

NEW PRODUCT

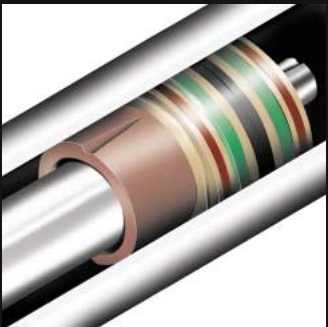
70/140H-8SERIES

Standard built-in high-performance cushion — 70/140H-8 series

Enhanced cushioning effect to keep up with high-speed machines. Identical mounting dimensions to those of 70/140H-7 series that are field-proven for long years (conform to JIS standards)

Suggestion of new hydraulic cylinder era

- Standard built-in high-performance cushion
- Products conforming to JIS standards
(with mounting dimensions identical to those of 70/140H-7 series)
- Common switches
- Enhanced safety countermeasures

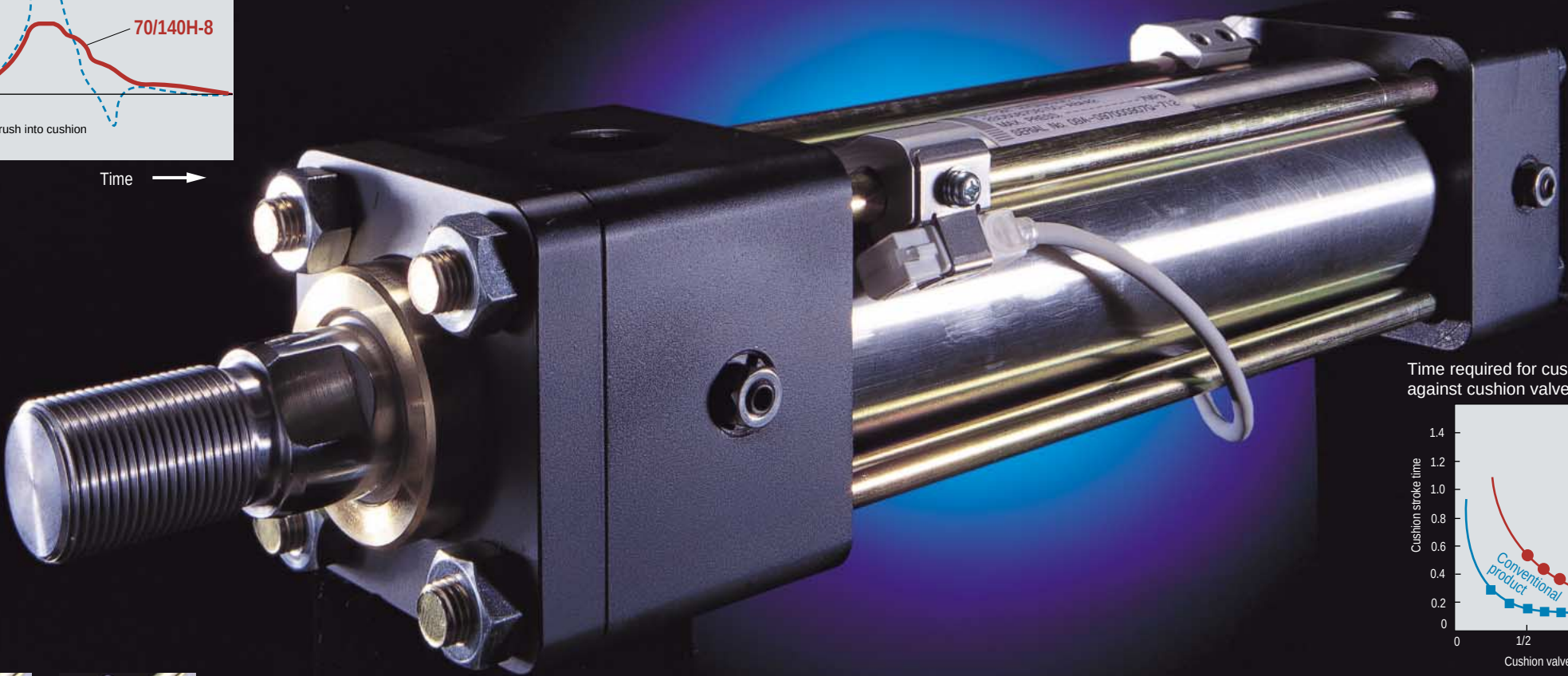
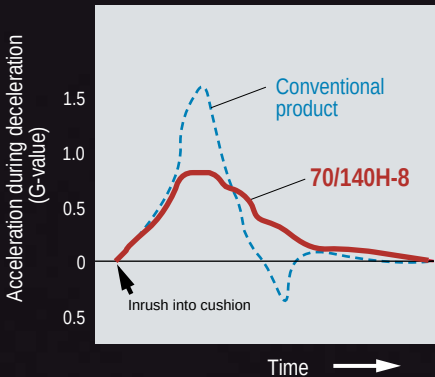


Cushion ring

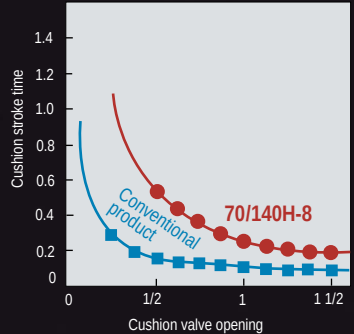
- The optimization of the groove profile has improved cushioning performance (compared with 70/140H-7).
- The cushion ring with the U-shape groove which features little change in the performance of the cushion stroke regardless of fluctuation in oil temperature.

Enhanced cushioning function has reduced shocks occurring when actuator stops.

G-value after inrush into cushion (inrush speed 400 mm/s)



Time required for cushion stroke against cushion valve speed



AX211 (2-wire, 2-LED type)
The red LED (detecting range), and the green LED (optimum position) light up.



AX101 (2-wire)
The indicator lamp can be easily seen from rear side as well as from front side.



- The adoption of switches common to other series permits the substantial reduction of the kinds of maintenance switches.
- The lighting status of the switch can be checked with wide range.

■ Range of bore applicable to 70/140H-8R with switch

	Rod A	Rod B	Rod C
Single Rod	φ40~φ125	φ32~φ140	φ40~φ140
Double Rod	—	φ32~φ140	φ40~φ140

- ※ The rod A with switch has been standardized.
- ※ The rods B and C of a φ140 bore have been standardized.

Cushion valve

- The improved structure that the cushion valve is hard to come off even when the screws are excessively slackened at adjustment for more reliable security.
- The structure that is convenient for speed fine tuning during the cushion stroke
- Added gaskets made of fluoric rubber (as well as the check plug)



Succeeded features of 70/140H-7

Applicable to highly frequent use

To meet requests for the highly frequent use under high loads, the rods B and C have been specialized, and the weary strength of the piston rods has been improved.

Simple structure

The bush part and bush holder of the rod C type have been discontinued with production. The bush, of which structure has been simplified, has been specialized in the rod C.

Easier disassembly and assembly

The housing shape of the cylinder tube and cover seal part has been modified for easier disassembly and assembly.

Improved sealing performance of air vent plug

The sealing of the air vent part (also used as the check plug) has been changed to the canned hydrogenated nitrile rubber for more reliable sealing after air vent.

Improved durability

Superior abrasion-proof copper alloy is adopted as bush material to improve the bush durability.

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	☐ MICRO CADAM ☐ AUTO CAD		
		☐ DXF		
		☐ Others		
	Supplying medium	☐ CD-ROM		
		☐ 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.



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For safe use

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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

- 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 8354 : Double acting hydraulic cylinder
- JIS B 8367 : Hydraulic cylinder, mounting dimensions
- High-pressure gas preservation law
- Labor safety and hygiene law
- Fire laws
- 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.



Imminent hazardous situation. Unless the situation is avoided, loss of life or serious injury may occur.



Potential hazardous situation. Unless the situation is avoided, loss of life or serious injury may occur.



Potential hazardous situation. Unless the situation is avoided, slight or medium injury, or physical damages may occur.



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 excessively loosen the air vent plug when venting air.
The excessive loosening of the air vent plug may lead to coming-off or jumping of the plug from the cylinder, causing spouted oil, injury of operator, or misoperation 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 or steel working machinery 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.



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 unsmooth movement of the rod may also occur.
- 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 10 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 cushion and air vent)

- The excessive loosening of the check plug when venting air may lead to coming-off or jumping of the check plug from the cylinder, causing spouted oil.
 - Feed the oil with a low pressure (the pressure with which the cylinder can move at the low speed of approx. 10 mm/s), and loosen the check plug by one or two turns (counterclockwise) to vent air in the oil from the check valve.
- 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.

! Caution

(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 counter-measures 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.

SI unit conversion table

	SI units	Conventional units	Conversion rate	* Conversion values
Weight	kg	kg	1kg = 1kg	1
Force, load	N	kgf	1N = 0.102kgf	× 0.102
Pressure	MPa	kgf/cm ²	1MPa = 10.2kgf/cm ²	× 10.2
Torque, moment	N·m	kgf·m	1N·m = 0.102kgf·m	× 0.102
Work, energy	J	kgf·m	1J = 0.102kgf·m	× 0.102
Moment of inertia	kg·m ²	kgf·cm·sec ²	1kg·m ² = 10.2kgf·cm·sec ²	× 10.2
Power	kW	kgf·m/sec	1kW = 102kgf·m/sec	× 102
		PS	1kW = 1.36PS	× 1.36
Stress	N/mm ²	kgf/mm ²	1N/mm ² = 0.102kgf/mm ²	× 0.102
Vacuum pressure	– kPa	– mmHg	– 1kPa = –7.52mmHg	× 7.52
Angle	rad	° (Degree)	1rad = 57.3° (Degree)	× 57.3
Angular speed	rad/s	rad/sec	1rad/s = 1rad/sec	1
Acceleration	m/s ²	G	1m/s ² = 0.102G	× 0.102
Viscosity	Pa·s	cP	1Pa·s = 10 ³ cP	× 10 ³
Kinematic coefficient of viscosity	m ² /s	cSt	1m ² /s = 10 ⁶ cSt	× 10 ⁶

The conversion values with *-marks are the coefficients to convert the SI units into the conventional units .

Ex.) 0.5MPa × 10.2 = 5.1kgf/cm²



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Check of conditions when using hydraulic cylinders

Items	Contents
1. Set pressure (MPa)	Set pressure in hydraulic circuit
2. Load weight (kg)	Weight of objects to be moved, angle with gravity
3. Load driving conditions	Load installation, moving condition, presence of offset load
4. Required cylinder stroke (mm)	Cylinder stroke required for machines, cylinder excess stroke
5. Working speed (mm/s)	The maximum and working speed of cylinder innrush into cushion
6. Working frequency (number of time/time)	Working frequency
7. Working oil	Type of working oil used
8. Environmental conditions Note)	Temperature, dusts, vibration, cutting fluid splashing conditions, etc.

Note) Be sure to contact us before using or storing cylinders in places where are splashed with water and sea water, or are highly humid, since countermeasures against rusts and corrosion are required.

Hydraulic cylinder selection procedures

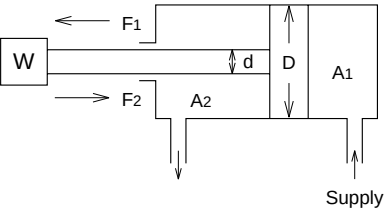
When selecting a hydraulic cylinder, the items below need to be decided.

Check	Selection items	Selection method	References
☐ 1	Selection of cylinder bore	Select the appropriate cylinder bore depending on the required cylinder output, referring to the selection materials of a cylinder bore. Remember that the selected bore may need to be modified depending on the buckling of the piston rod or judgment result of inertia force absorption. Select based on the items which will require the maximum bore. Ex. 1) If the cylinder stroke is long, select the cylinder bore based on the buckling of the piston rod. Ex. 2) If the cylinder is used for conveyance, and the load is stopped with the cylinder cushion, select the cylinder bore based on the judgment result of inertia force absorption.	15・16
☐ 2	Selection of cylinder series	Select the series based on the set pressure, cylinder bore, etc., referring to the type outline. At the same time, consider the specifications items.	Refer to the general catalogue of hydraulic equipment.
☐ 3	Selection of mounting style	Select the mounting style based on the machines conditions, referring to the dimensional drawings of each series.	Refer to each series.
☐ 4	Presence of boots and material selection (Selection of cylinder mounting length)	In the case of using cylinders in the places where are subjected to chips, sands, and dusts, boots need to be mounted to protect the piston rod. Select the material, referring to the selection materials of boots. Note 1) Since the boots have holes on their surfaces for expansion, the ingress of liquid, including cutting fluid (coolant), is inevitable. In such a case, use the cutting fluid proof type (70/140HW-8). Note 2) If the boots are equipped, the W (dimension WF) is long. Refer to the dimensional table.	24

□ 5	Judgment of piston rod buckling	⇒	Judge the usability, referring to the piston rod buckling materials. As a result, if the cylinder is inapplicable, modify any conditions shown below, and then, judge again. If it is still inapplicable, return to the 1) of the selection procedures, etc., and judge again. 1. Modify the mounting conditions. For example, if the load has no guide, attach the guide. 2. Decrease the set pressure. 3. Modify the cylinder bore or series, and widen the rod dia. (For the 70/140H-8 and 70/140HW-8, modify the rod type, and widen the rod dia..)	17 ~ 21
□ 6	Maximum absorbed energy of cylinder cushion	⇒	Judge the usability, referring to the chart of the maximum absorbed energy of cylinder cushion. If the cylinder is inapplicable, modify any conditions shown below, and then, judge again. If it is still inapplicable, return to the 1) of the selection procedures, etc., and judge again. 1. Decrease the set pressure. 2. Widen the cylinder bore, or modify the series (for example, change from the 35H-3 to the 70/140H-8). 3. Provide the deceleration circuit, and reduce the speed at the inrush into cushion until it is within the usable range. 4. Install external shock absorbers. Note 1) When using the cylinder without a cushion, decelerate until metallic noises due to the interference of the piston with the cover cannot be heard (approx. 50 mm/s or slower), or install the stopper outside. Note 2) If the cushioned cylinder is not used up to the stroke end, but it is stopped 5 mm or more before the stroke end, the cushioning effect becomes weaker.	26 ~ 33
□ 7	Selection of packing material	⇒	Select the material, referring to the packing material selection materials.	22 ~ 24
□ 8	Check of port dia. depending on cylinder speed	⇒	Check the cylinder port dia., referring to the relations diagrams of the cylinder speed, required oil amount, and pipe inside flow velocity.	25
□ 9	Check of notices on other selection	⇒	Check the notices on other selection.	35 ~ 39
□ 10	Selection of switches	⇒	Select the switches, referring to the switch selection procedures (refer to the switch specifications).	Refer to the switch specifications.

Selection of cylinder bore

The bore of a hydraulic cylinder depends on the required cylinder force.



- Push side cylinder force
 $F_1 = A_1 \times P \times \beta$ (N)
- Pull side cylinder force
 $F_2 = A_2 \times P \times \beta$ (N)

The hydraulic cylinder theoretical output table is based on the calculation results of the formula above.

A_1 : push side piston pressurized area (mm²) $A_1 = \frac{\pi}{4} D^2$

A_2 : pull side piston pressurized area (mm²) $A_2 = \frac{\pi}{4} (D^2 - d^2)$

D : cylinder bore (mm) d : piston rod dia. (mm)

P : set pressure (MPa)

β : load rate

When deciding the actual cylinder output, the resistance in the cylinder slipping part and the pressure loss in piping and machines must be considered.

The load rate is the ratio of the actual force loaded onto the cylinder to the theoretical force (theoretical cylinder force) calculated from the circuit set pressure. The general set points are shown below.

For low speed working 60 to 80%

For high speed working 25 to 35%

Pushed hydraulic cylinder theoretical output table (load rate 100%)

Unit : kN (1kN ≒ 102kgf)

Bore mm	Pressurized area mm ²	Set pressure MPa							
		1.0	3.5	5.0	7.0	10.0	14.0	16.0	21.0
φ20	314	0.31	1.10	1.57	2.20	3.14	4.40	5.02	6.60
φ25	491	0.49	1.72	2.45	3.44	4.91	6.87	7.85	10.31
φ32	804	0.80	2.81	4.02	5.63	8.04	11.26	12.86	16.89
φ40	1257	1.26	4.40	6.28	8.80	12.57	17.59	20.11	26.39
φ50	1963	1.96	6.87	9.82	13.74	19.63	27.49	31.40	41.23
φ63	3117	3.12	10.91	15.59	21.82	31.17	43.64	49.87	65.46
φ80	5027	5.03	17.59	25.13	35.19	50.27	70.37	80.43	105.56
φ100	7854	7.85	27.49	39.27	54.98	78.54	109.96	125.66	164.93
φ125	12272	12.27	42.95	61.36	85.90	122.72	171.81	196.35	257.71
φ140	15394	15.39	53.88	76.97	107.76	153.94	215.51	246.30	323.27
φ150	17671	17.67	61.85	88.36	123.70	176.71	247.40	282.73	371.10
φ160	20106	20.11	70.37	100.53	140.74	201.06	281.49	321.69	422.23
φ180	25447	25.45	89.06	127.23	178.13	254.47	356.26	407.15	534.38
φ200	31416	31.42	109.96	157.08	219.91	314.16	439.82	502.65	659.73
φ224	39408	39.41	137.93	197.04	275.86	394.08	551.71	630.52	827.57
φ250	49087	49.09	171.81	245.44	343.61	490.87	687.22	785.39	1030.84

- Notes)
- When deciding the actual cylinder output, consider the resistance in the cylinder slipping part and the pressure loss in piping and machines.
 - Remember that the output at start may be decreased when the piston comes to a close contact status at the stroke end due to a load.

