High performance cushioning system has been developed better.

1. Adapt long cushioning stroke.

Series	Bore	Rod side	Head side
210C-1	φ40 - φ63	25mm	25mm
	φ80 - φ160	30mm	30mm
210H-3	φ40 - φ63	20mm	20mm
	φ80 - φ160	25mm	25mm

2. Cushion ring

- Optimization of grooving on cushion ring for the best performance.

3. Cushion valve

- The new stopper prevents the valve from falling off in adjusting speed.
- Easy adjustment of cylinder speed in the cushioning travel.

Weight

SD type with 63 mm bore and 200 mm stroke		
210C-1	15.2kg	Weight: Reduced by 20%
210H-3	19.1kg	

SD type with 125 mm bore and 200 mm stroke		
210C-1	66.4kg	Weight: Reduced by 27%
210H-3	92.7kg	

Improved points

- The joint strength between the piston and the rod has been increased.
- The G port thread for decreasing the oil leakage can be ordered as semi-standard.
- Narrowed installation dimensions compared to 210H-3

Narrowed installation dimensions compared to 210H-3 Series

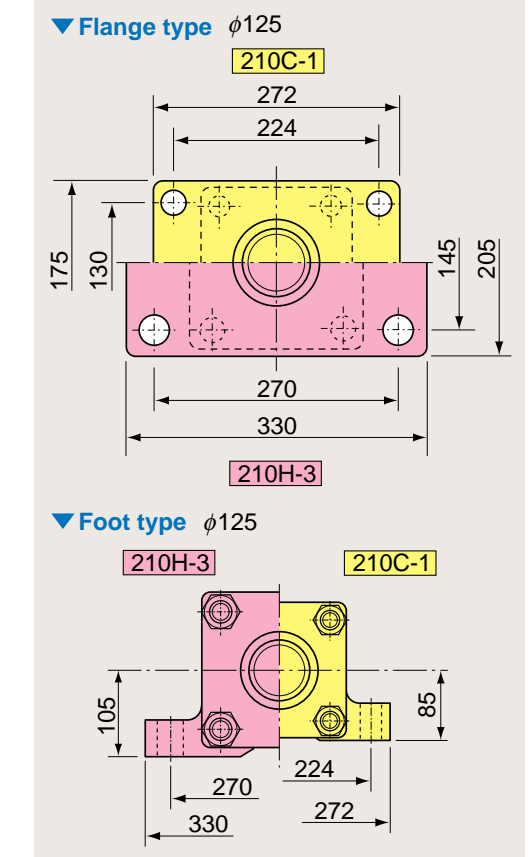


Image shows compactness



Use of CAD/DATA

TAIYO CAD/DATA reflects customers' requests.

TAIYO is currently supplying the third CAD/DATA that has been improved to reflect customers' various requests.

The improvement in the second CAD/DATA, comparing with the first CAD/DATA was centered on the operation performance, while the retrieving performance was stressed in the development of the third CAD/DATA, comparing with the second CAD/DATA.

Features of TAIYO CAD/DATA

1. Less number of the factors (data capacity) constructing the diagrams of products

The diagrams of products comprise the minimum factors necessary for machine design. Therefore, the influences on the all diagrams (influences on the data capacity) have been reduced even if the products' CAD/DATA are used on the diagram of the machine.

The non-use of ellipses and spline curves limits the increase of the factors even when data conversion is performed.

2. Less number of diagrams (files)

The diagrams of products are classified into the models to reduce the number of files for easier file management and less labor in data conversion.

Application for CAD/DATA

The CAD/DATA is available with no charge. If you request for the CAD/DATA, fill the application form below, and contact your nearest TAIYO sales office.

Application Form of TAIYO Series CAD/DATA

Date of entry:

Company name		Our remarks Charge sales office _____ Sales office code _____ Person in charge _____		
Department, section				
Official position				
Name				
Address				
	ZIP CODE	TEL	FAX	
E-mail				
Your CAD system	CAD system (software)	Name	Ver.	Manufacturer
	Computer model (hardware)	Name		Manufacturer
CAD/DATA supplying	Required data	<input type="checkbox"/> MICRO CADAM	<input type="checkbox"/> AUTO CAD	
		<input type="checkbox"/> DXF		
		<input type="checkbox"/> Others		
	Supplying medium	<input type="checkbox"/> CD-ROM		
		<input type="checkbox"/> Others		
Supplier of our products	Company name			

- "MICRO CADAM" is the registered trademark of which exclusive right for use is owned by CADAMSYSTEMS CO.
- "AUTO CAD" is the registered trademark of Autodesk, Inc. in the U.S.A.
- "DXF File" is the public data format of Autodesk, Inc. in the U.S.A.



21 MPa double-acting Hydraulic Cylinder 210C-1 Series

For safety use.....	5
Selection materials	7
Precautions for use (Be sure to read them).....	14
210C-1	17
How to order 210C-1	19
Dimensional drawing of 210C-1	23
Switch specifications	51
List of seals	63

Inappropriate handling of the products may lead to the unreliable performance or serious accidents. In order to prevent any accident, be sure to read carefully this catalogue, and fully understand the contents for safe handling.

Remember that your special attention must be paid to the messages with the words "DANGER", "WARNING", "CAUTION", and "NOTES". Non-observance of these messages may pose dangers to operators or machines. These are important safety messages and require your strict observance, adding to ISO4413, JIS B 8361 and other safety rules.

Related laws and rules

- High-pressure gas preservation law
- Labor safety and hygiene law
- Fire laws
- ISO 4413 : Hydraulic fluid power-General rules for the application of equipment to transmission and control systems
- JIS B 8361 : General rules for hydraulic system
- JIS B 8367-5 : Hydraulic cylinder
- JIS B 8243 : Structure of pressure container
- NAS 1638 : Classification of contamination particles levels

Instructions in this catalogue

The instructions in this catalogue are classified into "DANGER", "WARNING", "CAUTION", and "NOTES", according to the degree of risk and hindrance.

	DANGER	Imminent hazardous situation. Unless the situation is avoided, loss of life or serious injury may occur.
	WARNING	Potential hazardous situation. Unless the situation is avoided, loss of life or serious injury may occur.
	CAUTION	Potential hazardous situation. Unless the situation is avoided, slight or medium injury, or physical damages may occur.
	NOTES	Instructions which are required to be followed for appropriate use of the products.

- These products have been designed and manufactured as a general industrial machine component.

Warning

- Operators with sufficient knowledge and experiences should operate the equipment.
The assembly, operation, and maintenance of machines and devices using hydraulic equipment must be performed by only the persons with sufficient knowledge and experiences.
- Keep away from fire.
Since highly ignitable working oil is used for hydraulic equipment, the possibility of fires is inevitable.
- Do not handle the machines and devices or remove the hydraulic cylinder until safety is confirmed.
 - Prior to removal of hydraulic cylinders, ensure that safety countermeasures are provided, the hydraulic power supply is stopped, and the pressure in the hydraulic circuit is lost.
 - Ensure the safety of prevention against the drop of matters to be driven before maintenance and service of machines and devices.
 - The temperature of a cylinder is very high right after operation is stopped. Ensure that the temperature of the cylinder and oil is low before removing the cylinder.
 - When restarting the machines and devices, ensure that there is no abnormality in the bolts and other components, and slowly increase the pressure of the hydraulic source from low pressure to the set pressure.
- Mount protect covers if any danger may occur to operator's body.
If there is any danger to operator's body by matters to be driven or the movable part of the cylinder, try to consider the structure so that any part of operator's body cannot touch them.
- Deceleration circuit or shock absorber may be required.
When the speed of matters to be driven is excessively high, or the weight of them is excessively heavy, shock absorption by only the cylinder cushion may be difficult. In such a case, the provision of the deceleration circuit in front of the cushion or the external shock absorber is required as countermeasures against shocks. Also, take the hardness of machines and devices into consideration.
- Securely connect so that the fixed part and connecting part of the cylinder will not be loosened.
 - Use the bolts with the specified size and strength class for fixing the cylinder attachments, and clamp them with the specified clamping torque. For rotary attachments, use the pin of the specified size.
If the connection is inappropriate or the bolts or the pin with the size other than the specified may lead to the slackened or damaged bolts due to the driving force and reaction force of the cylinder.
- Use mounting components made of the material with sufficient hardness.
- Do not loosen the air vent valve excessively during air vent.
Excessive loosening of the air vent valve may lead to coming-off or jumping of the air vent valve from the cylinder, causing spouted oil, leading to injury or malfunction of the cylinder.
- Consider the movements at an emergency stop.
Consider the design without a risk of injuries of the operator or damages on machines and devices due to the cylinder movement, preparing for the case that the safety device is actuated to stop the machines at the emergency stop or system abnormalities due to power suspension.
- Check the specifications.
 - The products in this catalogue have been designed and manufactured as general industrial machine components. DO NOT use them under the pressure, temperature, or operating environment out of the specified range. Otherwise, the breakage or malfunctions of the machines may occur.
 - For electric components, such as switches, carefully check the specifications, including those of load current, temperature, and shocks. Otherwise, malfunction, breakage, or inflammable damages may occur.
- DO NOT make any modification on the products.
Otherwise, injury, electric shocks, fires due to malfunctions may occur.
- Take safety countermeasures into consideration, and contact us before using the products under the conditions and environment shown below.
 - The use of the products under the environment or conditions other than specified and the use of them outdoors.
 - Applications related to public safety (Ex.: machines or devices used for atomic, railway, aeronautics, car, medical, and entertainment industries, emergency shutdown circuit, brake circuit, and machines and devices which contact drinks and foods)
 - Use in safety equipment.
 - Applications requiring reliable safety.

- If you have any question, contact us.

⚠ Caution

(General precautions)

- When the weight of the cylinder exceeds 15 kg, use a lifting tool or a carrier.
- Keep good arrangement and cleanliness of the working site. The slippage due to oil leak may lead to a turnover. Keep clean, and try to find oil leak soon.
- When mounting a cylinder, be sure to perform centering. Otherwise, the rod and tube may be disordered, causing the wear and breakage of the tube inside, surfaces of bush or rod, and packings. The rod may not move smoothly, causing stick slip or noise.
- When using the external guide, adjust it so that it is not disordered in any position of the stroke, or connect considering the connection of the rod end and loads.
- Use the working oil applicable to the material of the packings for the cylinder, and DO NOT mix working oil of other types. The recommended cleanliness of working oil is the grade NAS 12 or higher.

(Piping)

- Perform flushing before piping to reduce chips, cutting oil, dusts in the pipes.
Remove the cylinder before flushing to avoid the ingress of flushing fluid into the cylinder.
- Application of sealing tape
When connecting pipings with sealing tape, apply the tape with one or two threads on the thread tip left.
When screwing pipings and fittings in, take care to avoid the ingress of chips or sealing material of the piping screw into the piping. When applying liquid packing to the fittings, similarly pay attention. Scraps of sealing tape or chips may cause oil leak or other malfunctions.
- When piping, take care to avoid air accumulation.
- When using steel pipe for piping, select proper size and avoid rusts and corrosion.
- If welding is required for piping, ground in other safety location to avoid ground current in the cylinder. The ground current between the bush and rod, cylinder tube and piston may lead to a spark, causing the damages on surfaces and malfunctions.

(Adjustment of air vent and cushion)

- Excessive loosening of the air vent valve during air vent may lead to coming-off or jumping of the air vent valve from the cylinder, causing spouted oil.
 - Feed oil under a low pressure (such that the cylinder can move at a low speed of approximately 10 mm/s), and loosen the air vent valve by one or two turns (counterclockwise) to vent air in the oil from the air vent valve.
 - For cylinders without air vent valves, install throttle valves to vent air.
- The initial increase of the piston speed during the cushion adjustment may lead to abnormal surge pressures, causing the damaged cylinder or machines.
 - Slowly increase the piston speed from the low speed of approx. 50 mm/s or lower to adjust the cushion.
When adjusting the cushion, adjust depending on matters to be driven (loads).
 - If the cushioning is excessive, the cylinder may not reach the stroke end due to the contained oil in the cushion.

(Notes on trial run and operation)

- Ensure that the machines and devices are correctly mounted. DO NOT start without the confirmation of no oil leak.
- Run with the minimum pressure to start the piston rod (the piston speed must be approx. 50 mm/s or lower), and ensure that it is worked smoothly.

(Maintenance and service)

- Perform maintenance and service (daily and regular inspection) to use cylinders safely for a long period.

- Prior to the maintenance and service, be sure to shut down the pressure source. Completely relieve the pressure in a cylinder.
- When relieving the pressure in a cylinder after shutting down the pressure source, the rod may be actuated with a load. Pay attention to the unexpected movement, and try to provide reliable safety countermeasures against it.

(Storage)

- DO NOT pile up cylinders. If any vibration is applied to the piled cylinders, they may become unfastened, causing an extreme danger and the damaged parts.
- DO NOT apply a vibration nor a shock to the stored cylinders, causing the damaged parts.
- Provide rust preventive measures to avoid rust occurrence to the stored cylinders.

(Wiring and connection)

- Prior to wiring, be sure to shut down the power supply to the electric circuit of the connection side.
Otherwise, the operator may get an electric shock during working, or the switches or load devices may be damaged.
- Pay attention to avoid bending, pulling, twist of the switch cord, causing broken wires.
Especially, provide appropriate measures to avoid any load applied to the end of the switch cord, including the fixing of the switch cord. When fixing the cord, do not clamp the cord excessively. Otherwise, the cord may be damaged, causing broken wires (of the cord).
Any load applied to the end of the cord may lead to the damaged electric circuit boards in the switches.
- The larger bending radius is better. If it is excessively small, the cord may be damaged. The recommended bending radius is twice of the cord dia. or larger.

(Wiring)

- If the connection distance is long, fix the cord every 20 cm to avoid a sag in the cord.
- When laying the cord on the floor, protect it by covering with metallic tubes to avoid direct treading on it or a crush under machines. Otherwise, the coating of the cord may be damaged, leading to the broken wires or short-circuit.
- The distance between the switches and load devices or power supply must be 10 m or shorter.
Otherwise, inrush current may occur to the switches during operation, causing the damaged switches.
- DO NOT bind the cord with high-voltage cables for other electric appliances, the power supply, nor with the power supply cord. NEVER perform wiring near these cables.
Otherwise, noises may enter the switch cord from the high-voltage cables and power source or power supply cable, causing the malfunctioned switches or load devices. It is recommended that the cord is protected with a shield tube.

(Connection)

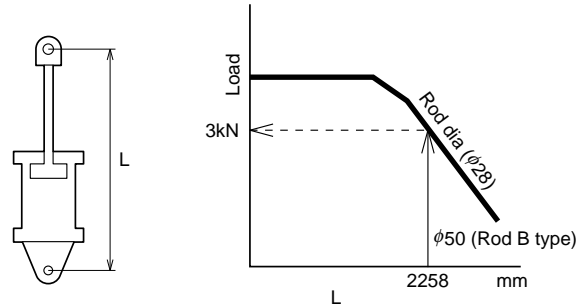
- DO NOT directly connect the switches to the power supply. Be sure to connect them with the specified load devices, such as small relays and programmable controllers. Otherwise, short-circuit may occur, causing the inflammable damage of the switches.
- Carefully check the switches used, voltage of power supply and load devices, and current specifications.
Inappropriate voltage or current specifications may lead to the malfunctioned or damaged switches.
- Perform wiring correctly according to the colors of lead wires. Prior to wiring, be sure to shut down the power supply to the electric circuit of the connection side.
Operation, wrong wiring, and short-circuit of load devices with electric current supplied may lead to the damaged switches and electric circuit in the load devices. Even if the short-circuit is momentary, it causes the inflammable damage of the main circuit or output circuit.

Calculation of cylinder buckling

- 1) Be sure to calculate the cylinder buckling.
- 2) In the case of using a hydraulic cylinder, the stress and buckling must be considered depending on the cylinder stroke.
The strength in the case that the piston rod is regarded as a long column, the buckling strength, cannot be enhanced by adopting highly tension-proof steel or heat treatment. The only way to improve the buckling strength of a cylinder is to widen the piston rod dia., and therefore, the selection of the piston rod is the very important point.
The buckling chart shown in the next page, based on the Euler's equation that is applicable to an upright long column, indicates the maximum safe L values against the piston rod dia. when the cylinder is used with the compressive load that is most frequently applied.
- 3) When buckling occurs to a cylinder, the cylinder rod may be bent, causing malfunctions or serious accidents.

Calculation method of cylinder buckling (use of buckling chart)

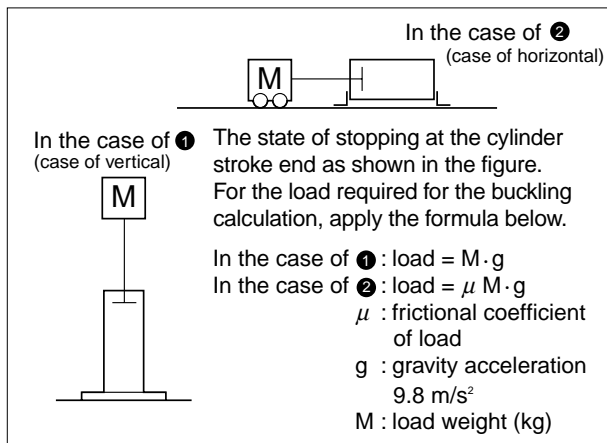
1. Find the L value (distance between the cylinder mounting position and load mounting position) with a cylinder fully extended.
 2. Select any buckling chart depending on the mounting style, and find the maximum working load.
- < Exercise >
Find the maximum working load for the 210C-1, $\phi 50$, rod B (rod dia. $\phi 28$), in case that the stroke is 1000 mm, CA type with the rod end eye.
- < Answer >
1. Find the L value with the cylinder fully extended.
From the dimensional drawings in this catalogue, the L value can be calculated by the formula below.
 $L = 242 + 80 + 1000 + 1000 = 2322 \text{ mm}$
 2. From the buckling chart of the both ends pin joints, the load can be found as below.
 $W = 3 \text{ kN} (\approx 306 \text{ kgf})$



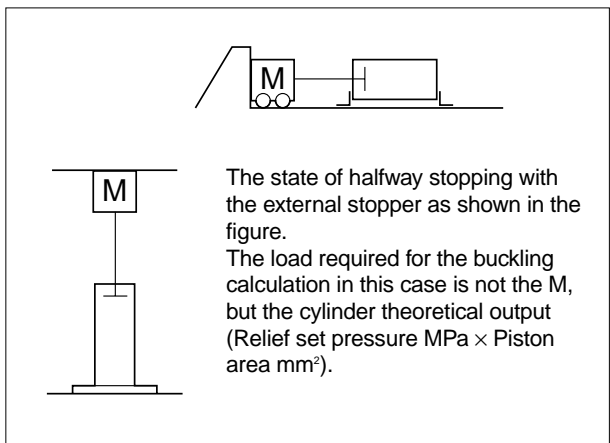
Notes on piston rod buckling

Prior to the calculation of the piston rod buckling, consider the cylinder stopping method. The stopping methods of a cylinder include the cylinder stopping method, in which a cylinder is stopped at the stroke end, and the external stopping method, in which a cylinder is stopped with the external stopper. The definition of load differs depending on the selection of the stopping method as shown below.

- Definition of a load when the cylinder stopping method is selected



- Definition of a load when the cylinder stopping method is selected



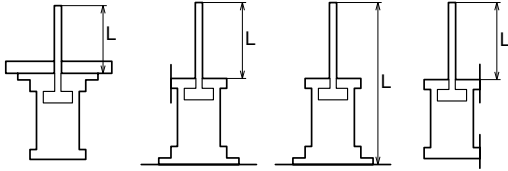
Rod diameter list

Unit: mm

Cylinder bore Series name	$\phi 40$	$\phi 50$	$\phi 63$	$\phi 80$	$\phi 100$	$\phi 125$	$\phi 140$	$\phi 150$	$\phi 160$	$\phi 180$	$\phi 200$	$\phi 224$	$\phi 250$
210C-1 Rod B	$\phi 22$	$\phi 28$	$\phi 36$	$\phi 45$	$\phi 56$	$\phi 70$	$\phi 80$	—	$\phi 90$	$\phi 100$	$\phi 110$	$\phi 125$	$\phi 140$
210C-1 Rod A	$\phi 28$	$\phi 36$	$\phi 45$	$\phi 56$	$\phi 70$	$\phi 90$	$\phi 100$	—	$\phi 110$	—	—	—	—

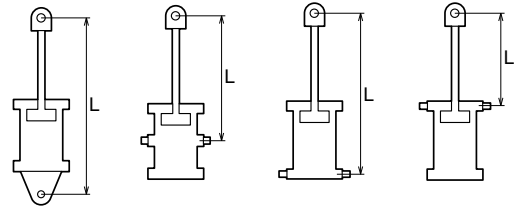
Buckling chart by cylinder mounting style

Fixed cylinder, rod end free

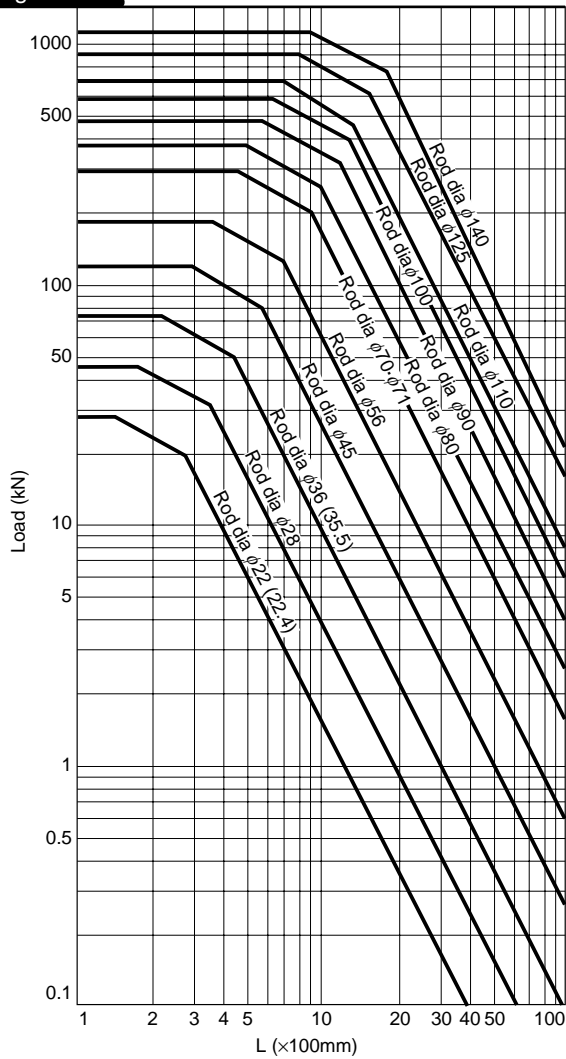


Buckling chart by cylinder mounting style

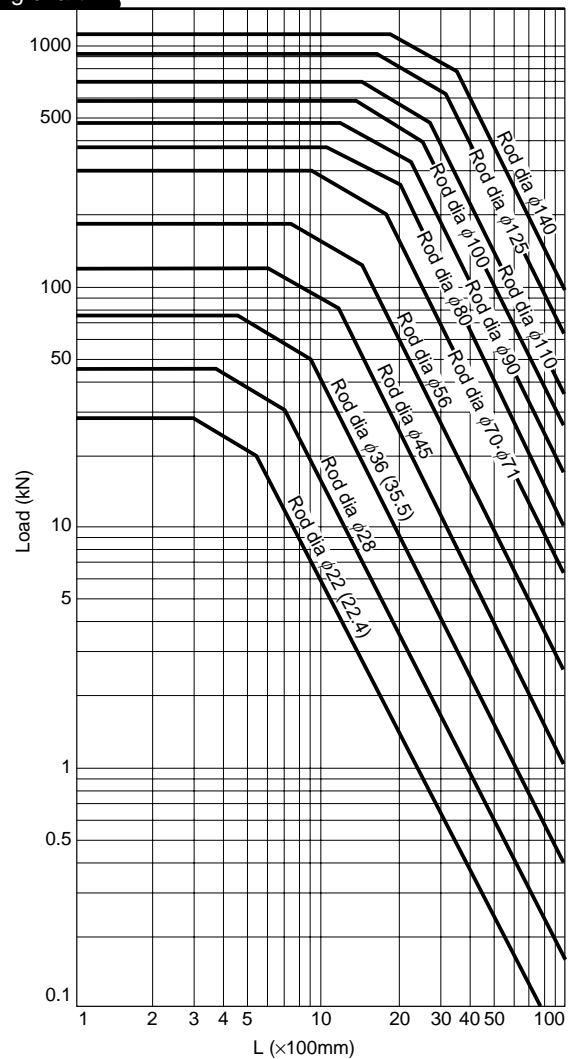
Both ends pin joints



Buckling chart

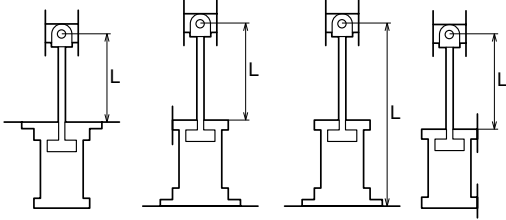


Buckling chart



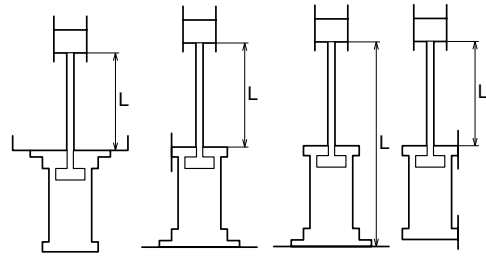
Buckling chart by cylinder mounting style

Fixed cylinder, rod end pin joint

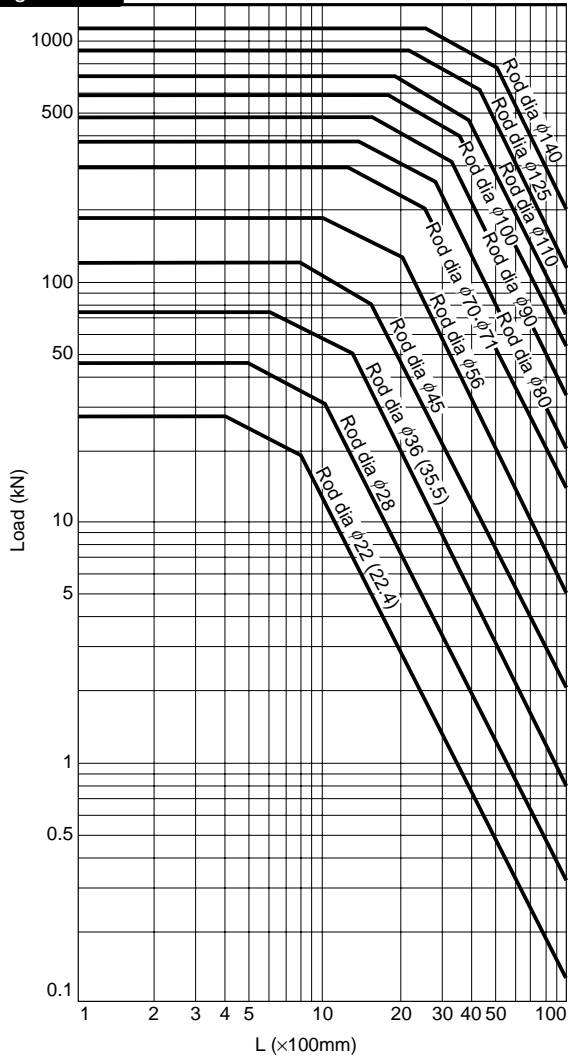


Buckling chart by cylinder mounting style

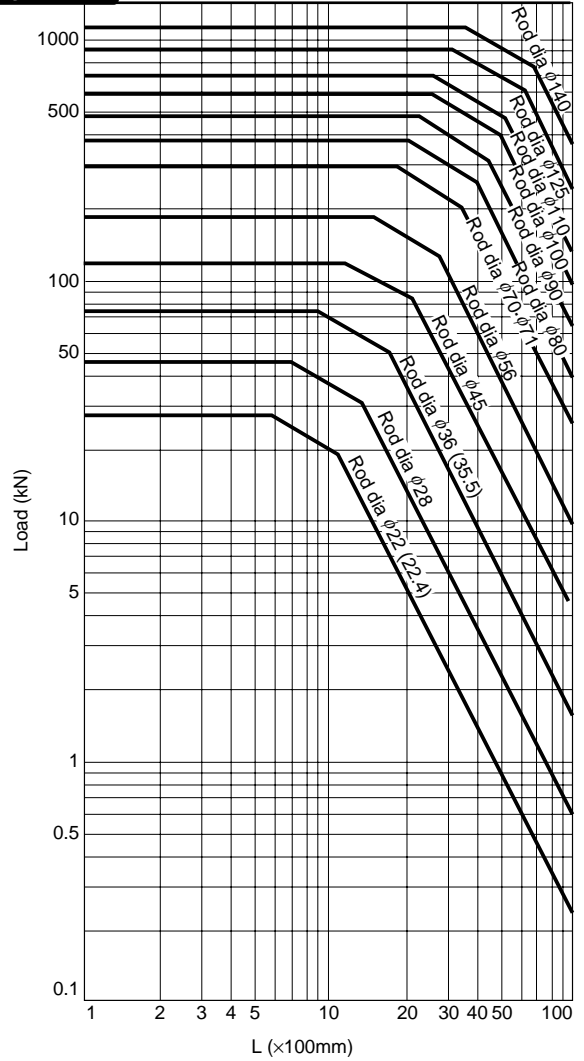
Fixed cylinder, rod end guide



Buckling chart

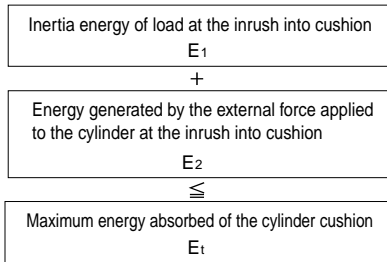


Buckling chart



Maximum energy absorbed of cylinder cushion

The conditions of absorbed energy allowable for the cylinder cushion can be obtained from the formula below.



The procedures to find each item above are shown below.

Find the inertia energy of load at the inrush into cushion, E_1 .

In the case of linear movement:

$E_1 = MV^2/2$ (J) M : load weight (kg)
 V : load speed at the inrush into cushion (m/s)

In the case of rotation movement:

$E_1 = I\omega^2/2$ (J) I : inertia moment of load ($kg \cdot m^2$)
 ω : angular velocity of load at the inrush into cushion (rads)

Notes: If the cylinder speed is less than 0.08 m/s (80 mm/s), the cushioning effect is weakened. Even if the cylinder speed is less than 0.08 m/s (80 mm/s), suppose it is 0.08 m/s to find the E_1 . In the case of rotation movement, even when the cylinder speed is 0.08 m/s or lower, similarly suppose it is 0.08 m/s, and calculate the angular velocity ω to find the E_1 .



Find the energy generated by the external force applied to the cylinder at the inrush into cushion, E_2 .

The forces acting in the direction of the cylinder axis at the inrush into cushion are shown below.

- The force applied to the cylinder by the gravity of load
- The force applied by other cylinders
- The force applied to the cylinder by springs

Find the external force F , which is applied to the cylinder at the inrush into cushion, and the energy E_2 by using the "Chart of conversion of external force into energy at the inrush into cushion".

In case that such an external force is not applied, the following condition is satisfied: $E_2 = 0$.

For the selection of cushion, suppose that the frictional resistance of load is 0.



Find the maximum energy absorbed of the cylinder cushion, E_t .

Find it with the corresponding chart of the "Maximum energy absorbed".

The maximum absorbed energy indicated on the graph can be applied for both directions. (forward/backward)



Ensure that $E_1 + E_2$ is same as the maximum energy absorbed E_t , or smaller.

If the following condition is satisfied, the cylinder is applicable: $E_1 + E_2 \leq E_t$.

If the following condition is satisfied, the cylinder is inapplicable: $E_1 + E_2 > E_t$.

In such a case, perform the steps below, and then, select again.

- Decrease the inertia force of load.
- Decrease the external force applied to the cylinder.
- Lower the set pressure.
- Widen the cylinder bore.
- Install a shock absorber.