Pulled hydraulic cylinder theoretical output table (load rate 100%)

Unit : kN (1kN ≒ 102kgf)

Series type	Bore mm	Rod dia. mm	Pressurized area mm ²	Set pressure MPa							
				1.0	3.5	5.0	7.0	10.0	14.0	16.0	21.0
70/140H-8 Rod B 70/140P-8 Rod B 70/140HW-8 Rod B	φ32	φ18	550	0.55	1.92	2.75	3.85	5.50	7.70	—	—
	φ40	φ22.4	863	0.86	3.02	4.31	6.04	8.63	12.08	13.80	18.11
	φ50	φ28	1348	1.35	4.72	6.74	9.43	13.48	18.87	21.56	28.30
	φ63	φ35.5	2127	2.13	7.45	10.64	14.89	21.27	29.78	34.04	44.68
	φ80	φ45	3436	3.44	12.03	17.18	24.05	34.36	48.11	54.98	72.16
	φ100	φ56	5391	5.39	18.87	26.95	37.74	53.91	75.47	86.26	113.21
	φ125	φ71	8313	8.31	29.09	41.56	58.19	83.13	116.38	133.00	174.57
	φ140	φ80	10367	10.37	36.29	51.84	72.57	103.67	145.14	165.88	217.71
	φ150	φ85	11997	12.00	41.99	59.98	83.98	119.97	167.96	—	—
	φ160	φ90	13744	13.74	48.11	68.72	96.21	137.44	192.42	219.91	288.63
	φ180	φ100	17593	17.59	61.58	87.96	123.15	175.93	246.30	—	—
	φ200	φ112	21564	21.56	75.47	107.82	150.95	215.64	301.89	—	—
70/140H-8 Rod C 70/140P-8 Rod C	φ224	φ125	27136	27.14	94.98	135.68	189.95	271.36	379.91	—	—
	φ250	φ140	33694	33.69	117.93	168.47	235.86	336.94	471.71	—	—
	φ40	φ18	1002	1.00	3.51	5.01	7.02	10.02	14.03	—	—
	φ50	φ22.4	1569	1.57	5.49	7.85	10.99	15.69	21.97	—	—
	φ63	φ28	2501	2.50	8.76	12.51	17.51	25.01	35.02	—	—
	φ80	φ35.5	4037	4.04	14.13	20.18	28.26	40.37	56.51	—	—
	φ100	φ45	6264	6.26	21.92	31.32	43.84	62.64	87.69	—	—
	φ125	φ56	9809	9.81	34.33	49.04	68.66	98.09	137.32	—	—
	φ140	φ63	12277	12.28	42.97	61.38	85.94	122.77	171.87	—	—
	φ150	φ67	14146	14.15	49.51	70.73	99.02	141.46	198.04	—	—
	φ160	φ71	16147	16.15	56.51	80.74	113.03	161.47	226.06	—	—
	φ180	φ80	20420	20.42	71.47	102.10	142.94	204.20	285.88	—	—
70/140H-8 Rod A	φ200	φ90	25054	25.05	87.69	125.27	175.38	250.54	350.76	—	—
	φ224	φ100	31554	31.55	110.44	157.77	220.88	315.54	441.76	—	—
	φ250	φ112	39235	39.24	137.32	196.18	274.65	392.35	549.29	—	—
	φ40	φ28	641	0.64	2.24	3.20	4.49	6.41	8.97	—	—
	φ50	φ35.5	974	0.97	3.41	4.87	6.82	9.74	13.63	—	—
	φ63	φ45	1527	1.53	5.34	7.63	10.69	15.27	21.38	—	—
	φ80	φ56	2564	2.56	8.97	12.82	17.94	25.64	35.89	—	—
	φ100	φ71	3895	3.89	13.63	19.47	27.26	38.95	54.53	—	—
	φ125	φ90	5910	5.91	20.69	29.55	41.37	59.10	82.74	—	—
	φ140	φ100	7540	7.54	26.39	37.70	52.78	75.40	105.56	—	—
	φ150	φ100	9817	9.82	34.36	49.09	68.72	98.17	137.44	—	—
	φ160	φ112	10254	10.25	35.89	51.27	71.78	102.54	143.56	—	—
	φ180	φ125	13175	13.18	46.11	65.88	92.23	131.75	184.45	—	—
	φ200	φ140	16022	16.02	56.08	80.11	112.15	160.22	224.31	—	—
	φ224	φ160	19302	19.30	67.56	96.51	135.11	193.02	270.23	—	—
	φ250	φ180	23640	23.64	82.74	118.20	165.48	236.40	330.97	—	—

- Notes) ● When deciding the actual cylinder output, consider the resistance in the cylinder slipping part and the pressure loss in piping and machines.
● Remember that the output at start may be decreased when the piston comes to a close contact status at the stroke end due to a load.

The hydraulic cylinder theoretical output table is based on the calculation results of the formula in page 15.

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)

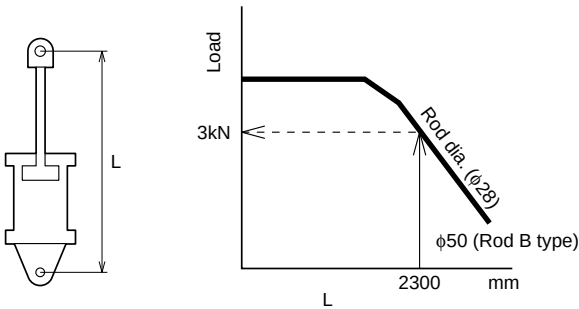
- 1. Find the L value (distance between the cylinder mounting position and load mounting position) with a cylinder fully extended.
- 2. Select any buckling chart depending on the mounting style, and find the maximum working load.

< Exercise >

Find the maximum working load for the 140H-8, φ50, rod B (rod dia. φ28), 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.
 $L = 230 + 70 + 1000 + 1000 = 2300 \text{ mm}$
- 2. From the buckling chart of the both ends pin joints, the load can be found as below.
 $W = 3 \text{ kN} (\approx 306 \text{ kgf})$

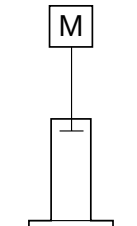


Notes on piston rod buckling

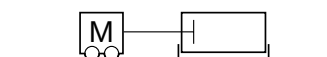
Prior to the calculation of the piston rod buckling, consider the cylinder stopping method. The stopping methods of a cylinder include the cylinder stopping method, in which a cylinder is stopped at the stroke end, and the external stopping method, in which a cylinder is stopped with the external stopper. 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

In the case of ❶

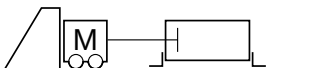


In the case of ❷



The state of stopping at the cylinder stroke end as shown in the figure.
For the load required for the buckling calculation, apply the formula below.
In the case of ❶ : load = $M \cdot g$
In the case of ❷ : load = $\mu \cdot M \cdot g$
 μ : frictional coefficient
 g : gravity acceleration 9.8 m/s²
 M : load weight (kg)

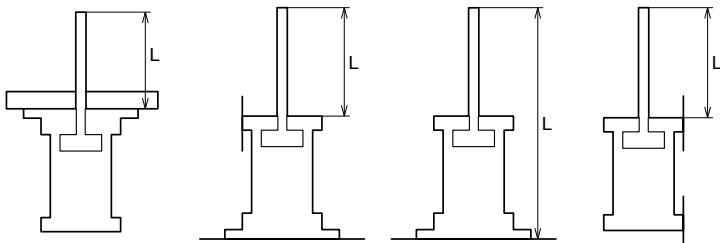
• Definition of load when the external stopping method is selected



The state of halfway stopping with the external stopper as shown in the figure.
The load required for the buckling calculation in this case is not the M, but the cylinder theoretical output (relief set pressure MPa × piston area mm²).

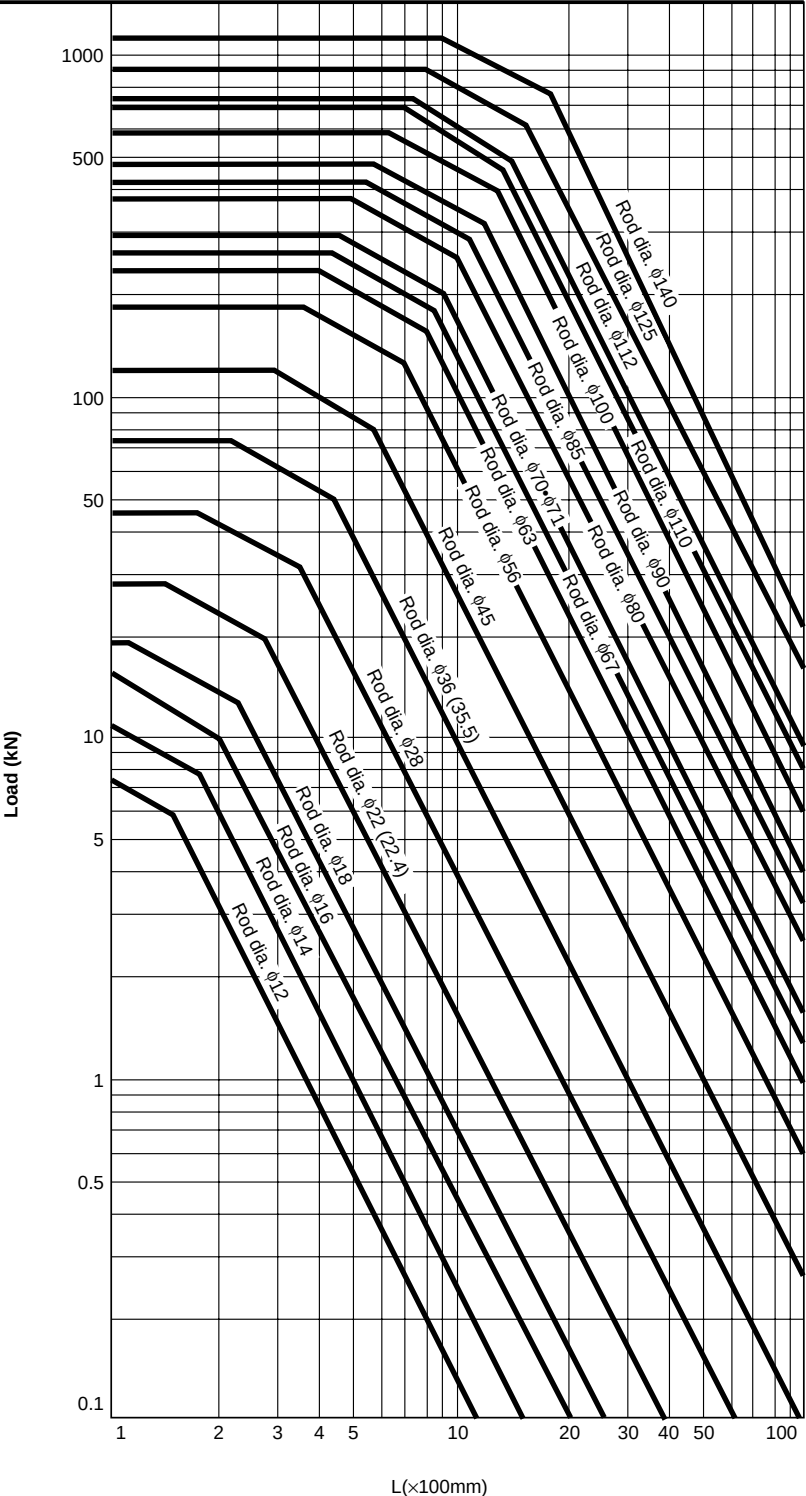
Buckling chart by cylinder mounting style

Fixed cylinder, rod end free



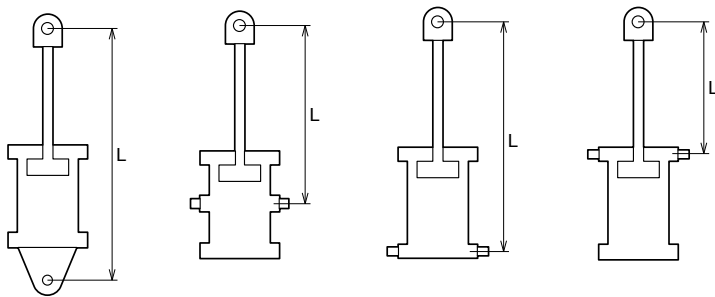
Selection materials

Buckling chart

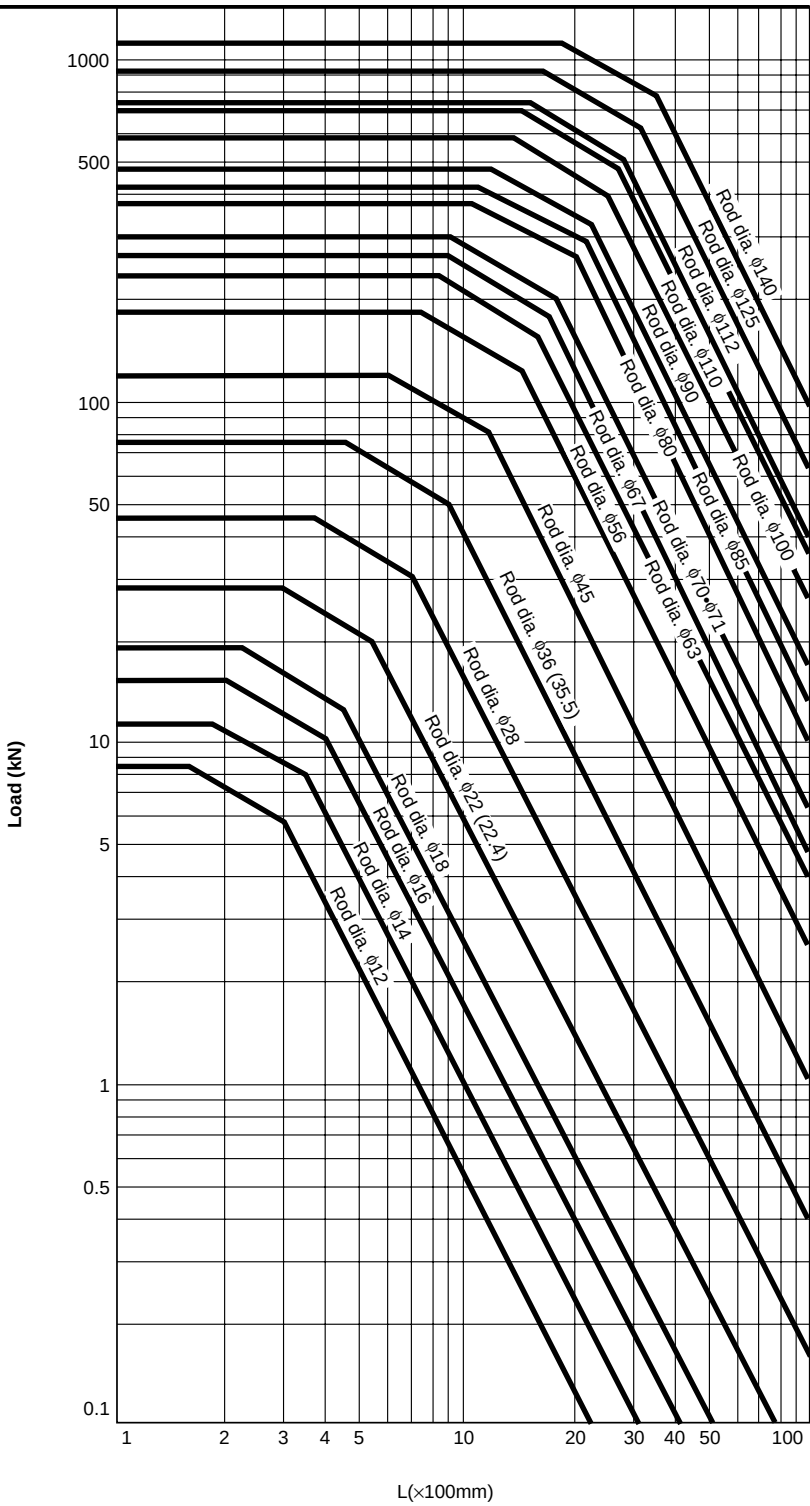


Buckling chart by cylinder mounting style

Both ends pin joints



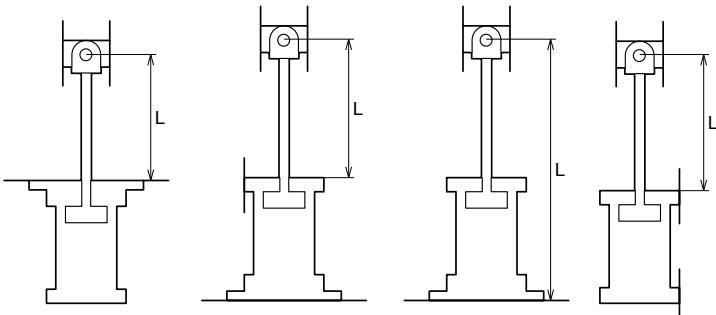
Buckling chart



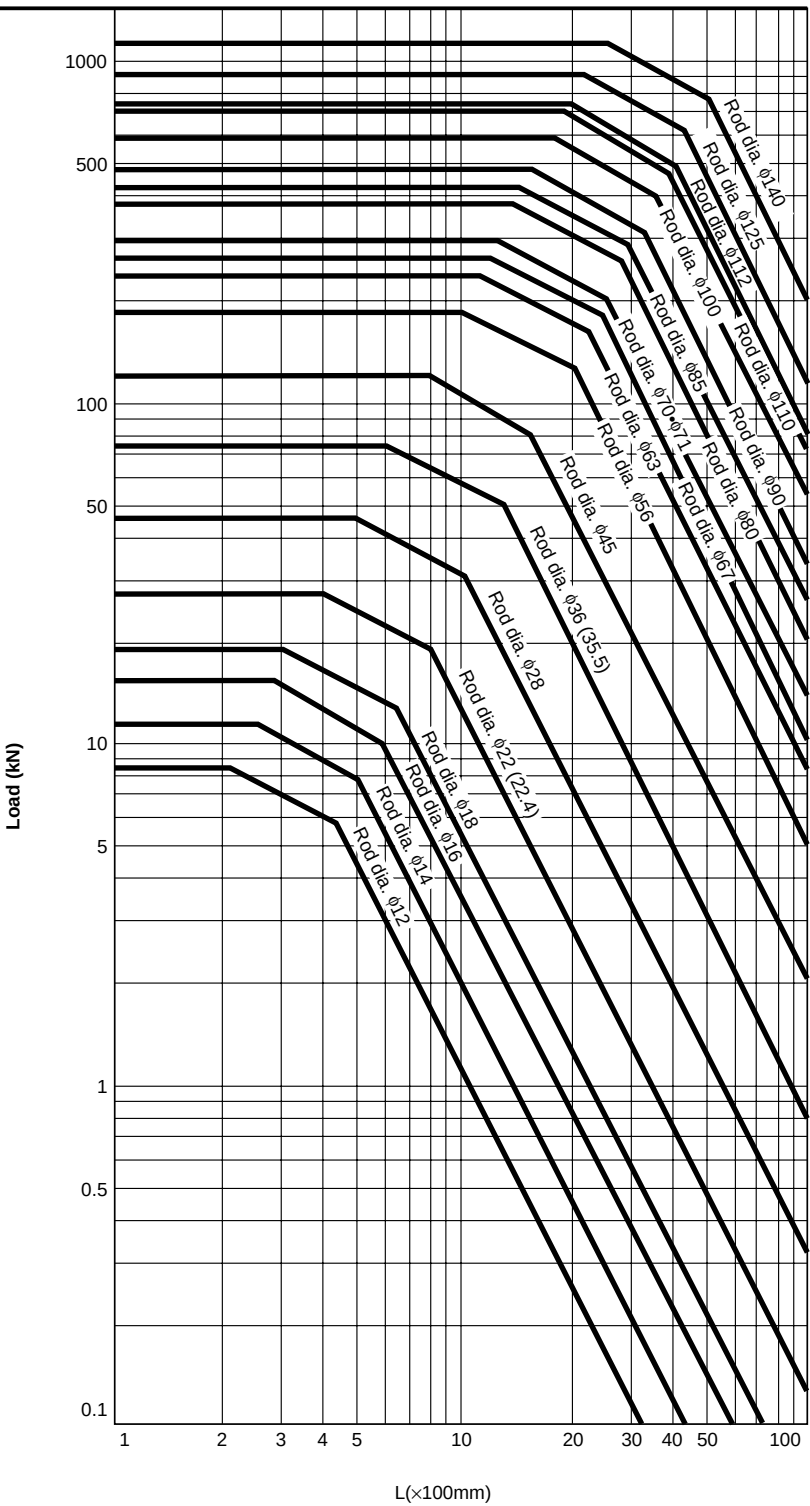
Buckling chart by cylinder mounting style