When installing a shock absorber, refer to the "TAIYO Shock absorber general catalogue".

DO NOT use the cylinder cushion together with a shock absorber.

Otherwise, the inertia force of load may be applied to either of them due to the difference of cushioning characteristics.

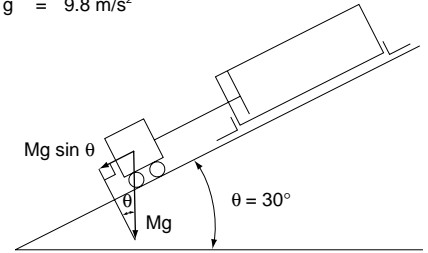


Be sure to use cylinders within the range of the maximum energy absorbed of the cylinder cushion. Otherwise, the cylinder or the peripheral devices may be damaged, leading to serious accidents.

Example of calculation for selection

< Example 1 >

Cylinder	210C-1 rod B $\phi 63$
Set pressure	$P_1 = 10$ MPa
Load weight	$M = 900$ kg
Load speed	$V = 0.3$ m/s (the speed at the inrush into cushion is 300 mm/s)
Load moving direction	Downward $\theta = 30^\circ$ (there is no external force applied to the cylinder other than gravity)
Working direction	Forward (the direction of the piston rod ejected from the cylinder)
Gravitational acceleration	$g = 9.8$ m/s ²



< Answer >

1. Find the inertia energy of load at the inrush into cushion, E_1 .

Inertia energy in the case of linear movement, E_1

$E_1 = MV^2/2 = 900 \times 0.3^2/2 = 40.5$ J

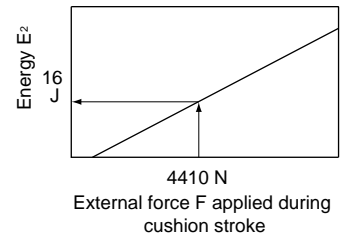
2. Find the E_2 , energy generated by the external force F , applied to the cylinder at the inrush into cushion.

2.1 Find the external force F , applied in the direction of the cylinder axis at the inrush into cushion.

$F = Mgsin \theta = 900 \times 9.8 \times \sin 30^\circ = 4410$ N

2.2 Convert the external force F , found in the step 2.1, into the energy E_2 .

In the "Chart of conversion of external force into energy at the inrush into cushion of 100H-2", find the cross point of the straight line from the point of 2450 N on the lateral axis F and the slant line shown in the chart. Then, draw a straight line from the cross point on the slant line parallel with the lateral axis until it reaches the longitudinal axis of the chart. The cross point 7.5 J, indicates the energy applied by the external force.

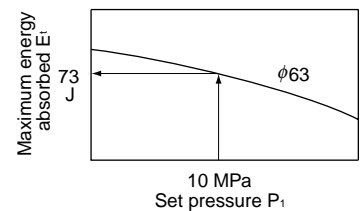


$E_2 = 16$ J

3. Find the maximum energy absorbed of the cylinder, E_t .

In the right chart, find the cross point of the straight line from the point of 010 MPa on the lateral axis, the set pressure of the "Maximum energy absorbed of cushion"

of the 100H-2 and the curve of $\phi 63$. Then, draw a straight line from the cross point on the curve parallel with the lateral axis until it reaches the longitudinal axis of the chart. The cross point, 62 J, indicates the maximum energy absorbed.



$E_t = 73$ J

4. Ensure that $E_1 + E_2$ is same as the maximum energy absorbed E_t , or smaller.

$E_1 + E_2 = 40.5 + 16 = 56.5$ J

where, $E_t = 73$ J

Therefore, the following condition is satisfied: $E_1 + E_2 \leq E_t$.

As a result, the cylinder is applicable.

< Reference >

In case that the load moving direction is horizontal and there is no external force applied ($E_2 = 0$), from the set pressure, first find the maximum energy absorbed, E_t . Then, the allowable load weight and allowable load speed can be found.

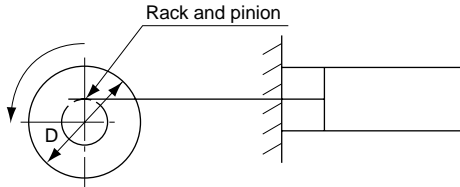
To find the allowable load weight, $M : M = 2E_t/V^2$

To find the allowable load speed, $V : V = \sqrt{2E_t/M}$

< Example 2 >

Cylinder	210C-1 rod B $\phi 63$
Set pressure	$P_1 = 10$ MPa
Load weight	$M = 900$ kg
Load dia.	$D = 0.7$ m (Uniform disk)
Angular velocity of load	$\omega = 1.5$ rad/s (angular speed at the inrush into cushion)
Load moving direction	Horizontal (without external force applied to the cylinder)
Working direction	Forward (the direction of the piston rod ejected from the cylinder)

The weight of the rack and pinion is so light that it can be ignored.



< Answer >

- Find the inertia energy of a load at the inrush into cushion, E_1 .
 - Find the inertia moment of a load, I .

From the inertia moment calculation table, the I can be calculated as below.

$$I = MD^2/8 = 900 \times 0.7^2/8 = 55.1 (\text{kg} \cdot \text{m}^2)$$

- Find the inertia energy of a load, E_1 .

$$E_1 = I \omega^2/2 = 55.1 \times 1.5^2/2 = 62.0 \text{ J}$$

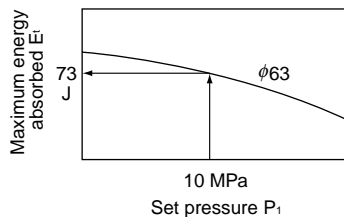
- Find the energy generated by the external force applied to the cylinder at the inrush into cushion, E_2 .

$E_2 = 0$, since there is no external force generated from the gravity of a load.

- Find the maximum energy absorbed of the cylinder, E_t .

In the right chart, find the cross point of the straight line from the point of 8 MPa on the lateral axis, the supply pressure of the "maximum energy absorbed of cushion" of the 210C-1 and the curve of $\phi 63$ bore. Then, draw a straight line from the cross point on the curve parallel with the lateral axis until it reaches the longitudinal axis of the chart. The cross point 40 J, indicates the maximum energy absorbed.

$$E_t = 73 \text{ J}$$



- Ensure that $E_1 + E_2$ is same as the maximum energy absorbed, E_t , or smaller.

$$E_1 + E_2 = 62.0 + 0 = 62.0 \text{ J}$$

where, $E_t = 73 \text{ J}$

Therefore, the following condition is satisfied: $E_1 + E_2 \leq E_t$.

As a result, the cylinder is applicable.

Note: Even if the cylinder speed is less than 0.08 m/s (80 mm/s), suppose it is 0.08 m/s, and find the angular velocity for calculation.

< Reference >

In case of the rotation movement, of which load moving direction is horizontal, without an external force ($E_2 = 0$), from the set pressure, first find the maximum energy absorbed, E_t . Then, the allowable inertia moment and allowable load angular velocity can be found.

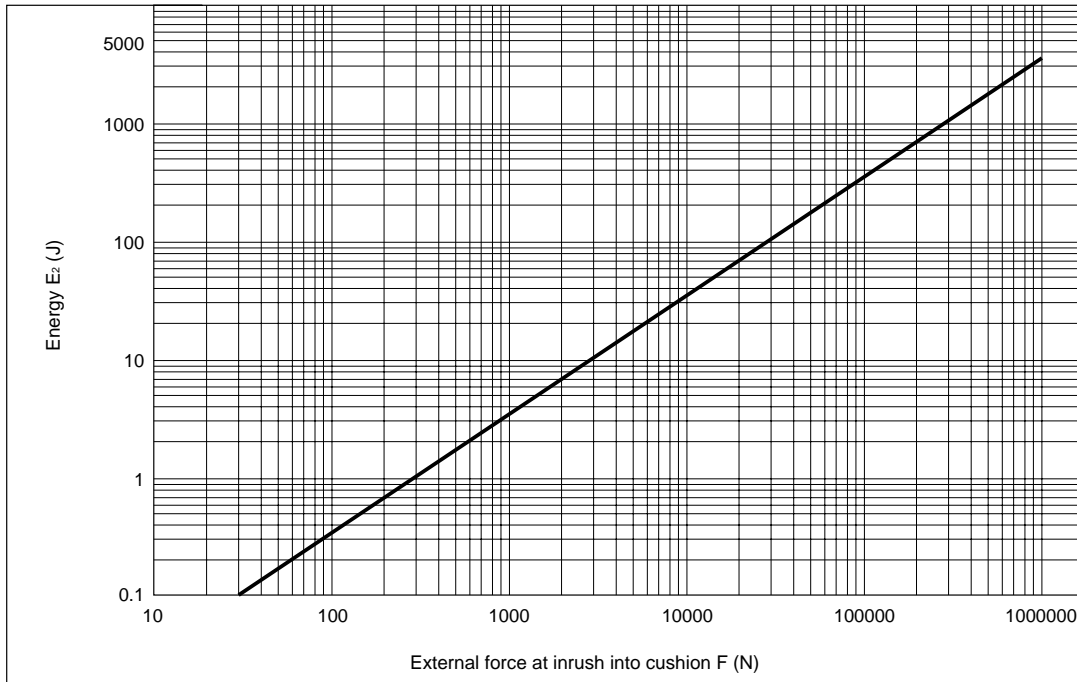
To find the allowable load inertia moment, $I = 2E_t/\omega^2$

To find the allowable load angular velocity, $\omega = \sqrt{2E_t/I}$

Inertia moment calculation table

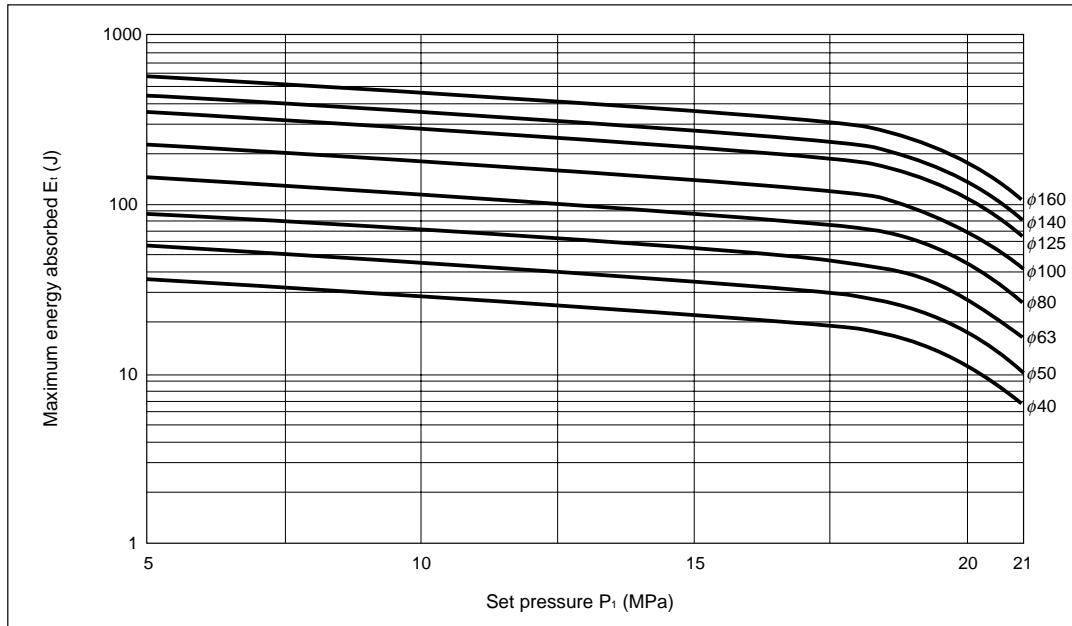
Outline	I: Inertia moment
<ul style="list-style-type: none"> In the case of the axis at rod end 	$I = \frac{Ml^2}{3}$
<ul style="list-style-type: none"> In the case of a cylinder (including a disk) <p>Note) The axis passes through the center of gravity.</p>	$I = \frac{MD^2}{8}$
<ul style="list-style-type: none"> In the case of an arm (rotated around the axis A) <p>M_1: Weight of a weight M_2: Weight of an arm l_1: Distance from the axis A to the center of a weight l_2: Arm length</p>	$I = M_1 l_1^2 + I_1 + \frac{M_2 l_2^2}{3}$ <p>I_1: The inertia moment of a weight when the axis passing through the center of the gravity of the weight (axis B) is the center.</p>
<ul style="list-style-type: none"> In the case of the axis in the middle of rod <p>Note) The axis passes through the center of gravity.</p>	$I = \frac{Ml^2}{12}$
<ul style="list-style-type: none"> In the case of a rectangular parallelepiped <p>Note) The axis passes through the center of gravity.</p>	$I = \frac{M}{12} (a^2 + b^2)$
<p>I (I_1): Inertia moment $\text{kg} \cdot \text{m}^2$ M (M_1, M_2): Weight kg l, a, b: Length m D: Diameter m</p>	

Chart of conversion of external force into energy at inrush into cushion of 210C-1



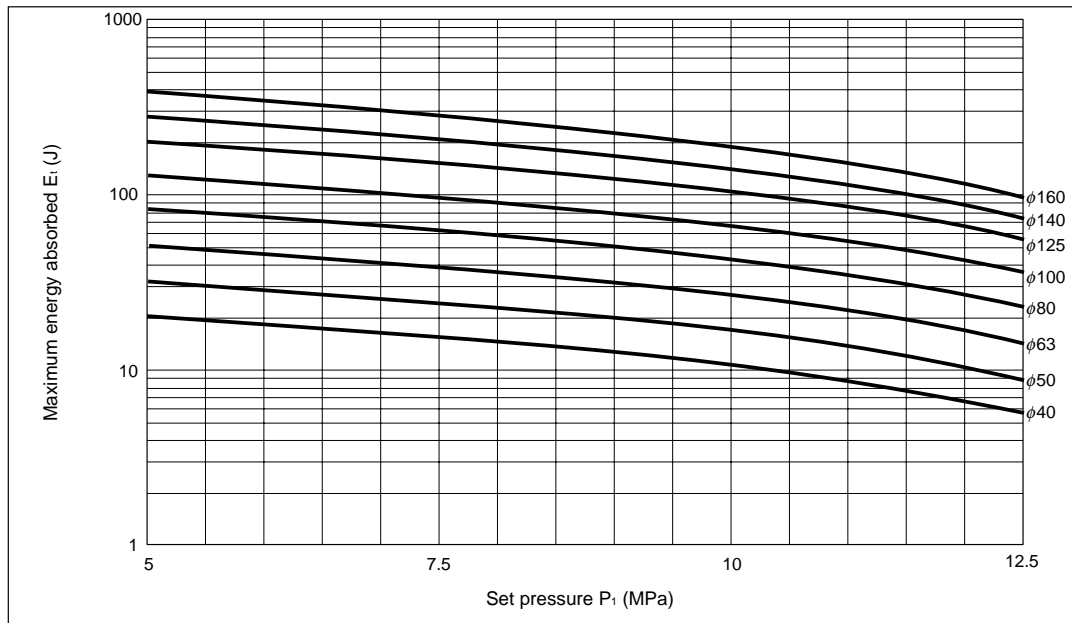
210C-1 Rod B Maximum energy absorbed

φ40 - φ160



210C-1 Rod A Maximum energy absorbed

φ40 - φ160



Use cylinders only under the operating conditions within the allowable range specified for each series. Otherwise, the performance may become unreliable as described below, or accidents may occur.

1. Pressure

The pressure supplied to cylinders, including surge pressure, must be lower than the maximum allowable level.

The use with the pressure exceeding the maximum allowable level may lead to galling in the slipping part or the damaged cylinder.

2. Speed

Use cylinders within the allowable working speed range. Otherwise, troubles below may occur.

When cylinders are used with the speed slower than the lower limit of the working speed range:

- Stick-slip (cracks)
- Unsmooth speed control

When cylinders are used with the speed faster than the upper limit of the working speed range:

- Damaged cylinder due to increased kinetic energy
- Damaged packings due to slipping heat
- Increased internal or external oil leak due to thickened oil film
- Higher flow velocity in the piping part, causing the lowered energy efficiency due to increased pressure loss

3. Environmental conditions

3-1) Temperature

Use cylinders only within the allowable working temperature range. Otherwise, troubles below may occur.

When cylinders are used at the temperature lower than the lower limit of the working temperature range:

- Brittle fracture due to lowered stretch of cylinder material
- Oil leak due to lowered elasticity of packings

When cylinders are used at the temperature higher than the upper limit of the working temperature range:

- Damage due to lowered strength of cylinder material
- Damaged packings
- Galling due to thermal expansion in the slipping part

3-2) Rust-proof measures

The use and storage of cylinders in the places where are highly humid, or are splashed with water or sea water require the consideration of rust-proof and anti-corrosion measures. In such a case, contact us.

3-3) Installing location

- (1) Use cylinders only indoors.
- (2) DO NOT use them in locations where dusts and vibration are excessive. Use of them under the environmental conditions shown below requires protection of the rod, rustproof measures, review of parts material, magnetic shield, and vibration-proof measures. If any countermeasure required for the cylinder side, contact us.

Working environmental conditions
Sands, dusts, soil, chips, welder spatter, etc.
Rain, water, sea water, oil, chemicals, etc.
Direct sunlight (ozone), humidity, etc.
High temperature, low temperature, freezing, etc.
Highly magnetic field
Vibrations

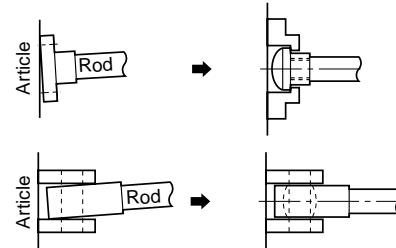
4. Mounting



- When mounting a cylinder, use bolts of the specified size, and fix it with the bolts of the specified strength class (strength class 10.9). In the case of rotary type, use pins of the specified size. Use of bolts or pins other than designated ones may cause looseness or damage to screws due to cylinder driving force or its reaction force.
- When a cylinder is mounted with fixed, the performance of the cylinder largely depends on the hardness of the mounting material. Therefore, insufficient hardness of mounting material may lead to a warp in mounting material due to the driving force of the cylinder and the disordered piston rod and bush, causing premature wear and the damaged thread of the piston rod. Use the mounting material with sufficient hardness.

4-1) Mounting of rod end in the case of fixed type (SD, LA, FA, FB types)

The movement direction of articles moved by a cylinder must be always aligned with the axis center of the piston rod movement. If the axis center is runout, premature wear of the bush, baking or galling of the cylinder tube may occur. To check the runout of the axis center, be sure to measure the core deviation of mounting part of the article at the position where the piston rod is fully ejected, and align the core. Then, connect the cylinder with the article.



4-2) Mounting of cylinder

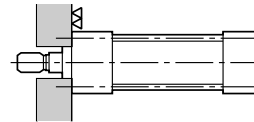
When mounting cylinders, consider the following points.

We cannot take responsibility for malfunctions due to wrong cylinder mounting.

(1) In the case of fixed type

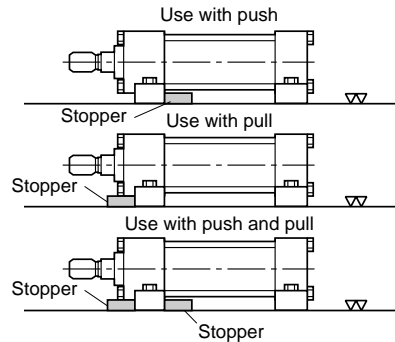
- ① SD type
 - Thread accuracy of tie rod : JIS 6g
 - Clamping torque : tie rod clamping specified torque value

(Refer to the clamping torque for each series.)



② LA type

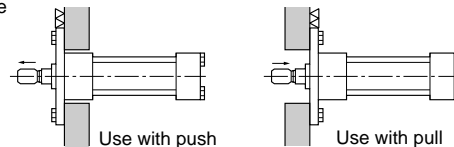
To mount LA type, fix the attachments with clamping bolts. However, remember that this procedure is not perfect for the move in the axial direction when a load is applied. Therefore, install the stopper to the



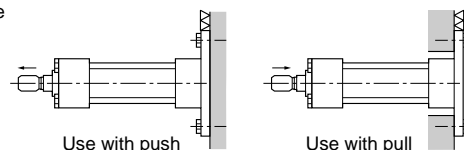
③ FA and FB types

Fix cylinders as shown in the figures below.

FA type

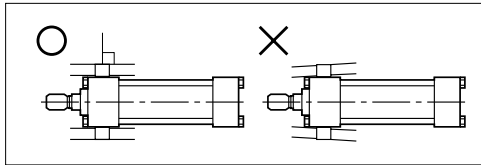


FB type



(2) Rotary type

- For the cylinder of which mounting part moves inside a plane, be sure to connect the connection fittings of the rod end with pins, so that the mounting part can move inside the plane. For the plane and rectangular direction, perform centering similarly to the fixed type.
 - Be sure to apply lubricant to the bearing part of the connection fittings.
 - DO NOT use floating joints for rod end attachments.
- ① CA, CB type attachments
- Use pins of the size specified in this catalogue.
 - In the case of a long stroke (1000 mm or longer), avoid horizontal mounting. Otherwise, a lateral load is applied to the bush part due to the weight of the cylinder, causing uneven abrasion, substantially shorter service life, or galling.
- ② TA, TC type attachments
- Mount counterpart attachments so that they are vertical with the trunnion boss. If they are mounted slantingly, uneven abrasion may occur in the boss bearing area, causing a substantially shorter service life.



5. Piping

- Take sufficient care to avoid dusts and chips of pipes in the piping.
- When piping, avoid any air accumulation in pipes.
- When connecting with a rubber hose, do not bend it with the bending radius smaller than the specified level.
- Be sure to perform piping flushing. After flushing is complete, connect to the cylinder. Otherwise, the cylinder may be malfunctioned or oil leak may occur due to dusts in the piping.

6. Other notes

- When welding near a cylinder, it may be subjected with spatters. Protect the cylinder rod to avoid spatters.
- When welding during mounting, take sufficient care to avoid an electric current in the cylinder. Any electric current in the cylinder may lead to arcs between the rod and bush or between the piston and tube, causing the damaged cylinder parts.
- After mounting is complete, be sure to perform air vent and cushion adjustment. For the adjustment methods, follow the descriptions in "7. Operation".

7. Operation

CAUTION

- If the piston speed is fast from the beginning, abnormal surge pressure may occur, causing the damaged cylinder or machine.

- Trial run (before operation)

7-1) Air vent

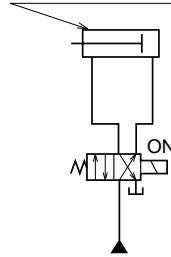
CAUTION

Overloosening of the check valve during the air vent may lead to the coming-off of the check valve from the cylinder, causing spouted oil and serious accidents.

- (1) Feed oil of low pressure (the pressure that the cylinder moves at a low speed, approx. 10 mm/s) to the cylinder, and vent air in oil from the check valve or air vent plug.
- At this time, if the check valve is excessively loosened, it may be come off from the cylinder, causing spouted oil and serious accidents.
 - Repeat the step above until no air remains in the pipe.
 - Exhaust air in the piping, as well as that in the cylinder. Any air remained may cause malfunctions below.
- [Symptoms]
- a) Stick-slip
 - b) Unsmooth speed control
 - c) Damaged packings due to increased temperature caused by adiabatic compression
 - d) Shock or vibration occurs to outside
 - e) Impossibility of set output

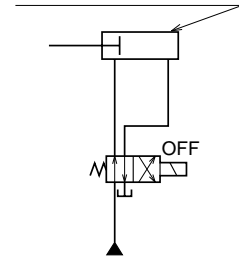
● When a cylinder moves forward

Loosen the check valve on the rod side



● When a cylinder moves backward

Loosen the check valve on the head side



7-2) Adjustment of cushion valve

CAUTION

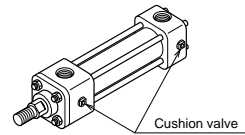
Excessive loosening of the cushion needle & plug during cushion adjustment may cause oil leaking and serious accidents.

(Cylinder with cushion)

Increase the piston speed gradually from a low speed, 50 mm/s or lower, and adjust the cushion.

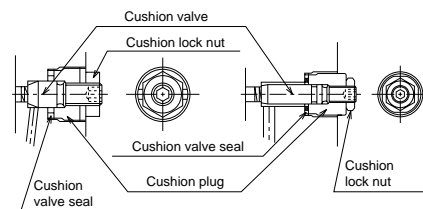
- The cushion must be adjusted, since it has not been adjusted at our factory.
- If the piston speed is fast from the beginning, abnormal surge pressure may occur, causing the damaged cylinder or machine.
- Even if the cushion valve is loosened during the cushion adjustment, it touches the cushion plug to prevent it from being removed. However, if it is further loosened, oil may be spouted, causing serious accidents.

Diagram of cushion valve structure



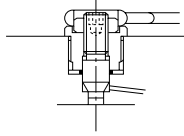
● Bore $\phi 40 - \phi 80$

● Bore $\phi 100 - \phi 160$

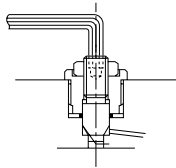


(1) Perform the adjustment of the cushion valve by following the sequences below.

- ① Loosen the cushion lock nut with a spanner.
- Note) DO NOT loosen the cushion plug.

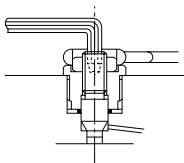


- ② Turn the cushion valve only with an allen wrench.
 - a) Turn clockwise: the cushion stroke speed decreases.
 - b) Turn counterclockwise: the cushion stroke speed increases.



- The structure of cushioning, built in the cylinder, is equipped to prevent it from being damaged. For the inertia force that cannot be absorbed with the structure of cushioning, install the inertia force absorber or measurers in the hydraulic circuit.

- ③ After the adjustment of the cushion valve is complete, fix the cushion valve with an allen wrench, and clamp the cushion lock nut. (clamping torque: 7 to 8 N•m)



Note) Cushion lock nut must not be fasten to excess. Otherwise cushion valve will be damaged.

8. Maintenance (maintenance and inspection)

To use cylinders without an accident for a long time, daily and regular inspections are required.

1) Daily inspection

For the daily inspection, check the points described below.

- (1) Check that the cylinder set bolts and nuts are not loosened.
- (2) Check that the working conditions are normal.
- (3) Check that there is no external leakage.
- (4) Check that there is no abnormality in other parts of the cylinder (tie rod, flange, etc.)

2) Regular inspection (disassembly inspection)

Decide the interval of the regular inspection depending on the working conditions and requirement, and perform according to the decided schedule. It is recommended to perform it once a year.

- Replace packings and gaskets with fresh ones at regular inspections.
- Do not use packings which have been stored for two years or more.
- Notes on fitting of valve seals

Valve seals must be fit in the specified direction and sequence. Wrong fitting direction and sequence will lead to the damaged packings, causing oil leak.

Fitting sequences

- Check the direction of a valve seal.

The marked side must be faced inside (refer to Fig.1).
- Fit the valve seal to the shaft of the cushion valve and the shaft of the check plug in the correct fitting direction (refer to Fig.2).
- Take care to prevent the valve seal from being dropped, and screw it in (refer to Fig.3).

Fig.1

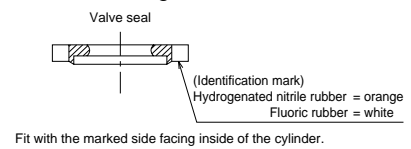


Fig.2

Check plug

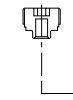
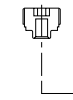


Fig.3

Cushion valve



(Valve seal fitting sequence)

Note If the seal is first fit in the cover hole, and then, it is screwed in, it may be damaged.

- Refastening the cushion valve or check valve, the torque value showed below should be applied.

- Bore $\phi 40 - \phi 80$ 20N•m
- Bore $\phi 100, \phi 125$ 30N•m
- Bore $\phi 140, \phi 160$ 40N•m

- Notes on tie rod tightening torque at assembly

- (1) Assembly instruction manual for disassembly inspection of the TC type is available. Contact us.
- (2) For other types, refer to the "Specified tie rod tightening torque table" of "4-2) Installation of cylinder"

9. Storage

1) Notes on storage

When storing cylinders, take countermeasures against the followings:

- (1) Rusts
- (2) Permanent warp and inferiority of packings

2) Storage location

- (1) Store cylinders in cool and dark place (max. temperature: 37°C), and protect them from direct sunlight and humidity. Place them higher than 30 cm from the floor.
- (2) DO NOT apply vibrations or shocks to the stored cylinders. The cylinder parts may be damaged.

3) Control and inspection during storage

- (1) Pack working oil (including rust preventive oil) in cylinders, and plug the port part.
 - If the port part is unplugged during storage, change working oil with fresh one, and plug again. Failure to perform this step may cause rusts on tube inside.
- (2) It is recommended to turn the stored cylinder 90°C every three months to let packed oil flow and reduce permanent warp of packings.
 - If there is any abnormality in the working condition of the cylinder that has been stored for a long time, replace packings.
 - If the storage period is a year or longer, it is recommended to perform the internal inspection of the stored cylinder.
- (3) Repeat of rust preventive treatment

After the purchase of cylinders, repeat rust preventive treatment every year.

 - Internal rust-proof measures (rust-proof measures for cylinder inside)

Change working oil (including rust preventive oil) in the cylinder.
 - External rust-proof measures (for machined face, exposed part)

Apply rust preventive oil to mounting faces to machines and machined faces, such as a rod end screw part. Also, apply grease to the rod slipping part and the dust seal part, and protect with oil paper.

10. Disposal

- 1) Disassemble cylinders, sort the disassembled components by material (iron, copper, aluminum, resin, rubber, waste oil, etc.), and then, dispose of them.
- 2) Piston rods are hard chrome plated. When disposing of them, consult with a disposal company.
- 3) Dispose of resin base and rubber base components as nonflammable wastes.
- 4) When disposing of waste oil, conform to related laws and rules.

Compact design hydraulic cylinder at 21MPa.

- 21 MPa double-acting hydraulic cylinder with bores from 40 mm to 250 mm.
- Innovation of design scrutinized carefully the excess of conventional model 210H-3.
- High performance cushioning system works for the smooth stop.
- Easy adjustment of cushioning on newly designed cushion valve.
- The cushion valve has been revised to apply the new stopper, paying attention to the safety measure.



Standard specifications

Types	Standard type, switch set		
Nominal pressure	21 MPa		
Maximum allowable pressure	Rod side: Rod A: 26.5 MPa Rod B: 24.5 MPa	Head side: Rod A: 26.5 MPa Rod B: 26.5 MPa	
Proof test pressure	31.5 MPa		
Minimum working pressure	Rod side: Rod A: 0.6 MPa or less Rod B: 0.45 MPa or less	Head side: 0.3 MPa or less	
Operating speed range (Except part of cushion)	$\phi 40 - \phi 63$: 8 - 400 mm/s $\phi 80 - \phi 125$: 8 - 300 mm/s $\phi 140 - \phi 250$: 8 - 200 mm/s		
Temperature range (ambient/oil temperature)	Standard type : $-10 - +80^{\circ}\text{C}$ Switch set : $-10 - +70^{\circ}\text{C}$ (Free from freezing)		
Structure of cushioning	Metal fitting system		
Adaptable working oil	Petroleum-based fluid (When using other fluids, refer to the table showing applicability of fluids.)		
Tolerance of thread	JIS 6g/6H		
Tolerance of stroke	100 mm or less $\begin{smallmatrix} +0.8 \\ 0 \end{smallmatrix}$	101-250 mm $\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$	251-630 mm $\begin{smallmatrix} +1.25 \\ 0 \end{smallmatrix}$ 631-1000 mm $\begin{smallmatrix} +1.4 \\ 0 \end{smallmatrix}$ 1001-1600 mm $\begin{smallmatrix} +1.6 \\ 0 \end{smallmatrix}$ 1601-2000 mm $\begin{smallmatrix} +1.8 \\ 0 \end{smallmatrix}$
Mounting type	SD • LA • FA • FB • CA • CB • TA • TC		
Accessories	Boots	Standard: Nylon tarpaulin Semi-standard: Chloroprene, Conex	
	Rod end attachments	Rod end eye (T-end) • Rod end clevis (Y-end) with pin	
	Others	Lock nut	

Terminologies

Nominal pressure

Pressure given for a cylinder for convenience of naming. It is not always the same as the operating pressure (rated pressure) that guarantees performance under the specified conditions.