Fixed cylinder, rod end pin joint

Selection materials

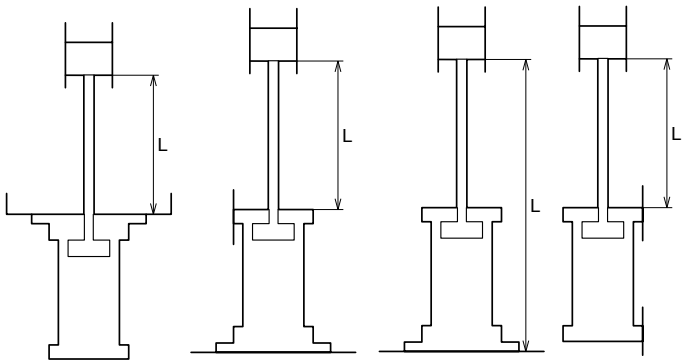


Buckling chart

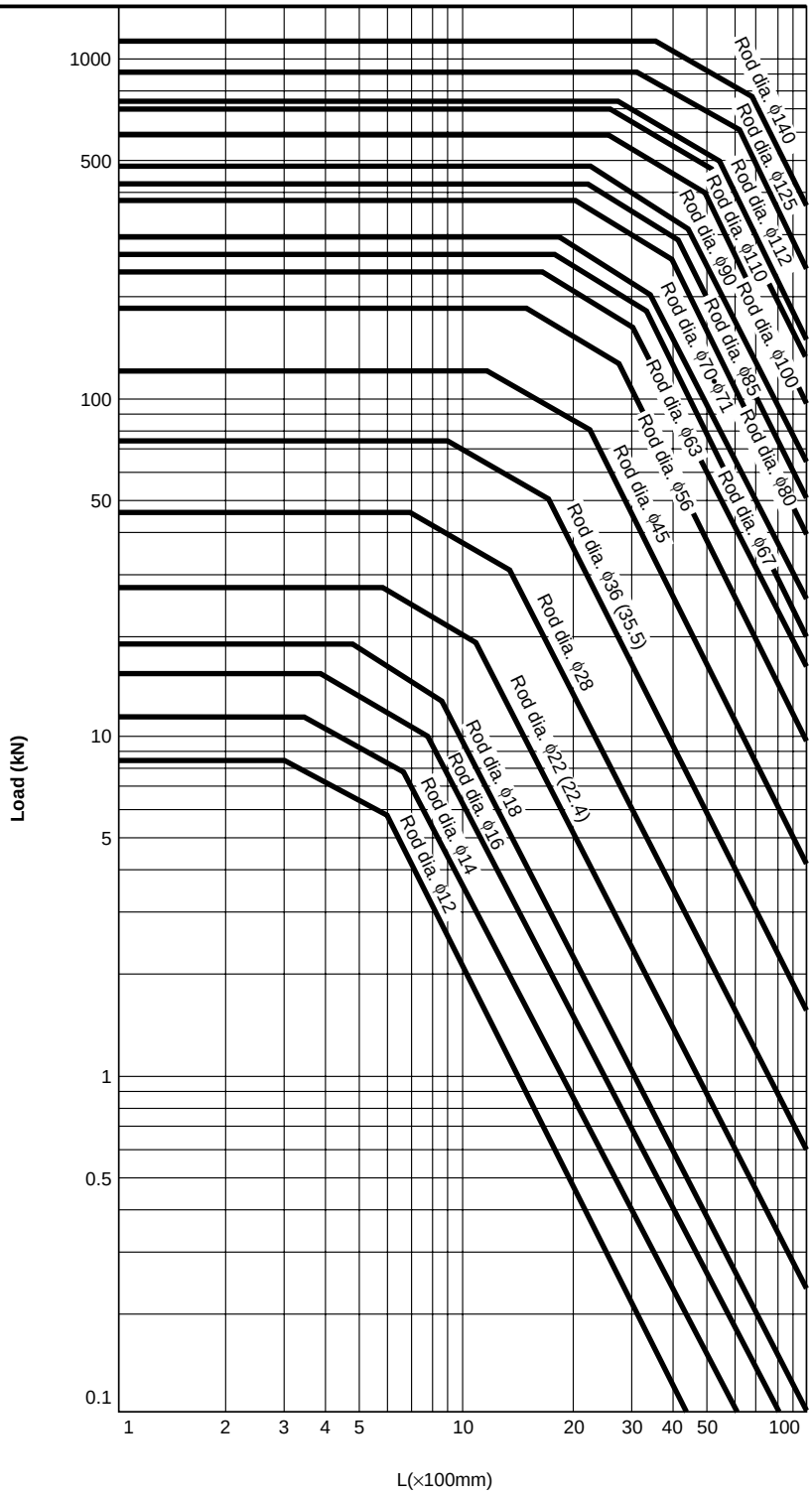


Buckling chart by cylinder mounting style

Fixed cylinder, rod end guide



Buckling char



Selection of packing material

Prior to the selection of packing material, check the conditions below.

1. Oil temperature in a cylinder and ambient temperature
2. Type of working oil
3. In the case of use in the places where are splashed with cutting fluid (coolant), the type of cutting fluid
4. Use frequency

- Notes)
- Select the packing material suitable for the working oil used. The wrong material selection may lead to the inferiority of packing material, causing the damaged packings.
 - The recommended cleanliness level of the working oil used is the NAS grade 10 or higher.
 - DO NOT mix different types of working oil. Otherwise, the mixed working oil may be changed in quality, posing the inferiority of the packings.
 - In the case that working oil including water (water-glycol fluid, water in oil fluid, oil in water fluid, etc.) is used, and the cylinder tube is made of carbon steel for machine-structural use, it is recommended to plate the cylinder tube inside. When you request the plated cylinder tube, instruct us.

Adaptability of packing material to working oil and working temperature range of packing material

No.	Packing material	Applicable working oil					Oil temperature and ambient temperature (°C)									
		Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	W/O fluid	W/O fluid	-50	-10	0	50	80	100	120	150		
1	Nitrile rubber	○	○	×	○	○										
2	Urethane rubber	◎	×	×	△	△										
3	Fluoric rubber	○	×	○	○	○										
6	Hydrogenated nitrile rubber	○	◎	×	◎	◎										
															Notes)	

- Notes)
- The ◎ and ○-marked items are applicable, while the X-marked items are inapplicable. For the △-marked items, contact us.
 - In case that the priority is given to the abrasion resistance, adopt the packing material of the ◎-marked combinations.
 - In case that hydrogenated nitrile rubber is adopted for the use of water-glycol fluid, water in oil fluid, oil in water fluid, the oil temperature must be ranged from -10 to +100°C.
 - The temperature range in the table above indicates the working temperature range of packing material, and it is not the working temperature range of the cylinder. For the use of a cylinder at high temperature, contact us.

Criteria for selection of urethane rubber and nitrile rubber

The material of the packing for standard cylinders includes urethane rubber and nitrile rubber. When selecting the material, refer to the criteria for selection in the table below.

- Characteristics of urethane rubber
Urethane rubber, having 2.5 times pull strength of nitrile rubber as shown in the table below, features the superior resistance against pressure and abrasion.
However, urethane rubber may be changed in quality due to heat and inferiority in working oil in a long run (and the multiplier effect of oil temperature), and therefore, disassembly and inspection are required every year.
- Characteristics of nitrile rubber
The influences of heat and inferiority in working oil on nitrile rubber is less than those on urethane rubber. Since the pull strength of nitrile rubber is less than that of urethane rubber, nitrile rubber is rather inferior to urethane rubber in the resistance against pressure and abrasion. Therefore, in case that the use frequency is low under low pressures and disassembly and inspection are not performed for two or three years, it is recommended to adopt nitrile rubber.
- Characteristics of hydrogenated nitrile rubber
When using in places where abrasion resistance more reliable than fluorine rubber is required at high temperature, and abrasion resistance more reliable than nitrile rubber is required at normal temperature, hydrogenated nitrile rubber is most suitable.

Table of packing selection criteria

Packing material Items	Nitrile rubber	Urethane rubber	Fluoric rubber	Hydrogenated nitrile rubber
Abrasion resistance	○	◎	○	◎
Life against inferiority of working oil	○	△	○	○
Life with high oil temperature	○	△	○	◎
Oil leak from rod	○ (JIS B type)	◎ (JIS A type)	○ (JIS B type)	○ (JIS B type)
High use frequency under high pressure	○	◎	△	◎
Low use frequency under low pressure	◎	○	○	◎
Pull strength (reference value) (MPa)	17	47	15	30

Note) ◎, ○, and △- marks indicate the priority of selection in this order.

Criteria for selection in case that cutting fluid is splashed

Cutting fluid is in mist form or it is splashed several times a day.	If packing material is selected based on the adaptability of packing material to cutting fluid, normal cylinders are applicable.
Cutting fluid is splashed always or frequently.	In a normal cylinder, cutting fluid may enter the cylinder from the ground section. Therefore, select cutting fluid resistance type (70/140HW-8). For the use of a cylinder in the places where are splashed with nonaqueous cutting fluid of the type 2, contact us.

Adaptability of cutting fluid (coolant) and packing material

No.	Cutting fluid type Chlorine in cutting oil Packing material	Nonaqueous cutting fluid		Aqueous cutting fluid	
		Not included (type 1)	Included (type 2)	Not included (W1, type 2, No.1, 3)	Included (W1, type 2, No.2)
1	Nitrile rubber	×	×	△	×
2	Urethane rubber	×	×	×	×
3	Fluoric rubber	○	○	×	×
6	Hydrogenated nitrile rubber	○	×	○	○

Note) The ○-marked combinations are applicable, while the ×-marked combinations are inapplicable. For the △-marked combinations, they are applicable at 50°C or under.

Packing material for each series

No.	Packing material	35Z-1	35H-3 35P-3	100Z-1	100H-2	70/140H-8 70/140P-8 (φ32~φ160)	70/140H-8R 70/140P-8R (φ32~φ140)	70/140H-8 (φ180~φ250)	70/140HW-8	160H-1	210C-1 210H-3	35S-1	HQS2 100S-1 160S-1 210S-1	HQSW2 100SW-1 160SW-1	70/140M-3
1	Nitrile rubber	○	○	○	○	○	○	○	×	○	○(with BUR)	×	×	×	△
2	Urethane rubber	×	×	×	○	○	○	×	×	○	○	×	×	×	○
3	Fluoric-containing rubber	×	○	×	×	○	○	○	×	×	○(with BUR)	×	○	×	△
6	Hydrogenated nitrile rubber	×	○	○	○	○	○	○	○	○	○(with BUR)	○	○	○	×
8	Slipper seal	×	○	×	×	○	×	×	×	×	×	×	×	×	×
	Combined seal	×	×	×	○	×	×	×	×	○	×	×	×	×	×

○-mark : standard

△-mark : semi-standard

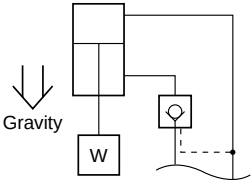
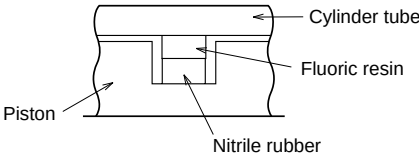
×-mark : not available

The “BUR” in the column of the 210H-3 series in the table above is the abbreviation of the back-up ring.

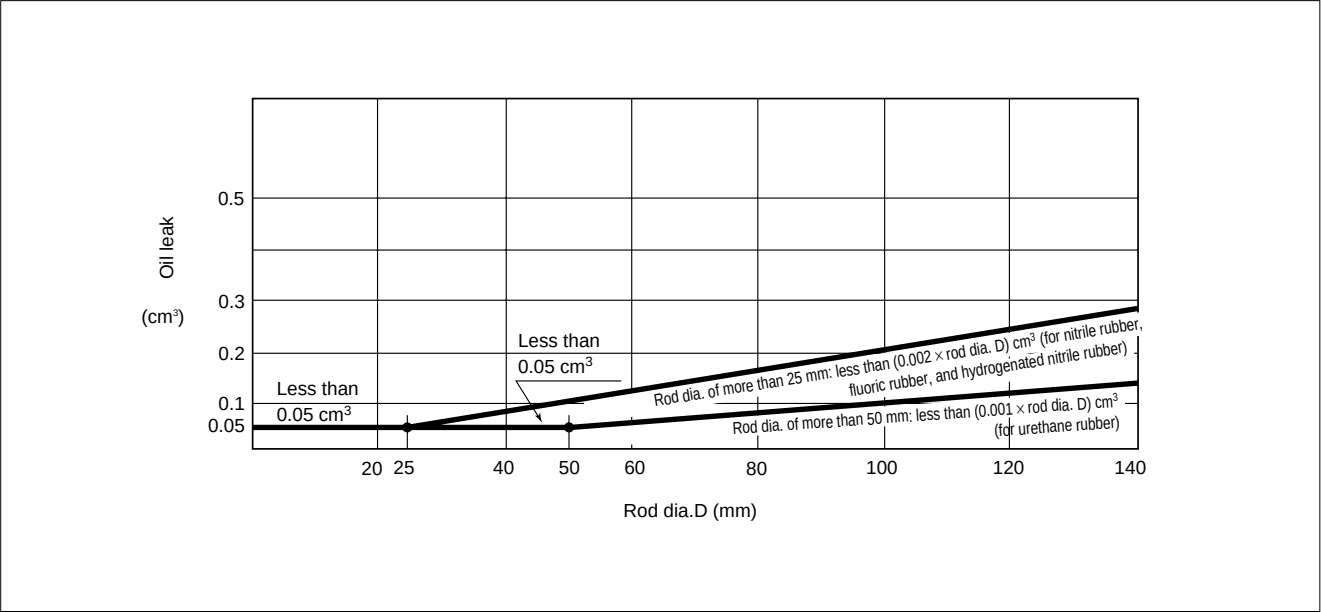
Notes on selection of slipper seal

- Outline This seal is a combination of fluoric resin of the slipping part and nitrile rubber of the back-up ring.
- Merits Reliable working performance at a low speed compared to the U type packing.
Ex.) The minimum speed of 70-140H-8 series
U type packing: 8 mm/s
Slipper seal: 1 mm/s
- Weak points More internal leakage compared to the U type packing. In case that the piston position must be held while an external force is applied as shown in the right figure, it is recommended to use the U type packing.

- Notes)
- For the applicable working oil temperature range and adaptability to working oil, refer to the materials related to nitrile rubber.
 - Slipper seal is the registered trademark of Nippon Valqua Industries, Ltd.



Relation between external oil leak amount and rod dia.



The external oil leak is the total of oil leak from the wiper part of the piston rod with the piston moving distance of 100 m (according to JIS B8367).

Selection of boots

If hydraulic cylinders are used in the places under unfavorable conditions, where are subjected to wind, wind and rain, and dusts, the piston rod especially needs to be protected. When selecting the boots, consider the environment conditions and temperature.

Boots type and resistible temperature

Symbols	Name	Material	Resistible temperature
J	Nylon tarpaulin	Vinyl-coated nylon cloth	80°C
JN	Chloroprene	Nylon cloth coated with chloroprene	130°C
JK	Conex	Silicon-coated Conex cloth	200°C

- Note) 1. If the boots are provided, the length of extended cylinder rod is changed.
- Note) 2. Remember that the resistible temperatures in the table above are for the boots, not for the cylinder.
- Note) 3. Conex is the registered trademark of Teijin Ltd.
- Note) 4. Neoprene, the older name of chloroprene, is the registered trademark of Du Pont-Showa Denko Co., Ltd. Thus, we have adopted general name, chloroprene.

Check of port dia. depending on cylinder speed

Cylinder speed depends on the quantity of oil fed into a cylinder.

The cylinder speed V can be obtained from the following formula:

$$V = 1.67 \times 10^4 \times Q_c/A$$

Qc : oil quantity supplied into cylinder (L/mm)
A : pressurized area of piston (mm²)

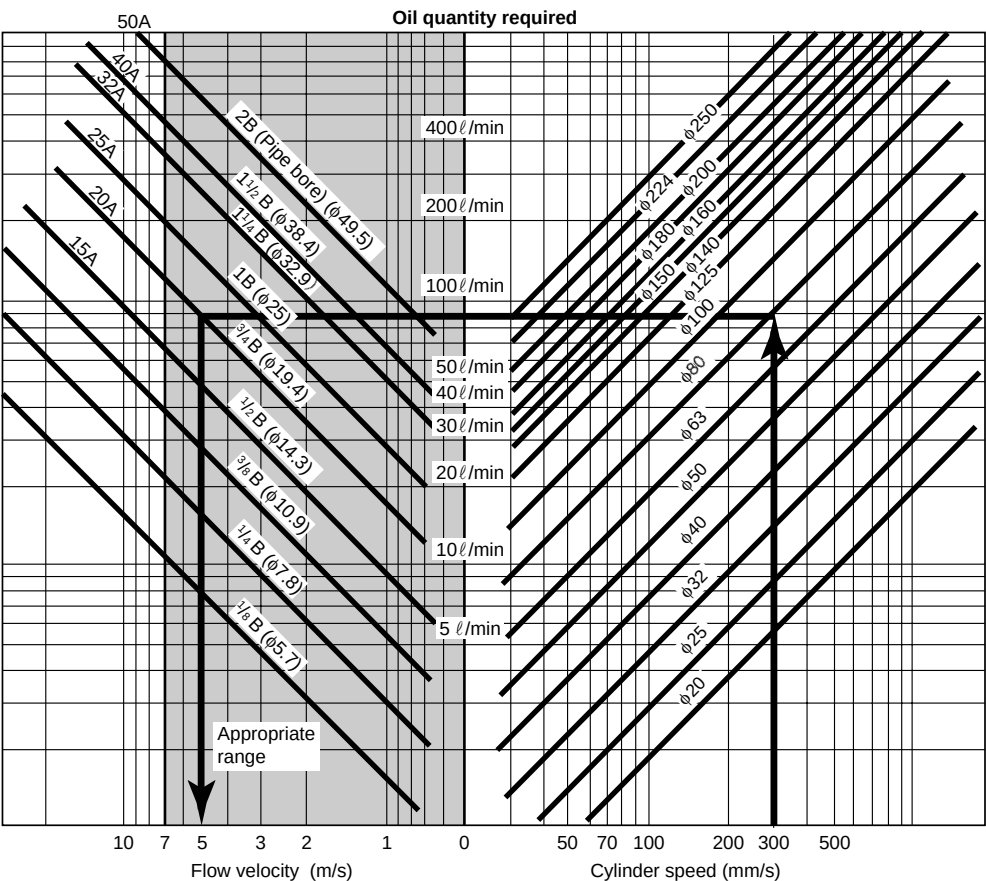
The chart below shows the relation between the speed and the required flow rate for each size of standard hydraulic cylinders (cylinder inside) and that between the required flow rate and flow velocity in pipe for each port dia.

< Example >

In the case of the 70/140H-8 series with an 80 mm cylinder bore and 300 mm/s cylinder speed, is the standard port dia. applicable ? Also, find the flow velocity in pipe.

< Answer >

In the chart below, find the cross point of the straight line from the point of 300 mm/s cylinder speed and the slant line of 80 mm cylinder bore, and draw a straight line parallel with the lateral axis until it reaches the slant line of the port dia. 3/4 (the standard port dia. for the 70/140H-8 series with a cylinder bore of 80 mm). From the cross point on the slant port dia. line, draw a straight line parallel with the longitudinal axis until it reaches the lateral axis. From the cross point, the corresponding flow velocity in pipe is 5.2 m/s. Since the cross point, which is found based on the port dia., cylinder speed, and bore, is within the applicable working range, the standard port dia. is applicable.