Maximum allowable pressure

The maximum allowable pressure generated in a cylinder (surge pressure, etc.)

Proof test pressure

Test pressure against which a cylinder can withstand without unreliability performance at the return to nominal pressure.

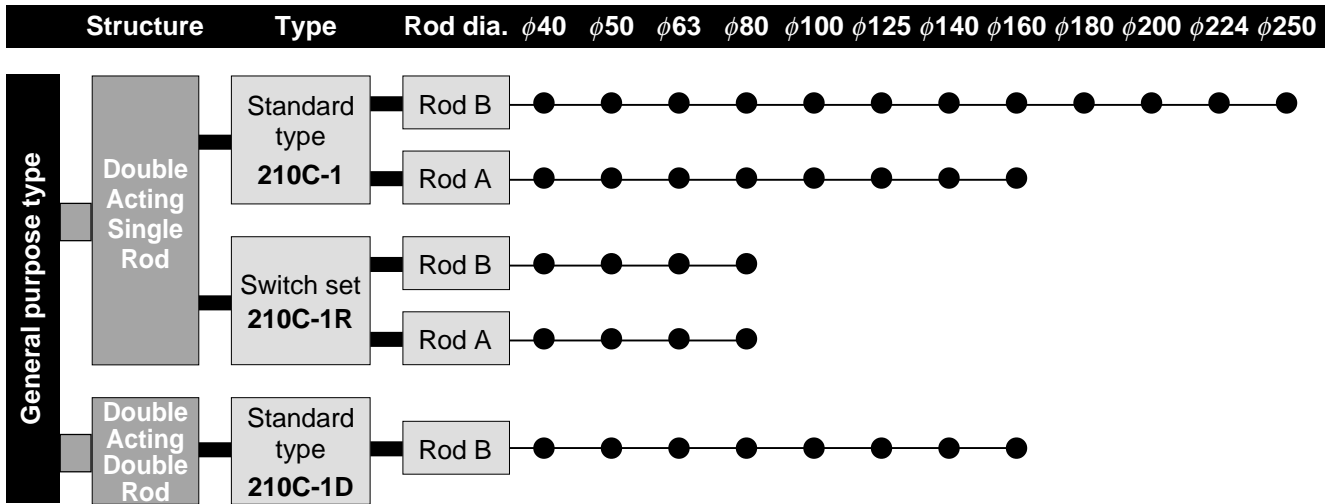
Minimum working pressure

The minimum pressure that the cylinder placed horizontally without a load can work.

- Notes) ● The hydraulic pressure generated in a cylinder due to the inertia of load must be lower than the maximum allowable pressure.
- In case that the lock nut is attached to the piston rod end thread part, lengthen the thread length (dimension A).
 - For the internal structure, refer to the sectional drawings in the end of this catalogue.
 - Conex, material of the boots, is the trademark of Teijin, Ltd.

Lines

Unit : mm



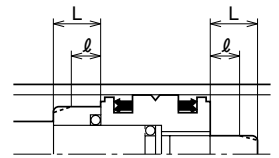
Standard stroke fabrication range Unit : mm

Bore	Stroke
$\phi 40$	- 1500
$\phi 50 - \phi 250$	- 2000

- The strokes above indicate the maximum available strokes for the standard type. If you request larger strokes than those in the table above, contact us.
- For the rod buckling, check with the buckling chart in the selection materials.
- Consult us for bore size 180 mm to 250 mm.

Cushion stroke length Unit : mm

Bore	Cushion ring length L	Cushion ring parallel part length ℓ
$\phi 40 - \phi 63$	25	7
$\phi 80 - \phi 125$	30	8
$\phi 140 \cdot \phi 160$	30	12



- Figures shown in the table above indicate the cushion stroke lengths in the case of cylinders used up to the stroke end.
- In the case that a cylinder is not used up to the stroke end, and if it is stopped 5 mm or more before the stroke end, the cushioning effect will be weakened. In such a case, contact us. Please consult us in this case.
- Consult us for bore size 180 mm to 250 mm.

How to order

General purpose type

The items in broken lines in the codes below need not to be entered, if unnecessary. Semi-standard specification

• Standard type

210C-1

• Switch set

210C-1R

Double-Acting Single Rod

210C-1 : Standard type

210C-1R : Switch set

Double-Acting Double Rod

210C-1D : Standard type

- 1 Nitrile rubber ($\phi 40 - \phi 250$)
- 2 Urethane rubber ($\phi 40 - \phi 250$)
- 3 Fluoric rubber ($\phi 40 - \phi 160$)
- 6 Hydrogenated nitrile rubber ($\phi 40 - \phi 160$)

Material No.3 and 6 cannot be used for the standard type of 140/160 mm bore and all switch set type.

Mounting type

Cylinder bore (mm)

Standard type

$\phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100 \cdot \phi 125 \cdot \phi 140 \cdot$

$\phi 160 \cdot \phi 180 \cdot \phi 200 \cdot \phi 224 \cdot \phi 250$

Switch set

$\phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80$

A Rod A

B Rod B

B with cushions on both ends

R with cushion on the rod side

H with cushion on the head side

N without cushion

Note) The cushion of the rod A, 40 mm bore and head side is not adjustable.

Cylinder stroke (mm)

None Rc thread

G G thread

Cushion valve position (A, B, C, D, 0)

Port position (A, B, C, D)

Switch code

Note) Select applicable switches out of the Switch List

Notes on order for switch sets

- If a switch is unnecessary, enter the switch code 1 and the switch quantity 12 of 0.

Switch quantity (1, 2, to n)

T T-end (rod end eye)

Y Y-end (rod end clevis)

Rod end attachments are exclusive use on the rod B. In case of the rod A, the thread size should be adjusted to that of the rod B in using attachments, and this change would be informed to us with order.

J Nylon tarpaulin

JN Chloroprene

JK Conex

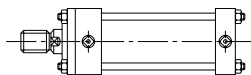
K Long thread with lock nut

A dimension conforms to the basic of long thread.

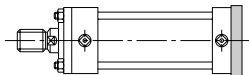
Note) The boots, the lock nuts and the rod end attachments, all accessories are for the 160 mm bore and below.

Mounting type

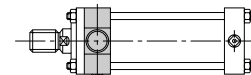
SD SD type (Basic type)



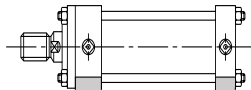
FB FB type (Cap rectangular flange mounting)



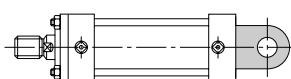
TA TA type (Head trunnion mounting)



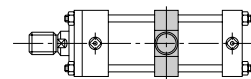
LA LA type (Side lugs mounting)



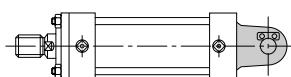
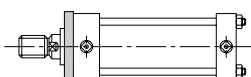
CA CA type (Eye mounting)



TC TC type (Intermediate trunnion mounting)



FA FA type (Head rectangular flange mounting) CB CB type (Clevis mounting)



Switches

Kind	Switch symbol	Load voltage range	Load current range	Maximum open/close capacity	Protective circuit	Indicating lamp	Wiring method	Cord length	Applicable load device
Contact	AF AX101	DC:5 - 30V AC:5 - 120V	DC:5 - 40mA AC:5 - 20mA	DC:1.5W AC:2VA	None	LED (Lights up in red during ON)	0.3 mm ² , 2-core, outer dia. 4 mm, rear wiring	1.5m	Small relay programmable controller
	AG AX105							5m	
	AH AX111				1.5m				
	AJ AX115				5m				
	AE AX125	DC:30V or less AC:120V or less	DC:40mA or less AC:20mA or less	2VA	None	No	4-pin connector type, rear wiring	5m	
	AK AX11A	AC:5 - 120V	5 - 20mA					0.5m	
	AL AX11B	DC:5 - 30V	5 - 40mA	1.5W	Present	LED (Lights up in red during ON)	4-pin connector type, rear wiring	0.5m	
	AP AZ101	DC:5 - 30V AC:5 - 120V	DC:5 - 40mA AC:5 - 20mA	DC:1.5W AC:2VA				None	
	AR AZ105				5m				
	AS AZ111				1.5m				
	AT AZ115				5m				
	AN AZ125	DC:30V or less AC:120V or less	DC:40mA or less AC:20mA or less	2VA	None	No	4-pin connector type, upper wiring	5m	
	AU AZ11A	AC:5 - 120V	5 - 20mA					0.5m	
	AW AZ11B	DC:5 - 30V	5 - 40mA	1.5W	Present	LED (Lights up in red during ON)	4-pin connector type, upper wiring	0.5m	
	No contact	BE AX201	DC:5 - 30V	5 - 40mA				-	
BF AX205		5m							
CE AX211		LED (2-lamp type, red/green)			4-pin connector type, rear wiring	1.5m			
CF AX215						5m			
CH AX21C		LED (Lights up in red during ON)			0.3 mm ² , 2-core, outer dia. 4 mm, upper wiring	0.5m			
CJ AX21D						1m			
BM AZ201		LED (2-lamp type, red/green)			4-pin connector type, rear wiring	1.5m			
BN AZ205						5m			
CM AZ211		LED (2-lamp type, red/green)			4-pin connector type, rear wiring	1.5m			
CN AZ215						5m			
No contact (CE coformed)	CT AX211CE	DC:5 - 30V	5 - 40mA	-	Present	LED (2-lamp type, red/green)	0.3 mm ² , 2-core, outer dia. 4 mm, rear wiring	1.5m	
	CU AX215CE							5m	
	CV AX21BCE							4-pin connector type, rear wiring	0.5m
	CW AZ211CE							0.3 mm ² , 2-core, outer dia. 4 mm, upper wiring	1.5m
	CX AZ215CE							5m	
	CY AZ21BCE							4-pin connector type, upper wiring	0.5m

Notes) ● For the switches without a protective circuit, be sure to provide the protective circuit (SK-100) with load devices when using induction load devices (relay, etc.).
 ● For the handling of switches, be sure to refer to the switch specifications in the end of this catalogue.
 ● For the 200 V AC type, contact us.

● General purpose type

AX type (Rear wiring)

Cord type



Connector type



AZ type (Upper wiring)

Cord type



Connector type



Adaptability of working oil to packing material

Packing material	Adaptable working oil				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	W/O Water in oil fluid	O/W Oil in water fluid
1 Nitrile rubber	○	○	×	○	○
2 Urethane rubber	◎	×	×	△	△
3 Fluoric rubber	○	×	○	○	○
6 Hydrogenated nitrile rubber	○	◎	×	◎	◎

Notes) 1. The ◎ and ○-marked items are applicable, while the ×-marked items are inapplicable. For the use of the △-marked items, contact us.
 2. The ◎ -marked items are the recommended packing materials in case of giving the first priority to abrasion resistance.

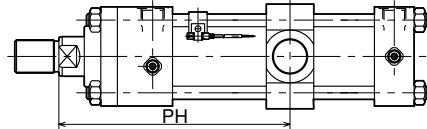
Switch mounting minimum possible stroke Unit: mm

Bore	Types other than TC type		TC type	
	with a switch	with two switches	with a switch	with two switches
φ40	20	20(50)	50	130
φ50	15	20(45)	50	130
φ63	20	20(50)	60	150
φ80	20	20(50)	70	170

Note) The parenthetic numeric value shows the case in which two switches are mounted on the same phase.

Notes)

- For the TC type (with a switch), the cylinder strokes in case that the TC type attachment shown in the right figures are positioned in the place other than the center are shown in the table above.

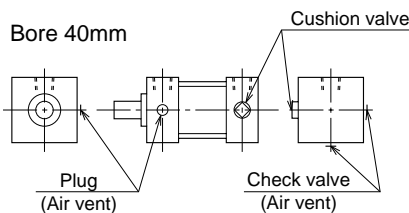


- For the minimum PH dimension at the switch mounting, refer to the dimensional drawings of the TC type.

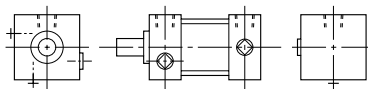
Cushion valve position and check valve (air vent) position depending on cylinder bore (Port position A, cushion valve position B)

Rod A

Bore 40mm

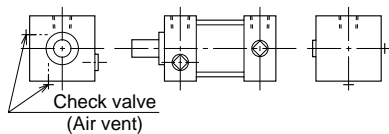


Bore 50 - 125mm

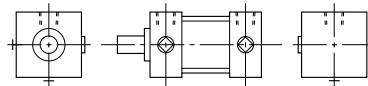


Rod B

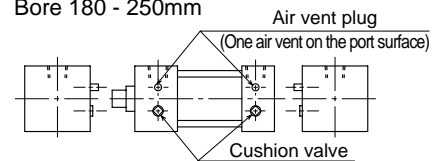
Bore 40 - 140mm



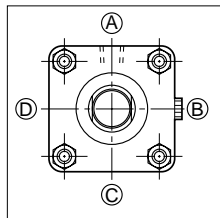
Bore 160mm



Bore 180 - 250mm



★ Standard specifications



- With both ends cushions
- Port position (A), cushion valve position (B)

★ Modification of port position and cushion valve position

When modifying the positions, enter the symbols shown in the dimensional drawings.

Ex.) 210C-1 2LA50BB100 - B A - J

Port position (A, B, C, D)

Cushion valve position (A, B, C, D, 0)

- In case that the cushion is not equipped, the cushion valve position is 0.
- The port and cushion position in LA mounting cannot be specified at the C phase as standard. Special case of C port or cushion in LA mounting needs consulting us.

★ Port G thread (BSPP) type

To order the port G thread type, add "G" ahead of the port position symbol.

Ex.) 210C-1 2LA50BB100 - G A B - J

Port G thread (BSPP) type

Port position

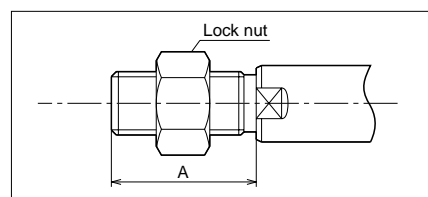
Cushion valve position

★ Notes on order of cylinder with lock nut

The rod end thread length (A) must be longer when a lock nut [K] is attached to the rod end.

Ex.) 210C-1 2LA50BB100 - A B - K

Long thread with lock nut



A without lock nut
A=30

A of long thread
with lock nut
A=50

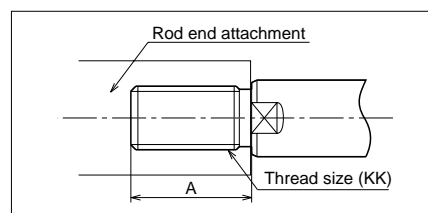
Note) When a lock nut is attached to the rod end, length "A" shown in the figure above must be the same as that of the long thread with lock nut type or longer. For details, refer to "Thread length with lock nut".

★ Note for the use of attachments on the rod A

In case of the rod A, the thread size and length should be adjusted to that of the rod B in using attachments, and this change would be informed to us with order.

Ex.) 210C-1 2LA50AB100 - A B - T

Rod end attachment (T-end)



Standard rod A
KK=M30×1.5
A=35

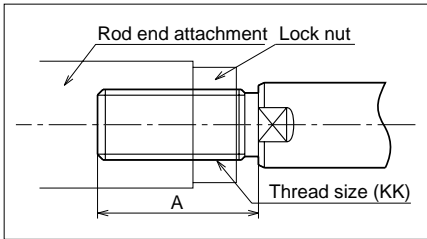
Standard rod B
KK=M24×1.5
A=30

Note) Please refer to the dimensional table of the rod end attachments in detail.

★ Note for the use of lock nut on the rod A

In case of the rod A, the thread size should be adjusted to that of the rod B in using lock nut, and the thread length should be adjusted to the Long thread basic. (with the symbol K)

Ex.) 210C-1 2LA50AB100 – A B – **T** **K**
 Rod end attachment (T-end)
 Long thread basic with lock nut



Standard rod A
 KK=M30×1.5
 A=35

↓
 Rod B
 KK=M24×1.5
 A=50 (Long thread basic)

Note) In using the lock nut, the thread length (A dimension) should be extended to the Long thread basic at least. Please refer to the drawing of rod end attachments in detail.

★ Semi-standard Fabrication range

- Modification of piston rod end
- Modification of TC attachment (dimensional symbol: PH)
- With boots
- Plated cylinder tube (hard chrome plated 2/100 mm)
- Working fluid other than normal mineral oil (Water-glycol fluid)
- BB dimension change (Extension of tie rods)

Weight table

Unit: kg

Bore mm	Rod size	Basic weight (SD type)		Additional weight per 1 mm stroke		Mounting accessories weight								Rod end attachment weight				
		Single rod type	Double rod type	Single rod type	Double rod type	LA		FA		FB	CA	CB	TA	TC	Rod end eye (T-end)	Rod end clevis (Y-end)	With lock nut	
						Single rod type	Double rod type	Single rod type	Double rod type								Lock nut	Lock nut with long thread
φ40	A	4.2	—	0.012	—	0.33	—	0.60	—	0.89	0.42	0.58	0.17	0.67	—	—	0.11	0.18
	B	4.1	5.0	0.011	0.014	0.33	0.38	0.52	0.52	0.89	0.42	0.58	0.17	0.67	0.74	1.17	0.07	0.12
φ50	A	7.1	—	0.019	—	0.78	—	1.24	—	1.72	0.81	1.19	0.28	1.08	—	—	0.22	0.36
	B	6.9	8.5	0.016	0.021	0.78	0.88	1.00	1.00	1.72	0.81	1.19	0.28	1.08	1.67	2.30	0.11	0.18
φ63	A	11.1	—	0.029	—	1.12	—	1.66	—	2.68	1.48	2.08	0.54	1.80	—	—	0.48	0.81
	B	10.5	13.2	0.024	0.032	1.12	1.30	1.50	1.50	2.68	1.48	2.08	0.54	1.80	2.51	3.97	0.22	0.36
φ80	A	18.9	—	0.043	—	1.57	—	2.55	—	4.04	2.46	3.64	1.17	3.25	—	—	0.91	1.48
	B	17.9	22.8	0.036	0.049	1.57	1.87	2.09	2.09	4.04	2.46	3.64	1.17	3.25	3.77	6.54	0.48	0.81
φ100	A	29.0	—	0.065	—	2.44	—	5.11	—	7.67	4.92	7.17	2.87	7.02	—	—	1.84	3.10
	B	27.2	35.2	0.054	0.073	2.44	2.90	4.23	4.23	7.67	4.92	7.17	2.81	7.02	7.47	12.62	0.91	1.48
φ125	A	52.2	—	0.104	—	4.46	—	7.21	—	12.61	8.80	13.68	5.01	14.15	—	—	3.23	5.80
	B	49.9	65.2	0.084	0.114	4.46	5.30	6.19	6.19	12.61	8.80	13.68	5.01	14.15	12.41	22.96	1.84	3.10
φ140	A	74.5	—	0.131	—	8.18	—	8.71	—	16.77	11.79	18.72	7.43	20.61	—	—	5.16	9.60
	B	71.1	94.6	0.109	0.149	8.18	8.38	5.76	5.76	16.77	11.79	18.72	7.43	20.61	19.17	33.75	2.50	4.42
φ160	A	101.7	—	0.166	—	13.21	—	13.10	—	25.22	17.54	26.48	12.02	26.14	—	—	6.22	11.14
	B	97.6	129.9	0.142	0.192	13.21	14.22	10.16	10.16	25.22	17.54	26.48	12.02	26.14	26.97	46.72	3.23	5.80
φ180	B	145	—	0.170	—	—	—	20.10	—	41.10	40.10	—	—	30.90	—	—	—	—
φ200	B	229	—	0.220	—	—	—	35.00	—	70.10	47.90	—	—	50.70	—	—	—	—
φ224	B	272	—	0.280	—	—	—	42.20	—	82.80	68.30	—	—	64.80	—	—	—	—
φ250	B	369	—	0.330	—	—	—	72.40	—	124.00	96.40	—	—	93.70	—	—	—	—

Note) ● In case of the Long thread basic (symbol K), please refer to the weight value of the lock nut with long thread.
 ● Rod end attachments are exclusive use on the rod B. In case of the rod A, the thread size should be adjusted to that of the rod B in using attachments.

Switch additional weight

Unit: kg

Bore (mm)	Switch	AX · AZ type		
		Cord length 1.5 m	Cord length 5 m	Connector type
φ40 · φ50		0.05	0.13	0.04
φ63 · φ80		0.07	0.15	0.06

Calculation formula cylinder weight (kg) = basic weight + (cylinder stroke mm × additional weight per 1 mm stroke) + mounting accessories weight + rod end attachment weight + (switch additional weight × switch quantity)

Calculation example 210C-1R, rod B, bore φ63, cylinder stroke 500 mm, LA type, 2 pcs. of AX215
 10.5 + (0.024 × 500) + 1.12 + (0.15 × 2) = 23.92 kg

CAD/DATA is available.

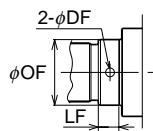
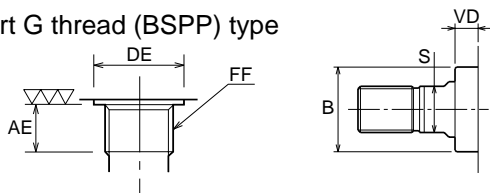
210C-1/THC1 Bore A•B



SD

210C-1 2 SD Bore B B Stroke

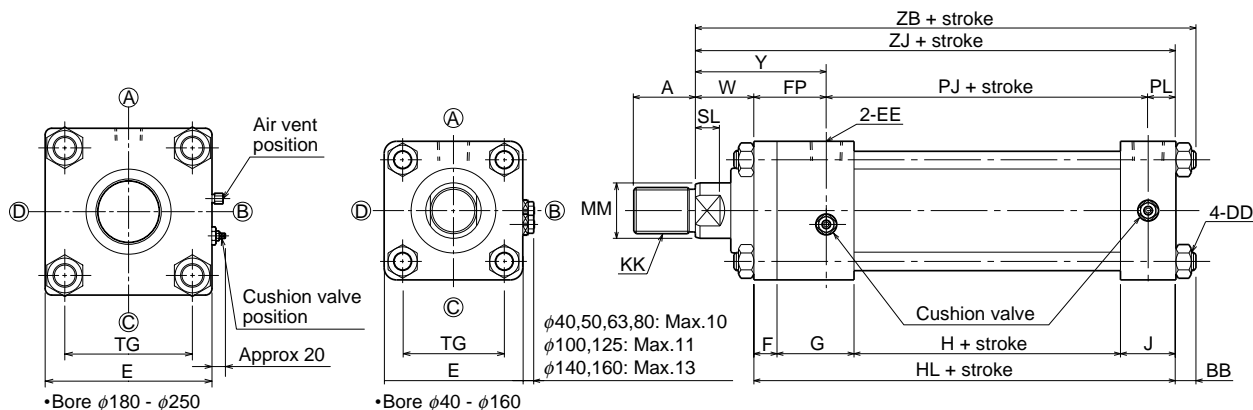
Port G thread (BSPP) type



•Rod dia. over φ90

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30
φ125	φ124	φ15	35
φ140	φ139	φ15	35

Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



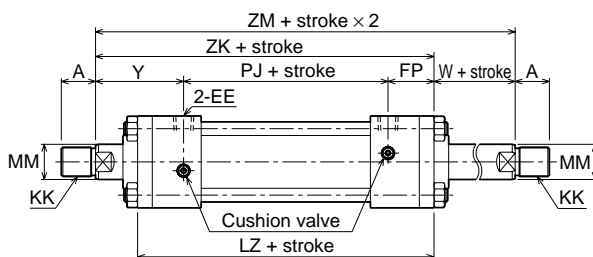
- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".
- We have two types in assembling way, the tie rod type and the tube flange type. These are separated according to the stroke.

Types	Tie rod type	Tube flange type
Stroke	- 800	801 - 2000

Note) The tube flange cylinder has the same dimensions as the tie rod cylinder.

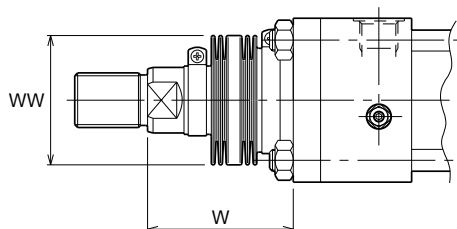
Double-acting double rod (Rod B)

- Bore φ40 - φ160



With boots

210C-1/THC1 BoreK



W dimension

Rod B	Material	Stroke	W dimension
φ40 • φ50	Nylon tarpaulin	1/3.5 Stroke + X	1/4 Stroke + X
φ63 - φ100	Chloroprene	1/4 Stroke + X	1/5 Stroke + X
φ125 • φ160	Conex	1/5 Stroke + X	1/4 Stroke + X

Rod A	Material	Stroke	W dimension
φ40 • φ50	Nylon tarpaulin	1/2.5 Stroke + X	1/3 Stroke + X
φ63 - φ100	Chloroprene	1/3 Stroke + X	1/3.5 Stroke + X
φ125 • φ140	Conex	1/3.5 Stroke + X	1/4 Stroke + X
φ160	Conex	1/4 Stroke + X	1/4 Stroke + X

- If decimals are included into the calculation results, raise them to the next whole number.
- Please consult us the dimensions for the special order of 180mm to 250mm bore.

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
 • The boots have been mounted at our factory prior to delivery.
 • Conex is the registered trademark of Teijin Ltd.

Rod A	Material	Stroke	W dimension
φ40	Nylon tarpaulin	1/3.5 Stroke + X	1/4 Stroke + X
φ50 - φ80	Chloroprene	1/4 Stroke + X	1/5 Stroke + X
φ100 - φ160	Conex	1/5 Stroke + X	1/4 Stroke + X

Rod A	Material	Stroke	W dimension
φ40 • φ50	Nylon tarpaulin	1/2.5 Stroke + X	1/3 Stroke + X
φ63 - φ100	Chloroprene	1/3 Stroke + X	1/3.5 Stroke + X
φ125 - φ160	Conex	1/4 Stroke + X	1/4 Stroke + X

Dimensional table

Symbol Bore	Rod B									Rod A								
	A	B	KK	MM	S	SL	VD	W	Y	A	B	KK	MM	S	SL	VD	W	Y
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	70	30	φ43	M24×1.5	φ28	24	14	15	32	70
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	78	35	φ55	M30×1.5	φ36	30	16	15	36	78
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	90	45	φ65	M39×1.5	φ45	41	20	19	43	90
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	105	55	φ80	M48×1.5	φ56	50	23	19	48	105
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	114	75	φ95	M64×2	φ70	65	27	19	53	114
φ125	75	φ95	M64×2	φ70	65	27	19	60	133	90	φ120	M80×2	φ90	—	—	28	60	133
φ140	80	φ105	M72×2	φ80	75	31	15	60	141	105	φ130	M95×2	φ100	—	—	24	60	141
φ160	90	φ120	M80×2	φ90	85	33	15	60	146	110	φ140	M100×2	φ110	—	—	24	60	146
φ180	105	φ130	M95×2	φ100	—	—	10	55	154	—	—	—	—	—	—	—	—	—
φ200	110	φ140	M100×2	φ110	—	—	10	55	170	—	—	—	—	—	—	—	—	—
φ224	130	φ155	M120×2	φ125	—	—	10	60	175	—	—	—	—	—	—	—	—	—
φ250	140	φ170	M130×2	φ140	—	—	10	65	196	—	—	—	—	—	—	—	—	—

Symbol Bore	AE	BB	DD	DE	E	EE	F	FF	FP	G	H	HL	J	LZ	PJ	PL	TG
	φ40	12	11	M10×1.25	φ25.5	□65	Rc3/8	11	G3/8	38	43	62	147	31	170	94	15
φ50	14	13	M12×1.25	φ30	□80	Rc1/2	13	G1/2	42	47	66	162	36	186	102	18	□56
φ63	14	14	M14×1.5	φ30	□94	Rc1/2	15	G1/2	47	50	73	174	36	203	109	18	□68
φ80	16	16	M16×1.5	φ36.9	□114	Rc3/4	18	G3/4	57	60	83	202	41	239	125	20	□84
φ100	16	18	M18×1.5	φ36.9	□135	Rc3/4	22	G3/4	61	60	90	213	41	254	132	20	□102
φ125	18	21	M22×1.5	φ46.1	□165	Rc1	24	G1	73	75	98	248	51	296	150	25	□125
φ140	18	25	M27×2	φ46.1	□192	Rc1	32	G1	81	75	108	266	51	322	160	25	□144
φ160	18	27	M30×2	φ46.1	□218	Rc1	37	G1	86	75	127	290	51	351	179	25	□164
φ180	—	32	M36×1.5	—	□255	Rc1 1/4	41	—	99	90	138	330	61	—	202	29	195
φ200	—	37	M42×1.5	—	□295	Rc1 1/2	51	—	115	100	148	369	70	—	220	34	220
φ224	—	39	M45×1.5	—	□325	Rc1 1/2	51	—	115	100	157	378	70	—	229	34	243
φ250	—	41	M48×1.5	—	□355	Rc2	56	—	131	120	162	428	90	—	252	45	268

Symbol Bore	ZB	ZJ	ZK	ZM
	φ40	190	179	202
φ50	211	198	222	258
φ63	231	217	246	289
φ80	266	250	287	335
φ100	284	266	307	360
φ125	329	308	356	416
φ140	351	326	382	442
φ160	377	350	411	471
φ180	385	417	—	—
φ200	424	461	—	—
φ224	438	477	—	—
φ250	493	534	—	—

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

CAD/DATA is

210C-1/THC1 Bore A•B

available.

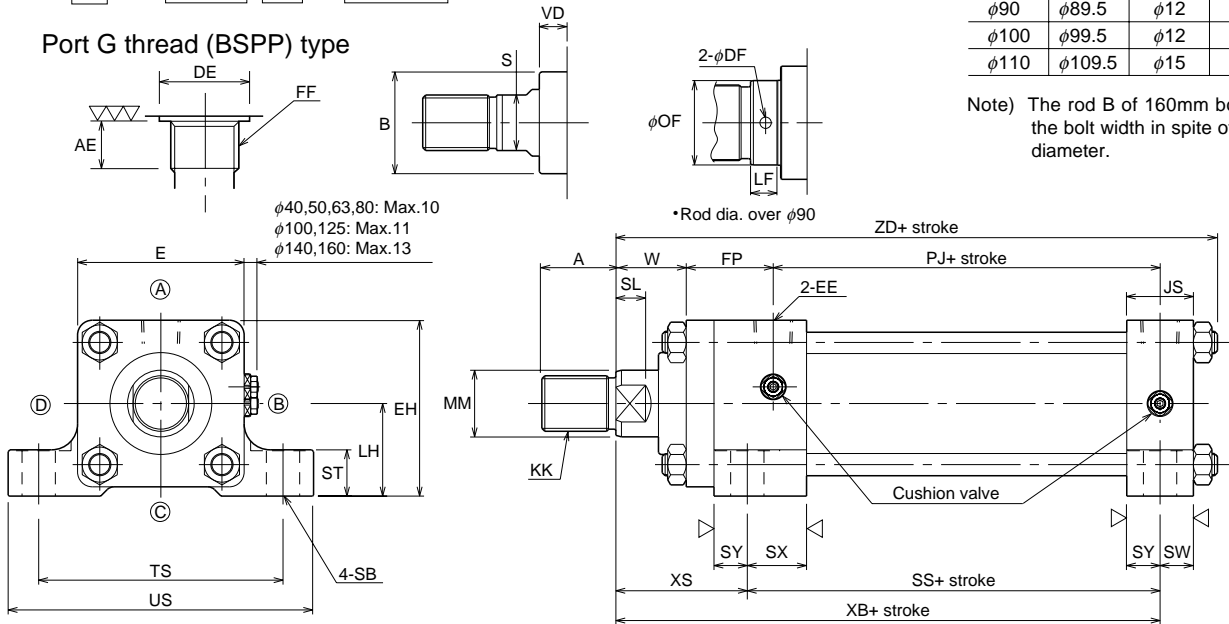


LA

210C-1 2 LA Bore B B Stroke

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30

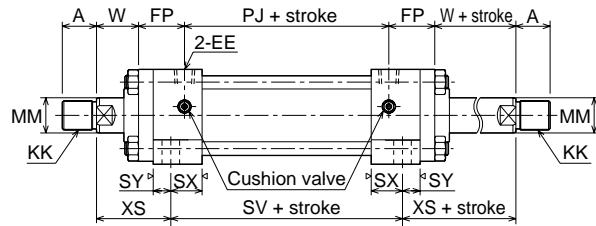
Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- Please consult us in the case that the cushion or check valves would be on the C phase.
- Having the side port on (B) or (D) phase, the port has some deviation to the center like the figure below.
- When you want to change the length of the projected rod, specify the "W".

Double-acting double rod (Rod B)

- Bore φ40 - φ160

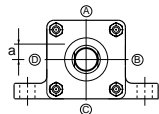
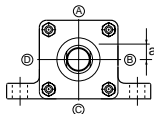


Note) a dimension (deviation to the center)

Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160	
Symbol	a	5	6	6	10	10	10	0	0

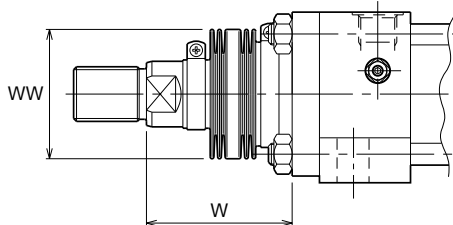
Port position (B)

Port position (D)



With boots

210C-1/THC1 BoreK



W dimension

Rod B	(φ40 • φ50 1/3.5 Stroke + X)
Nylon tarpaulin	(φ63 - φ100 1/4 Stroke + X)
Chloroprene	(φ125 - φ160 1/5 Stroke + X)

Conex	(φ40 • φ50 1/2.5 Stroke + X)
	(φ63 - φ100 1/3 Stroke + X)
	(φ125 • φ140 1/3.5 Stroke + X)
	(φ160 1/4 Stroke + X)

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

- Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
• The boots have been mounted at our factory prior to delivery.
• Conex is the registered trademark of Teijin Ltd.

Rod A	(φ40 1/3.5 Stroke + X)
Nylon tarpaulin	(φ50 - φ80 1/4 Stroke + X)
Chloroprene	(φ100 - φ160 1/5 Stroke + X)

Conex	(φ40 1/2.5 Stroke + X)
	(φ50 - φ80 1/3 Stroke + X)
	(φ100 1/3.5 Stroke + X)
	(φ125 - φ160 1/4 Stroke + X)

- If decimals are included into the calculation results, raise them to the next whole number.

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	–	–	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	–	–	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	–	–	24	60

Symbol Bore	AE	DE	E	EE	EH	FF	FP	JS	LH	PJ	SB	SS	ST	SV	SW	SX	SY	TS
	φ40	12	φ25.5	□65	Rc3/8	68.5	G3/8	38	31	36±0.15	94	φ11	105	15	116	15	27	16
φ50	14	φ30	□80	Rc1/2	85	G1/2	42	36	45±0.15	102	φ14	113	20	124	18	29	18	115
φ63	14	φ30	□94	Rc1/2	97	G1/2	47	36	50±0.15	109	φ18	123	25	137	18	32	18	136
φ80	16	φ36.9	□114	Rc3/4	117	G3/4	57	41	60±0.25	125	φ18	143	30	161	20	39	21	155
φ100	16	φ36.9	□135	Rc3/4	137.5	G3/4	61	41	70±0.25	132	φ22	150	35	164	18	37	23	190
φ125	18	φ46.1	□165	Rc1	167.5	G1	73	51	85±0.25	150	φ26	173	45	192	23	47	28	224
φ140	18	φ46.1	□192	Rc1	196	G1	81	56	100±0.25	160	φ30	183	45	202	28	47	28	262
φ160	18	φ46.1	□218	Rc1	224	G1	86	60	115±0.25	179	φ33	202	55	217	30	45	30	294

Symbol Bore	US	XB	XS	ZD
	φ40	122	164	59
φ50	145	180	67	211
φ63	169	199	76	231
φ80	190	230	87	266
φ100	230	248	98	284
φ125	272	285	112	329
φ140	320	303	120	356
φ160	356	329	127	386

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

CAD/DATA is

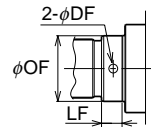
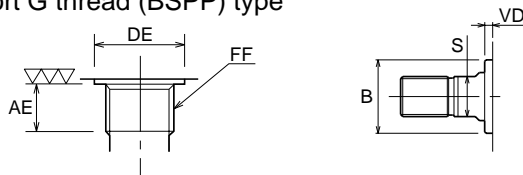
210C-1/THC1 Bore A•B available.



FA

210C-1 2 FA Bore B B Stroke

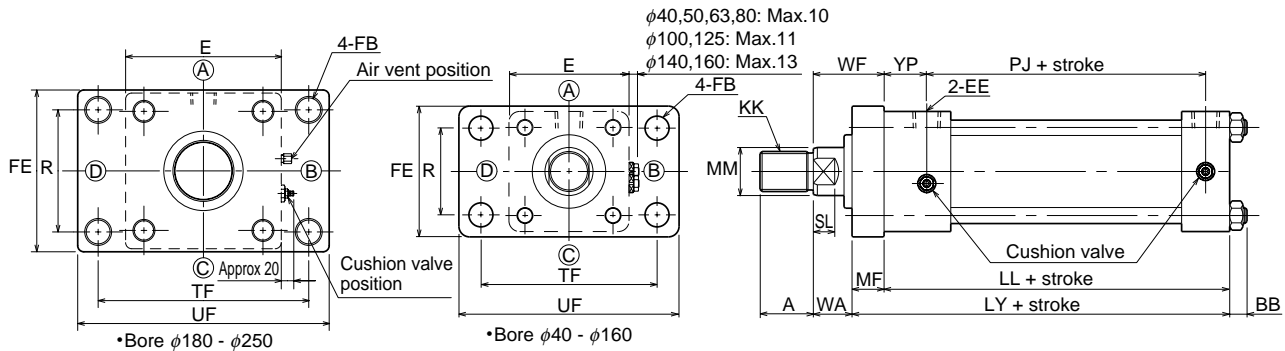
Port G thread (BSPP) type



• Rod dia. over φ90

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30
φ125	φ124	φ15	35
φ140	φ139	φ15	35

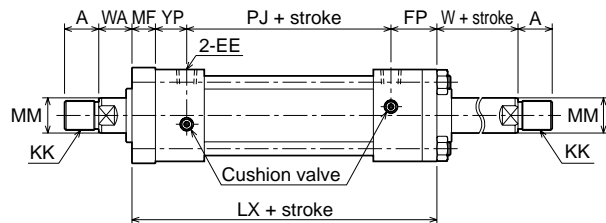
Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "WA".
- We have two types in assembling way, the tie rod type and the tube flange type. These are separated according to the stroke.

Double-acting double rod (Rod B)

- Bore φ40 - φ160

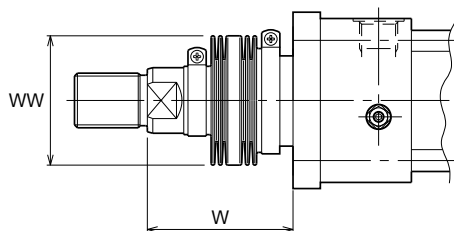


Types	Tie rod type	Tube flange type
Stroke	- 800	801 - 2000

Note) The tube flange cylinder has the same dimensions as the tie rod cylinder.

With boots

210C-1/THC1 BoreK



W dimension

Rod B	(φ40 • φ50 1/3.5 Stroke + X)
Nylon tarpaulin	(φ63 - φ100 1/4 Stroke + X)
Chloroprene	(φ125- φ160 1/5 Stroke + X)

Conex	(φ40 • φ50 1/2.5 Stroke + X)
	(φ63 - φ100 1/3 Stroke + X)
	(φ125 • φ140 1/3.5 Stroke + X)
	(φ160 1/4 Stroke + X)

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

- Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
 • The boots have been mounted at our factory prior to delivery.
 • Conex is the registered trademark of Teijin Ltd.

Rod A	(φ40 1/3.5 Stroke + X)
Nylon tarpaulin	(φ50 - φ80 1/4 Stroke + X)
Chloroprene	(φ100- φ160 1/5 Stroke + X)

Conex	(φ40 1/2.5 Stroke + X)
	(φ50 - φ80 1/3 Stroke + X)
	(φ100 1/3.5 Stroke + X)
	(φ125- φ160 1/4 Stroke + X)

- If decimals are included into the calculation results, raise them to the next whole number.
- The wearing bush design at FA mounting or boots style is different from others.
- Please consult us the dimensions for the special order of 180mm to 250mm bore.

Dimensional table

Symbol Bore	Rod B										Rod A									
	A	B	KK	MM	S	SL	VD	W	WA	WF	A	B	KK	MM	S	SL	VD	W	WA	WF
φ40	25	φ40	M20×1.5	φ22	19	11	7	32	28	43	30	φ43	M24×1.5	φ28	24	14	11	32	28	43
φ50	30	φ46	M24×1.5	φ28	24	14	6	36	29	49	35	φ55	M30×1.5	φ36	30	16	8	36	29	49
φ63	35	φ55	M30×1.5	φ36	30	16	6	43	34	58	45	φ65	M39×1.5	φ45	41	20	10	43	34	58
φ80	45	φ65	M39×1.5	φ45	41	20	6	48	42	66	55	φ80	M48×1.5	φ56	50	23	13	48	42	66
φ100	55	φ80	M48×1.5	φ56	50	23	6	53	44	75	75	φ95	M64×2	φ70	65	27	10	53	44	75
φ125	75	φ95	M64×2	φ70	65	27	6	60	47	84	90	φ120	M80×2	φ90	—	—	15	60	47	84
φ140	80	φ105	M72×2	φ80	75	31	6	60	51	92	105	φ130	M95×2	φ100	—	—	15	60	51	92
φ160	90	φ120	M80×2	φ90	85	33	6	60	51	97	110	φ140	M100×2	φ110	—	—	15	60	51	97
φ180	105	φ130	M95×2	φ100	—	—	10	—	55	116	—	—	—	—	—	—	—	—	—	—
φ200	110	φ140	M100×2	φ110	—	—	10	—	55	121	—	—	—	—	—	—	—	—	—	—
φ224	130	φ155	M120×2	φ125	—	—	10	—	60	131	—	—	—	—	—	—	—	—	—	—
φ250	140	φ170	M130×2	φ140	—	—	10	—	65	141	—	—	—	—	—	—	—	—	—	—

Symbol Bore	AE	BB	DE	E	EE	FB	FF	Rod B	Rod A	LL	LX	Rod B	Rod A	Rod B	Rod A	PJ	R
	FE	FE	LY	LY	MF	MF											
φ40	12	11	φ25.5	□65	Rc3/8	φ11	G3/8	73	80	136	174	151	151	15	15	94	46
φ50	14	13	φ30	□80	Rc1/2	φ14	G1/2	85	92	149	193	169	169	20	20	102	58
φ63	14	14	φ30	□94	Rc1/2	φ18	G1/2	98	105	159	212	183	183	24	24	109	65
φ80	16	16	φ36.9	□114	Rc3/4	φ18	G3/4	125	140	184	245	208	208	24	24	125	87
φ100	16	18	φ36.9	□135	Rc3/4	φ22	G3/4	150	165	191	263	222	222	31	31	132	109
φ125	18	21	φ46.1	□165	Rc1	φ26	G1	175	195	224	309	261	261	37	37	150	130
φ140	18	25	φ46.1	□192	Rc1	φ30	G1	195	215	234	331	275	275	41	41	160	145
φ160	18	27	φ46.1	□218	Rc1	φ33	G1	225	245	253	360	299	299	46	46	179	170
φ180	—	32	—	□255	Rc1 1/4	φ39	—	265	—	289	—	350	—	61	—	202	200
φ200	—	37	—	□295	Rc1 1/2	φ48	—	315	—	318	—	384	—	66	—	220	230
φ224	—	39	—	□325	Rc1 1/2	φ48	—	335	—	327	—	398	—	71	—	229	250
φ250	—	41	—	□355	Rc2	φ56	—	375	—	372	—	448	—	76	—	252	275

Symbol Bore	TF	UF	YP
φ40	95	118	27
φ50	115	145	29
φ63	132	165	32
φ80	155	190	39
φ100	190	230	39
φ125	224	272	49
φ140	250	300	49
φ160	285	345	49
φ180	345	412	58
φ200	412	500	64
φ224	425	515	64
φ250	480	585	75

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

CAD/DATA is available.

210C-1/THC1 Bore A•B



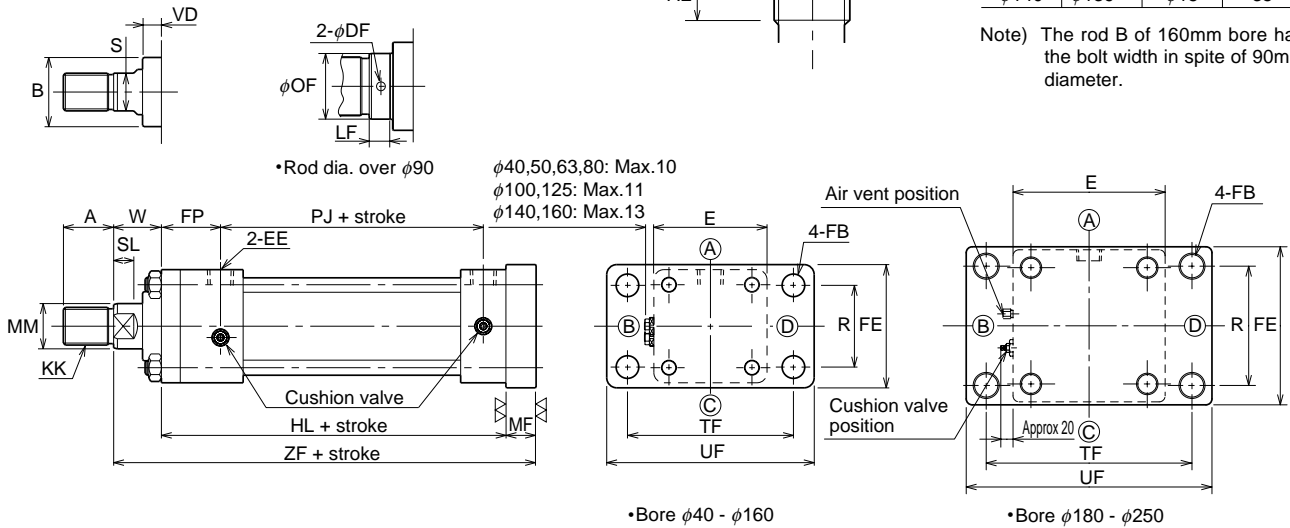
FB

210C-1 2 FB Bore B B Stroke

Port G thread (BSPB) type

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30
φ125	φ124	φ15	35
φ140	φ139	φ15	35

Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



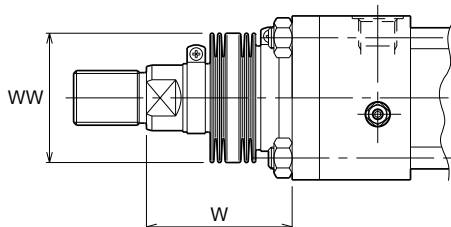
- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".
- We have two types in assembling way, the tie rod type and the tube flange type. These are separated according to the stroke.

Types	Tie rod type	Tube flange type
Stroke	- 800	801 - 2000

Note) The tube flange cylinder has the same dimensions as the tie rod cylinder.

With boots

210C-1/THC1 BoreK



W dimension

Rod B	(φ40 • φ50 1/3.5 Stroke + X)
Nylon tarpaulin	(φ63 - φ100 1/4 Stroke + X)
Chloroprene	(φ125 - φ160 1/5 Stroke + X)

Conex	(φ40 • φ50 1/2.5 Stroke + X)
	(φ63 - φ100 1/3 Stroke + X)
	(φ125 • φ140 1/3.5 Stroke + X)
	(φ160 1/4 Stroke + X)

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
 • The boots have been mounted at our factory prior to delivery.
 • Conex is the registered trademark of Teijin Ltd.

Rod A	(φ40 1/3.5 Stroke + X)
Nylon tarpaulin	(φ50 - φ80 1/4 Stroke + X)
Chloroprene	(φ100 - φ160 1/5 Stroke + X)

Conex	(φ40 1/2.5 Stroke + X)
	(φ50 - φ80 1/3 Stroke + X)
	(φ100 1/3.5 Stroke + X)
	(φ125 - φ160 1/4 Stroke + X)

- If decimals are included into the calculation results, raise them to the next whole number.
- Please consult us the dimensions for the special order of 180mm to 250mm bore.

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	–	–	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	–	–	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	–	–	24	60
φ180	105	φ130	M95×2	φ100	–	–	10	55	–	–	–	–	–	–	–	–
φ200	110	φ140	M100×2	φ110	–	–	10	55	–	–	–	–	–	–	–	–
φ224	130	φ155	M120×2	φ125	–	–	10	60	–	–	–	–	–	–	–	–
φ250	140	φ170	M130×2	φ140	–	–	10	65	–	–	–	–	–	–	–	–

Symbol Bore	AE	DE	E	EE	FB	FE	FF	FP	HL	MF	PJ	R	TF	UF	ZF
	φ40	12	φ25.5	□65	Rc3/8	φ11	73	G3/8	38	147	15	94	46	95	118
φ50	14	φ30	□80	Rc1/2	φ14	85	G1/2	42	162	20	102	58	115	145	218
φ63	14	φ30	□94	Rc1/2	φ18	98	G1/2	47	174	24	109	65	132	165	241
φ80	16	φ36.9	□114	Rc3/4	φ18	125	G3/4	57	202	24	125	87	155	190	274
φ100	16	φ36.9	□135	Rc3/4	φ22	150	G3/4	61	213	31	132	109	190	230	297
φ125	18	φ46.1	□165	Rc1	φ26	175	G1	73	248	37	150	130	224	272	345
φ140	18	φ46.1	□192	Rc1	φ30	195	G1	81	266	41	160	145	250	300	367
φ160	18	φ46.1	□218	Rc1	φ33	225	G1	86	290	46	179	170	285	345	396
φ180	–	–	□255	Rc1 1/4	φ39	265	–	99	330	61	202	200	345	412	446
φ200	–	–	□295	Rc1 1/2	φ48	315	–	115	369	66	220	230	412	500	490
φ224	–	–	□325	Rc1 1/2	φ48	335	–	115	378	71	229	250	425	515	509
φ250	–	–	□355	Rc2	φ56	375	–	131	428	76	252	275	480	585	569

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
		WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125
	Rod A	φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

210C-1/THC1 **Bore** A•B CAD/DATA is available.

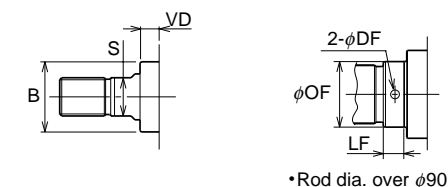
CA

210C-1 **2** CA **Bore** **B** **B** **Stroke**

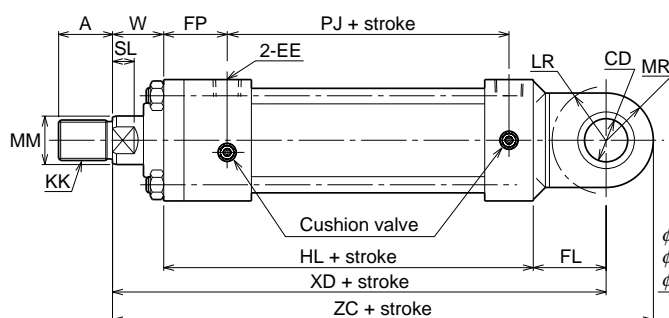
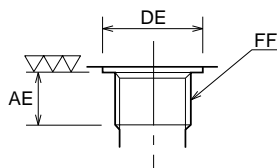
Port G thread (BSPB) type

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30
φ125	φ124	φ15	35
φ140	φ139	φ15	35

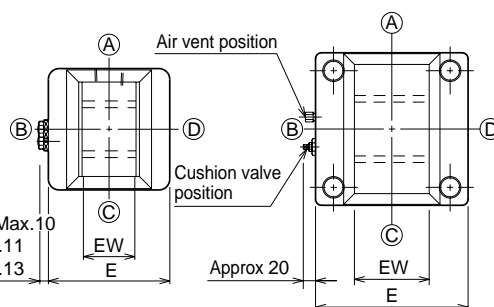
Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



•Rod dia. over φ90



φ40,50,63,80: Max.10
φ100,125: Max.11
φ140,160: Max.13



•Bore φ40 - φ160

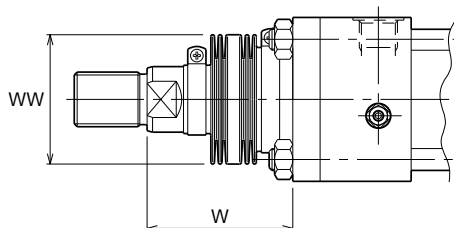
•Bore φ180 - φ250

- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".
- We have two types in assembling way, the tie rod type and the tube flange type. These are separated according to the stroke.

Types	Tie rod type	Tube flange type
Stroke	- 800	801 - 2000

Note) The tube flange cylinder has the same dimensions as the tie rod cylinder.

With boots

210C-1/THC1 **Bore**K

W dimension

Rod B
Nylon tarpaulin $\left(\begin{array}{l} \phi 40 \cdot \phi 50 \quad 1/3.5 \text{ Stroke} + X \\ \phi 63 - \phi 100 \quad 1/4 \text{ Stroke} + X \\ \phi 125 - \phi 160 \quad 1/5 \text{ Stroke} + X \end{array} \right)$

Conex $\left(\begin{array}{l} \phi 40 \cdot \phi 50 \quad 1/2.5 \text{ Stroke} + X \\ \phi 63 - \phi 100 \quad 1/3 \text{ Stroke} + X \\ \phi 125 \cdot \phi 140 \quad 1/3.5 \text{ Stroke} + X \\ \phi 160 \quad 1/4 \text{ Stroke} + X \end{array} \right)$

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
• The boots have been mounted at our factory prior to delivery.
• Conex is the registered trademark of Teijin Ltd.

Rod A
Nylon tarpaulin $\left(\begin{array}{l} \phi 40 \quad 1/3.5 \text{ Stroke} + X \\ \phi 50 - \phi 80 \quad 1/4 \text{ Stroke} + X \\ \phi 100 - \phi 160 \quad 1/5 \text{ Stroke} + X \end{array} \right)$

Conex $\left(\begin{array}{l} \phi 40 \quad 1/2.5 \text{ Stroke} + X \\ \phi 50 - \phi 80 \quad 1/3 \text{ Stroke} + X \\ \phi 100 \quad 1/3.5 \text{ Stroke} + X \\ \phi 125 - \phi 160 \quad 1/4 \text{ Stroke} + X \end{array} \right)$

- If decimals are included into the calculation results, raise them to the next whole number.
- Please consult us the dimensions for the special order of 180mm to 250mm bore.

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	–	–	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	–	–	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	–	–	24	60
φ180	105	φ130	M95×2	φ100	–	–	10	55	–	–	–	–	–	–	–	–
φ200	110	φ140	M100×2	φ110	–	–	10	55	–	–	–	–	–	–	–	–
φ224	130	φ155	M120×2	φ125	–	–	10	60	–	–	–	–	–	–	–	–
φ250	140	φ170	M130×2	φ140	–	–	10	65	–	–	–	–	–	–	–	–

Symbol Bore	AE	CD	DE	E	EE	EW	FF	FL	FP	HL	LR	MR	PJ	XD	ZC
	φ40	12	φ20H10	φ25.5	□65	Rc3/8	25 ^{-0.1} _{-0.4}	G3/8	35	38	147	R25	R25	94	214
φ50	14	φ25H10	φ30	□80	Rc1/2	32 ^{-0.1} _{-0.4}	G1/2	44	42	162	R32	R30	102	242	272
φ63	14	φ32H10	φ30	□94	Rc1/2	40 ^{-0.1} _{-0.4}	G1/2	54	47	174	R40	R35	109	271	306
φ80	16	φ40H10	φ36.9	□114	Rc3/4	50 ^{-0.1} _{-0.4}	G3/4	66	57	202	R50	R40	125	316	356
φ100	16	φ50H10	φ36.9	□135	Rc3/4	63 ^{-0.1} _{-0.4}	G3/4	79	61	213	R63	R50	132	345	395
φ125	18	φ63H10	φ46.1	□165	Rc1	80 ^{-0.1} _{-0.6}	G1	90	73	248	R71	R63	150	398	461
φ140	18	φ70H10	φ46.1	□192	Rc1	90 ^{-0.1} _{-0.6}	G1	99	81	266	R80	R70	160	425	495
φ160	18	φ80H10	φ46.1	□218	Rc1	100 ^{-0.1} _{-0.6}	G1	110	86	290	R90	R80	179	460	540
φ180	–	φ90H10	–	□255	Rc1 ¹ / ₄	125 ^{-0.1} _{-0.6}	–	145	99	330	R120	R108	202	530	638
φ200	–	φ100H10	–	□295	Rc1 ¹ / ₂	125 ^{-0.1} _{-0.6}	–	155	115	369	R130	R120	220	579	699
φ224	–	φ112H10	–	□325	Rc1 ¹ / ₂	140 ^{-0.1} _{-0.6}	–	175	115	378	R150	R135	229	613	748
φ250	–	φ125H10	–	□355	Rc2	160 ^{-0.1} _{-0.6}	–	195	131	428	R165	R150	252	688	838

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

210C-1/THC1 Bore A•B available.

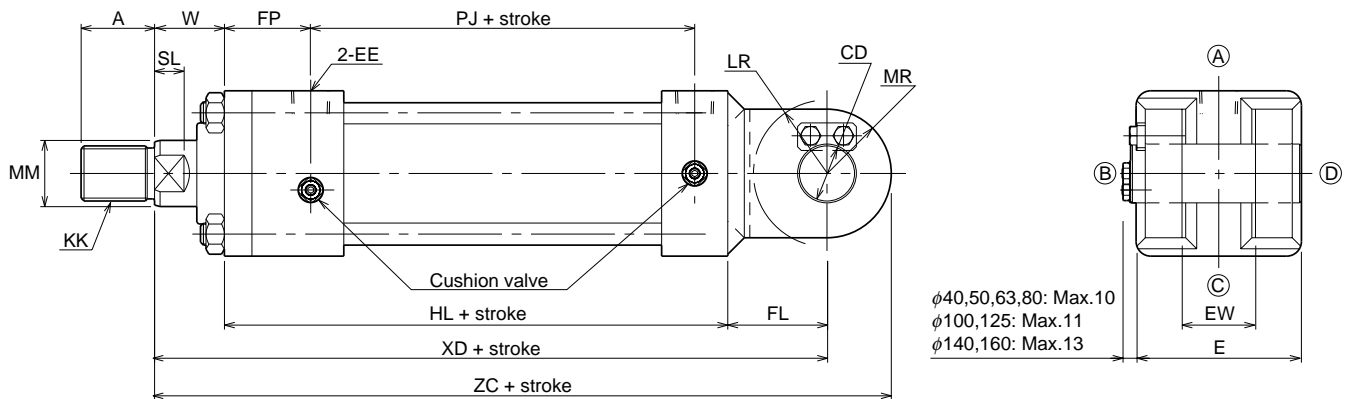
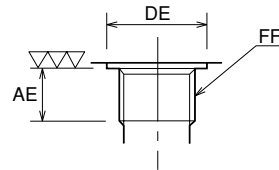
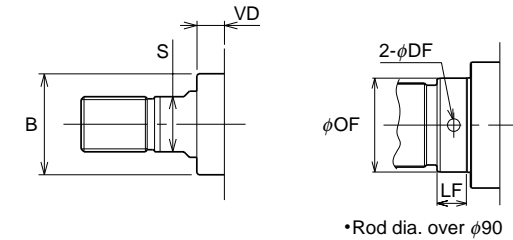
CB

210C-1 2 CB Bore B B Stroke

Port G thread (BSPF) type

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30

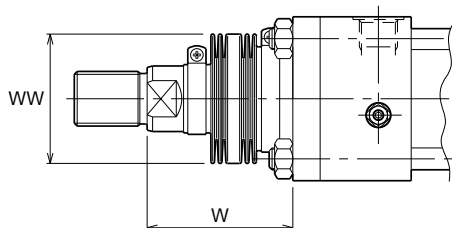
Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



φ40,50,63,80: Max.10
 φ100,125: Max.11
 φ140,160: Max.13

- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".

With boots

210C-1/THC1 BoreK

W dimension

Rod B	φ40 • φ50	1/3.5 Stroke + X
Nylon tarpaulin	φ63 - φ100	1/4 Stroke + X
Chloroprene	φ125 - φ160	1/5 Stroke + X

Conex	φ40 • φ50	1/2.5 Stroke + X
	φ63 - φ100	1/3 Stroke + X
	φ125 • φ140	1/3.5 Stroke + X
	φ160	1/4 Stroke + X

- If decimals are included into the calculation results, raise them to the next whole number.

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
 • The boots have been mounted at our factory prior to delivery.
 • Conex is the registered trademark of Teijin Ltd.

Rod A	φ40	1/3.5 Stroke + X
Nylon tarpaulin	φ50 - φ80	1/4 Stroke + X
Chloroprene	φ100 - φ160	1/5 Stroke + X

Conex	φ40	1/2.5 Stroke + X
	φ50 - φ80	1/3 Stroke + X
	φ100	1/3.5 Stroke + X
	φ125 - φ160	1/4 Stroke + X

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	–	–	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	–	–	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	–	–	24	60

Symbol Bore	AE	CD	DE	E	EE	EW	FF	FL	FP	HL	LR	MR	PJ	XD	ZC
	φ40	12	φ20 ^{H10/f8}	φ25.5	□65	Rc3/8	25 ^{+0.4/+0.1}	G3/8	35	38	147	R25	R25	94	214
φ50	14	φ25 ^{H10/f8}	φ30	□80	Rc1/2	32 ^{+0.4/+0.1}	G1/2	44	42	162	R32	R30	102	242	272
φ63	14	φ32 ^{H10/f8}	φ30	□94	Rc1/2	40 ^{+0.4/+0.1}	G1/2	54	47	174	R40	R35	109	271	306
φ80	16	φ40 ^{H10/f8}	φ36.9	□114	Rc3/4	50 ^{+0.4/+0.1}	G3/4	66	57	202	R50	R40	125	316	356
φ100	16	φ50 ^{H10/f8}	φ36.9	□135	Rc3/4	63 ^{+0.4/+0.1}	G3/4	79	61	213	R63	R50	132	345	395
φ125	18	φ63 ^{H10/f8}	φ46.1	□165	Rc1	80 ^{+0.6/+0.1}	G1	90	73	248	R71	R63	150	398	461
φ140	18	φ70 ^{H10/f8}	φ46.1	□192	Rc1	90 ^{+0.6/+0.1}	G1	99	81	266	R80	R70	160	425	495
φ160	18	φ80 ^{H10/f8}	φ46.1	□218	Rc1	100 ^{+0.6/+0.1}	G1	110	86	290	R90	R80	179	460	540

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

CAD/DATA is

210C-1/THC1 **Bore** A·B

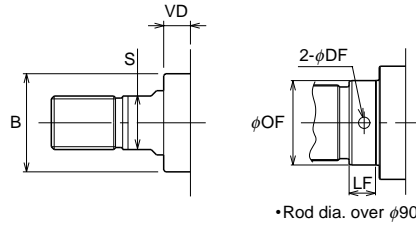
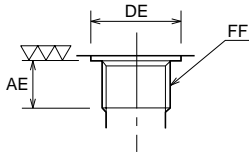
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TA

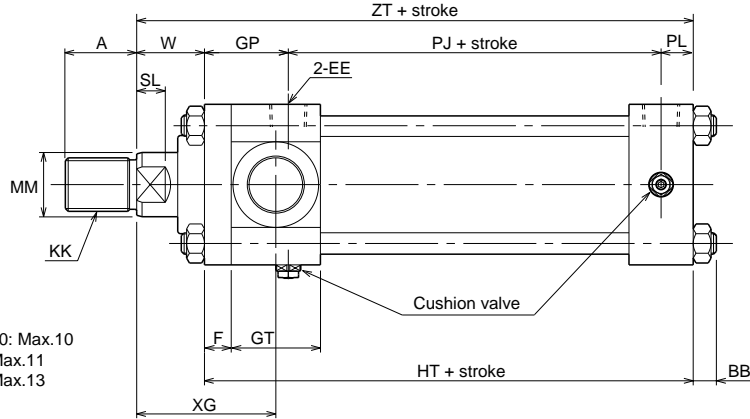
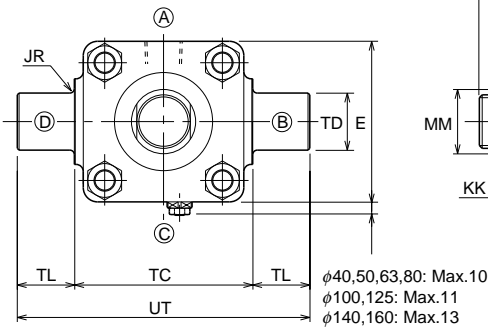
210C-1 **2** TA **Bore** **B** **B** **Stroke**

Port G thread (BSPP) type



Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30

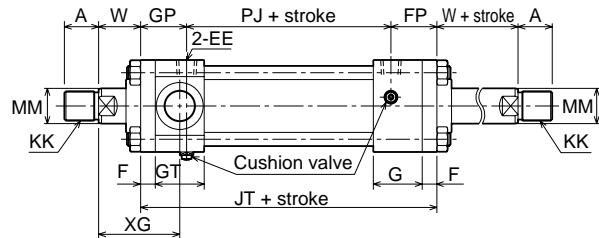
Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".
- The port and cushion position is only (A)C or C(A) because of the mounting boss.