Note)
The appropriate flow velocity in pipe for the appropriate range is 7 m/s or under. In general, if the flow velocity in pipe exceeds 7 m/s, the piping resistance and pressure loss are increased, causing less output during cylinder work and lower speed. To reduce pressure loss, adopt piping with larger dia. of one grade to the cylinder port. The flow velocity is calculated with steel tube for piping S ch80.

Chart of relation between cylinder speed, required flow rate, and flow velocity in pipe

Standard port dia.

Series	Bore (mm)	Port dia.															
		20	25	32	40	50	63	80	100	125	140	150	160	180	200	224	250
70/140H-8		—	—	⅜	⅜	½	½	¾	¾	1	1	1	1	1¼	1½	1½	2
70/140P-8		—	—	—	⅜	½	½	¾	¾	—	—	—	—	—	—	—	—

Maximum energy absorbed of cylinder cushion

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

Inertia energy of load at the inrush into cushion E_1	+	Energy generated by the external force applied to the cylinder at the inrush into cushion E_2	$\cong$	Maximum energy absorbed of the cylinder cushion E_t
--	---	--	---------	--

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:

$$E_1 = MV^2/2 \text{ (J)} \quad \begin{array}{l} M : \text{load weight (kg)} \\ V : \text{load speed at the inrush into cushion (m/s)} \end{array}$$

In the case of rotation movement:

$$E_1 = I \omega^2/2 \text{ (J)} \quad \begin{array}{l} I : \text{inertia moment of load (kg} \cdot \text{m}^2\text{)} \\ \omega : \text{angular velocity of load at the inrush into cushion (rad/s)} \end{array}$$

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 of 70/140H-8".

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".

Remember that the maximum energy absorbed of the cylinder moving forward (the ejected direction of the piston rod from the cylinder) and that of the cylinder moving backward are identical.



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: $E_1 + E_2 \geq E_t$.

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.

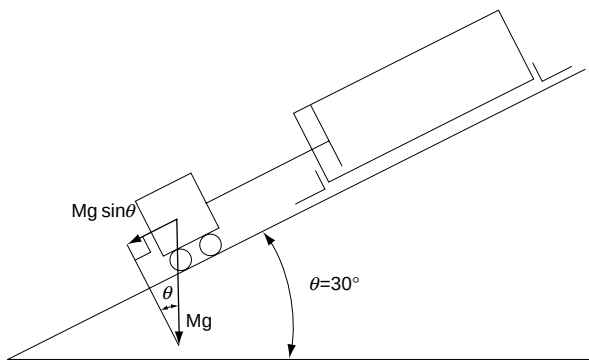
CAUTION

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 70H-8 $\phi 63$
Set pressure $P_1 = 5 \text{ MPa}$
Load weight $M = 500 \text{ kg}$
Load speed $V = 0.3 \text{ m/s}$ (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 $g = 9.8 \text{ m/s}^2$



< 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

$E_1 = MV^2/2 = 500 \times 0.3^2/2 = 22.5 \text{ J}$

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

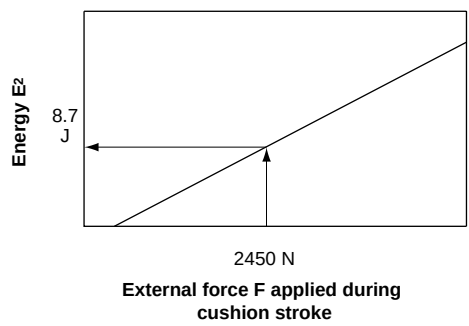
2.1 Find the external force F , applied in the direction of the cylinder axis at the inrush into cushion.

$F = Mg \sin \theta = 500 \times 9.8 \times \sin 30^\circ = 2450 \text{ N}$

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 70/140H-8”, 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 8.7 J, indicates the energy applied by the external force.

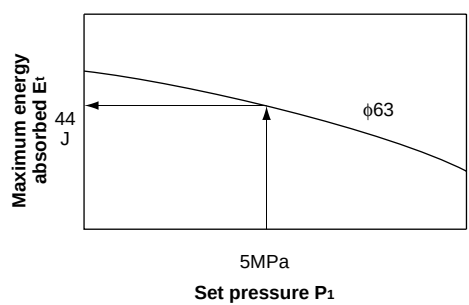
$E_2 = 8.7 \text{ J}$



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 5 MPa on the lateral axis, the set pressure of the “Maximum energy absorbed of cushion” of the 70H-8 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, 44 J, indicates the maximum energy absorbed.

$E_t = 44 \text{ J}$



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

$E_1 + E_2 = 22.5 + 8.7 = 31.2 \text{ J}$

where, $E_t = 44 \text{ J}$

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

As a result, the cylinder is applicable.

< Reference >

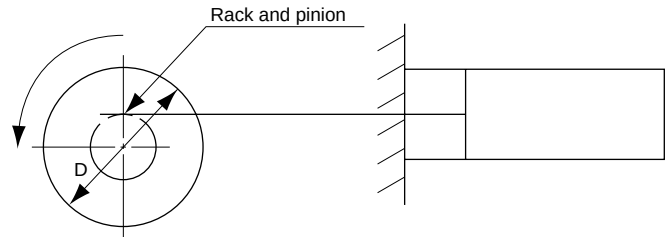
In case that the load moving direction is horizontal and there is no external force applied ($E_2 = 0$), from the set pressure, first find the maximum energy absorbed, E_t . Then, the allowable load weight and allowable load speed can be found.

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 70H-8 $\phi 63$
 Set pressure $P_1 = 5 \text{ MPa}$
 Load weight $M = 500 \text{ kg}$
 Load dia. $D = 0.7 \text{ m}$
 Angular velocity of load
 $\omega = 1.5 \text{ rad/s}$ (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 >

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

1.1 Find the inertia moment of a load, I .

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

$$I = MD^2/8 = 500 \times 0.7^2/8 = 30.6 \text{ (kg} \cdot \text{m}^2\text{)}$$

1.2 Find the inertia energy of a load, E_1 .

$$E_1 = I \omega^2/2 = 30.6 \times 1.5^2/2 = 34.4 \text{ J}$$

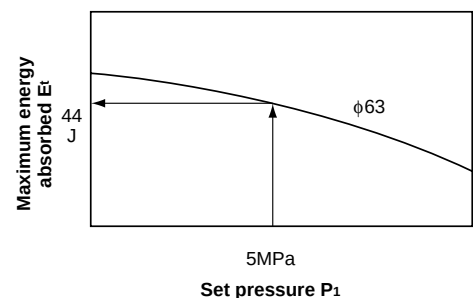
2. Find the energy generated by the external force applied to the cylinder at the inrush into cushion, E_2 .

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

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 5 MPa on the lateral axis, the supply pressure of the "maximum energy absorbed of cushion" of the 70H-8 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 44 J, indicates the maximum energy absorbed.

$$E_t = 44 \text{ J}$$



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

$$E_1 + E_2 = 34.4 + 0 = 34.4 \text{ J}$$

where, $E_t = 44 \text{ J}$

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 : $I = 2E_t/\omega^2$

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

Inertia moment calculation table

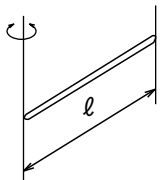
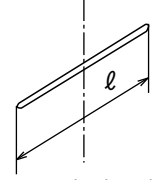
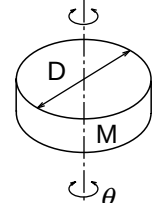
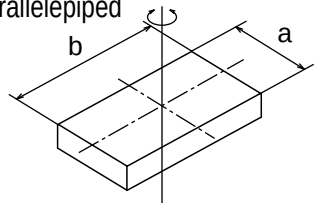
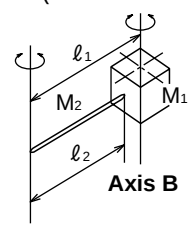
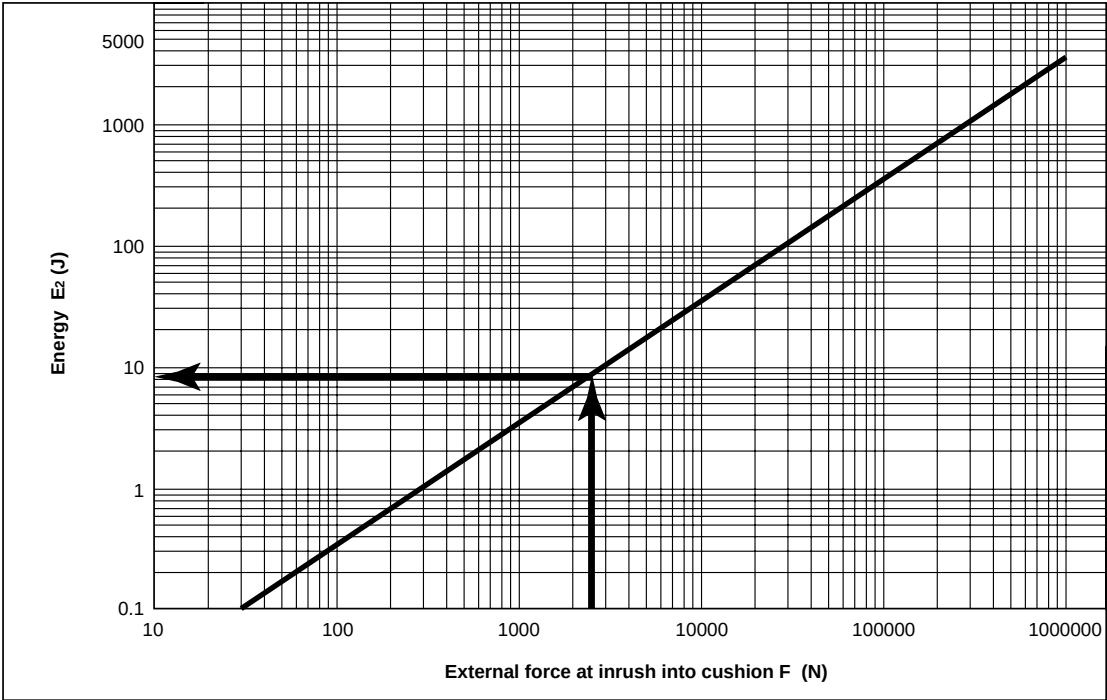
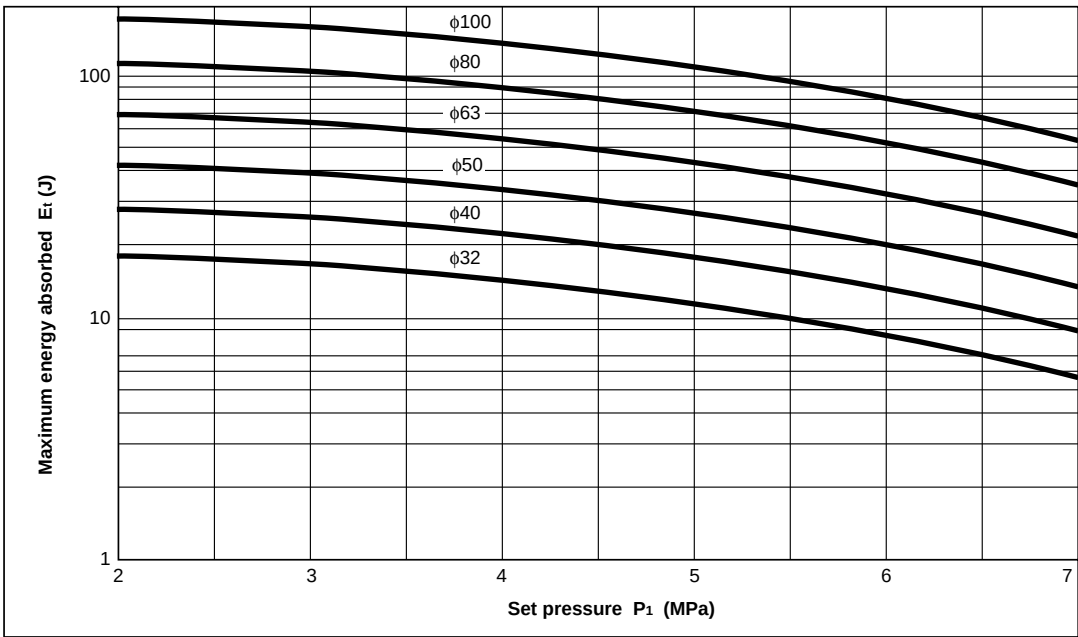
Outline	I : Inertia moment	Outline	I : Inertia moment
In the case of the axis at rod end 	$I = \frac{M \ell^2}{3}$	In the case of the axis in the middle of rod  Note) The axis passes through the center of gravity.	$I = \frac{M \ell^2}{12}$
In the case of a cylinder (including a disk)  Note) The axis passes through the center of gravity.	$I = \frac{MD^2}{8}$	In the case of a rectangular parallelepiped  Note) The axis passes through the center of gravity.	$I = \frac{M}{12} (a^2 + b^2)$
In the case of an arm (rotated around the axis A)  M₁ : Weight of a weight M₂ : Weight of an arm ℓ₁ : Distance from the axis A to the center of a weight ℓ₂ : Arm length Axis A	$I = M_1 \ell_1^2 + I_1 + \frac{M_2 \ell^2}{3}$ I₁ : The inertia moment of a weight when the axis passing through the center of the gravity of the weight (axis B) is the center.	I (I₁) : Inertia moment kg · m² M (M₁, M₂) : Weight kg ℓ , a, b : Length m D : Diameter m	

Chart of conversion of external force into energy at inrush into cushion of 70/140H-8