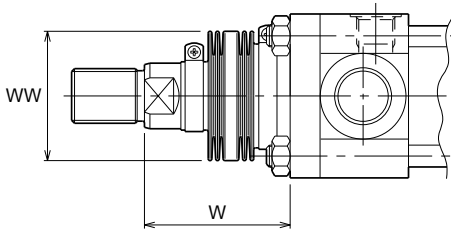
Double-acting double rod (Rod B)

- Bore φ40 - φ80



With boots

210C-1/THC1 **Bore**K



	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
• The boots have been mounted at our factory prior to delivery.
• Conex is the registered trademark of Teijin Ltd.

W dimension

Rod B	Material	W dimension
φ40 • φ50	Nylon tarpaulin	1/3.5 Stroke + X
φ63 - φ100	Nylon tarpaulin	1/4 Stroke + X
φ125 - φ160	Chloroprene	1/5 Stroke + X

Rod A	Material	W dimension
φ40	Nylon tarpaulin	1/3.5 Stroke + X
φ50 - φ80	Nylon tarpaulin	1/4 Stroke + X
φ100 - φ160	Chloroprene	1/5 Stroke + X

Conex	Material	W dimension
φ40 • φ50	Conex	1/2.5 Stroke + X
φ63 - φ100	Conex	1/3 Stroke + X
φ125 • φ140	Conex	1/3.5 Stroke + X
φ160	Conex	1/4 Stroke + X

Conex	Material	W dimension
φ40	Conex	1/2.5 Stroke + X
φ50 - φ80	Conex	1/3 Stroke + X
φ100	Conex	1/3.5 Stroke + X
φ125 - φ160	Conex	1/4 Stroke + X

- If decimals are included into the calculation results, raise them to the next whole number.

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	–	–	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	–	–	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	–	–	24	60

Symbol Bore	AE	BB	DE	E	EE	F	FF	FP	G	GP	GT	HT	JR	JT	PJ	PL	TC
	φ40	12	11	φ25.5	□65	Rc3/8	11	G3/8	38	43	38	43	147	R2.5	170	94	15
φ50	14	13	φ30	□80	Rc1/2	13	G1/2	42	47	42	47	162	R2.5	186	102	18	85 ⁰ _{-0.35}
φ63	14	14	φ30	□94	Rc1/2	15	G1/2	47	50	47	50	174	R2.5	203	109	18	100 ⁰ _{-0.35}
φ80	16	16	φ36.9	□114	Rc3/4	18	G3/4	57	60	57	60	202	R3	239	125	20	125 ⁰ _{-0.4}
φ100	16	18	φ36.9	□135	Rc3/4	22	G3/4	61	60	66	65	218	R3	259	132	20	155 ⁰ _{-0.4}
φ125	18	21	φ46.1	□165	Rc1	24	G1	73	75	73	75	248	R4	296	150	25	195 ⁰ _{-0.46}
φ140	18	25	φ46.1	□192	Rc1	32	G1	81	75	86	80	271	R4	327	160	25	220 ⁰ _{-0.46}
φ160	18	27	φ46.1	□218	Rc1	37	G1	86	75	111	100	315	R4	376	179	25	240 ⁰ _{-0.46}

Symbol Bore	TD	TL	UT	XG	ZT
	φ40	φ20e9	20	110	65
φ50	φ25e9	25	135	72	198
φ63	φ32e9	32	164	83	217
φ80	φ40e9	40	205	96	250
φ100	φ50e9	50	255	107	271
φ125	φ63e9	63	321	122	308
φ140	φ70e9	70	360	132	331
φ160	φ80e9	80	400	147	375

With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

CAD/DATA is

210C-1/THC1 Bore A•B

available.

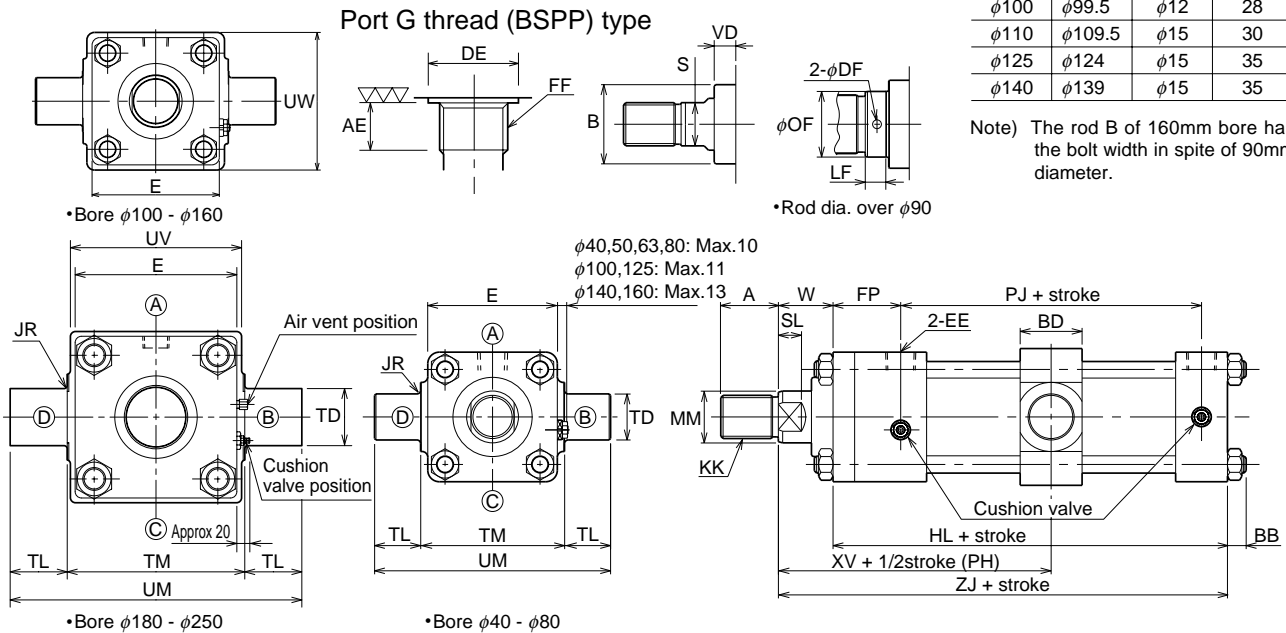


TC

210C-1 2 TC Bore B B Stroke

Rod dia.	OF	DF	LF
φ90	φ89.5	φ12	28
φ100	φ99.5	φ12	28
φ110	φ109.5	φ15	30
φ125	φ124	φ15	35
φ140	φ139	φ15	35

Note) The rod B of 160mm bore has the bolt width in spite of 90mm diameter.



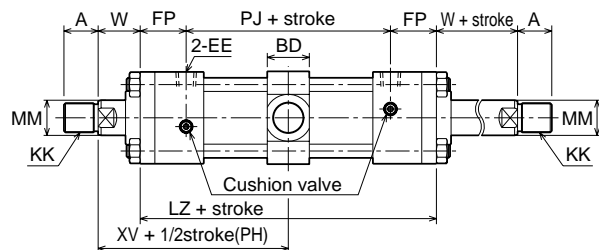
- The cushion of the rod A, 40mm bore and head side is not adjustable.
- Positions of the cushion needles depend on the cylinder bore.
- For the short stroke cylinder or the small PH dimension, the interference of the cushion valve should be checked in designing.
- For the screw length (dimension A) in the case of using the lock nut, refer to "Accessories".
- When you want to change the length of the projected rod, specify the "W".
- We have two types in assembling way, the tie rod type and the tube flange type. These are separated according to the stroke

Types	Tie rod type	Tube flange type
Stroke	- 800	801 - 2000

Note) The tube flange cylinder has the same dimensions as the tie rod cylinder.

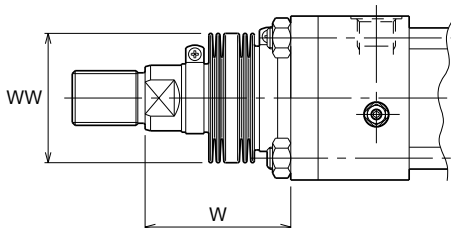
Double-acting double rod (Rod B)

- Bore φ40 - φ160



With boots

210C-1/THC1 BoreK



W dimension

Rod B	(φ40 • φ50 1/3.5 Stroke + X)
Nylon tarpaulin	(φ63 - φ100 1/4 Stroke + X)
Chloroprene	(φ125 - φ160 1/5 Stroke + X)

Conex	(φ40 • φ50 1/2.5 Stroke + X)
	(φ63 - φ100 1/3 Stroke + X)
	(φ125 • φ140 1/3.5 Stroke + X)
	(φ160 1/4 Stroke + X)

- If decimals are included into the calculation results, raise them to the next whole number.
- Please consult us the dimensions for the special order of 180mm to 250mm bore.

	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Resistible temperature	80°C	130°C	200°C

- Notes) • Remember that the resistible temperatures shown in the table above are for the boots, not for the cylinder.
 • The boots have been mounted at our factory prior to delivery.
 • Conex is the registered trademark of Teijin Ltd.

Rod A	(φ40 1/3.5 Stroke + X)
Nylon tarpaulin	(φ50 - φ80 1/4 Stroke + X)
Chloroprene	(φ100 - φ160 1/5 Stroke + X)

Conex	(φ40 1/2.5 Stroke + X)
	(φ50 - φ80 1/3 Stroke + X)
	(φ100 1/3.5 Stroke + X)
	(φ125 - φ160 1/4 Stroke + X)

Dimensional table

Symbol Bore	Rod B								Rod A							
	A	B	KK	MM	S	SL	VD	W	A	B	KK	MM	S	SL	VD	W
φ40	25	φ40	M20×1.5	φ22	19	11	11	32	30	φ43	M24×1.5	φ28	24	14	15	32
φ50	30	φ46	M24×1.5	φ28	24	14	13	36	35	φ55	M30×1.5	φ36	30	16	15	36
φ63	35	φ55	M30×1.5	φ36	30	16	15	43	45	φ65	M39×1.5	φ45	41	20	19	43
φ80	45	φ65	M39×1.5	φ45	41	20	12	48	55	φ80	M48×1.5	φ56	50	23	19	48
φ100	55	φ80	M48×1.5	φ56	50	23	15	53	75	φ95	M64×2	φ70	65	27	19	53
φ125	75	φ95	M64×2	φ70	65	27	19	60	90	φ120	M80×2	φ90	—	—	28	60
φ140	80	φ105	M72×2	φ80	75	31	15	60	105	φ130	M95×2	φ100	—	—	24	60
φ160	90	φ120	M80×2	φ90	85	33	15	60	110	φ140	M100×2	φ110	—	—	24	60
φ180	105	φ130	M95×2	φ100	—	—	10	55	—	—	—	—	—	—	—	—
φ200	110	φ140	M100×2	φ110	—	—	10	55	—	—	—	—	—	—	—	—
φ224	130	φ155	M120×2	φ125	—	—	10	60	—	—	—	—	—	—	—	—
φ250	140	φ170	M130×2	φ140	—	—	10	65	—	—	—	—	—	—	—	—

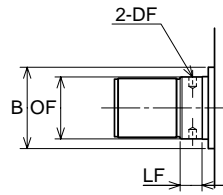
Symbol Bore	AE	BB	BD	DE	E	EE	FF	FP	HL	JR	LZ	The minimum dimension PH	PJ	TD
	φ40	12	11	33	φ25.5	□65	Rc3/8	G3/8	38	147	R2.5		170	102.5
φ50	14	13	33	φ30	□80	Rc1/2	G1/2	42	162	R2.5	186	112.5	102	φ25e9
φ63	14	14	43	φ30	□94	Rc1/2	G1/2	47	174	R2.5	203	129.5	109	φ32e9
φ80	16	16	53	φ36.9	□114	Rc3/4	G3/4	57	202	R3	239	152.5	125	φ40e9
φ100	16	18	63	φ36.9	□135	Rc3/4	G3/4	61	213	R3	254	166.5	132	φ50e9
φ125	18	21	78	φ46.1	□165	Rc1	G1	73	248	R4	296	198	150	φ63e9
φ140	18	25	88	φ46.1	□192	Rc1	G1	81	266	R4	322	211	160	φ70e9
φ160	18	27	98	φ46.1	□218	Rc1	G1	86	290	R4	351	221	179	φ80e9
φ180	—	32	108	—	□255	Rc1 ^{1/4}	—	99	330	R5	—	398	202	φ90
φ200	—	37	118	—	□295	Rc1 ^{1/2}	—	115	369	R5	—	433	220	φ100
φ224	—	39	137	—	□325	Rc1 ^{1/2}	—	115	378	R5	—	466.5	229	φ112
φ250	—	41	147	—	□355	Rc2	—	131	428	R5	—	511.5	252	φ125

Symbol Bore	TL	TM	UM	UW	XV	ZJ
	φ40	20	70 ⁰ _{-0.3}	110	—	117
φ50	25	85 ⁰ _{-0.35}	135	—	129	198
φ63	32	100 ⁰ _{-0.35}	164	—	144.5	217
φ80	40	125 ⁰ _{-0.4}	205	—	167.5	250
φ100	50	155 ⁰ _{-0.4}	255	□146	180	266
φ125	63	195 ⁰ _{-0.46}	321	□185	208	308
φ140	70	220 ⁰ _{-0.46}	360	□210	221	326
φ160	80	240 ⁰ _{-0.46}	400	□230	235.5	350
φ180	90	280 ⁰ _{-0.8}	460	—	255	385
φ200	100	320 ⁰ _{-0.8}	520	—	280	424
φ224	112	355 ⁰ _{-0.8}	579	—	289.5	438
φ250	125	400 ⁰ _{-0.8}	650	—	322	493

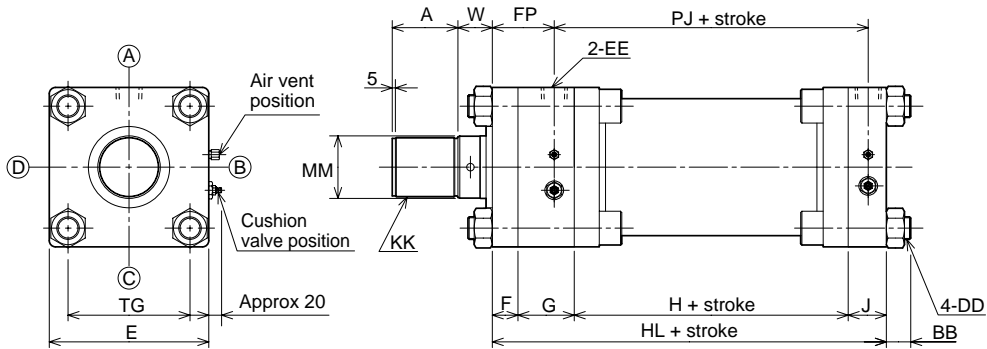
With boots

Symbol	Bore	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ160
	WW	Rod B	φ50	φ63	φ71	φ80	φ100	φ125	φ125
Rod A		φ63	φ71	φ80	φ100	φ125	φ140	φ160	φ180
X	Rod B	45	45	55	55	55	65	65	65
	Rod A	45	55	55	55	65	65	65	65

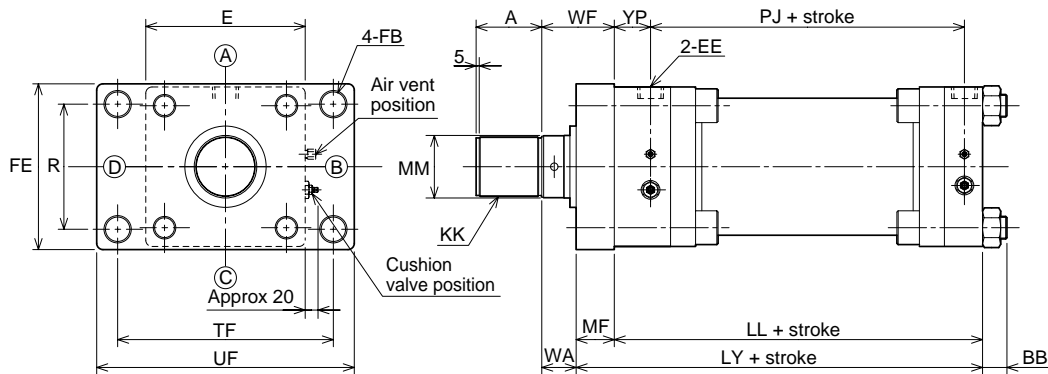
Tube flange type (Stroke: 801 - 2000mm)



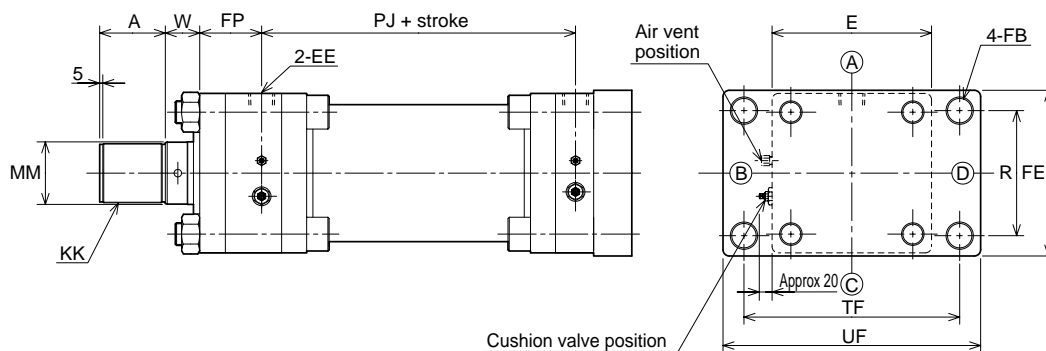
● SD type



● FA type



● FB type



Dimensional table/SD•FA•FB type

Symbol Bore	A	B	DF	E	EE	KK	LF	MM	OF	PJ
φ180	105	φ130	φ12	255	Rc1 ¹ / ₄	M95×2	28	φ100	φ99.5	202
φ200	110	φ140	φ15	295	Rc1 ¹ / ₂	M100×2	30	φ110	φ109.5	220
φ224	130	φ155	φ15	325	Rc1 ¹ / ₂	M120×2	35	φ125	φ123	229
φ250	140	φ170	φ15	355	Rc2	M130×2	35	φ140	φ138	252

Dimensional table/SD type

Symbol Bore	BB	DD	F	FP	G	H	HL	J	TG	W
φ180	32	M36×1.5	41	99	90	138	330	61	195	55
φ200	37	M42×1.5	51	115	100	148	369	70	220	55
φ224	39	M45×1.5	51	115	100	157	378	70	243	60
φ250	41	M48×1.5	56	131	120	162	428	90	268	65

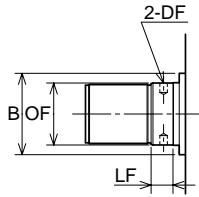
Dimensional table/FA type

Symbol Bore	BB	FB	FE	LL	LY	MF	TF	UF	WA	WF	YP
φ180	32	φ39	265	289	350	61	345	412	55	116	58
φ200	37	φ48	315	318	384	66	412	500	55	121	64
φ224	39	φ48	335	327	398	71	425	515	60	131	64
φ250	41	φ56	375	372	448	76	480	585	65	141	75

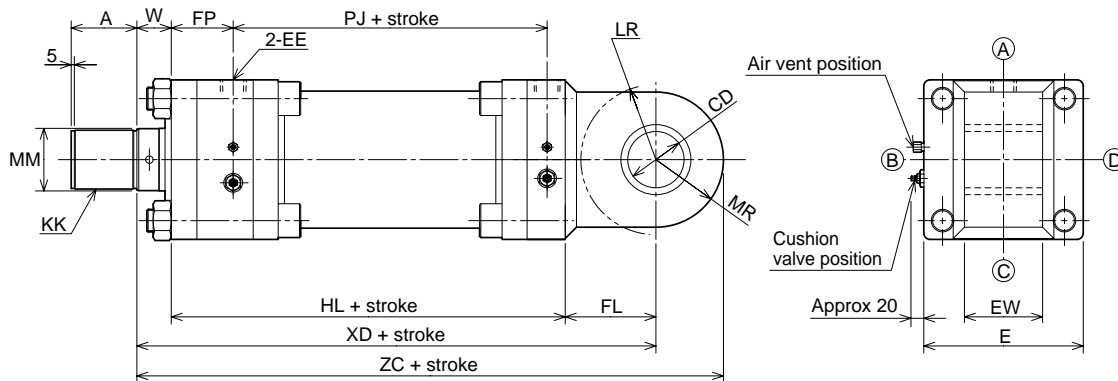
Dimensional table/FB type

Symbol Bore	FB	FE	FP	HL	MF	R	TF	UF	W	ZF
φ180	φ39	265	99	330	61	200	345	412	55	446
φ200	φ48	315	115	369	66	230	412	500	55	490
φ224	φ48	335	155	378	71	250	425	515	60	509
φ250	φ56	375	131	428	76	275	480	585	65	569

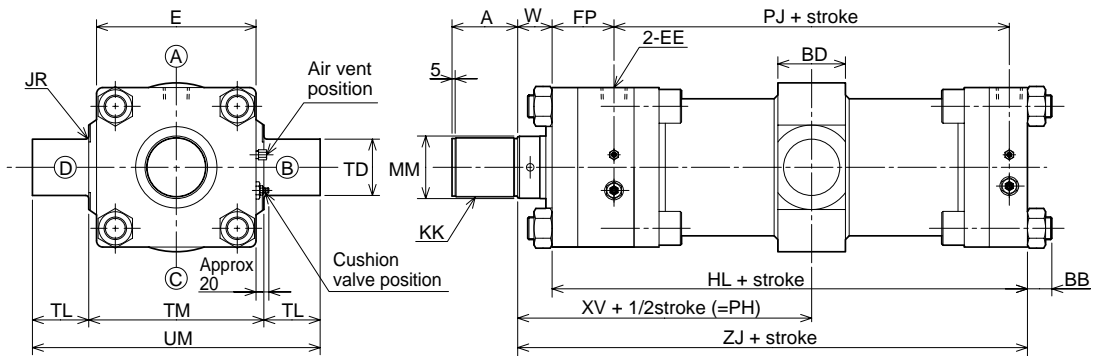
Tube flange type (Stroke: 801 - 2000mm)



• CA type



• TC type



Dimensional table/CA•TC type

Symbol Bore	A	B	DF	E	EE	KK	LF	MM	OF	PJ	W
φ180	105	φ130	φ12	255	Rc1 ¹ / ₄	M95×2	28	φ100	φ99.5	202	55
φ200	110	φ140	φ15	295	Rc1 ¹ / ₂	M100×2	30	φ110	φ109.5	220	55
φ224	130	φ155	φ15	325	Rc1 ¹ / ₂	M120×2	35	φ125	φ123	229	60
φ250	140	φ170	φ15	355	Rc2	M130×2	35	φ140	φ138	252	65

Dimensional table/CA type

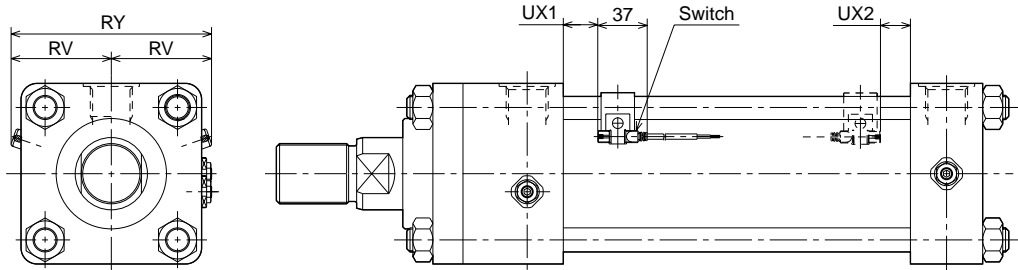
Symbol Bore	CD	EW	FL	FP	HL	LR	MR	XD	ZC
φ180	φ90H10	125 ^{-0.1} / _{-0.6}	145	99	330	R120	R108	530	638
φ200	φ100H10	125 ^{-0.1} / _{-0.6}	155	115	369	R130	R120	579	699
φ224	φ112H10	140 ^{-0.1} / _{-0.6}	175	115	378	R150	R135	613	748
φ250	φ125H10	160 ^{-0.1} / _{-0.6}	195	131	428	R165	R150	688	838

Dimensional table/TC type

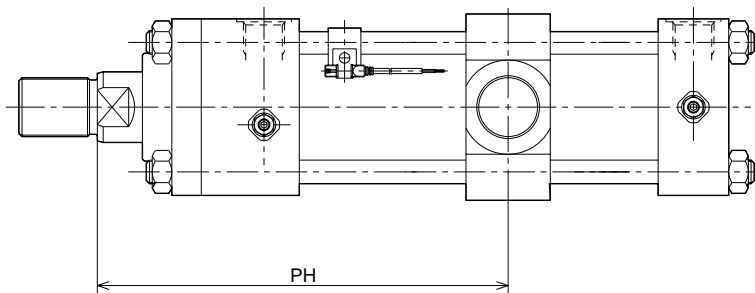
Symbol Bore	BB	BD	FP	HL	JR	Minimum PH	TD	TL	TM	UM	XV	ZJ
φ180	32	108	99	330	R5	398	φ90	90	280 ⁰ / _{-0.8}	460	255	385
φ200	37	118	115	369	R5	433	φ100	100	320 ⁰ / _{-0.8}	520	280	424
φ224	39	137	115	378	R5	466.5	φ112	112	355 ⁰ / _{-0.8}	579	289.5	438
φ250	41	147	131	428	R5	511.5	φ125	125	400 ⁰ / _{-0.8}	650	322	493

Switch set

210C-1R 2 SD Bore B B Stroke - A B Switch symbol Switch quantity



Minimum dimension PH of switch set cylinder 210C-1R



Note) Please consult us the details for TC mounting of switch set as the special order.

- The minimum dimension PH of the switch set cylinder is the dimension when the trunnion is moved toward the rod side in case that the switch is mounted to the rod side.

If the boots are equipped, the dimension WF is modified. In such a case, specify the dimension PH.

Dimensional table

Bore \ Symbol		RV	RY	UX1		UX2		The minimum dimension PH
				Contact	No contact	Contact	No contact	
φ40	Rod B	40	80	21	24	21	23	176
	Rod A			21	23	21	23	176
φ50	Rod B	46	92	23	25	23	25	187
	Rod A			23	25	23	25	187
φ63	Rod B	53	106	26	29	27	29	208
	Rod A			26	28	27	28	208
φ80	Rod B	61	122	31	34	32	33	236
	Rod A			34	33	32	33	236

Note) The dimension UX indicates the optimum switch mounting position at the detection of the stroke end.

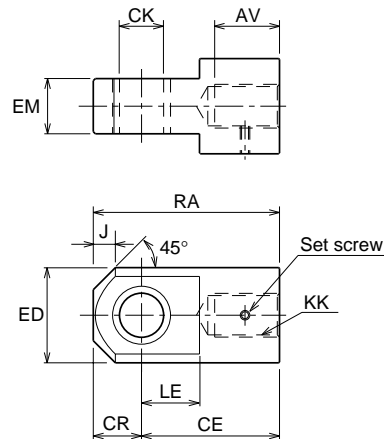
Working range and difference

Bore	Contact		No contact	
	Working range	Difference	Working range	Difference
φ40	9	1 or less	4	1 or less
φ50	10		5	
φ63	11		5	
φ80	12		6	



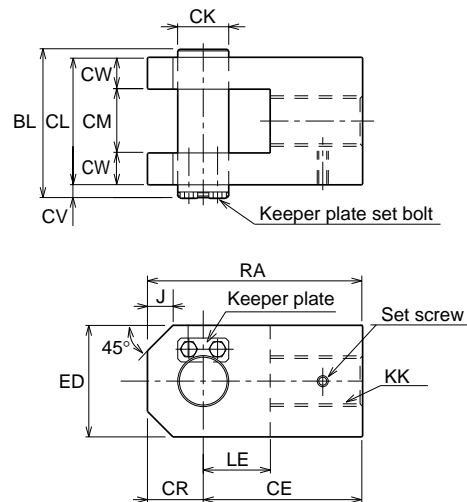
Rod end attachment

• Rod end eye (T-end)



- Using on the rod A, the thread size should be adjusted to that of rod B.

• Rod end clevis (Y-end)

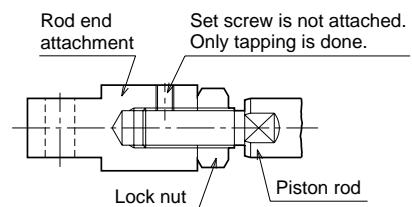


- Using on the rod A, the thread size should be adjusted to that of rod B.

• Delivery of rod end attachment (T-end, Y-end)

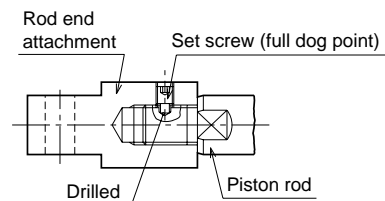
- ① In the case that the lock nut and rod end attachment are additionally ordered

The rod end attachment and lock nut are temporarily assembled to the piston rod for delivery. Since the lock nut is not tightened, tighten it after the position of the rod end attachment is adjusted. No set screw is included.



- ② In the case that only the rod end attachment is additionally ordered (without lock nut)

The rod end attachment is tightened to the piston rod, and a drill hole is made on the piston rod for delivery.



If a drill hole is unnecessary, advise us.

Dimensional table/Rod end eye (T-end)

Bore	Symbol	Rod B									
	Part code	AV	CE	CK	CR	ED	EM	J	KK	LE	RA
φ40	RTH-20-2-H	32	70	φ20H10	22.5	φ45	25 ^{-0.1} _{-0.4}	8	M20×1.5	27	92.5
φ50	RTH-24-3-H	35	80	φ25H10	30	φ55	32 ^{-0.1} _{-0.4}	15	M24×1.5	34	110
φ63	RTH-30-2-H	40	95	φ32H10	35	φ70	40 ^{-0.1} _{-0.4}	16	M30×1.5	42	130
φ80	RTH-39-2-H	53	110	φ40H10	40	φ80	50 ^{-0.1} _{-0.4}	15	M39×1.5	52	150
φ100	RTH-48-2-H	62	135	φ50H10	50	φ98	63 ^{-0.1} _{-0.4}	20	M48×1.5	65	185
φ125	RTH-64-3-H	80	160	φ63H10	63	φ118	80 ^{-0.1} _{-0.6}	30	M64×2	75	223
φ140	RTH-72-3-H	87	180	φ70H10	70	φ138	90 ^{-0.1} _{-0.6}	35	M72×2	82	250
φ160	RTH-80-3-H	96	195	φ80H10	80	φ158	100 ^{-0.1} _{-0.6}	40	M80×2	94	275

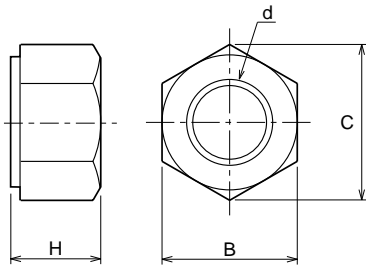
Dimensional table/Rod end clevis (Y-end) with pin

Bore	Symbol	Rod B												
	Part code	BL	CE	CK	CL	CM	CR	CV	CW	ED	J	KK	LE	RA
φ40	RYH-20-2-H	63	70	φ20 ^{H10} / _{F8}	50	25 ^{+0.4} _{+0.1}	22.5	8	12.5	45	8	M20×1.5	27	92.5
φ50	RYH-24-3-H	77	80	φ25 ^{H10} / _{F8}	64	32 ^{+0.4} _{+0.1}	30	8	16	60	15	M24×1.5	34	110
φ63	RYH-30-1-H	93	95	φ32 ^{H10} / _{F8}	80	40 ^{+0.4} _{+0.1}	35	8	20	70	16	M30×1.5	42	130
φ80	RYH-39-2-H	117	110	φ40 ^{H10} / _{F8}	100	50 ^{+0.4} _{+0.1}	40	12	25	80	15	M39×1.5	52	150
φ100	RYH-48-2-H	143	135	φ50 ^{H10} / _{F8}	126	63 ^{+0.4} _{+0.1}	50	12	31.5	100	20	M48×1.5	65	185
φ125	RYH-64-3-H	183	160	φ63 ^{H10} / _{F8}	160	80 ^{+0.6} _{+0.1}	63	18	40	120	30	M64×2	75	223
φ140	RYH-72-3-H	203	180	φ70 ^{H10} / _{F8}	180	90 ^{+0.6} _{+0.1}	70	18	45	140	35	M72×2	82	250
φ160	RYH-80-3-H	223	195	φ80 ^{H10} / _{F8}	200	100 ^{+0.6} _{+0.1}	80	18	50	160	40	M80×2	94	275

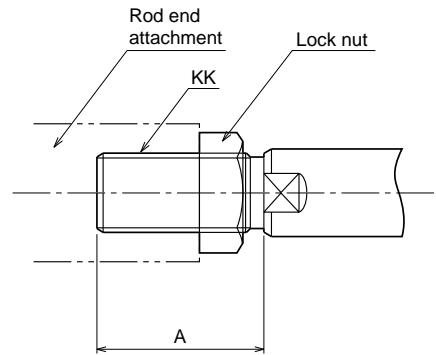
Note) Rod end attachments are exclusive use on the rod B. In case of the rod A, the thread size should be adjusted to that of the rod B in using attachments, and this change would be informed to us with order.

In using the lock nut and the attachment at one time, the thread length should be adjusted to the Long thread basic. (with the symbol K)

- Lock nut

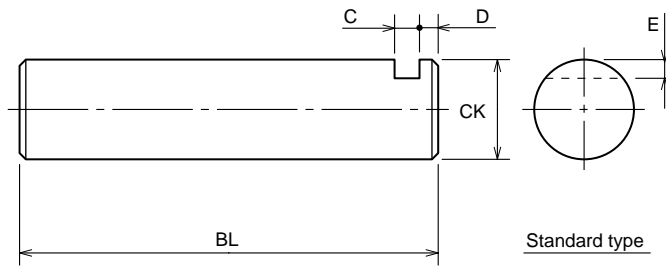


- A dimension in using lock nut



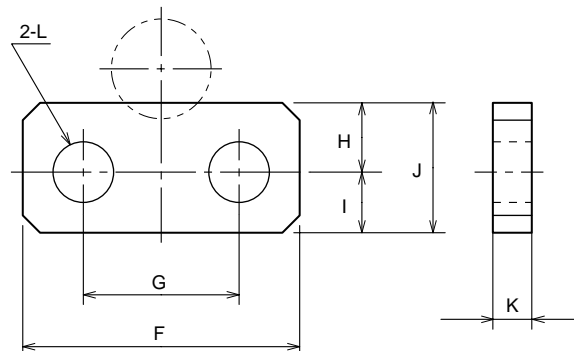
The guide of the fitting length of the rod end attachment and piston rod is approx. 80% of the thread dia. If the fitting length is insufficient when the lock nut is used, it is required to lengthen the thread length (dimension A) as shown in the figure below.

- Parallel pin



Standard type

- Keeper plate



Dimensional table/A dimension in using the lock nut (The Long thread basic)

Symbol Bore	Rod B		Rod A	
	A	KK	A	KK
φ40	45	M20×1.5	50	M24×1.5
φ50	50	M24×1.5	60	M30×1.5
φ63	60	M30×1.5	80	M39×1.5
φ80	80	M39×1.5	95	M48×1.5
φ100	95	M48×1.5	125	M64×2
φ125	125	M64×2	155	M80×2
φ140	140	M72×2	185	M95×2
φ160	155	M80×2	190	M100×2

Dimensional table/Lock nut

Symbol Bore	Rod B					Rod A				
	Part code	B	C	d	H	Part code	B	C	d	H
φ40	LNH-20F-1-H	30	34.6	M20×1.5	18	LNH-24F-1-H	36	41.6	M24×1.5	20
φ50	LNH-24F-1-H	36	41.6	M24×1.5	20	LNH-30F-1-H	46	53.1	M30×1.5	25
φ63	LNH-30F-1-H	46	53.1	M30×1.5	25	LNH-39F-1-H	60	69.3	M39×1.5	32
φ80	LNH-39F-1-H	60	69.3	M39×1.5	32	LNH-48F-1-H	75	86.6	M48×1.5	38
φ100	LNH-48F-1-H	75	86.6	M48×1.5	38	LNH-64F-1-H	95	109.7	M64×2	51
φ125	LNH-64F-1-H	95	109.7	M64×2	51	LNH-80F-1-H	115	132.8	M80×2	64
φ140	LNH-72F-1-H	105	121.2	M72×2	58	LNH-95F-1-H	135	155.9	M95×2	76
φ160	LNH-80F-1-H	115	132.8	M80×2	64	LNH-100F-1-H	145	167.4	M100×2	80

Dimensional table/Parallel pin

Symbol Bore	BL	C	CK	D	E
φ40	63	5	φ20	3	3
φ50	77	5	φ25	3	3.5
φ63	93	5	φ32	3	4
φ80	117	7	φ40	5	5
φ100	143	7	φ50	5	5
φ125	183	10	φ63	8	8
φ140	203	10	φ70	8	8
φ160	223	10	φ80	8	8

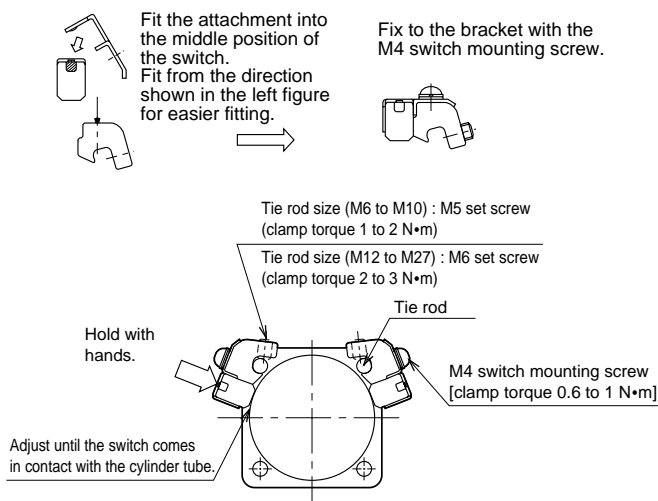
• Allowance of CK is f8.

Dimensional table/Keeper plate

Symbol Bore	F	G	H	I	J	K	L	Volt size
φ40	32	18	8	7	15	4.5	φ7	M6
φ50	32	18	8	7	15	4.5	φ7	M6
φ63	32	18	8	7	15	4.5	φ7	M6
φ80	50	30	10	8	18	6	φ10	M8
φ100	65	40	12	10	22	6	φ12	M10
φ125	75	48	17	13	30	9	φ14	M12
φ140	75	48	17	13	30	9	φ14	M12
φ160	75	48	17	13	30	9	φ14	M12

Setting method of switch detecting position

AX type



1. Loosen the two set screws with an allen wrench, and move them along with the tie rod.
2. Adjust the detecting position (for the 2-LED type, the position that the green lamp lights up) 2 to 5 mm (about half of the working range is appropriate) before the required position that the switch indicator lamp starts to light up (ON). Then, gently hold the top of the switch so that the cylinder tube contacts the detecting face of the switch, and clamp the set screw with the appropriate clamp torque.
Note) Inappropriate clamp torque may cause the off-center of the switch position.
3. The indicator lamp lights up when the switch is set to the ON position.
4. Switches can be mounted to any of four tie rods and on the most suitable position depending on the mounting space of the cylinder and wiring method.
5. Mount a switch to the most suitable position to detect the stroke end with the "Switch mounting dimension" (dimension UX).

Notes on assembly

Clamping of tie rod

- When clamping the tie rods, DO NOT clamp only one tie rod at once, but clamp them gradually in the order shown in the right diagram. The single clamping of the tie rod may cause malfunctions or cracks of cylinders.

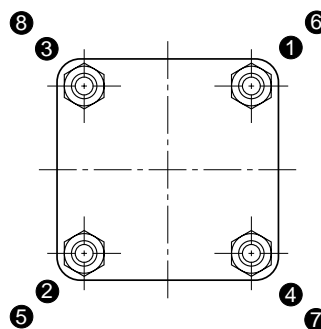


Table of specified tie rod clamp torque

Bore mm	φ40	φ50	φ63	φ80	φ100	φ125
Tie rod screw	M10×1.25	M12×1.25	M14×1.5	M16×1.5	M18×1.5	M22×1.5
Clamp torque N•m	41	70	120	170	280	500
Bore mm	φ140	φ160	φ180	φ200	φ224	φ250
Tie rod screw	M27×2	M32×2	M36×1.5	M42×1.5	M45×1.5	M48×1.5
Clamp torque N•m	880	1100	1900	3000	3700	4600

Precautions for use

Take sufficient care to prevent the pressure in the cylinder with the rod A from exceeding the maximum allowable pressure, since the cylinder has the smaller pressurized area on the rod side, and the pressure in it tends to increase easily.

< Example >

Find the pressure on the rod side when the cylinder is moved forward (lowered) under the conditions shown below.

- Cylinder : 210C-1 ϕ 80 Rod A
- Load : $W = 1000 \text{ kg} (\approx 10000 \text{ N})$
- Set pressure : $P_H = 12 \text{ MPa}$
- Installing direction : Rod facing downward
- Speed control : Meter-out
- The working speed is slow, and the load rate is 100%.

< Answer >

The pressure P_R , generated on the rod side is the sum of the pressure P_1 , generated to balance with the load W and the pressure P_2 , boosted by the supply from the head side.

- The pressure P_1 , generated to balance with the load W , can be calculated with the formula below.

$$P_1 = \frac{W}{A_R} = \frac{10000 \text{ (N)}}{2564 \text{ (mm}^2\text{)}} = 3.9 \text{ (MPa)}$$

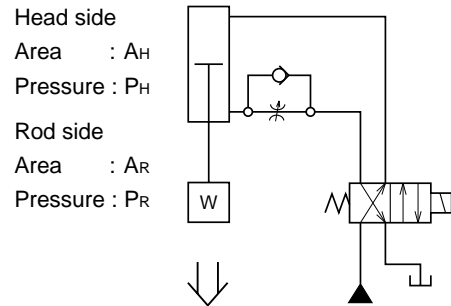
- The pressure P_2 , boosted by the supply from the head side, can be calculated with the formula below.
where, $P_2 A_R = P_H A_H$

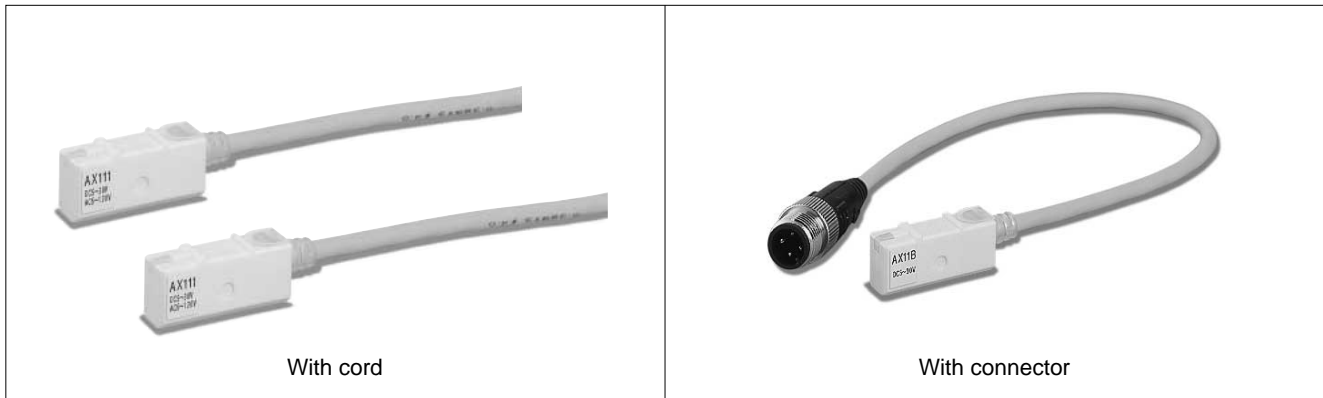
$$P_2 = \frac{P_H A_H}{A_R} = \frac{12 \text{ (MPa)} \times 5027 \text{ (mm}^2\text{)}}{2564 \text{ (mm}^2\text{)}} = 23.5 \text{ (MPa)}$$

- The pressure P_R , generated on the rod side, can be calculated with the formula below.

$$P_R = P_1 + P_2 = 3.9 + 23.5 = 27.4 \text{ (MPa)}$$

∴ Therefore, the pressure in the cylinder exceeds the maximum allowable pressure of the 210C-1, rod A type, on the rod side, 26.5 MPa shown in the standard specifications, and the cylinder is not applicable. Modify the working conditions, and recalculate.





Specifications

Code	With cord (1.5m)	AX101	AX111	—	—	—
	With cord (5m)	AX105	AX115	—	—	AX125
	With connector (AC type)	—	—	AX11A	—	—
	With connector (DC type)	—	—	—	AX11B	—
Load voltage range	AC : 5 - 120V	DC : 5 - 30V	AC : 5 - 120V	DC : 5 - 30V	AC: 120 V or less	DC: 30 V or less
Load current range	AC : 5 - 20mA	DC : 5 - 40mA	5 - 20mA	5 - 40mA	AC: 20 mA or less	DC: 40 mA or less
Maximum open/close capacity	AC : 2VA DC : 1.5W					
Inner drop voltage	2V (at 10mA) 3V or less					0V
Current leak	0 μ A	10 μ A or less				0 μ A
Working time	1ms or less					
Return time	1ms or less					
Insulation resistance	100 M Ω or more at 500 MV DC (between case and cord)					
Voltage-proof	AC1500V 1 min (between case and cord)					
Shock resistance	294m/s ² (Non-repetition)					
Vibration-proof	Total amplitude 1.5mm, 10 - 55Hz (1 sweep, 1 min) 2 hours in X, Y, and Z directions					
Ambient temperature	-10 - +70°C (at non-freezing condition)					-10 - +100°C (at non-freezing condition)
Wiring method	0.3mm ² 2-core Outer diameter 4mm Oil-proof cabtyre cord					
Protective structure	IP67 (IEC standards), JIS C0920 (dusts-proof, immersion-proof type)					
Contact protective circuit	Note) None	Equipped				Note) None
Indicating lamp	LED (red lamp lights up during ON)					None
Electric circuit						
Applied load	Small relay • Programmable Controller					IC circuit, small relay, programmable controller

- Notes
- When using induction load devices (small relay, etc.), be sure to provide the protective circuit (SK-100).
 - For the cord length and connector pin position of the connector type, refer to the dimensional drawings.
 - When using the AC voltage input programmable controller as a load, select the switch with contact protective circuit.

Applicable hydraulic cylinder

Series	Bore
35S-1R	ϕ 20, ϕ 25, ϕ 32, ϕ 40, ϕ 50, ϕ 63
HQS2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
100S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
160S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80
210S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80
35Z-1R	ϕ 20, ϕ 25, ϕ 32
35H-3R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100

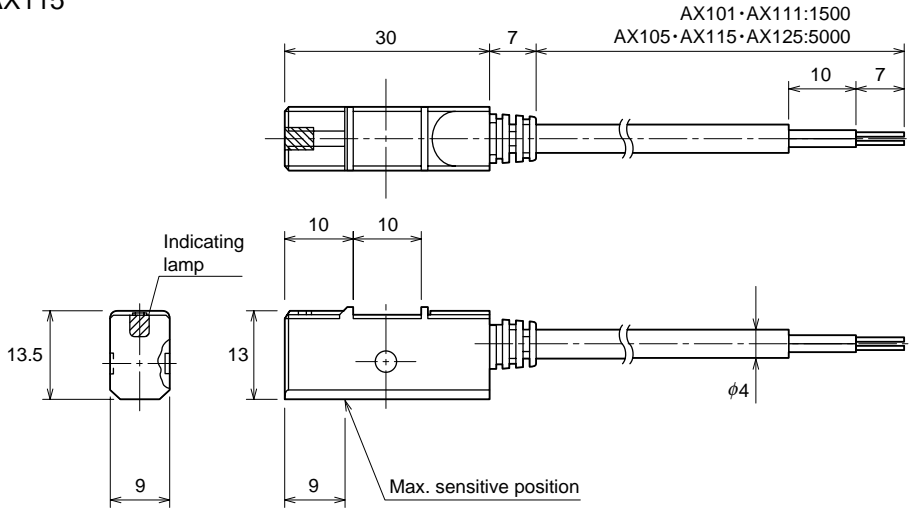
Series	Bore
100Z-1R	ϕ 20, ϕ 25, ϕ 32
100H-2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125
70/140H-8R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125, ϕ 140
160H-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125, ϕ 140, ϕ 160

Series	Bore
210C-1R	ϕ 40, ϕ 50, ϕ 63, ϕ 80
70/140Y-2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125
35P-3R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
70/140P-8R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100

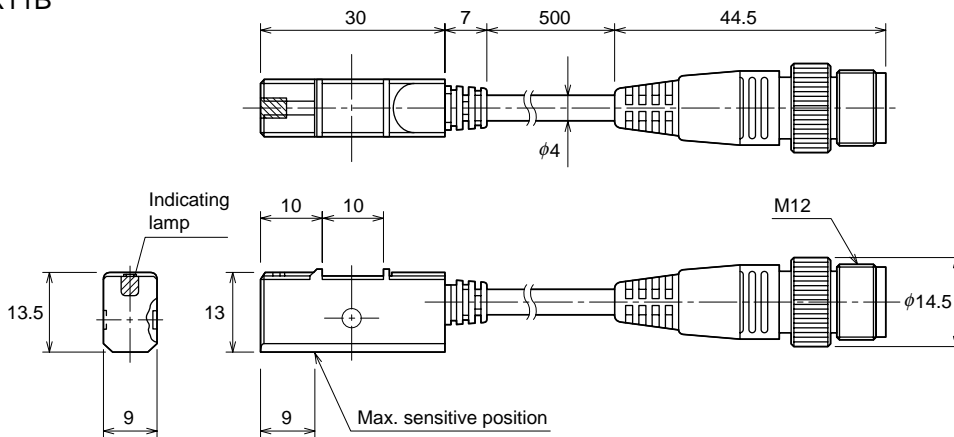
Unit: mm

Dimensional Drawing

- Cord type
AX101 • AX105
AX111 • AX115
AX125

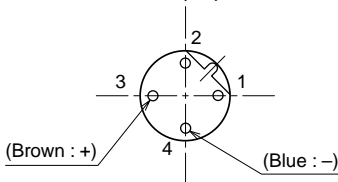


- Connector type
AX11A • AX11B



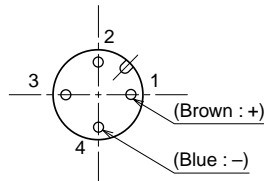
AX11A (AC type)

Connector pin position



AX11B (DC type)

Connector pin position

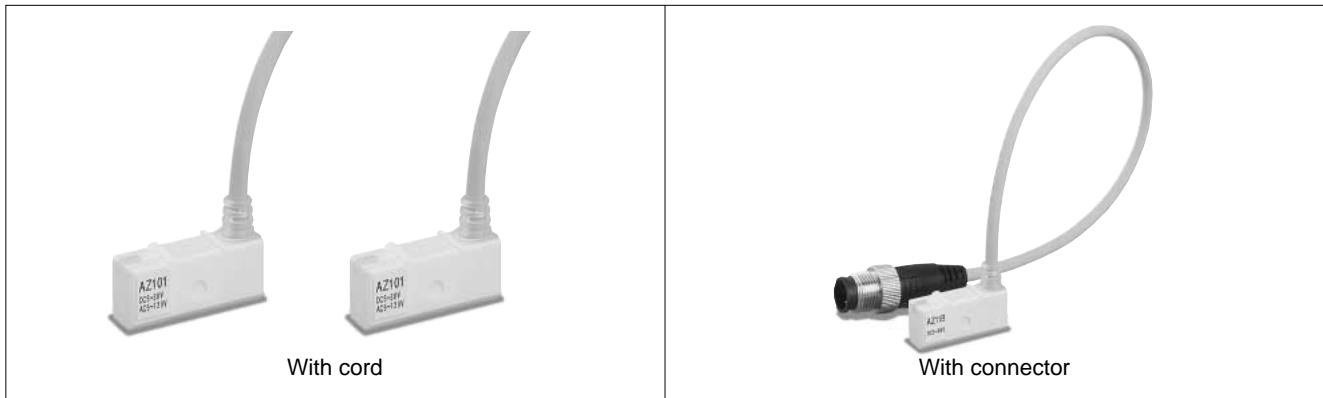


Applicable counter connectors

Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

• For details, refer to the catalogues of the manufacturers' products.

- No. of connector standards
Models M12X1 screw locking
- IEC 947-5-2
- DIN/VDE 0660 part 208 A2
- NECA (The Japan Electric Control Equipment Industry Association) 4202
Connector for FA sensor



Specifications

Code	With cord (1.5m)	AZ101	AZ111	—	—	—
	With cord (5m)	AZ105	AZ115	—	—	AZ125
	With connector (AC type)	—	—	AZ11A	—	—
	With connector (DC type)	—	—	—	AZ11B	—
Load voltage range	AC : 5 - 120V	DC : 5 - 30V	AC : 5 - 120V	DC : 5 - 50V	AC: 120 V or less DC: 30 V or less	
Load current range	AC : 5 - 20mA	DC : 5 - 40mA	5 - 20mA	5 - 40mA	AC: 20 mA or less DC: 40 mA or less	
Maximum open/close capacity	AC : 2VA DC : 1.5W					
Inner drop voltage	2V (at 10mA) 3V or less					0V
Current leak	0 μ A	10 μ A or less				0 μ A
Working time	1ms or less					
Return time	1ms or less					
Insulation resistance	100 M Ω or more at 500 MV DC (between case and cord)					
Voltage-proof	AC1500V 1 min (between case and cord)					
Shock resistance	294m/s ² (Non-repetition)					
Vibration-proof	Total amplitude 1.5mm, 10 - 55Hz (1 sweep, 1 min) 2 hours in X, Y, and Z directions					
Ambient temperature	-10 - +70°C (at non-freezing condition)				-10 - +100°C (at non-freezing condition)	
Wiring method	0.3mm ² 2-core Outer diameter 4mm Oil-proof cabtyre cord					
Protective structure	IP67 (IEC standards), JIS C0920 (dusts-proof, immersion-proof type)					
Contact protective circuit	Note) None	Equipped				Note) None
Indicating lamp	LED (red lamp lights up during ON)					None
Electric circuit						
Applied load	Small relay • Programmable Controller					IC circuit, small relay, programmable controller

Notes ● When using induction load (including a small relay) for the switch without contact protective circuit, be sure to provide the protective circuit (SK-100) for the load.

● For the cord length and connector pin position of the connector type, refer to the dimensional drawings.

● When using the AC voltage input programmable controller as a load, select the switch with contact protective circuit.

Applicable hydraulic cylinder

Series	Bore
35S-1R	ϕ 20, ϕ 25, ϕ 32, ϕ 40, ϕ 50, ϕ 63
HQS2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
100S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
160S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80
210S-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80
35Z-1R	ϕ 20, ϕ 25, ϕ 32
35H-3R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100

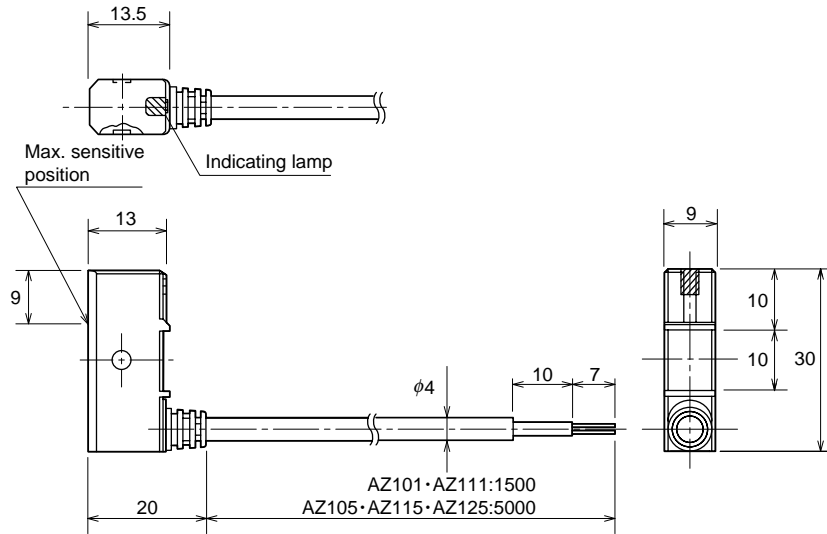
Series	Bore
100Z-1R	ϕ 20, ϕ 25, ϕ 32
100H-2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125
70/140H-8R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125, ϕ 140
160H-1R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125, ϕ 140, ϕ 160

Series	Bore
210C-1R	ϕ 40, ϕ 50, ϕ 63, ϕ 80
70/140Y-2R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100, ϕ 125
35P-3R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100
70/140P-8R	ϕ 32, ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100

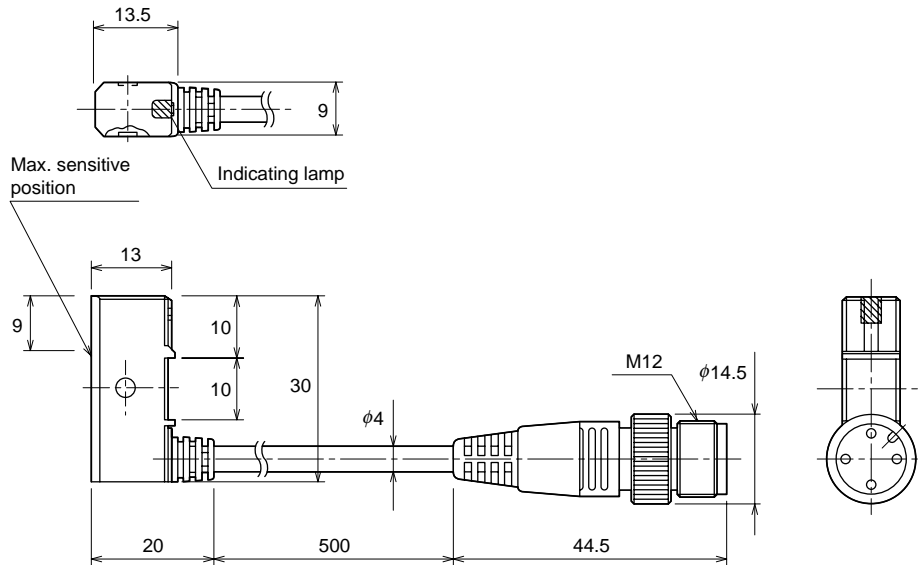
Unit: mm

Dimensional Drawing

- Cord type
AZ101 • AZ105
AZ111 • AZ115
AZ125

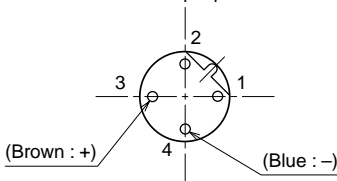


- Connector type
AZ11A • AZ11B



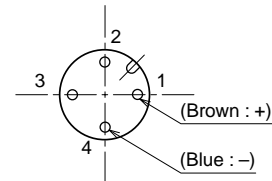
AZ11A (AC type)

Connector pin position



AZ11B (DC type)

Connector pin position

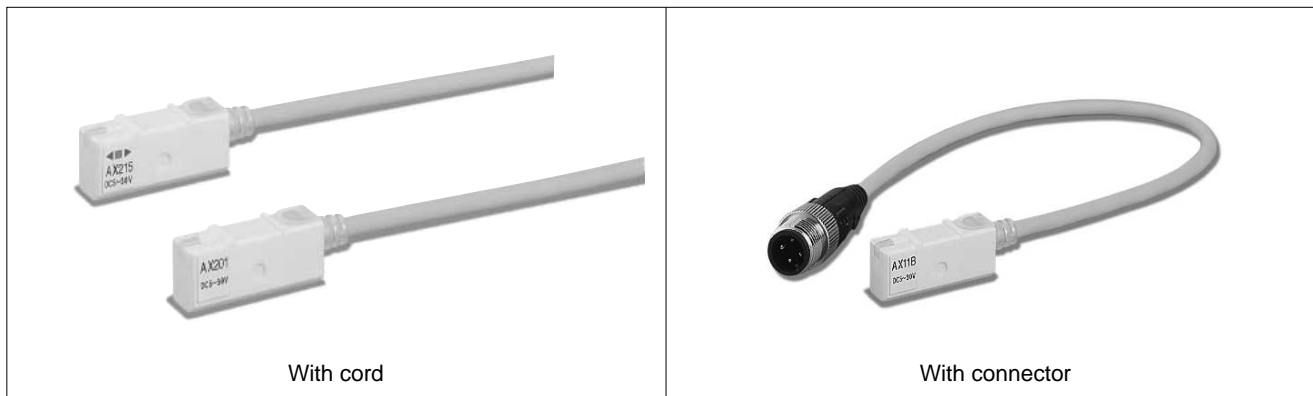


Applicable counter connectors

Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

- For details, refer to the catalogues of the manufacturers' products.