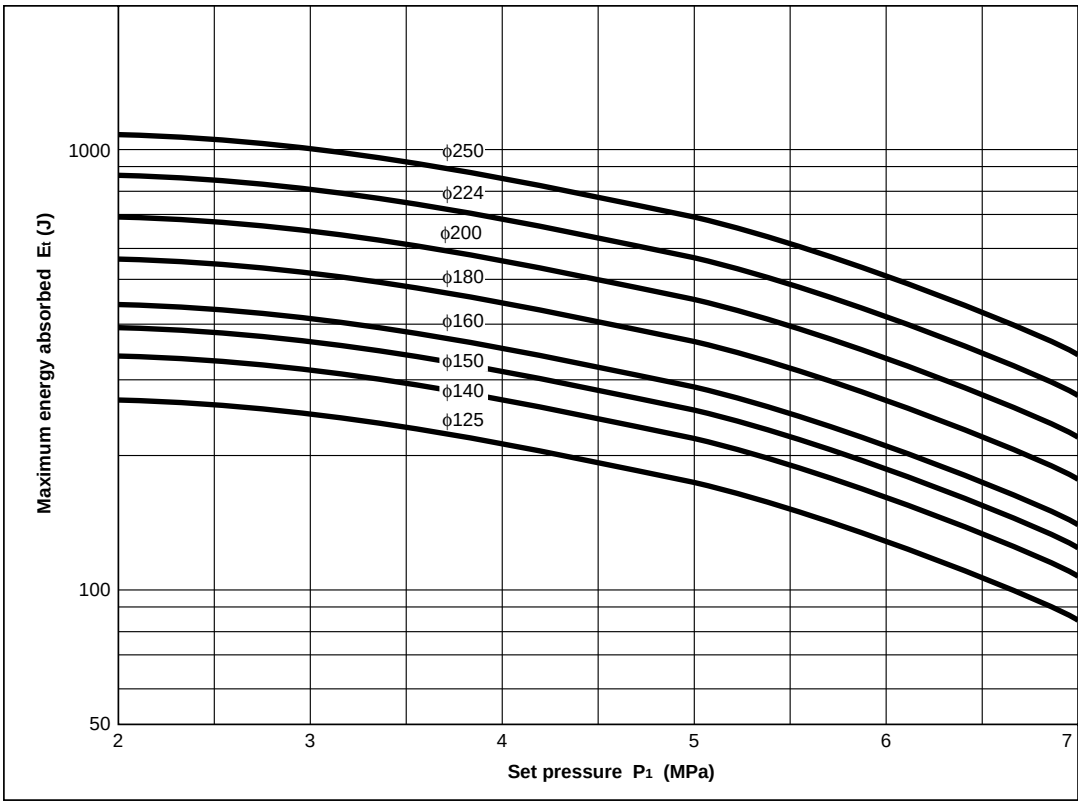


70H-8 Maximum energy absorbed common to rod A, B, C

Bore $\phi 32 - \phi 100$

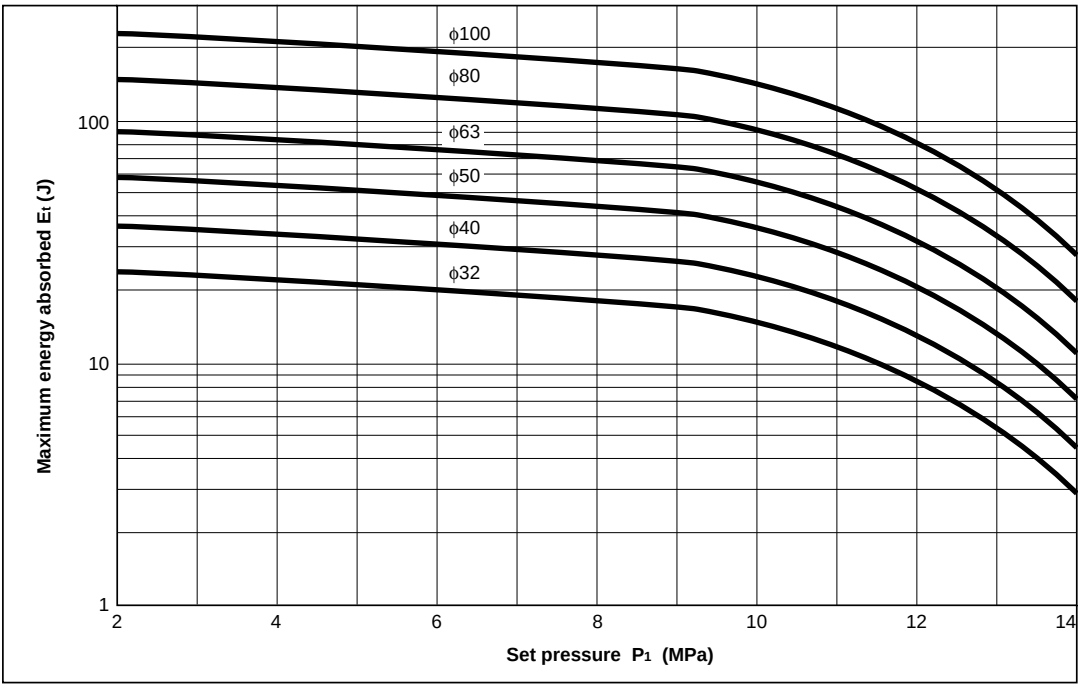


Bore $\phi 125 - \phi 250$

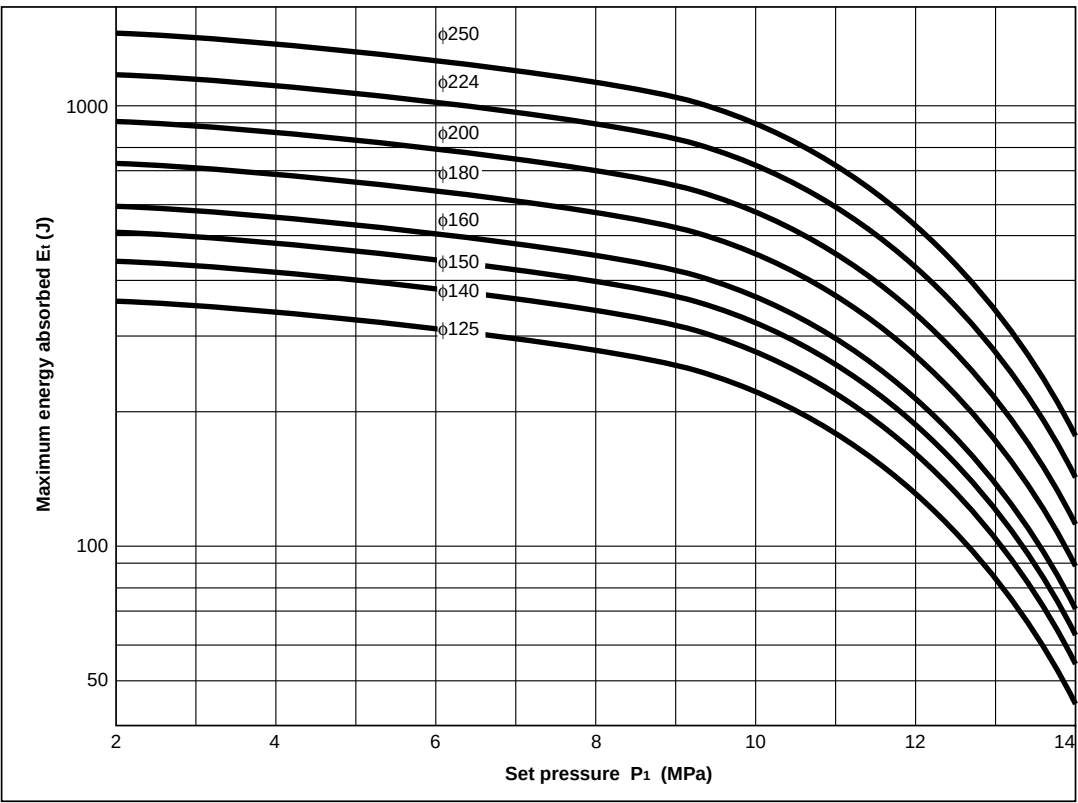


140H-8 Maximum energy absorbed of rod B

Bore $\phi 32 - \phi 100$

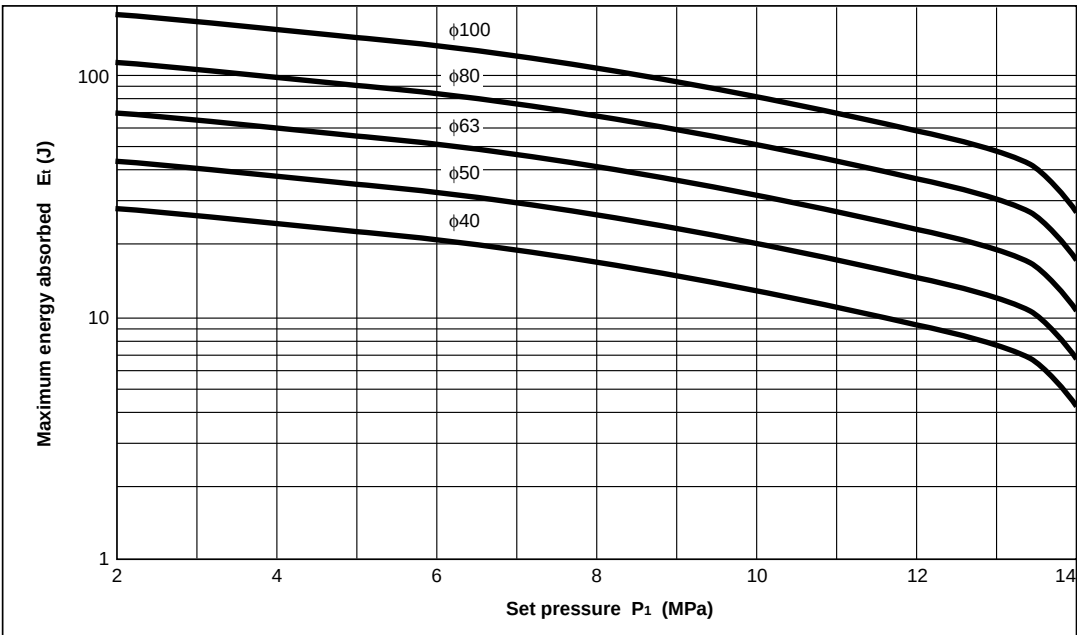


Bore $\phi 125 - \phi 250$

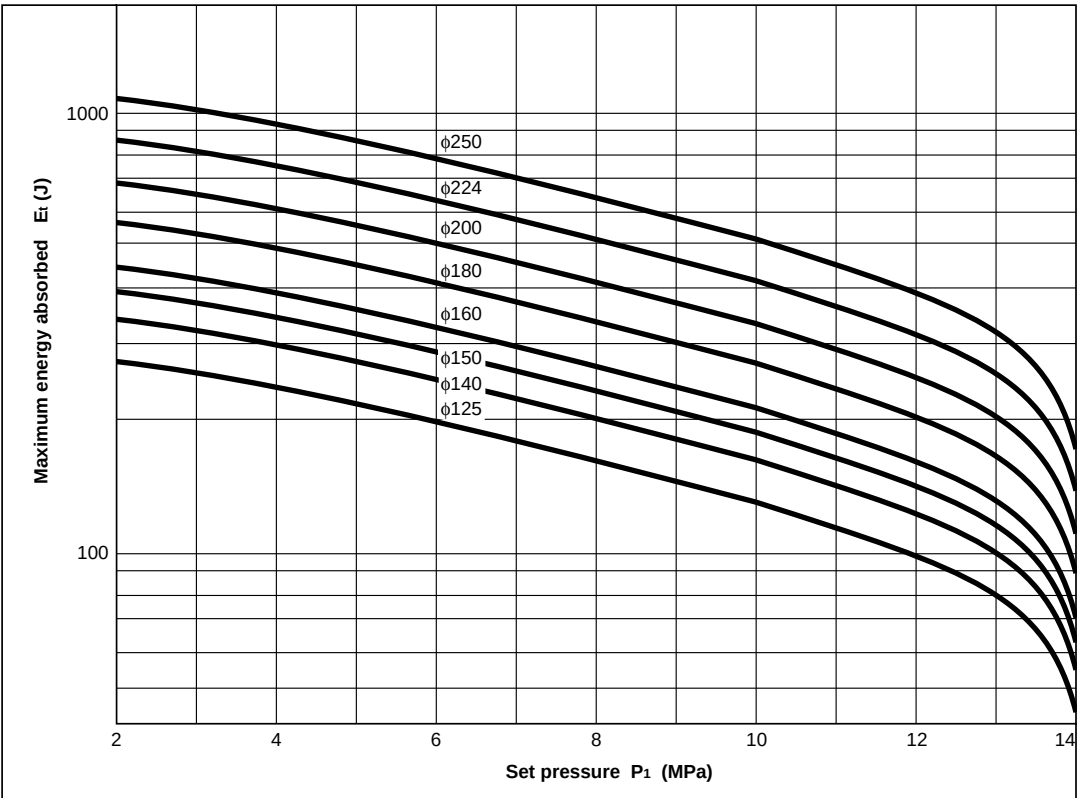


140H-8 Maximum energy absorbed of rod C

Bore $\phi 40 - \phi 100$

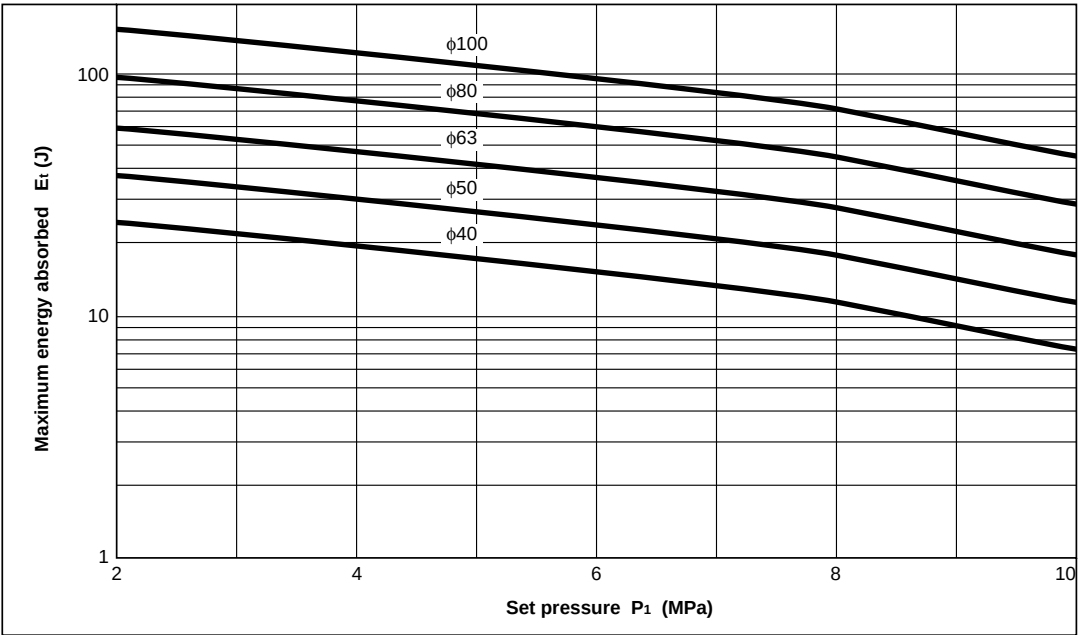


Bore $\phi 125 - \phi 250$

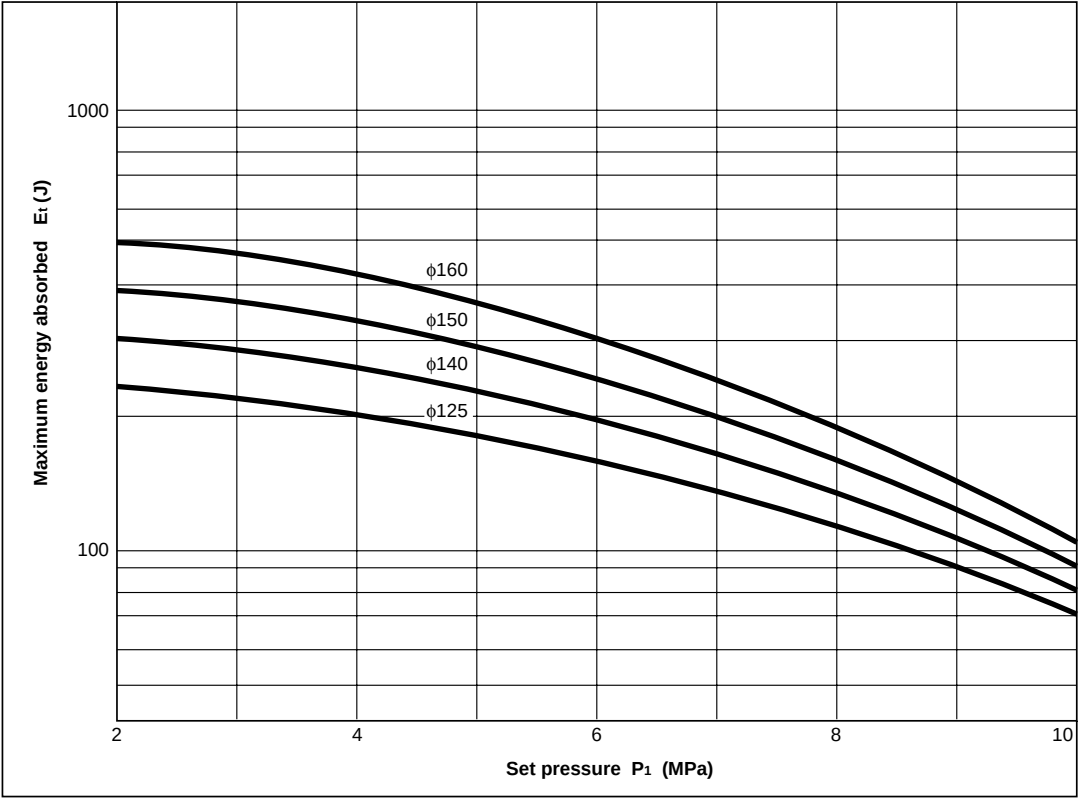


140H-8 Maximum energy absorbed of rod A

Bore $\phi 40 - \phi 100$



Bore $\phi 125 - \phi 160$





Precautions for use

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Precautions for use

Prior to the use of cylinders, be sure to read carefully the precautions below.

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

For the use of the items below, use them at the temperature lower than the upper limits shown below.

Items		Upper limit oil temperature
Switch set cylinder	WR・WS types	60°C or lower
	Other switches	70°C or lower
Cylinder with position detector	35P-3 70/140P-8	50°C or lower
	70・140MT-3	65°C or lower
Cylinder with primary components for which aluminum alloy is used (35S-1・100S(W)-1・35SY-1)		70°C or lower

If several items with different upper limits of oil temperature are used, adopt the lowest temperature limit, and use the items at the temperature lower than the adopted upper limit.

Ex.) When using 100SW-1R with the WR type switch, use it at 60°C or lower.

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) Avoid the use in the places where are subjected to dusts and vibrations.

DO NOT use them under the environmental conditions shown below. The use under these conditions requires the protection of the rod part, rust-proof measures, review of part 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

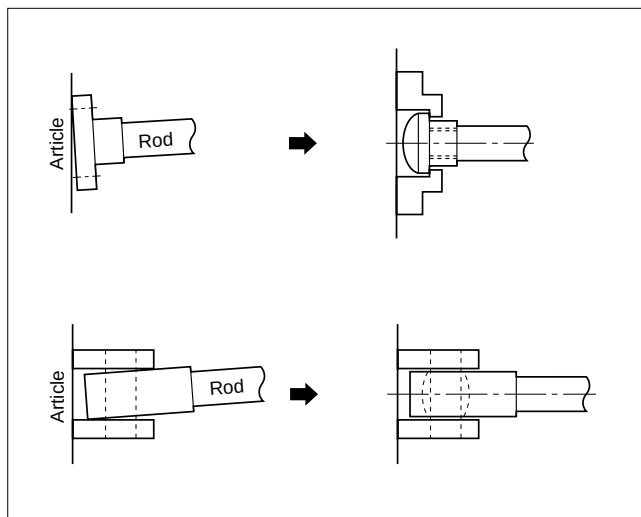
4. Mounting

⚠ CAUTION

- For the mounting of cylinders, use bolts of the specified size, and fix with the bolts of the strength class (refer to JIS B8367).
In the case of the rotary type, use pins of the specified size. Otherwise, screws may be loosened or damaged 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, EA, EB, LA, LB, FA, FB, FY, FE, FZ, FC, FD 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.



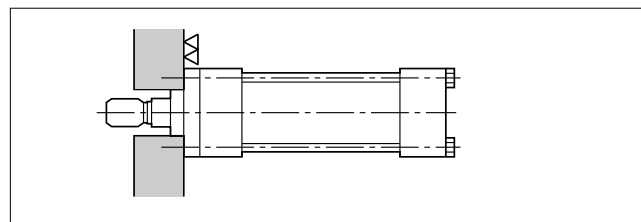
4-2) Mounting of cylinder

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

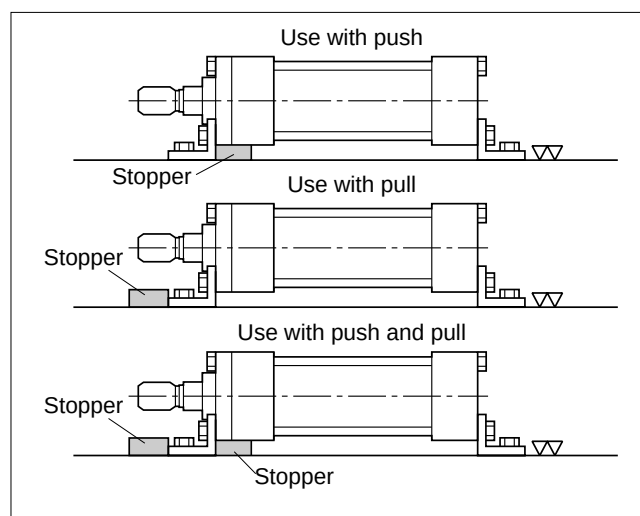
① SD type

- Thread accuracy of tie rod : JIS 6h (equivalent to JIS grade 2)
- Clamping torque : tie rod clamping specified torque value
(Refer to the clamping torque for each series.)



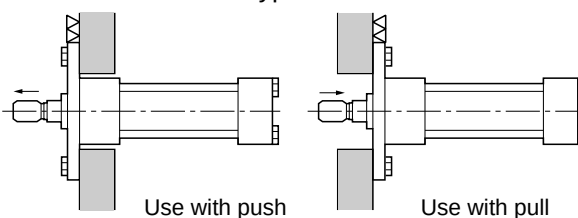
② LA, LB and LC types

To mount LA and LB types, 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 mounting base, as shown in the figures below.

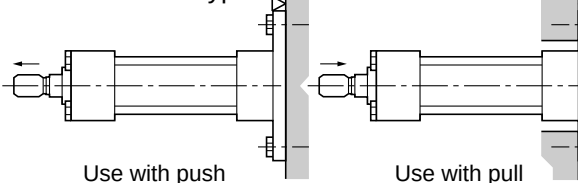


③ EA, EB, FA, FB, FY, FE, FZ, FC, and FD types Fix cylinders as shown in the figures below.

EA • FA • FC • FY • FE types



EB • FB • FD • FZ types



Precautions for use

Prior to the use of cylinders, be sure to read carefully the precautions below.

(2) Rotary type

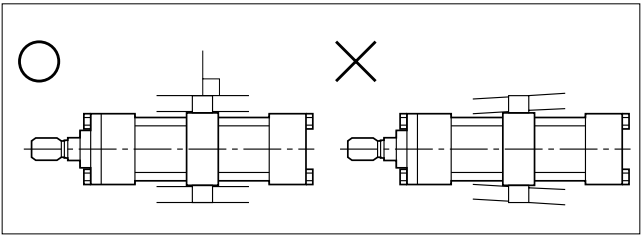
- For the cylinder of which mounting part moves inside a plane, be sure to connect the connection fittings of the rod end with pins, so that the mounting part can move inside the plane. For the plane and rectangular direction, perform centering similarly to the fixed type.
- Be sure to apply lubricant to the bearing part of the connection fittings.
- DO NOT use floating joints for rod end attachments.

① CA, CB, TA, and TC 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.

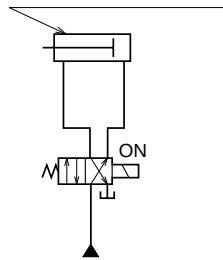
- At this time, if the check valve is excessively loosened, it may be come off from the cylinder, causing spouted oil and serious accidents.
- Repeat the step above until no air remains in the pipe.
- Exhaust air in the piping, as well as that in the cylinder. Any air remained may cause malfunctions 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

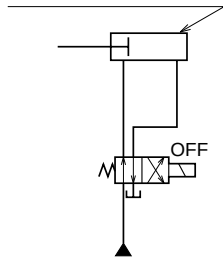
• When a cylinder moves forward

Loosen the check valve on the rod side



• When a cylinder moves backward

Loosen the check valve on the head side



- (2) After air vent procedure is complete, clamp the check valve or air vent valve (clamping torque: 8 to 10 N·m), and check for oil leak.

7-2) Adjustment of cushion valve

CAUTION

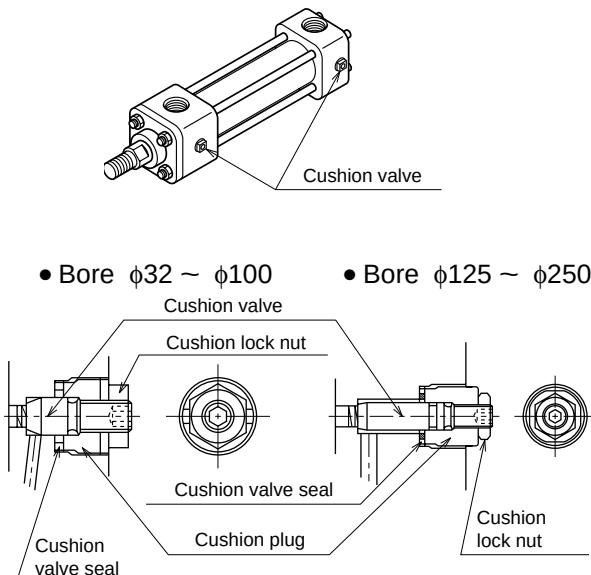
Even if the cushion valve is loosened during the cushion adjustment, it touches the cushion plug to prevent it from being removed. However, if it is forcibly turned, it may be loosened and oil may be spouted, causing serious accidents.

(Cylinder with cushion)

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

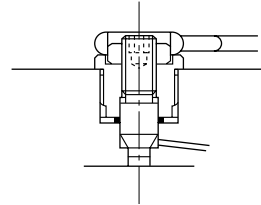
- The cushion must be adjusted, since it has not been adjusted at our factory.
- If the piston speed is fast from the beginning, abnormal surge pressure may occur, causing the damaged cylinder or machine.
- Even if the cushion valve is loosened during the cushion adjustment, it touches the cushion plug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

Diagram of cushion valve structure

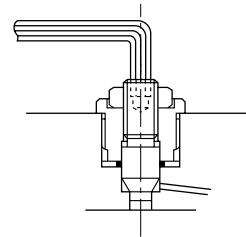


- (1) Perform the adjustment of the cushion valve by following the sequences below.

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

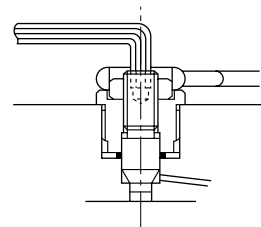


- ② Turn the cushion valve only with an allen wrench.
a) Turn clockwise: the cushion stroke speed decreases.
b) Turn counterclockwise: the cushion stroke speed increases.



- 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.

Precautions for use

Prior to the use of cylinders, be sure to read carefully the precautions below.

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)

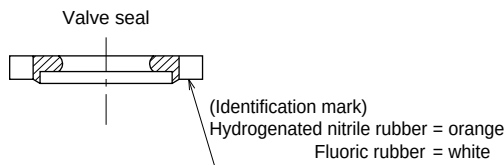
Decide the interval of the regular inspection depending on the working conditions and requirement, and perform according to the decided schedule. It is recommended to perform it once a year.

- 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

- 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 and the shaft of the check plug in the 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).

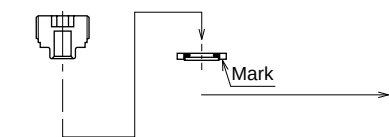
Fig.1



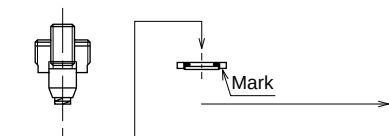
Fit with the marked side facing inside of the cylinder.

Fig.2

Check plug

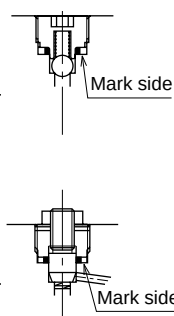


Cushion valve



(Valve seal fitting sequence)

Fig.3



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

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 them.
- 2) Piston rods are hard chrome plated. When disposing them, consult with a disposal company.
- 3) Dispose resin base and rubber base components as nonflammable wastes.
- 4) When disposing waste oil, conform to related laws and rules.



70/140H-8



Standard built-in high-performance cushion in hydraulic cylinders

- Double acting hydraulic cylinders for 7/14 MPa with a bore from $\phi 32$ to $\phi 250$.
- The adoption of high-performance cushion has reduced a shock at stopping.
- The adoption of newly designed cushion valve allows easy cushion adjustment.
- The anti-coming-off structure and looseness-preventive lock nut have been adopted as safety measures for the cushion valve.
- Standardized new-type small switch in varieties with the improved maintenance.



Standard specifications

Types	Specifications of general purpose and cutting fluid proof types		
Nominal pressure	7MPa		14MPa
Maximum allowable pressure	Head side: 9MPa Rod side : (A)15MPa (B)13.5MPa (C)11MPa	Head side: 18MPa Rod side : (A)18MPa (B)18MPa (C)14MPa	
Proof test pressure	10.5MPa		21MPa
Minimum working pressure	Head side: 0.3MPa or less Rod side : (A)0.6MPa or less (B)0.45MPa or less (C)0.4MPa or less		
Operating speed range	$\phi 32\text{--}\phi 63$: 8–400mm/s $\phi 80\text{--}\phi 125$: 8–300mm/s $\phi 140\text{--}\phi 250$: 8–200mm/s		
Temperature range (Ambient temperature and oil temperature)	Standard type –10 - +80°C (Notes) Switch set AX type –10 - +70°C WR•WS type –10 - +60°C (at non-freezing condition)		
Structure of cushioning	Metal fitting type		
Adaptable working oil	Petroleum-based fluid (For other working oil, refer to the table of working oil adaptability)		
Tolerance of thread	JIS 6g/6H (JIS grade 2 or equivalence)		
Tolerance of stroke	100mm or lower $^{+0.8}_0$	101– 250mm $^{+1.0}_0$	251– 630mm $^{+1.25}_0$ 631–1000mm $^{+1.4}_0$ 1001–1600mm $^{+1.6}_0$ 1601–2000mm $^{+1.8}_0$
Tube material	Standard type • carbon steel for machine structural use Switch set • stainless		
Mounting type	SD•LA•LB•LC•FA•FB•FC•FD•FK• FE•FY•FZ•CA•CB•CS•TA•TC FY•FZ•CA•CB•CS•TA•TC		
Accessories	• Rod end eye (T-end), Eye joint with spherical bearing (S-end) , rod end clevis (Y-end) with pin, lock nut • Floating joint (F-end) : only 7 MPa type • Boots : only general purpose type Standard: nylon tarpaulin Semi-standard: chloroprene, Conex		

Terminologies

Nominal pressure

The maximum set pressure of a relief valve in a hydraulic circuit in which a cylinder is used.

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.
- The working temperature range depends on the material of packings. For details, refer to the selection materials in the beginning of this catalogue.
- In case that the lock nut is attached to the piston rod end thread part, lengthen the thread length (dimension A).
- The cylinder with a bore of $\phi 150$ mm does not conform to JIS standards.
- The types in () marks in the mounting style column are applicable to the nominal pressure of 7MPa. It is basically impossible to use them with the pressure exceeding 7 MPa. For using method, contact us. The FE type is applicable only to the rod 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.
- LB mounting and A rod is limited at the bore 125mm.

Lines

Unit: mm

Structure		Type	Rod dia.	φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
General purpose type	Double Acting Single Rod	Standard type 70/140H-8	Rod B	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Rod C		●	●	●	●	●	●	●	●	●	●	●	●	●
			Rod A		●	●	●	●	●	●	●	●	●				
	Double Acting Single Rod	Switch set 70/140H-8R	Rod B	●	●	●	●	●	●	●	●						
			Rod C		●	●	●	●	●	●	●						
			Rod A		●	●	●	●	●	●	●						
	Double Acting Double Rod	Standard type 70/140H-8D	Rod B	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Rod C		●	●	●	●	●	●	●	●	●	●	●	●	●
	Double Acting Double Rod	Switch set 70/140H-8RD	Rod B	●	●	●	●	●	●	●	●	●					
			Rod C		●	●	●	●	●	●	●	●					
Cutting fluid proof type	Double Acting Single Rod	Standard type 70/140HW-8	Rod B	●	●	●	●	●	●	●	●						
			Rod C		●	●	●	●	●	●	●						
	Double Acting Single Rod	Switch set 70/140HW-8R	Rod B	●	●	●	●	●	●	●	●						
			Rod C		●	●	●	●	●	●	●						

General purpose hydraulic cylinder

- Notes) ● You are requested to select "Switch set" cylinder when you would like to use switches.
● Switches can't be mounted on Standard type.

Stroke fabrication range

Unit: mm

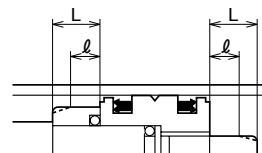
Bore	Standard type	Switch set
φ32 - φ50	- 1200	- 1200
φ63•φ80	- 1600	- 1600
φ100 - φ140	- 2000	- 2000
φ150 - φ250	- 2000	—

- The above strokes indicate the maximum available strokes for the standard type.
- For the rod buckling, check with the buckling chart of the selection materials. If you request the strokes other than in the table above, contact us.

Cushion stroke length

Unit: mm

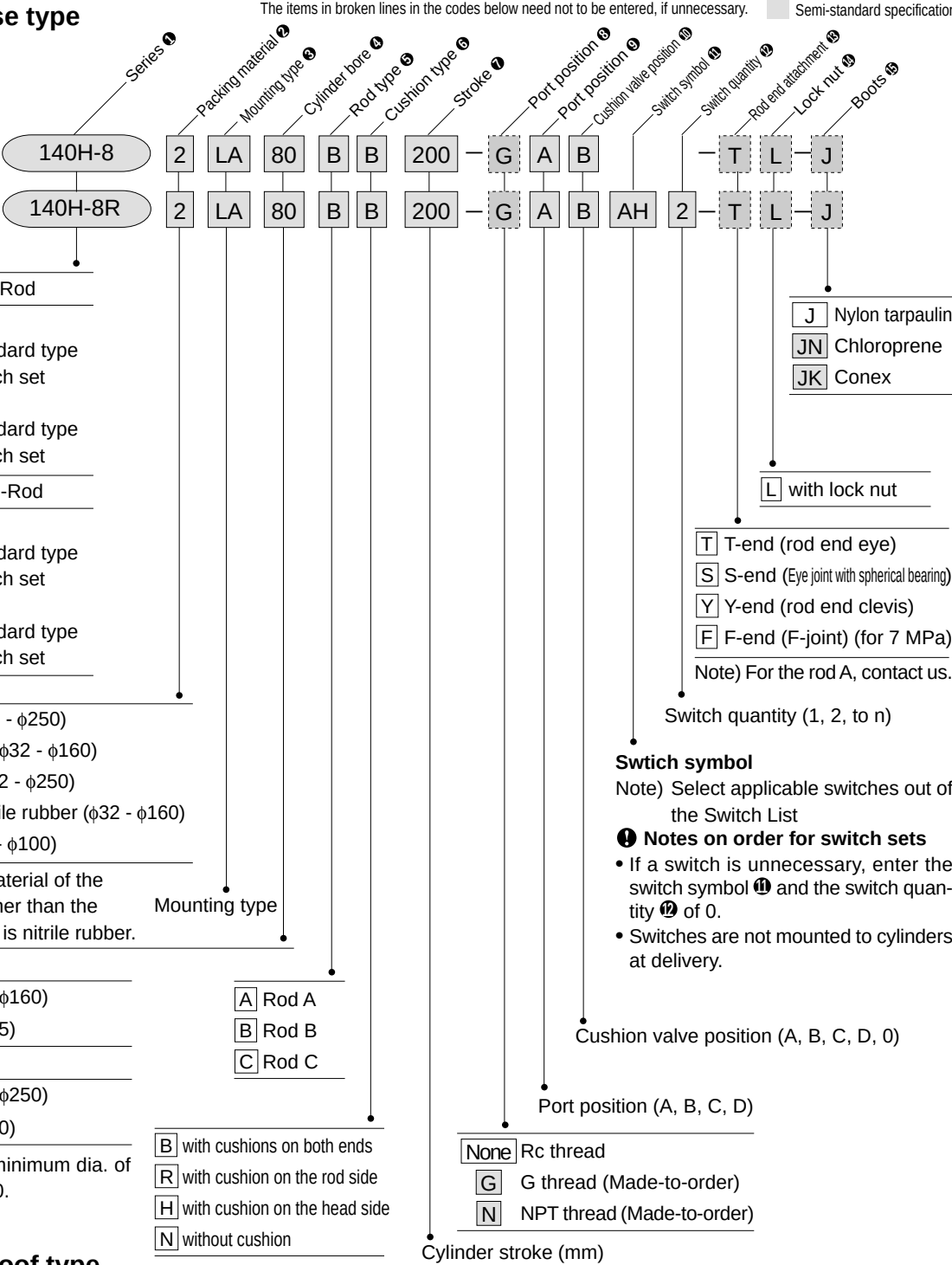
Bore	Cushion ring length L	Cushion ring parallel part length l
φ32	R side	25
	H side	23
φ40 - φ63	25	7
φ80 - φ125	25	8
φ140 - φ160	30	12
φ180 - φ224	40	20
φ250	45	25



- The cushion stroke lengths in case of cylinders used up to the stroke end.
- In case that cylinders are not used up to the stroke end, and they are stopped 5 mm or more before the stroke end, the cushioning effect will be weakened. In such a case, contact us.

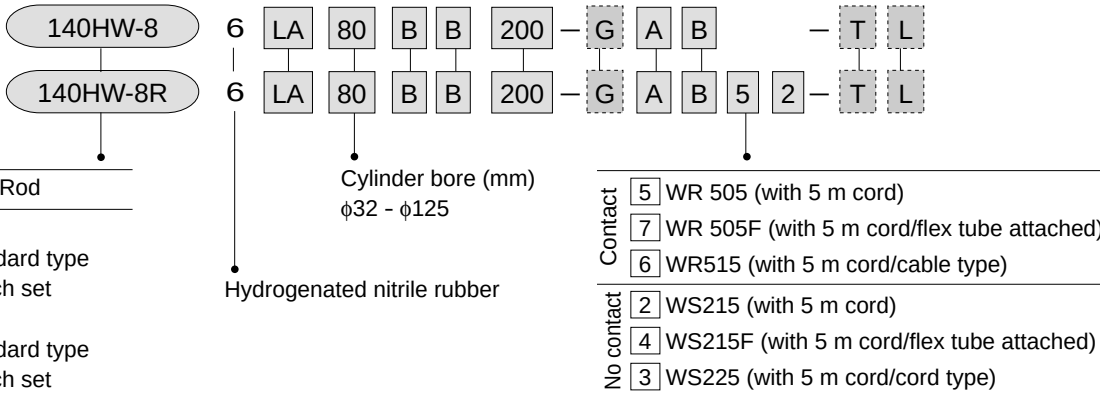
General purpose type

- Standard type
- Switch set



Cutting fluid proof type

- Standard type
- Switch set



Switch List

Kind	Switch symbol	Load voltage range	Load current range	Maximum open/close capacity	Protective circuit	Indicating lamp	Wiring method	Code length	Applicable load device
Contact	 AX101	DC5-30V AC5-120V	DC: 5-40mA AC: 5-20mA	DC: 1.5W AC: 2VA	None	LED (red light lights up during ON)	0.3mm ² 2-core, outside diameter φ4mm Rear wiring	1.5m	Small relay program- mable controller
	 AX105				5m				
	 AX111				1.5m				
	 AX115				5m				
	 AX125	DC30V or less AC120V or less	DC40mA or less AC20mA or less	None	None	5m			
	 AX11A	AC5-120V	5-20mA	2VA	Present	LED (red light lights up during ON)	4-pin connector type Rear wiring	0.5m	
	 AX11B	DC5-30V	5-40mA	1.5W				0.5m	
	 WR505	DC5-50V AC5-120V	DC3-40mA AC3-20mA	DC: 1.5W AC: 2VA	None	LED (red light lights up during ON)	0.3mm ² 2-core, outside diameter φ4mm Rear wiring	5m	
	 WR505F							5m	
	 WR515							5m	
	 SR405	AC80-220V	2-300mA	30VA	Present	Neon lamp (lamp lights up during OFF)	0.5mm ² 2-core, outside diameter φ6mm Rear wiring	5m	
No contact	 AX201	DC5-30V	5-40mA	—	Present	LED (red light lights up during ON)	0.3mm ² 2-core, outside diameter φ4mm Rear wiring	1.5m	Small relay program- mable controller
	 AX205					5m			
	 AX211					LED (2-lamp type in red/green)		1.5m	
	 AX215					5m			
	 WS215	DC10-30V	6-70mA	—	Present	LED (2-lamp type in red/green)	5m		
	 WS215F					5m			
	 WS225					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.
 ● All the AX type switches can be mounted. For the types other than the above, refer to the switch specifications in the end of this catalogue.
 ● The WR and WS type switches are cutting fluid proof type.
 ● SR405 switch can be used for only bore size ϕ 32- ϕ 125.
 ● We have developed CE conformed switches. Please refer to the end of a book for detailed information.
 ● We recommend AND UNIT (AU series) for multiple switches connected in series.

● General purpose type

AX type switch

Cord type



Connector type



● Cutting fluid proof type

WR • WS type switch



● For the switch symbol **11**, pay attention to the points below when ordering the cutting fluid proof type switches, WR and WS types.

- | | |
|-----------------|--|
| 5 WR505 | The switch and straight box connector (F-SB) are combined [the flex tube (F-05: 4.8 m) is required]. |
| 2 WS215 | |
| 7 WR505F | The flex tube (F-05: 4.8 m) is attached to the |
| 4 WS215F | switch and straight box connector (F-SB). |

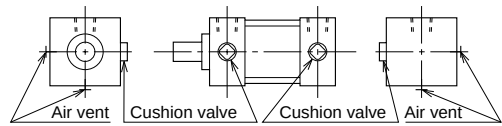
Mounting type

SD SD type (Basic type)	FA FA type (head rectangular flange mounting) (for 7MPa) (for Rod B•C)	FC FC type (head square flange mounting) (for Rod B•C)	CS CS type (With spherical bearing)
LA LA type (Side lugs mounting)	FB FB type (cap rectangular flange mounting) (for 7MPa) (for Rod B•C)	FD FD type (cap square flange mounting) (for Rod B•C)	CB CB type (Clevis mounting) Clevis mounting in old JIS standards
LB LB type (End angles mounting) (for 7MPa)	FY FY type (head rectangular flange mounting) FE FE type (for Rod A)	FK FK type (Intermediate flange mounting)	TA TA type (head trunnion mounting)
LC LC type (End angles mounting)	FZ FZ type (cap rectangular flange mounting)	CA CA type (Eye mounting) Cap eye mounting in old JIS standards	TC TC type (intermediate trunnion mounting)

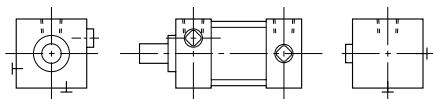
Note) The mounting type of the 7 MPa type cannot be used basically with the pressure exceeding 7 MPa. For the using method, contact us.