- No. of connector standards
Models M12X1 screw locking
- IEC 947-5-2
- DIN/VDE 0660 part 208 A2
- NECA (The Japan Electric Control Equipment Industry Association) 4202
Connector for FA sensor



Specifications

Code	With cord (1.5m)	AX201
	With cord (5m)	AX205
	With connector	AX20B
Wiring direction		Rear wiring
Load voltage range		DC : 5 - 30V
Load current range		DC : 5 - 40 mA
Inner drop voltage		3 V or less
Leak current		0.7 mA or less
Working time		1 ms or less
Return time		1 ms or less
Insulation resistance		100 MΩ or more at 500 MV DC (between case and cord)
Voltage-proof		AC 1500 V, 1 min. (between case and cord)
Shock resistance		490m/s ² (Non-repetition)
Vibration-proof		Total amplitude 0.6 mm, 10 Hz to 200 Hz (log sweep 1 hour) in X, Y, and Z directions
Ambient temperature		-10°C to +70°C (at non-freezing condition)
Wiring method		0.3 mm ² 2-core Outer diameter 4 mm Oil-proof cabtyre cord
Protective structure		IP67 (IEC standards), JIS C0920 (dust-proof, immersion-proof type)
Contact protective circuit		Equipped
Indicating lamp		LED (red lamp lights up during ON)
Electric circuit		
Applied load		Small relay, programmable controller

Applicable hydraulic cylinder

Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80
210S-1R	φ32, φ40, φ50, φ63, φ80
35Z-1R	φ20, φ25, φ32
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100

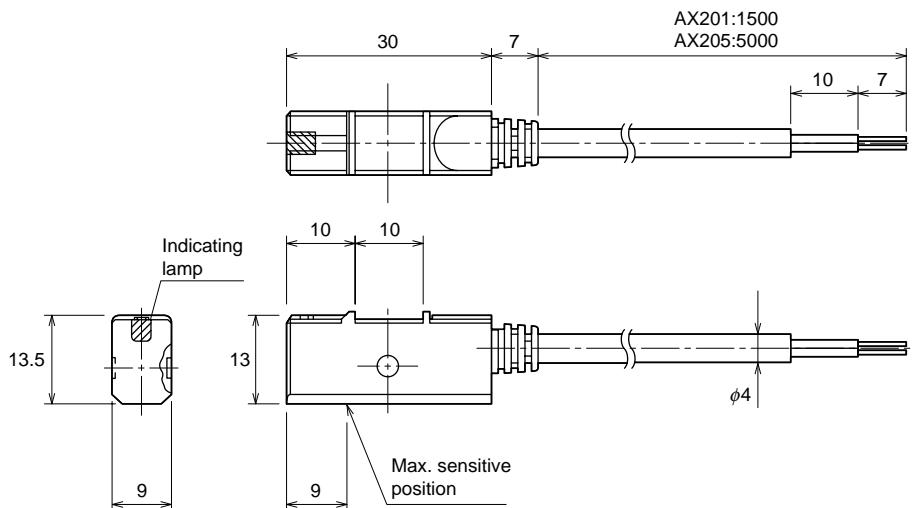
Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

Series	Bore
210C-1R	φ40, φ50, φ63, φ80
70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100

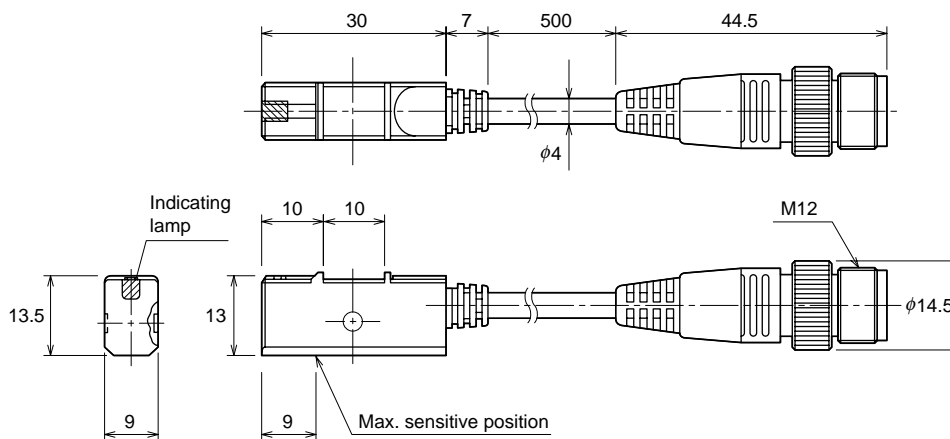
Unit: mm

Dimensional Drawing

- Cord type
AX201 • AX205

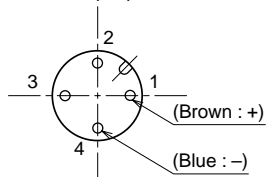


- Connector type
AX20B



AX20B (DC type)

Connector pin position

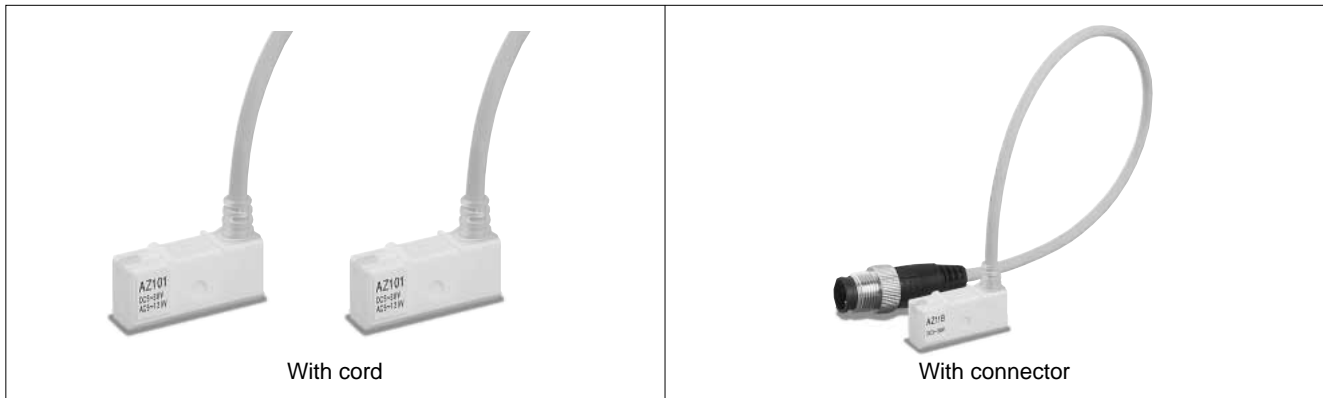


Applicable counter connectors

Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

- For details, refer to the catalogues of the manufacturers' products.

- No. of connector standards
Models M12X1 screw locking
- IEC 947-5-2
- DIN/VDE 0660 part 208 A2
- NECA (The Japan Electric Control Equipment Industry Association) 4202
Connector for FA sensor



Specifications

Code	With cord (1.5m)	AZ201
	With cord (5m)	AZ205
	With connector	AZ20B
Wiring direction	Upper wiring	
Load voltage range	DC : 5 - 30V	
Load current range	DC : 5 - 40 mA	
Inner drop voltage	3 V or less	
Leak current	0.7 mA or less	
Working time	1 ms or less	
Return time	1 ms or less	
Insulation resistance	100 MΩ or more at 500 MV DC (between case and cord)	
Voltage-proof	AC 1500 V, 1 min. (between case and cord)	
Shock resistance	490m/s ² (Non-repetition)	
Vibration-proof	Total amplitude 0.6 mm, 10 Hz to 200 Hz (log sweep 1 hour) in X, Y, and Z directions	
Ambient temperature	-10°C to +70°C (at non-freezing condition)	
Wiring method	0.3 mm ² 2-core Outer diameter 4 mm Oil-proof cabtyre cord	
Protective structure	IP67 (IEC standards), JIS C0920 (dust-proof, immersion-proof type)	
Contact protective circuit	Equipped	
Indicating lamp	LED (red lamp lights up during ON)	
Electric circuit		
Applied load	Small relay, programmable controller	

Applicable hydraulic cylinder

Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80
210S-1R	φ32, φ40, φ50, φ63, φ80
35Z-1R	φ20, φ25, φ32
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100

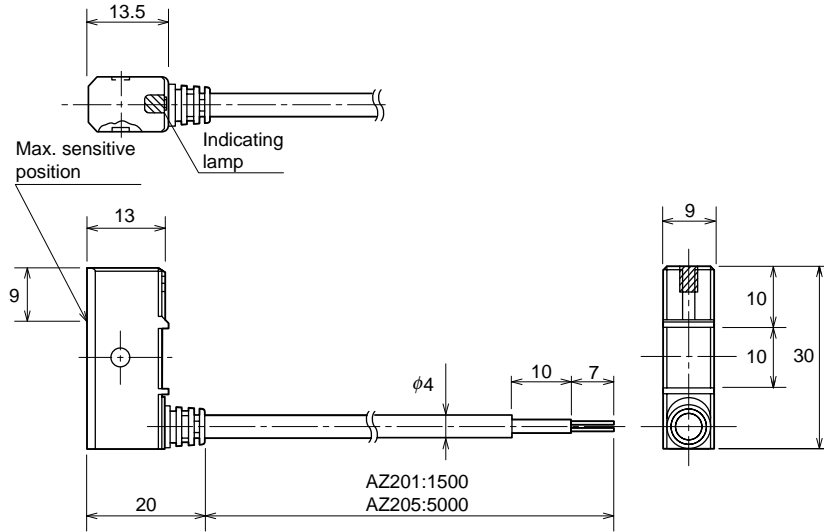
Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

Series	Bore
210C-1R	φ40, φ50, φ63, φ80
70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100

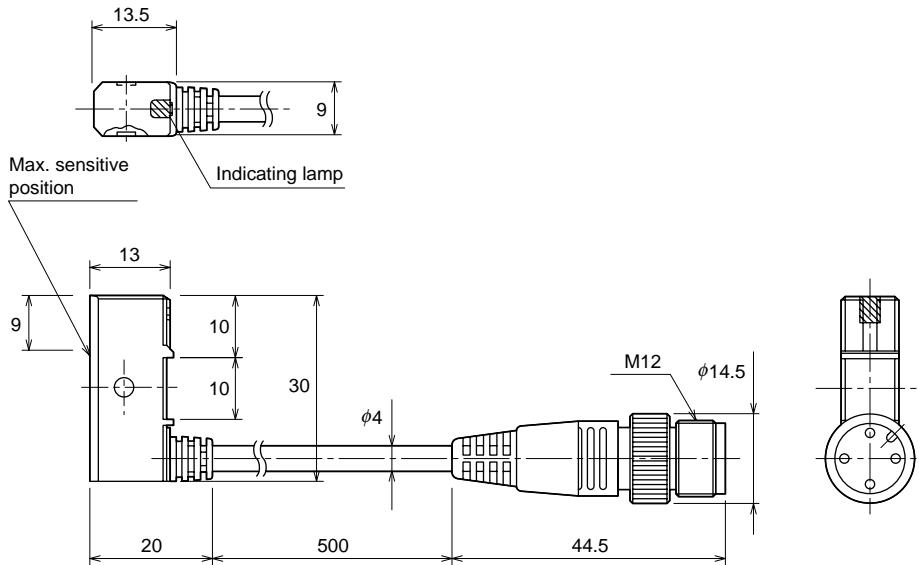
Unit: mm

Dimensional Drawing

- Cord type
AZ201 • AZ205

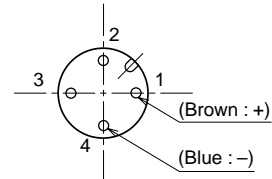


- Connector type
AZ20B



AZ20B (DC type)

Connector pin position

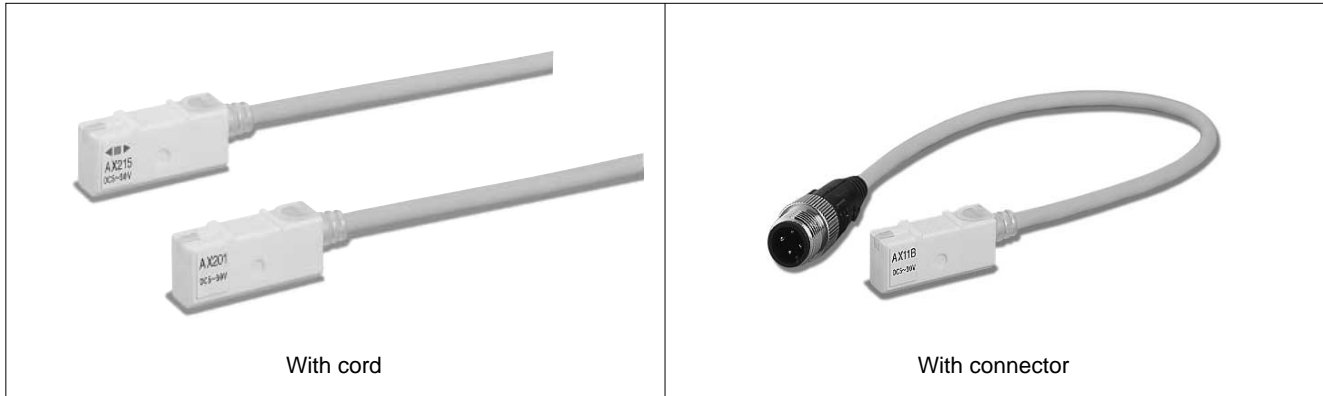


Applicable counter connectors

Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

- For details, refer to the catalogues of the manufacturers' products.

- No. of connector standards
Models M12X1 screw locking
- IEC 947-5-2
- DIN/VDE 0660 part 208 A2
- NECA (The Japan Electric Control Equipment Industry Association) 4202
Connector for FA sensor

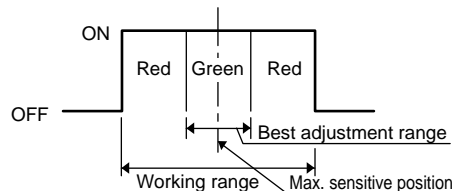


Specifications

Code	With cord (1.5m)	AX211
	With cord (5m)	AX215
	With connector	AX21C
		AX21D
Wiring direction	Rear wiring	
Load voltage range	DC : 5 - 30V	
Load current range	DC : 5 - 40 mA	
Inner drop voltage	3 V or less	
Leak current	0.7 mA or less	
Working time	1 ms or less	
Return time	1 ms or less	
Insulation resistance	100 MΩ or more at 500 MV DC (between case and cord)	
Voltage-proof	AC 1500 V, 1 min. (between case and cord)	
Shock resistance	490m/s ² (Non-repetition)	
Vibration-proof	Total amplitude 0.6 mm, 10 Hz to 200 Hz (log sweep 1 hour) in X, Y, and Z directions	
Ambient temperature	-10°C to +70°C (at non-freezing condition)	
Wiring method	0.3 mm ² 2-core Outer diameter 4 mm Oil-proof cabtyre cord	
Protective structure	IP67 (IEC standards), JIS C0920 (dust-proof, immersion-proof type)	
Contact protective circuit	Equipped	
Indicating lamp	Working position: Red/green LED lights up Most suitable position: Green LED lights up	
Electric circuit		
Applied load	Small relay, programmable controller	

Note) AX211CE, AX215CE, and AX21BCE conforming to CE standards are also available.

LED indicating style (Two-wire, two-lamp type)



Applicable hydraulic cylinder

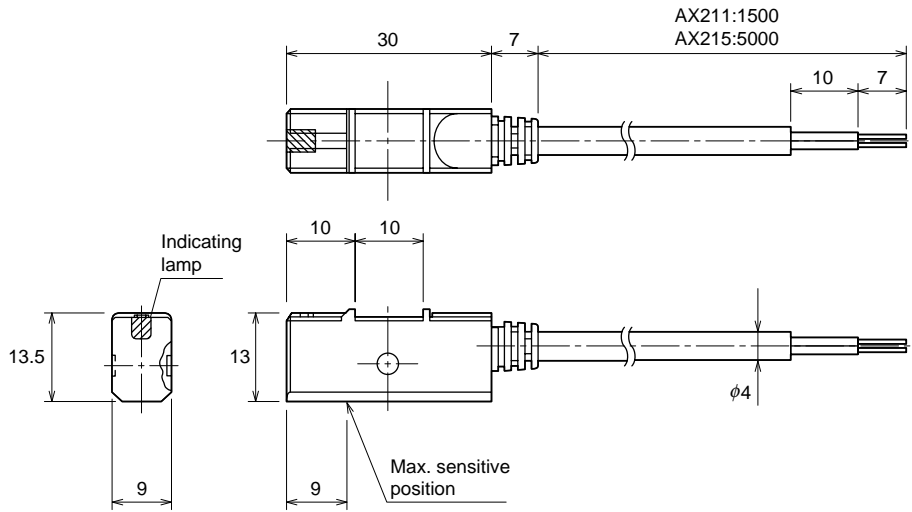
Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80
210S-1R	φ32, φ40, φ50, φ63, φ80
35Z-1R	φ20, φ25, φ32
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100

Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

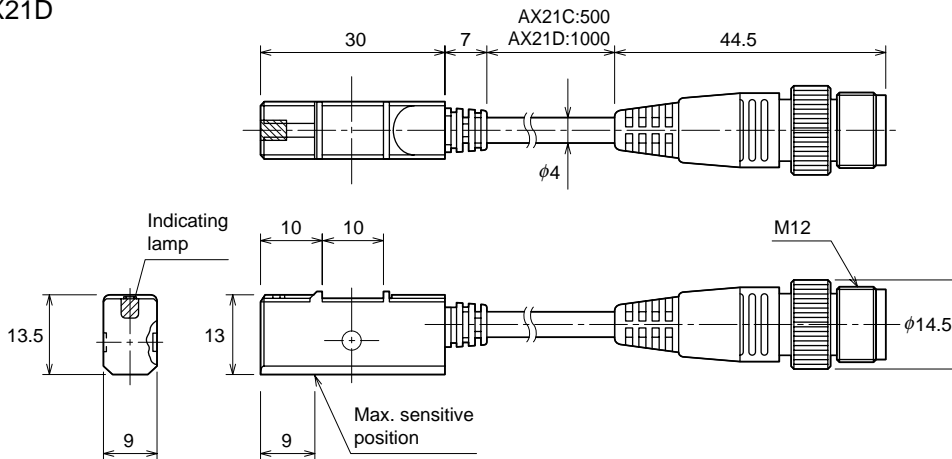
Series	Bore
210C-1R	φ40, φ50, φ63, φ80
70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100

Dimensional Drawing

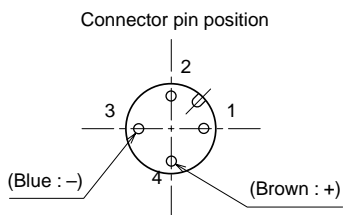
- Cord type
AX211 • AX215



- Connector type
AX21C • AX21D



AX21C • AX21D (DC type)



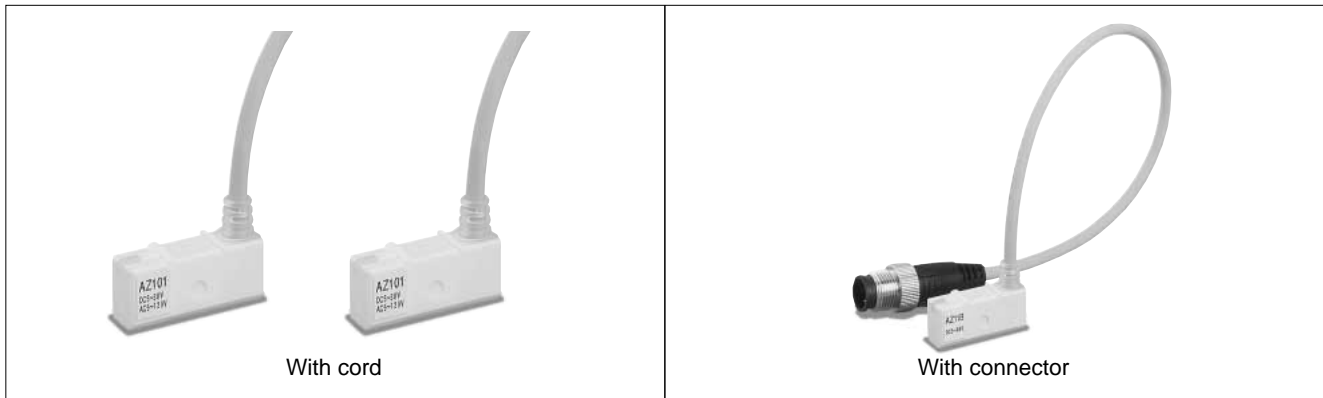
Applicable counter connectors

Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

- For details, refer to the catalogues of the manufacturers' products.

- TMS standards conforming type

- As for the connector pin layout conforming to the IEC standards (1:+4-), contact us.
- AX21B conforming to TMS standards is also available.

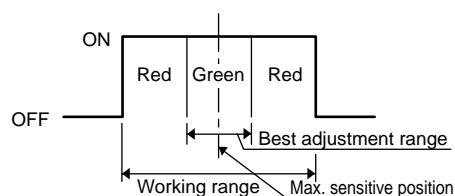


Specifications

Code	With cord (1.5m)	AZ211
	With cord (5m)	AZ215
	With connector	AZ21C AZ21D
Wiring direction	Upper wiring	
Load voltage range	DC : 5 - 30V	
Load current range	DC : 5 - 40 mA	
Inner drop voltage	3 V or less	
Leak current	0.7 mA or less	
Working time	1 ms or less	
Return time	1 ms or less	
Insulation resistance	100 MΩ or more at 500 MV DC (between case and cord)	
Voltage-proof	AC 1500 V, 1 min. (between case and cord)	
Shock resistance	490m/s ² (Non-repetition)	
Vibration-proof	Total amplitude 0.6 mm, 10 Hz to 200 Hz (log sweep 1 hour) in X, Y, and Z directions	
Ambient temperature	-10°C to +70°C (at non-freezing condition)	
Wiring method	0.3 mm ² 2-core Outer diameter 4 mm Outer diameter Oil-proof cabtyre cord	
Protective structure	IP67 (IEC standards), JIS C0920 (dust-proof, immersion-proof type)	
Contact protective circuit	Equipped	
Indicating lamp	Working position: Red/green LED lights up Most suitable position: Green LED lights up	
Electric circuit		
Applied load	Small relay, programmable controller	

Note) AZ211CE, AZ215CE, and AZ21BCE confirming to CE standards are also available.

LED indicating style (Two-wire, two-lamp type)



Applicable hydraulic cylinder

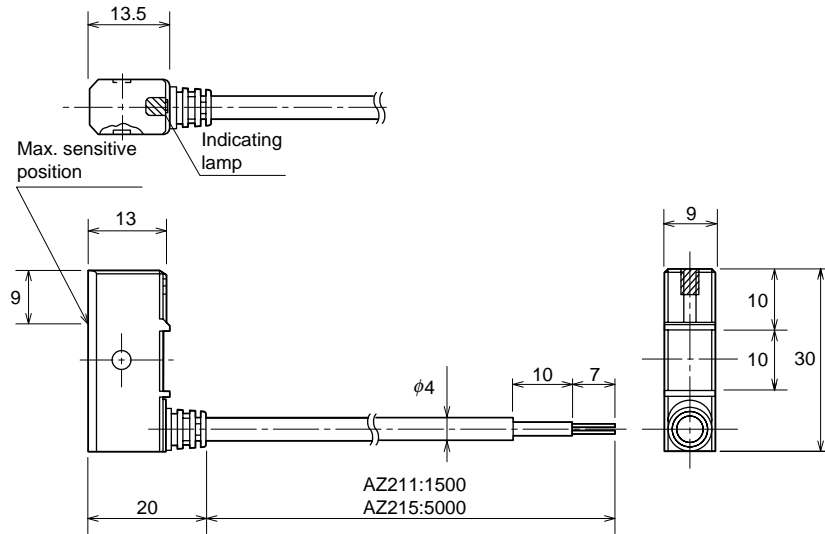
Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80
210S-1R	φ32, φ40, φ50, φ63, φ80
35Z-1R	φ20, φ25, φ32
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100

Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

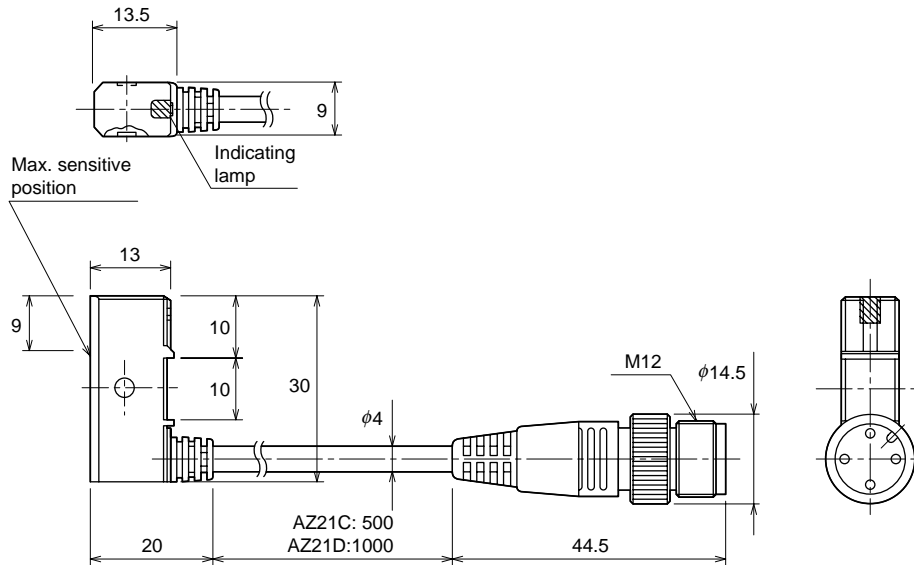
Series	Bore
210C-1R	φ40, φ50, φ63, φ80
70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100

Dimensional Drawing

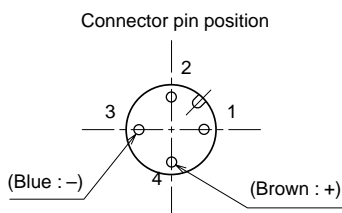
- Cord type
AZ211 • AZ215



- Connector type
AZ21C • AZ21D



AZ21C • AZ21D (DC type)



Applicable counter connectors

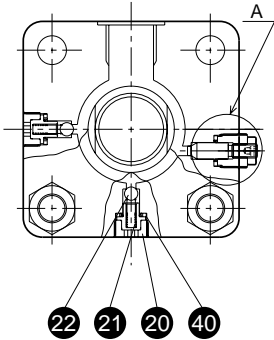
Manufacturers	Connector series name	
Correns Co., Ltd.	VA connector	VA-4DS, VA-4DL
Omron Corporation	XS2 sensor I/O connector	XS2
Hirose Electric Co., Ltd.	Connector for FA sensor	HR24

- For details, refer to the catalogues of the manufacturers' products.

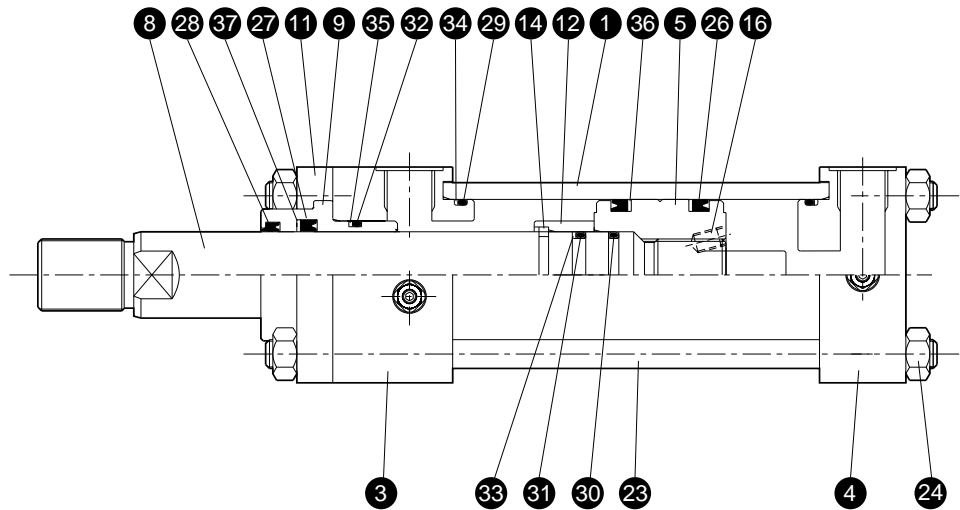
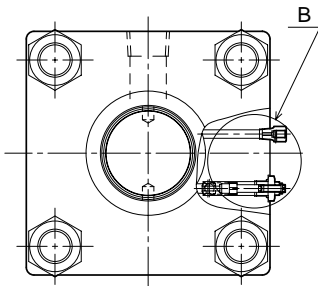
- TMS standards conforming type

Double acting single rod/standard type/210C-1 (rod A, B)

- Bore $\phi 40 - \phi 160$

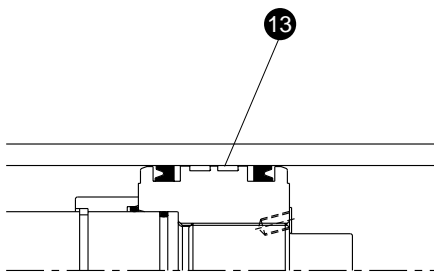


- Bore $\phi 180 - \phi 250$

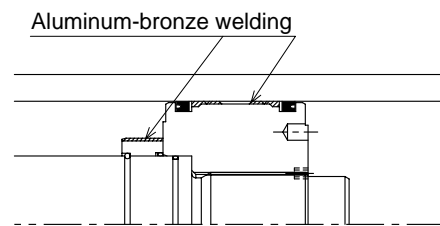


The detailed structure of the piston varies depending on the bore.

- Bore $\phi 80 - \phi 160$

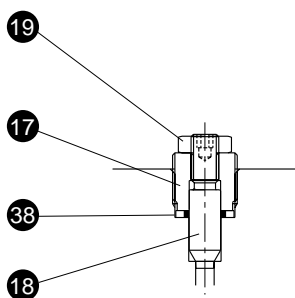


- Bore $\phi 180 - \phi 250$

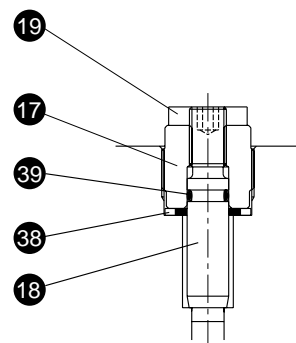


Enlarged drawing of part A (cushion valve)

- Bore $\phi 40 - \phi 80$

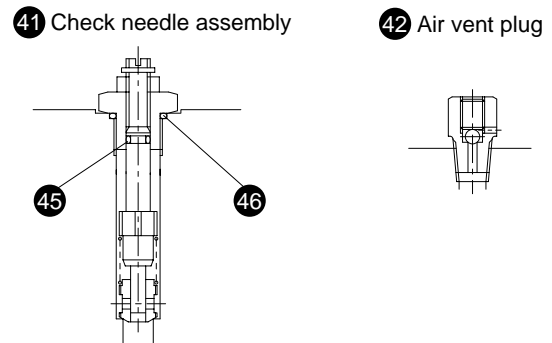


- Bore $\phi 100 - \phi 160$



Enlarged drawing of part B

- Bore $\phi 180 - \phi 250$



Parts list

No..	Name	Material	Q'ty
①	Cylinder tube	Carbon steel for machine structural use	1
③	Rod cover	Carbon steel for machine structural use ($\phi 40 - \phi 80$) Structural rolled steel ($\phi 100 - \phi 250$)	1
④	Head cover	Carbon steel for machine structural use ($\phi 40 - \phi 80$) Structural rolled steel ($\phi 100 - \phi 250$)	1
⑤	Piston	Copper alloy ($\phi 40 - \phi 63$) Spheroidal graphite iron castings ($\phi 80 - \phi 160$) Structural carbon steel ($\phi 180 - \phi 250$)	1
⑧	Piston rod	Carbon steel for machine structural use	1
⑨	Bush	Copper alloy	1
⑪	Retainer	Carbon steel for machine structural use ($\phi 40 - \phi 80$) Structural rolled steel ($\phi 100 - \phi 250$)	1
⑫	Cushion ring	Copper alloy ($\phi 40 - \phi 63$) Spheroidal graphite iron castings ($\phi 80 - \phi 160$) Carbon steel for machine structural use ($\phi 180 - \phi 250$)	1
⑬	Wear ring	Synthetic resin ($\phi 40 - \phi 160$)	(2)
⑭	Stop ring	Carbon steel for machine structural use ($\phi 50 - \phi 100$) Piano wire ($\phi 180 - \phi 250$)	(1)
⑯	Set screw	Chrome molybdenum steel	1
⑰	Cushion plug	Carbon steel for machine structural use	2
⑱	Cushion valve	Chrome molybdenum steel	2
⑲	Cushion lock nut	Carbon steel for machine structural use	2
⑳	Check plug	Carbon steel for machine structural use	4
㉑	Check spring	Piano wire	4
㉒	Check ball	High carbon chromium bearing steel	4
㉓	Tie rod	Chrome molybdenum steel	4
㉔	Tie rod nut (type 2)	Carbon steel for machine structural use	8
④①	Check needle ASSY	—	2
④②	Air vent plug	—	2

- The quantities shown in the table above are applicable to the type with both ends cushioned.
- The item with the quantity in the () mark may not be used depending on the bore and rod dia.