Cushion valve position and air vent position depending on cylinder bore (for rod A only)

Bore φ40 • φ50 • φ100• φ140• φ150



Bore φ63 • φ80 • φ125• φ160



Stroke fabrication range

Bore	Standard type	Switch set
φ32 - φ50	- 1200	- 1200
φ63 •φ80	- 1600	- 1600
φ100 - φ140	- 2000	- 2000
φ150 - φ250	- 2000	—

- The above strokes indicate the maximum available strokes for the standard type. For the rod buckling, check with the buckling chart of the selection materials. If you request the strokes other than in the table above, contact us.
- Please refer to the 140L-1 series beyond above mentioned strokes. (140L-1, bore:63mm to 160mm, Maximum:3000mm stroke)
*140L-1 series is specially designed for long stroke, so not interchangeable with H-8 series.

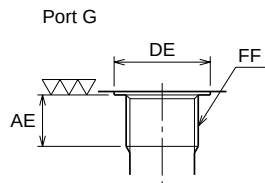
★ Port G or NPT

Please specify the model as following
(ex.) 70H-8 2LA50BB100-G A B

Port G or NPT

Port position

Cushion valve position



The locations of port, cushion and check in case of LA mounting

Port position A surface Port position B surface



Port position C surface Port position D surface



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.

Cutting fluid proof type/adaptability of cutting fluid to packing material

Packing material	Nonaqueous cutting fluid		Aqueous cutting fluid
	Type 1	Type 2	
6 Hydrogenated nitrile rubber	○	×	○

○ : applicable × : inapplicable

For the working temperature range of packing materials, refer to the selection materials in the beginning of this catalogue.

Thread dimension table

Unit : mm

Bore	G thread			NPT thread
	AE	DE	FF	
φ32	12	φ25.5	G3/8	NPT3/8
φ40	12	φ25.5	G3/8	NPT3/8
φ50	14	φ30	G1/2	NPT1/2
φ63	14	φ30	G1/2	NPT1/2
φ80	16	φ36.9	G3/4	NPT3/4
φ100	16	φ36.9	G3/4	NPT3/4
φ125	18	φ46.1	G1	NPT1
φ140	18	φ46.1	G1	NPT1
φ150	18	φ46.1	G1	NPT1
φ160	18	φ46.1	G1	NPT1

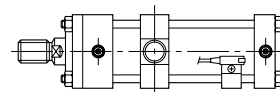
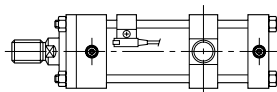
Switch mounting minimum possible stroke

Unit: mm

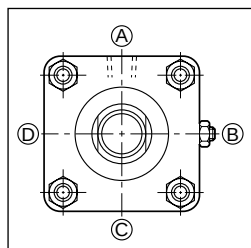
Bore mm	Mounting style Switch quantity Switch type	Types other than TC type						TC type					
		with a switch			with two switches			with a switch			with two switches		
		AX type	WR type	WS type	AX type	WR type	WS type	AX type	WR type	WS type	AX type	WR type	WS type
φ32		20	45(35)		25	45(35)		50	70 (60)	75 (65)	110	155 (135)	165 (145)
φ40		20	45(35)		25	45(35)		50	70 (60)	75 (65)	110	155 (135)	165 (145)
φ50		20	40 (30)	45 (35)	25	40 (30)	45 (35)	50	70 (60)	75 (65)	110	155 (135)	165 (145)
φ63		20	40(30)		25	40(30)		60	85(75)		120	170 (150)	175 (155)
φ80		20	40(30)		25	40(30)		60	85(75)		120	170 (150)	175 (155)
φ100		20	35 (25)	40 (30)	25	35 (25)	40 (30)	65	85 (75)	95 (85)	135	175 (150)	190 (170)
φ125		20	35 (25)	40 (25)	25	35 (25)	40 (25)	70	90 (80)	95 (85)	150	185 (160)	195 (170)
φ140		20	—	—	25	—	—	95	—	—	175	—	—

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.
- The dimensions in the () marks of the WR and WS types are the minimum strokes at the mounting of the WR505 and WS225.



★ Standard specifications



- With both ends cushions
- Port position ①, cushion valve position ②

★ Modification of port position and cushion valve position

The standard port position is ①, and the standard cushion valve position is ②.

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

Ex.) 70H-8R 2SD80BB100 — **B** **C** AH2

Port position (A, B, C, D)

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

- For the TA type, the standard port position and cushion valve position on the rod side are ① and ③, and those on the head side are ② and ④.
- In case that the cushion is not equipped, the cushion valve position is ⑤.

★ Semi-standard Fabrication range

- With boots
- Magnetic proximity switch WR and WS types
- Note) The WR and WS types are the standard cutting fluid proof types.
- Modification of TC attachment (dimensional symbol: PH)
- Modification of FK dimension
- Plated cylinder tube (hard chrome plated 2/100 mm)
- Modification of piston rod end (dimensional symbol: W, A, KK)

Refer to page 95.

Weight table/general purpose type, cutting fluid proof type

Unit: kg

Bore mm	Rod type	Basic weight (SD type)		Additional weight per 1 mm stroke		Mounting accessories weight																	
		Standard type switch set	Double rod type	Standard type switch set	Double rod type	LA	LB	LC	FA	FB	FC	FD	FK	FE	FY	FZ	CA	CS	CB	TA	TC		
φ32	B	3.3	4.1	0.006	0.008	0.3	0.3		0.1	0.6	0.6	0.9	1.1	—	0.2	0.7	0.4	—	0.5	0.1	0.5		
φ40	A	3.8	—	0.013	—	0.5	0.5	—	—	—	0.7	1.1	—	0.9	0.3	0.8	0.5	0.6	0.6	0.1	0.6		
	B	3.5	4.4	0.011	0.014			0.63	0.2	0.7			1.2	—									
	C	3.4	4.3	0.010	0.012																		
φ50	A	5.5	—	0.017	—	0.9	0.7	—	—	—	1.5	2.0	—	1.5	1.1	1.6	1.0	1.1	1.2	0.4	1.0		
	B	5.0	6.4	0.014	0.019			0.88	0.7	1.2			2.2	—									
	C	4.9	6.2	0.012	0.014																		
φ63	A	9.1	—	0.024	—	1.0	1.2	—	—	—	2.2	3.0	—	2.3	1.6	2.4	2.0	1.9	2.6	0.6	1.2		
	B	7.9	10.2	0.019	0.027			1.5	1.0	1.8			3.6	—									
	C	7.6	9.8	0.017	0.022																		
φ80	A	18.0	—	0.039	—	1.8	2.0	—	—	—	2.8	4.7	—	3.9	2.1	4.0	3.0	3.6	3.6	0.6	2.1		
	B	16.2	20.3	0.032	0.045			2.5	1.1	3.0			4.7	—									
	C	15.5	19.4	0.027	0.035																		
φ100	A	29.6	—	0.060	—	2.1	2.9	—	—	—	4.6	7.4	—	6.6	3.9	6.9	5.5	6.7	6.7	1.0	3.8		
	B	26.0	32.7	0.048	0.067			3.63	1.8	4.8			8.9	—									
	C	24.9	31.1	0.042	0.055																		
φ125	A	49.2	—	0.096	—	3.2	5.5	—	—	—	8.0	13.0	—	11.4	6.2	12.1	9.9	12.8	12.1	2.1	6.2		
	B	42.9	53.6	0.077	0.107			6.88	2.9	8.4			12.6	—									
	C	42.5	52.7	0.065	0.084																		
φ140	A	67.5	—	0.122	—	3.8	7.7	—	—	—	9.2	17.1	—	14.9	8.2	16.1	16.7	—	21.0	4.1	11.1		
	B	59.6	73.9	0.100	0.140			9.63	3.2	11.1			20.4	—									
	C	56.0	69.6	0.085	0.111																		
φ150	A	77.9	—	0.148	—	4.8	9.6	—	—	—	16.6	22.4	—	17.9	10.7	19.5	18.2	—	26.8	4.6	10.9		
	B	69.6	86.5	0.118	0.162			12.0	4.9	13.7			22.9	—									
	C	67.9	83.6	0.101	0.127																		
φ160	A	93.0	—	0.148	—	5.4	10.0	—	—	—	19.0	25.2	—	21.5	11.3	22.5	22.9	—	28.4	5.2	14.8		
	B	84.3	114.6	0.121	0.171			13.0	5.3	16.5			31.2	—									
	C	79.9	99.1	0.102	0.132																		
φ180	B	115.1	—	0.179	—	7.9	13.8	—	7.7	22.7	25.0	33.6	—	—	17.5	32.5	33.8	—	42.9	—	19.4		
	C	108.5		0.157																			
φ200	B	155.2	—	0.220	—	11.4	21.0	—	10.6	31.6	28.8	48.7	—	—	22.6	43.6	51.4	—	65.4	—	27.2		
	C	147.3		0.192																			
φ224	B	203.8	—	0.268	—	12.7	32.0	—	11.6	41.5	33.2	63.1	—	—	30.6	60.5	65.6	—	82.7	—	36.5		
	C	190.9		0.234																			
φ250	B	283.7	—	0.333	—	18.3	46.7	—	17.5	55.1	48.2	88.3	—	—	42.5	80.1	74.5	—	91.6	—	43.3		
	C	264.1		0.290																			

Switch additional weight

Unit: kg

Switch Bore (mm)	AX type			SR type	WR, WS types
	Cord length 1.5 m	Cord length 5 m	Connector type	Cord length 5m	
φ32 - φ50	0.05	0.13	0.04	0.22	0.5
φ63	0.07	0.14	0.06	0.22	
φ80 • φ100	0.07	0.15	0.06	0.22	
φ125	0.09	0.16	0.07	0.22	
φ140	0.09	0.16	0.08	—	

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

Calculation example 140H-8R, bore φ80, rod B, cylinder stroke 200 mm, 2 pcs. of AX215, LA type
16.2 + (0.032 × 200) + (0.15 × 2) + 1.8 = 24.7 kg

Unit: kg

Bore mm	Rod type	Rod end attachment weight					
		Rod end eye (T-end)	Rod end eye (S-end)	Rod end clevis (Y-end w/ pin)	Floating joint (F-end)	Lock nut	Separate flange joint (M type joint)
φ32	B	0.5	—	0.7	0.39	0.02	0.3
φ40	A	—	—	—	—	0.05	0.6
	B	0.5	0.7	0.7	0.75	0.03	0.4
	C		0.7		0.39	0.02	—
	A	—	—	—	—	0.11	0.8
φ50	B	1.0	1.1	1.2	1.41	0.05	0.6
	C		1.2		0.75	0.03	—
	A	—	—	—	—	0.24	1.4
φ63	B	2.7	2.1	3.9	2.68	0.11	0.8
	C		2.3		1.41	0.05	—
	A	—	—	—	—	0.52	3.0
φ80	B	2.2	3.2	3.7	—	0.24	1.4
	C		3.6		2.68	0.11	—
	A	—	—	—	—	1.10	5.3
φ100	B	4.2	6.7	7.7	—	0.52	3.0
	C		7.3		—	0.24	—
	A	—	—	—	—	1.93	10.6
φ125	B	8.0	12.4	14.6	—	1.10	5.3
	C		13.7		—	0.52	—
	A	—	—	—	—	2.90	—
φ140	B	19.0	—	28.8	—	1.44	7.0
	C		—		—	0.77	—
	A	—	—	—	—	3.24	—
φ150	B	18.9	—	28.3	—	1.65	9.3
	C		—		—	0.94	—
	A	—	—	—	—	3.24	—
φ160	B	22.7	—	34.2	—	1.93	10.6
	C		—		—	1.10	—
	A	—	—	—	—	2.90	—
φ180	B	37.6	—	53.7	—	2.90	—
	C		—		—	1.44	—
φ200	B	53.9	—	87.4	—	3.24	—
	C		—		—	1.93	—
φ224	B	77.2	—	128.3	—	5.97	—
	C		—		—	2.90	—
φ250	B	74.4	—	123.9	—	7.77	—
	C		—		—	3.24	—

70-140H-8/TH8

Bore

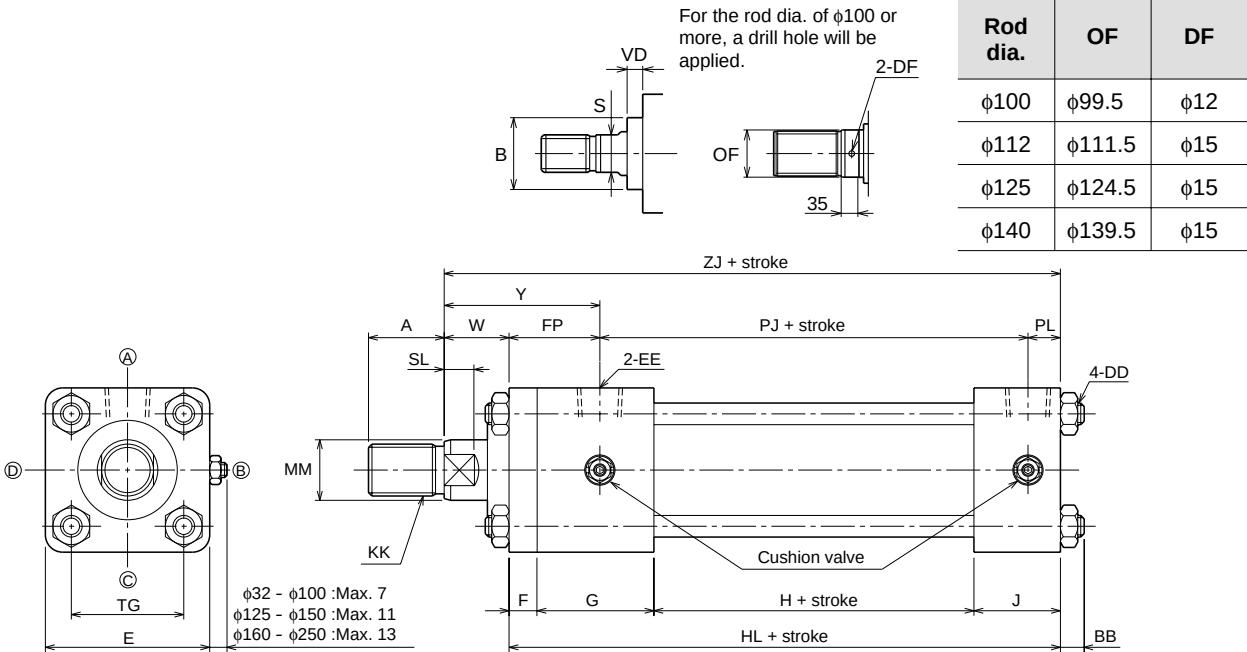
A.C

CAD/DATA is available.



SD

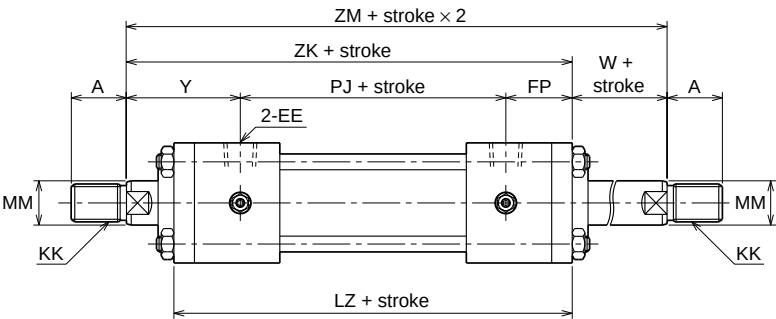
70H-8	1	SD	Bore	B	B	Stroke	-	A	B
140H-8	1	SD	Bore	B	B	Stroke	-	A	B



- For the use of the SD type, be sure to refer to the “Precautions for use, 4. Mounting” in the beginning of this catalogue.
- For the screw length (dimension A) in the case of using the lock nut, refer to “Accessories”.
- For the mounting of switches, refer to the dimensional drawings of “Switch set”. All the contents other than “switch mounting dimensions” are identical.

Double rod type ($\phi 32$ - $\phi 160$ /rod B, C)

For both ends loaded type



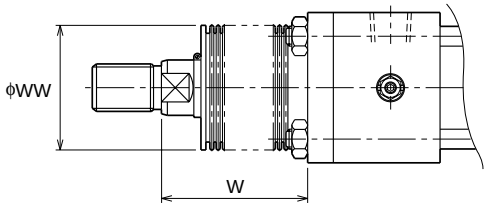
- The switch set ($\phi 32$ - $\phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Rod B • C	$\phi 32$	1/3	Stroke + X
Nylon tarpaulin	$\phi 40$ • $\phi 50$	1/3.5	Stroke + X
Chloroprene	$\phi 63$ - $\phi 100$	1/4	Stroke + X
	$\phi 125$ - $\phi 200$	1/5	Stroke + X
	$\phi 224$ • $\phi 250$	1/6	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40$ • $\phi 50$	1/2.5	Stroke + X
	$\phi 63$ - $\phi 100$	1/3	Stroke + X
	$\phi 125$ • $\phi 140$	1/3.5	Stroke + X
	$\phi 150$ - $\phi 200$	1/4	Stroke + X
	$\phi 224$ • $\phi 250$	1/4.5	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.
• Conex is the registered trademark of Teijin Ltd.
• If decimals are included into the calculation results, raise them to the next whole number.
• The boots have been mounted at our factory prior to delivery.

Rod A	$\phi 40$	1/3.5	Stroke + X
Nylon tarpaulin	$\phi 50$ - $\phi 80$	1/4	Stroke + X
Chloroprene	$\phi 100$ - $\phi 160$	1/5	Stroke + X
Conex	$\phi 40$	1/2.5	Stroke + X
	$\phi 50$ - $\phi 80$	1/3	Stroke + X
	$\phi 100$	1/3.5	Stroke + X
	$\phi 125$ - $\phi 160$	1/4	Stroke + X

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	33	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	BB	DD	E	EE	F	FP	G	H	HL	J	LZ	PJ	PL	TG	W		Y		ZJ		ZK	ZM
															B•C	A	B•C	A	B•C	A		
φ32	11	M10×1.25	□58	Rc 3/8	11	38	50	44	141	36	166	90	13	□38	30	—	68	—	171	—	196	226
φ40	11	M10×1.25	□65	Rc 3/8	11	38	50	44	141	36	166	90	13	□45	30	35	68	73	171	176	196	226
φ50	11	M10×1.25	□76	Rc 1/2	13	42	54	48	155	40	182	98	15	□52	30	41	72	83	185	196	212	242
φ63	13	M12×1.5	□90	Rc 1/2	15	46	56	52	163	40	194	102	15	□63	35	48	81	94	198	211	229	264
φ80	16	M16×1.5	□110	Rc 3/4	18	56	66	54	184	46	222	110	18	□80	35	51	91	107	219	235	257	292
φ100	18	M18×1.5	□135	Rc 3/4	20	58	66	60	192	46	232	116	18	□102	40	57	98	115	232	249	272	312
φ125	21	M22×1.5	□165	Rc 1	24	67	76	64	220	56	264	130	23	□122	45	57	112	124	265	277	309	354
φ140	22	M24×1.5	□185	Rc 1	26	69	76	72	230	56	276	138	23	□138	50	57	119	126	280	287	326	376
φ150	25	M27×1.5	□196	Rc 1	28	71	76	80	240	56	288	146	23	□148	50	57	121	128	290	297	338	388
φ160	25	M27×1.5	□210	Rc 1	31	74	81	80	253	61	304	156	23	□160	55	57	129	131	308	310	359	414
φ180	27	M30×1.5	□235	Rc 1 1/4	33	75	85	86	275	71	—	172	28	□182	55	—	130	—	330	—	—	—
φ200	29	M33×1.5	□262	Rc 1 1/2	37	85	95	90	301	79	—	184	32	□200	55	—	140	—	356	—	—	—
φ224	34	M39×1.5	□292	Rc 1 1/2	41	89	95	90	305	79	—	184	32	□225	60	—	149	—	365	—	—	—
φ250	37	M42×1.5	□325	Rc 2	46	106	115	90	346	95	—	200	40	□250	65	—	171	—	411	—	—	—

● Allowance of B is h8, allowance of MM is f8.