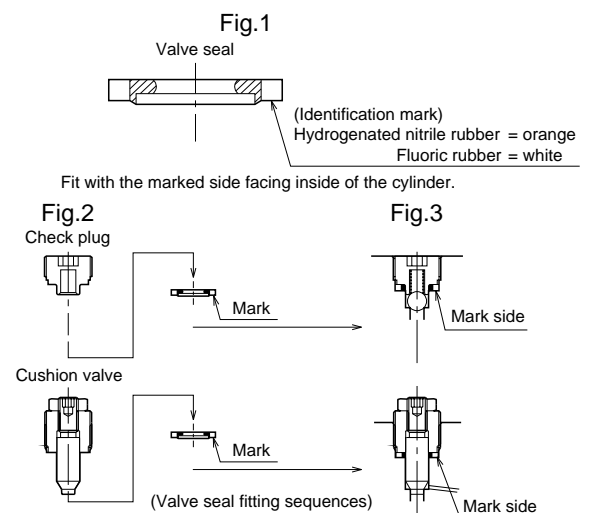
- Precautions for fitting of valve seals ③③, ④④

The valve seals, ③③ and ④④, must be fit in the specified direction and sequences. Wrong fitting direction and sequences will lead to the damaged packings, causing oil leak.

Fitting sequences

- ① Check the direction of a valve seal.
The marked side must be faced inside (refer to Fig.1).
- ② Fit the valve seal to the shaft of the cushion valve or the shaft of the check plug in correct fitting direction (refer to Fig.2).
- ③ Take care to prevent the valve seal from being dropped, and screw it in (refer to Fig.3).

Note) If the seal is first fit in the cover hole, and then, it is screwed in, it may be damaged.



Packing list

Standard type/ 1 nitrile rubber (rod B) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Nitrile rubber	2	OUHR-40	OUHR-50	OUHR-63	OUHR-80A
27	Rod packing	Nitrile rubber	1	IUH-22A	IUH-28	IUH-36	IUH-45A
28	Dust wiper	Nitrile rubber	1	LBH-22	LBH-28	LBH-36	LBH-45
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	S-16-1B	P-22A-1B	P-30-1B	G-40-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS1-040B	TC1/PKS1-050B	TC1/PKS1-063B	TC1/PKS1-080B

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Nitrile rubber	2	OUHR-100	OUHR-125	OUHR-140	OUHR-160
27	Rod packing	Nitrile rubber	1	IUH-56	IUH-70	IUH-80	IUH-90
28	Dust wiper	Nitrile rubber	1	LBH-56	LBH-70	LBH-80	LBH-90
29	O-ring for cover	Nitrile rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Nitrile rubber	1	G-50-1B	G-65-1B	G-70-1B	G-80-1B
31	O-ring for cushion ring	Nitrile rubber	1	*3 G-55-1B	*3 G-65-1B	*3 G-75-1B	*3 G-85-1B
32	O-ring for bush	Nitrile rubber	1	G-65	G-80	G-90	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G75	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G65	BUR-G80	BUR-G90	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	140×125×3	160×145×3
37	Backup-ring for rod seal	Fluoric resin	1	56×66×1.5	70×80×1.5	80×90×1.5	90×105×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS1-100B	TC1/PKS1-125B	TC1/PKS1-140B	TC1/PKS1-160B

● O-ring for the piston rod and * -marked items conform to JIS B2401-1B standard. Other O-rings conform to JIS B2401-1A. The models with * -marks conform to TAIYO standards. The hardness of the O-ring for cushion valve is HS90°.

● celled parts are TAIYO original Backup-rings.

● The Backup-ring for piston seal contains the bronze at the bore of 80 to 160mm.

● 26 27 28 seals are TAIYO original ones.

Note) The nominal code of packings may be changed.

● Please consult us the seals in 180mm to 250mm bore.

Standard type/2 urethane rubber (rod B) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Urethane rubber	2	OUIS-40	OUIS-50	OUIS-63	OUIS-80A
27	Rod packing	Urethane rubber	1	ISI-22AB	ISI-28B	ISI-36B	ISI-45AB
28	Dust wiper	Urethane rubber	1	LBI-22	LBI-28	LBI-36	LBI-45
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	S-16-1B	P-22A-1B	P-30-1B	G-40-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS2-040B	TC1/PKS2-050B	TC1/PKS2-063B	TC1/PKS2-080B

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Urethane rubber	2	OUIS-100	OUIS-125	OUIS-140	OUIS-160
27	Rod packing	Urethane rubber	1	ISI-56B	ISI-70B	ISI-80B	ISI-90B
28	Dust wiper	Urethane rubber	1	LBI-56	LBI-70	LBI-80	LBI-90
29	O-ring for cover	Nitrile rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Nitrile rubber	1	G-50-1B	G-65-1B	G-70-1B	G-80-1B
31	O-ring for cushion ring	Nitrile rubber	1	*3 G-55-1B	*3 G-65-1B	*3 G-75-1B	*3 G-85-1B
32	O-ring for bush	Nitrile rubber	1	G-65	G-80	G-90	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G75	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G65	BUR-G80	BUR-G90	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	140×125×3	160×145×3
37	Backup-ring for rod seal	Fluoric resin	1	56×66×1.5	70×80×1.5	80×90×1.5	90×105×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS2-100B	TC1/PKS2-125B	TC1/PKS2-140B	TC1/PKS2-160B

● O-ring for the piston rod and *3-marked items conform to JIS B2401-1B standard. Other O-rings conform to JIS B2401-1A. The models with *3-marks conform to TAIYO standards. The hardness of the O-ring for cushion valve is HS90°.

● celled parts are TAIYO original Backup-rings.

● The Backup-ring for piston seal contains the bronze at the bore of 80 to 160mm.

● 26 27 28 seals are TAIYO original ones.

Note) The nominal code of packings may be changed.

● Please consult us the seals in 180mm to 250mm bore.

Packing list

Standard type/ 3 fluoric rubber (rod B) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing	Fluoric rubber	1	UHR-22	UHR-28	UHR-36	UHR-45
28	Dust wiper	Fluoric rubber	1	DHS-22	DHS-28	DHS-36	DHS-45
29	O-ring for cover	Fluoric rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Fluoric rubber	1	S-16	P-22A	P-30	G-40
31	O-ring for cushion ring	Fluoric rubber	1	—	*3 P-22A	*3 P-30	*3 G-45
32	O-ring for bush	Fluoric rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F
39	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—
40	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS3-040B	TC1/PKS3-050B	TC1/PKS3-063B	TC1/PKS3-080B

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Fluoric rubber	2	UHP-100	UHP-125	UHP-140	UHP-160
27	Rod packing	Fluoric rubber	1	UHR-56	UHR-70	UHR-80	UHR-90
28	Dust wiper	Fluoric rubber	1	DHS-56	DHS-70	DHS-80	DHS-90
29	O-ring for cover	Fluoric rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Fluoric rubber	1	G-50	G-65	G-70	G-80
31	O-ring for cushion ring	Fluoric rubber	1	*3 G-55	*3 G-65	*3 G-75	*3 G-85
32	O-ring for bush	Fluoric rubber	1	G-65	G-80	G-90	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G75	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G65	BUR-G80	BUR-G90	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	140×125×3	160×145×3
37	Backup-ring for rod seal	Fluoric resin	1	56×66×1.5	70×80×1.5	80×90×1.5	90×105×2
38	Valve seal	Canned fluoric rubber	2	CR-18F	CR-18F	CR-22F	CR-22F
39	O-ring for cushion valve	Fluoric rubber	2	*3 S-7	*3 S-7	*3 S-11.2	*3 S-11.2
40	Valve seal	Canned fluoric rubber	4	CR-18F	CR-18F	CR-22F	CR-22F
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS3-100B	TC1/PKS3-125B	TC1/PKS3-140B	TC1/PKS3-160B

• The hardness of the O-ring for piston rod and *3 marked items is HS90°. Other O-rings conform to JIS B2401-4D. The models with *3-marks conform to TAIYO standards.

• celled parts are TAIYO original Backup-rings.

• The Backup-ring for piston seal contains the bronze at the bore of 80 to 160mm.

Note) The nominal code of packings may be changed.

Standard type/6 hydrogenated nitrile rubber (rod B) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-22	UHR-28	UHR-36	UHR-45
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-22	DHS-28	DHS-36	DHS-45
29	O-ring for cover	Hydrogenated nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Hydrogenated nitrile rubber	1	S-16	P-22A	P-30	G-40
31	O-ring for cushion ring	Hydrogenated nitrile rubber	1	—	P-22A	P-30	G-45
32	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS6-040B	TC1/PKS6-050B	TC1/PKS6-063B	TC1/PKS6-080B

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-100	UHP-125	UHP-140	UHP-160
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-56	UHR-70	UHR-80	UHR-90
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-56	DHS-70	DHS-80	DHS-90
29	O-ring for cover	Hydrogenated nitrile rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Hydrogenated nitrile rubber	1	G-50	G-65	G-70	G-80
31	O-ring for cushion ring	Hydrogenated nitrile rubber	1	G-55	G-65	G-75	G-85
32	O-ring for bush	Hydrogenated nitrile rubber	1	G-65	G-80	G-90	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G75	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G65	BUR-G80	BUR-G90	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	140×125×3	160×145×3
37	Backup-ring for rod seal	Fluoric resin	1	56×66×1.5	70×80×1.5	80×90×1.5	90×105×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS6-100B	TC1/PKS6-125B	TC1/PKS6-140B	TC1/PKS6-160B

- The hardness of the O-ring is HS90°. The models with * marks conform to TAIYO standards.
 - celled parts are TAIYO original Backup-rings.
 - The Backup-ring for piston seal contains the bronze at the bore of 80 to 160mm.
- Note) The nominal code of packings may be changed.

Packing list

Standard type/1 nitrile rubber (rod A) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Nitrile rubber	2	OUHR-40	OUHR-50	OUHR-63	OUHR-80A
27	Rod packing	Nitrile rubber	1	IUH-28	IUH-36	IUH-45A	IUH-56
28	Dust wiper	Nitrile rubber	1	LBH-28	LBH-36	LBH-45	LBH-56
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	S-16-1B	P-22A-1B	P-30-1B	G-40-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS1-040A	TC1/PKS1-050A	TC1/PKS1-063A	TC1/PKS1-080A

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Nitrile rubber	2	OUHR-100	OUHR-125	OUHR-140	OUHR-160
27	Rod packing	Nitrile rubber	1	IUH-70	IUH-90	IUH-100	IUH-110
28	Dust wiper	Nitrile rubber	1	LBH-70	LBH-90	LBH-100	LBH-110
29	O-ring for cover	Nitrile rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Nitrile rubber	1	G-50-1B	G-65-1B	G-70-1B	G-80-1B
31	O-ring for cushion ring	Nitrile rubber	1	*3 G-55-1B	*3 G-65-1B	G-75-1B	G-85-1B
32	O-ring for bush	Nitrile rubber	1	G-80	G-100	G-110	G-125
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G65	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G80	BUR-G100	BUR-G110	BUR-G125
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	125×140×3	145×160×3
37	Backup-ring for rod seal	Fluoric resin	1	70×80×1.5	90×105×2	100×115×2	110×125×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS1-100A	TC1/PKS1-125A	TC1/PKS1-140A	TC1/PKS1-160A

● O-ring for the piston rod and *3-marked items conform to JIS B2401-1B standard. Other O-rings conform to JIS B2401-1A. The models with *3-marks conform to TAIYO standards. The hardness of the O-ring for cushion valve is HS90°.

● celled parts are TAIYO original Backup-rings.

● The Backup-ring for piston seal contains the bronze at the bore of 80 to 125mm.

● 26 27 28 seals are TAIYO original ones.

Note) The nominal code of packings may be changed.

Standard type/2 urethane rubber (rod A) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Urethane rubber	2	OUIS-40	OUIS-50	OUIS-63	OUIS-80A
27	Rod packing	Urethane rubber	1	ISI-28B	ISI-36B	ISI-45AB	ISI-56B
28	Dust wiper	Urethane rubber	1	LBI-28	LBI-36	LBI-45	LBI-56
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	S-16-1B	P-22A-1B	P-30-1B	G-40-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1set	TC1/PKS2-040A	TC1/PKS2-050A	TC1/PKS2-063A	TC1/PKS2-080A

No.	Parts name	Material	Q'ty	Parts code			
				φ100	φ125	φ140	φ160
26	Piston packing	Urethane rubber	2	OUIS-100	OUIS-125	OUIS-140	OUIS-160
27	Rod packing	Urethane rubber	1	ISI-70B	ISI-90B	ISI-100B	ISI-110B
28	Dust wiper	Urethane rubber	1	LBI-70	LBI-90	LBI-100	LBI-110
29	O-ring for cover	Nitrile rubber	2	G-95	G-120	G-135	G-150
30	O-ring for piston rod	Nitrile rubber	1	G-50-1B	G-65-1B	G-70-1B	G-80-1B
31	O-ring for cushion ring	Nitrile rubber	1	*3 G-55-1B	*3 G-65-1B	G-75-1B	G-85-1B
32	O-ring for bush	Nitrile rubber	1	G-80	G-100	G-110	G-125
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65	BUR-G75	BUR-G85
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120	BUR-G135	BUR-G150
35	Backup-ring for bush	Fluoric resin	1	BUR-G80	BUR-G100	BUR-G110	BUR-G125
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3	125×140×3	145×160×3
37	Backup-ring for rod seal	Fluoric resin	1	70×80×1.5	90×105×2	100×115×2	110×125×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1set	TC1/PKS2-100A	TC1/PKS2-125A	TC1/PKS2-140A	TC1/PKS2-160A

• O-ring for the piston rod and *-marked items conform to JIS B2401-1B standard. Other O-rings conform to JIS B2401-1A. The models with *-marks conform to TAIYO standards. The hardness of the O-ring for cushion valve is HS90°.

• celled parts are TAIYO original Backup-rings.

• The Backup-ring for piston seal contains the bronze at the bore of 80 to 125mm.

• 26 27 28 seals are TAIYO original ones.

Note) The nominal code of packings may be changed.

Packing list

Standard type/ fluoric rubber (rod A) / 210C-1

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing	Fluoric rubber	1	UHR-28	UHR-36	UHR-45	UHR-56
28	Dust wiper	Fluoric rubber	1	DHS-28	DHS-36	DHS-45	DHS-56
29	O-ring for cover	Fluoric rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Fluoric rubber	1	S-16	P-22A	P-30	G-40
31	O-ring for cushion ring	Fluoric rubber	1	—	*3 P-22A	*3 P-30	*3 G-45
32	O-ring for bush	Fluoric rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F
39	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—
40	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS3-040A	TC1/PKS3-050A	TC1/PKS3-063A	TC1/PKS3-080A

No.	Parts name	Material	Q'ty	Parts code	
				φ100	φ125
26	Piston packing	Fluoric rubber	2	UHP-100	UHP-125
27	Rod packing	Fluoric rubber	1	UHR-70	UHR-90
28	Dust wiper	Fluoric rubber	1	DHS-70	DHS-90
29	O-ring for cover	Fluoric rubber	2	G-95	G-120
30	O-ring for piston rod	Fluoric rubber	1	G-50	G-65
31	O-ring for cushion ring	Fluoric rubber	1	*3 G-55	*3 G-65
32	O-ring for bush	Fluoric rubber	1	G-80	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120
35	Backup-ring for bush	Fluoric resin	1	BUR-G80	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3
37	Backup-ring for rod seal	Fluoric resin	1	70×80×1.5	90×105×2
38	Valve seal	Canned fluoric rubber	2	CR-18F	CR-18F
39	O-ring for cushion valve	Fluoric rubber	2	*3 S-7	*3 S-7
40	Valve seal	Canned fluoric rubber	4	CR-18F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	TC1/PKS3-100A	TC1/PKS3-125A

• The hardness of the O-ring for piston rod and *3 marked items is HS90°. Other O-rings conform to JIS B2401-4D. The models with *3-marks conform to TAIYO standards.

• celled parts are TAIYO original Backup-rings.

• The Backup-ring for piston seal contains the bronze at the bore of 80 to 125mm.

Note) The nominal code of packings may be changed.

Standard type/6 hydrogenated nitrile rubber (rod A) / 210C-1

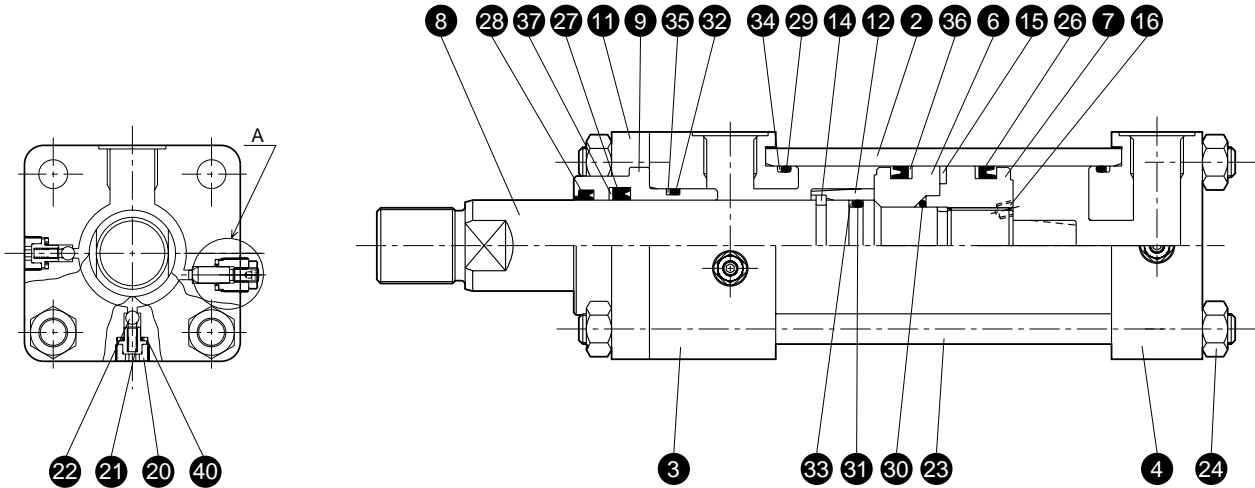
No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-28	UHR-36	UHR-45	UHR-56
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-28	DHS-36	DHS-45	DHS-56
29	O-ring for cover	Hydrogenated nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Hydrogenated nitrile rubber	1	S-16	P-22A	P-30	G-40
31	O-ring for cushion ring	Hydrogenated nitrile rubber	1	—	P-22A	P-30	G-45
32	O-ring for bush	Hydrogenated nitrile rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1set	TC1/PKS6-040A	TC1/PKS6-050A	TC1/PKS6-063A	TC1/PKS6-080A

No.	Parts name	Material	Q'ty	Parts code	
				φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-70	UHR-90
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-70	DHS-90
29	O-ring for cover	Hydrogenated nitrile rubber	2	G-95	G-120
30	O-ring for piston rod	Hydrogenated nitrile rubber	1	G-50	G-65
31	O-ring for cushion ring	Hydrogenated nitrile rubber	1	G-55	G-65
32	O-ring for bush	Hydrogenated nitrile rubber	1	G-80	G-100
33	Backup-ring for cushion ring	Fluoric resin	1	BUR-G56	BUR-G65
34	Backup-ring for cover	Fluoric resin	2	BUR-G95	BUR-G120
35	Backup-ring for bush	Fluoric resin	1	BUR-G80	BUR-G100
36	Backup-ring for piston seal	Fluoric resin	2	100×85×3	125×112×3
37	Backup-ring for rod seal	Fluoric resin	1	70×80×1.5	90×105×2
38	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7
40	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1set	TC1/PKS6-100A	TC1/PKS6-125A

- The hardness of the O-ring is HS90°. The models with * marks conform to TAIYO standards.
 - celled parts are TAIYO original Backup-rings.
 - The Backup-ring for piston seal contains the bronze at the bore of 80 to 125mm.
- Note) The nominal code of packings may be changed.

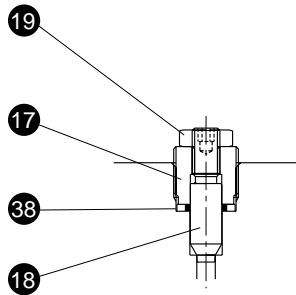
Double acting single rod/switch set/210C-1R (rod A, B)

- Bore $\phi 40 - \phi 80$



Enlarged drawing of A (cushion valve)

- Bore $\phi 40 - \phi 80$



Parts list

No..	Name	Material	Q'ty
②	Cylinder tube	Stainless steel	1
③	Rod cover	Carbon steel for machine structural use	1
④	Head cover	Carbon steel for machine structural use	1
⑥	Piston R	Copper alloy	1
⑦	Piston H	Copper alloy	1
⑧	Piston rod	Carbon steel for machine structural use	1
⑨	Bush	Copper alloy	1
⑪	Retainer	Carbon steel for machine structural use	1
⑫	Cushion ring	Copper alloy ($\phi 40 - \phi 63$) Spheroidal graphite iron castings ($\phi 80$)	1
⑬	Wear ring	Synthetic resin	(2)
⑭	Stop ring	Carbon steel for machine structural use ($\phi 50 - \phi 80$)	(1)
⑮	Magnet	—	1
⑯	Set screw	Chrome molybdenum steel	1
⑰	Cushion plug	Carbon steel for machine structural use	2
⑱	Cushion valve	Chrome molybdenum steel	2
⑲	Cushion lock nut	Carbon steel for machine structural use	2
⑳	Check plug	Carbon steel for machine structural use	4
㉑	Check spring	Piano wire	4
㉒	Check ball	High carbon chromium bearing steel	4
㉓	Tie rod	Chrome molybdenum steel	4
㉔	Tie rod nut (type 2)	Carbon steel for machine structural use	8

- The quantities shown in the table above are applicable to the type with both ends cushioned.
- The item with the quantity in the () mark may not be used depending on the bore and rod dia.



- Precautions for fitting of valve seals ⑳, ㉑

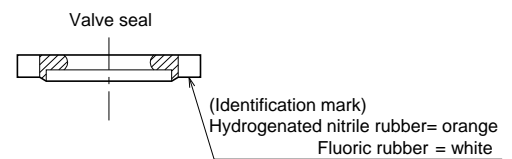
The valve seals, ⑳ and ㉑, must be fit in the specified direction and sequences. Wrong fitting direction and sequences will lead to the damaged packings, causing oil leak.

Fitting sequences

- ① Check the direction of a valve seal.
The marked side must be faced inside (refer to Fig.1).
- ② Fit the valve seal to the shaft of the cushion valve or the shaft of the check plug in correct fitting direction (refer to Fig.2).
- ③ Take care to prevent the valve seal from being dropped, and screw it in (refer to Fig.3).

Note) If the seal is first fit in the cover hole, and then, it is screwed in, it may be damaged.

Fig.1



Fit with the marked side facing inside of the cylinder.

Fig.2

Check plug

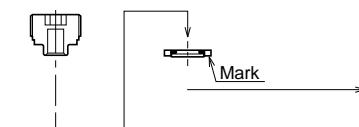
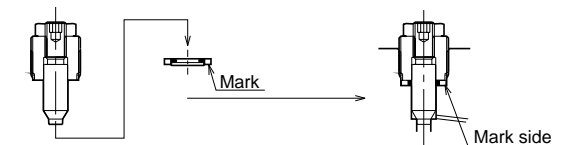


Fig.3

Cushion valve



(Valve seal fitting sequences)

Packing list

Switch set/**1** nitrile rubber (rod B) / 210C-1R

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Nitrile rubber	2	OUHR-40	OUHR-50	OUHR-63	OUHR-80A
27	Rod packing	Nitrile rubber	1	IUH-22A	IUH-28	IUH-36	IUH-45A
28	Dust wiper	Nitrile rubber	1	LBH-22	LBH-28	LBH-36	LBH-45
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	JASO-1018-1B	AS568-119-1B	G-30-1B	G-35-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1R/PKS1-040B	TC1R/PKS1-050B	TC1R/PKS1-063B	TC1R/PKS1-080B

Switch set/**1** nitrile rubber (rod A) / 210C-1R

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Nitrile rubber	2	OUHR-40	OUHR-50	OUHR-63	OUHR-80A
27	Rod packing	Nitrile rubber	1	IUH-28	IUH-36	IUH-45A	IUH-56
28	Dust wiper	Nitrile rubber	1	LBH-28	LBH-36	LBH-45	LBH-56
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	JASO-1018-1B	AS568-119-1B	G-30-1B	G-35-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1R/PKS1-040A	TC1R/PKS1-050A	TC1R/PKS1-063A	TC1R/PKS1-080A

• celled parts are TAIYO original Backup-rings.

Note) The nominal code of packings may be changed.

Switch set/2 urethane rubber (rod B) / 210C-1R

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Urethane rubber	2	OUIS-40	OUIS-50	OUIS-63	OUIS-80A
27	Rod packing	Urethane rubber	1	ISI-22AB	ISI-28B	ISI-36B	ISI-45AB
28	Dust wiper	Urethane rubber	1	LBI-22	LBI-28	LBI-36	LBI-45
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	JASO-1018-1B	AS568-119-1B	G-30-1B	G-35-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-55
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G25	BUR-G31	BUR-G40	BUR-G55
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	22×30×1	28×35.5×1	36×46×1.5	45×56×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	TC1R/PKS2-040B	TC1R/PKS2-050B	TC1R/PKS2-063B	TC1R/PKS2-080B

Switch set/2 urethane rubber (rod A) / 210C-1R

No.	Parts name	Material	Q'ty	Parts code			
				φ40	φ50	φ63	φ80
26	Piston packing	Urethane rubber	2	OUIS-40	OUIS-50	OUIS-63	OUIS-80A
27	Rod packing	Urethane rubber	1	ISI-28B	ISI-36B	ISI-45AB	ISI-56B
28	Dust wiper	Urethane rubber	1	LBI-28	LBI-36	LBI-45	LBI-56
29	O-ring for cover	Nitrile rubber	2	G-35	G-45	*1 G-58	G-75
30	O-ring for piston rod	Nitrile rubber	1	JASO-1018-1B	AS568-119-1B	G-30-1B	G-35-1B
31	O-ring for cushion ring	Nitrile rubber	1	—	*3 P-22A-1B	*3 P-30-1B	*3 G-45-1B
32	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-55	G-65
33	Backup-ring for cushion ring	Fluoric resin	1	—	BUR-P22A	BUR-P30	BUR-G45
34	Backup-ring for cover	Fluoric resin	2	BUR-G35	BUR-G45	BUR-G58	BUR-G75
35	Backup-ring for bush	Fluoric resin	1	BUR-G31	BUR-G40	BUR-G55	BUR-G65
36	Backup-ring for piston seal	Fluoric resin	2	40×30×1.5	50×40×1.5	63×53×1.5	80×71×2
37	Backup-ring for rod seal	Fluoric resin	1	28×35.5×1	36×46×1.5	45×56×1.5	56×66×1.5
38	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H
39	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
40	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1set	TC1R/PKS2-040A	TC1R/PKS2-050A	TC1R/PKS2-063A	TC1R/PKS2-080A

● celled parts are TAIYO original Backup-rings.

Note) The nominal code of packings may be changed.

New Brand

TAIYO 

New brand satisfying global standards

Hydraulic Cylinder 100H-2 Series

Conforming to ISO10762 (JIS B8367-5)

Features

- Seals in sliding sections conform to ISO standards groove size.
- Normally equipped switches for cylinders with bores from 32 mm to 125 mm.
(CE mark switches are also available.)
- Adoption of the floating cushion unique to TAIYO (patent pending).
 - Improved start performance.
 - Cushion performance is hard to be affected by fluctuations in oil temperature.
(Change in cushioning time is less to fluctuations in oil temperature.)
- Main specifications
 - Rod series: B
 - Nine types of bores from 32 mm to 125 mm are available.
 - Ports are applicable to Rc (tapered thread) and G (straight thread).
- More compact and lightweight than our 70H-8.
- Normally equipped high-performance cushion
- Cushion valve easy to adjust.

Specifications

Bore (mm) : $\phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100 \cdot \phi 125$
Nominal pressure : 10MPa
Mounting style : SD · FA · FB · EA · EB · FE · LA · CA · CB · TA · TC



Hydraulic Cylinder 160H-1 Series

Conforming to ISO6020-2 (JIS B8367-2)

Features

- Seals in sliding sections conform to ISO standards groove size.
- Normally equipped switches for cylinders with bores from 32 mm to 160 mm.
(CE mark switches are also available.)
- Adoption of the floating cushion unique to TAIYO (patent pending).
 - Improved start performance.
 - Cushion performance is hard to be affected by fluctuations in oil temperature.
(Change in cushioning time is less to fluctuations in oil temperature.)
- Main specifications
 - Rod series: Two, A and B
 - Nine types of bores from 32 mm to 160 mm are available.
 - Ports are applicable to Rc (tapered thread) and G (straight thread).
- More compact and lightweight than our 140H-8.
- Normally equipped high-performance cushion
- Cushion valve easy to adjust.

Specifications

Bore (mm) : $\phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100 \cdot \phi 125 \cdot \phi 140 \cdot \phi 160$
Nominal pressure : 16MPa
Mounting style : SD · FA · FB · EA · EB · FE · LA · CA · CB · TA · TC



Tiny-Bore Hydraulic Cylinder 100Z-1 Series

10 MPa round type tiny-bore hydraulic cylinder with high-performance cushion

Features

- 10 MPa tiny-bore hydraulic cylinders with bores 20, 25, and 32 mm.
- Cushion adjustable to all the bores and floating cushion.
- Nitrile rubber and hydrogenated nitrile rubber are used as the materials of seals for sliding section, widen the applicable range of hydraulic fluid.
- Completely identical mounting dimensions to those of 70Z-1 Series.
- New small type switches AX and AZ.

Specifications

Bore (mm) : $\phi 20 \cdot \phi 25 \cdot \phi 32$
Nominal pressure : 10 MPa



Compact Design Hydraulic Cylinder HQS2 Series

Depending on usage frequency, pressures up to 16 MPa can be used

Features

- Economical selection can be made based on usage frequency and operating pressure.
- Conforms to JIS B8367-6. Fatigue test class A1.
- Type of mounting, SD, LD, FA, FB.
- Interchangeable with the 100S-1 and 160S-1 series, our preceding model.
- The switch of CE standard is also prepared.

Specifications

Bore (mm) : $\phi 20 \cdot \phi 25 \cdot \phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100$
Rated pressure : 16 MPa
Type: General purpose, abrasive-fluid-resistant, double-acting single rod, double rod, standard, switch set



Compact Design Hydraulic Cylinder 100S-1 Series

Space saving/10 MPa compact design hydraulic cylinder

Features

- Allows economical selection depending on use frequency and operating pressure.
- Conforms to JIS B8367. Fatigue test class A1.
- Great variety of mounting styles, SD, LD, FA, and FB.

Specifications

Bore (mm) : $\phi 20 \cdot \phi 25 \cdot \phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100$
Nominal pressure : 10 MPa
Type: General purpose type/Cutting oil proof type
Double-acting single rod/Double rod type
Standard type/Switch set



Compact Design Hydraulic Cylinder 160S-1 Series

16 MPa compact design hydraulic cylinder requires less mounting space

Features

- Standardized cutting oil proof type.
- Can be disassembled for easier maintenance.
- Allows highly precise mounting.
- Standardized switch outfit type. (Magnetic proximity type and cutting oil proof type)
- Great variety of mounting styles, SD, LA, LD, FA, and FB.
- Dog limit switch outfit type is also available. (Semi-standard type)

Specifications

Bore (mm) : $\phi 20 \cdot \phi 25 \cdot \phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100 \cdot \phi 125$
Nominal pressure : 16 MPa
Type: General purpose type/Cutting oil proof type
Double-acting single rod/Double rod/Foot type
Standard type/Switch set



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November 2003



Specifications are subject to change without notice.

CAT. No. A00357-210C-1-1-1 (R)