With boots

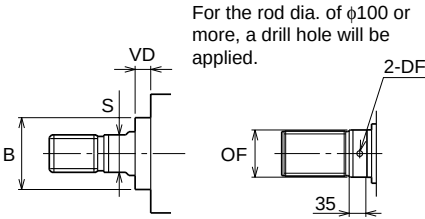
Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol															
WW	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

70-140H-8/TH8 Bore A.C CAD/DATA is available.



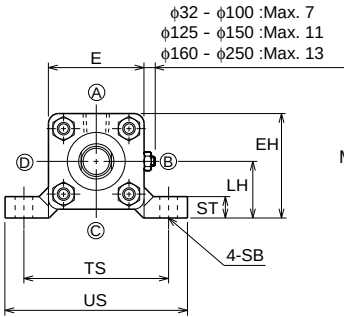
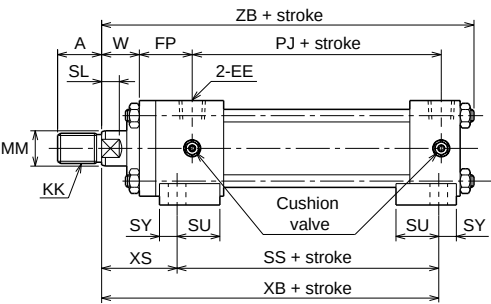
LA

70H-8	1	LA	Bore	B	B	Stroke	-	A	B
140H-8	1	LA	Bore	B	B	Stroke	-	A	B

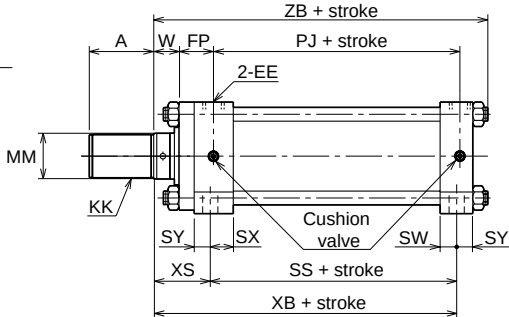


Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15

• Bore φ32 - φ160

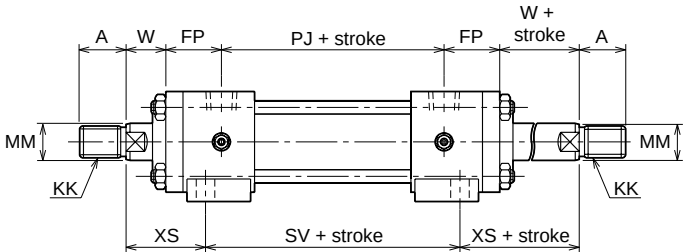


• Bore φ180 - φ250



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

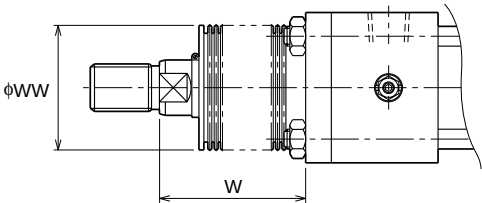
Double rod type (φ32 - φ160/rod B, C)
For both ends loaded type



- The switch set (φ32 - φ140) is also within the fabrication range.

With boots

70-140H-8/TH8 Bore K



Rod B • C Nylon tarpaulin Chloroprene	(φ32 • φ50 1/3 Stroke + X φ40 • φ100 1/4 Stroke + X φ63 - φ125 1/5 Stroke + X φ125 - φ200 1/6 Stroke + X φ224 • φ250)
Conex	(φ32 • φ50 1/2 Stroke + X φ40 • φ100 1/3 Stroke + X φ63 - φ125 1/3.5 Stroke + X φ125 - φ200 1/4 Stroke + X φ150 - φ224 1/4.5 Stroke + X φ224 • φ250)

	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.
• Conex is the registered trademark of Teijin Ltd.
• If decimals are included into the calculation results, raise them to the next whole number.
• The boots have been mounted at our factory prior to delivery.

Rod A Nylon tarpaulin Chloroprene	(φ40 1/3.5 Stroke + X φ50 - φ80 1/4 Stroke + X 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 C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	E	EE	EH	FP	LH	PJ	SB	SS	ST	SU	SV	SW	SX	SY	TS	US	W		XB		XS		ZB	
																	B·C	A	B·C	A	B·C	A	B·C	A
φ32	□58	Rc 3/8	64	38	35±0.15	90	φ11	98	12	31	112	—	—	13	88	109	30	—	155	—	57	—	182	—
φ40	□65	Rc 3/8	70	38	37.5±0.15	90	φ11	98	14	31	112	—	—	13	95	118	30	35	155	160	57	62	182	187
φ50	□76	Rc 1/2	83	42	45±0.15	98	φ14	108	17	34	122	—	—	14	115	145	30	41	168	179	60	71	196	207
φ63	□90	Rc 1/2	95	46	50±0.15	102	φ18	106	19	32	122	—	—	18	132	165	35	48	177	190	71	84	211	224
φ80	□110	Rc 3/4	115	56	60±0.25	110	φ18	124	25	42	144	—	—	18	155	190	35	51	198	214	74	90	235	251
φ100	□135	Rc 3/4	138.5	58	71±0.25	116	φ22	122	27	38	142	—	—	22	190	230	40	57	207	224	85	102	250	267
φ125	□165	Rc 1	167.5	67	85±0.25	130	φ26	136	32	41	156	—	—	25	224	272	45	57	235	247	99	111	286	298
φ140	□185	Rc 1	187.5	69	95±0.25	138	φ26	144	35	41	164	—	—	25	250	300	50	57	250	257	106	113	302	309
φ150	□196	Rc 1	204	71	106±0.25	146	φ30	146	37	38	166	—	—	28	270	320	50	57	257	264	111	118	315	322
φ160	□210	Rc 1	217	74	112±0.25	156	φ33	150	42	40	170	—	—	31	285	345	55	57	272	274	122	124	333	335
φ180	□235	Rc 1 1/4	242.5	75	125±0.25	172	φ33	172	47	—	—	36	50	35	315	375	55	—	295	—	123	—	357	—
φ200	□262	Rc 1 1/2	271	85	140±0.25	184	φ36	186	52	—	—	40	56	39	355	425	55	—	317	—	131	—	385	—
φ224	□292	Rc 1 1/2	296	89	150±0.25	184	φ42	186	52	—	—	40	56	39	395	475	60	—	326	—	140	—	399	—
φ250	□325	Rc 2	332.5	106	170±0.25	200	φ45	206	57	—	—	48	68	47	425	515	65	—	364	—	158	—	448	—

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

70-140H-8/TH8

Bore

A.C

CAD/DATA is available.



LB

For 7 MPa

70H-8

1

LB

Bore

B

B

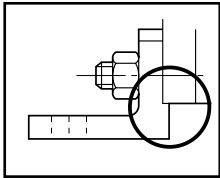
Stroke

-

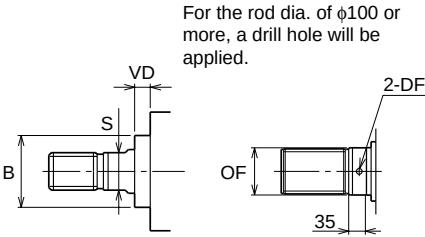
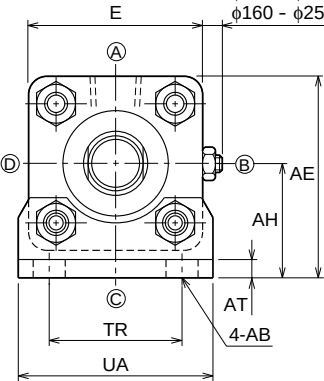
A

B

LB accessory working face
($\phi 32 - \phi 80$)

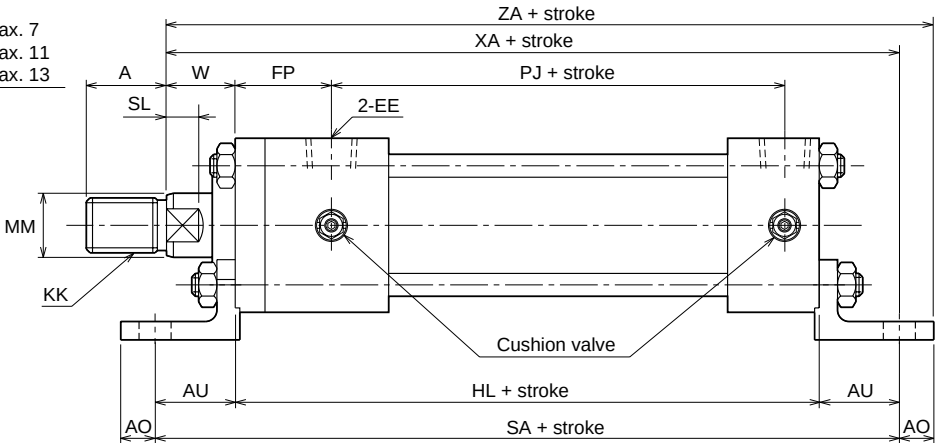


$\phi 32 - \phi 100$:Max. 7
 $\phi 125 - \phi 150$:Max. 11
 $\phi 160 - \phi 250$:Max. 13



For the rod dia. of $\phi 100$ or more, a drill hole will be applied.

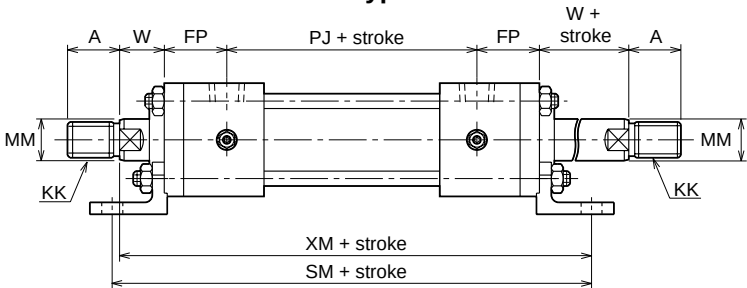
Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$
$\phi 125$	$\phi 124.5$	$\phi 15$
$\phi 140$	$\phi 139.5$	$\phi 15$



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type ($\phi 32 - \phi 160$ /rod B, C)

For both ends loaded type



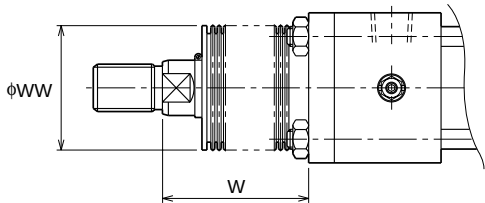
- The switch set ($\phi 32 - \phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Rod B • C Nylon tarpaulin Chloroprene	$\phi 32$	1/3	Stroke + X
	$\phi 40 \bullet \phi 50$	1/3.5	Stroke + X
	$\phi 63 - \phi 100$	1/4	Stroke + X
	$\phi 125 - \phi 200$	1/5	Stroke + X
	$\phi 224 - \phi 250$	1/6	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40 \bullet \phi 50$	1/2.5	Stroke + X
	$\phi 63 - \phi 100$	1/3	Stroke + X
	$\phi 125 \bullet \phi 140$	1/3.5	Stroke + X
	$\phi 150 - \phi 200$	1/4	Stroke + X
	$\phi 224 \bullet \phi 250$	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	—	—	—	—	—	—	—
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	—	—	—	—	—	—	—
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	—	—	—	—	—	—	—
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	AB	AE	AH	AO	AT	AU	E	EE	FP	HL	PJ	SA	SM	TR	UA	W		XA		XM	ZA	
																B·C	A	B·C	A		B·C	A
φ32	φ11	69	40±0.15	13	8	32	□58	Rc 3/8	38	141	90	205	230	40	62	30	—	203	—	228	216	—
φ40	φ11	75.5	43±0.15	13	8	32	□65	Rc 3/8	38	141	90	205	230	46	69	30	35	203	208	228	216	221
φ50	φ14	88	50±0.15	15	8	35	□76	Rc 1/2	42	155	98	225	252	58	85	30	41	220	231	247	235	246
φ63	φ18	105	60±0.15	18	10	42	□90	Rc 1/2	46	163	102	247	278	65	98	35	48	240	253	271	258	271
φ80	φ18	127	72±0.25	20	12	50	□110	Rc 3/4	56	184	110	284	322	87	118	35	51	269	285	307	289	305
φ100	φ22	152.5	85±0.25	23	12	55	□135	Rc 3/4	58	192	116	302	342	109	150	40	57	287	304	327	310	327
φ125	φ26	187.5	105±0.25	29	15	66	□165	Rc 1	67	220	130	352	396	130	175	45	57	331	343	375	360	372
φ140	φ26	207.5	115±0.25	30	18	70	□185	Rc 1	69	230	138	370	416	145	195	50	—	350	—	396	380	—
φ150	φ30	221	123±0.25	30	18	75	□196	Rc 1	71	240	146	390	438	155	210	50	—	365	—	413	395	—
φ160	φ33	237	132±0.25	35	18	75	□210	Rc 1	74	253	156	403	454	170	225	55	—	383	—	434	418	—
φ180	φ33	265.5	148±0.25	40	20	85	□235	Rc 1 1/4	75	275	172	445	—	185	243	55	—	415	—	—	455	—
φ200	φ36	296	165±0.25	40	25	98	□262	Rc 1 1/2	85	301	184	497	—	206	272	55	—	454	—	—	494	—
φ224	φ42	331	185±0.25	45	30	115	□292	Rc 1 1/2	89	305	184	535	—	230	310	60	—	480	—	—	525	—
φ250	φ45	370.5	208±0.25	50	35	130	□325	Rc 2	106	346	200	606	—	250	335	65	—	541	—	—	591	—

● Allowance of B is h8, allowance of MM is f8.

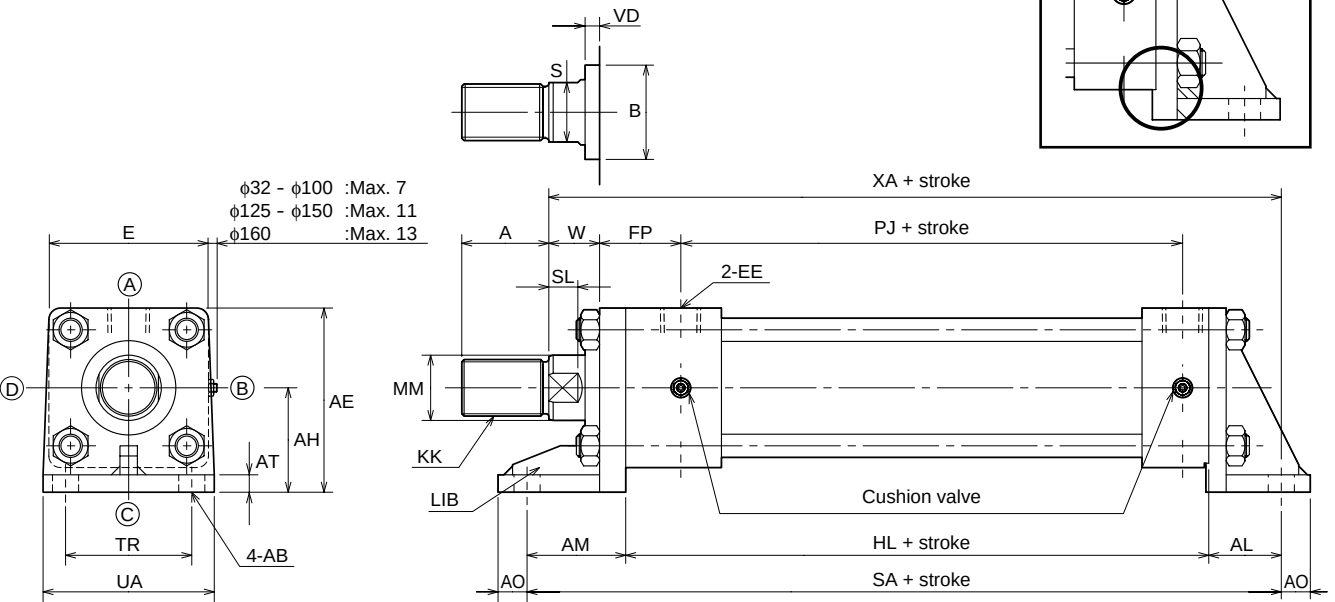
With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	WW														
		Rod B	40	50	63	71	80	100	125	125	140	140	160	180	200
X	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
		Rod B	45	45	45	55	55	55	65	65	65	65	65	80	80
X	Rod C	—	45	45	55	55	55	55	65	65	65	65	65	80	80

LC

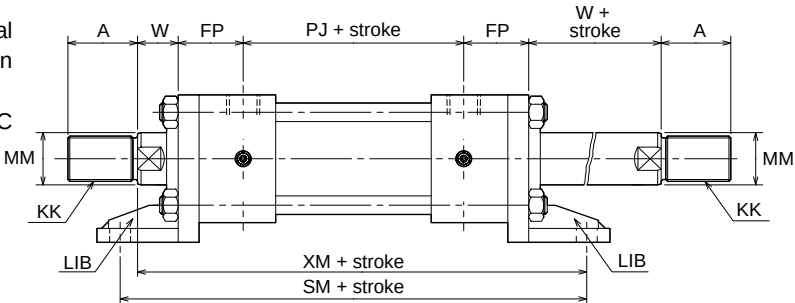
70H-8	1	LC	Bore	B	B	Stroke	-	A	B
140H-8	1	LC	Bore	B	B	Stroke	-	A	B

Detail of LC mounting working face
(φ32 - φ80)



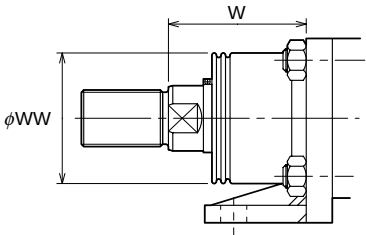
- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.
- The reinforcing plate is not being attached to the LC mounting bracket in case of under 63mm bore.

Double rod type (φ32 - φ160/rod B, C)
For both ends loaded type



- The switch set (φ32 - φ140) is also within the fabrication range.

With boots



Rod B • C	φ32	1/3	Stroke + X
Nylon tarpaulin	φ40 • φ50	1/3.5	Stroke + X
Chloroprene	φ63 - φ100	1/4	Stroke + X
	φ125 - φ160	1/5	Stroke + X
Conex	φ32	1/2	Stroke + X
	φ40 • φ50	1/2.5	Stroke + X
	φ63 - φ100	1/3	Stroke + X
	φ125 • φ140	1/3.5	Stroke + X
	φ150 - 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.
●Conex is the registered trademark of Teijin Ltd.
●If decimals are included into the calculation results, raise them to the next whole number.
●The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10

Symbol Bore	AB	AE	AH	AL	AM	AO	AT	E	EE	FP	HL	PJ	SA	TR	UA	W	XA	XM	SM
φ32	φ11	69	40±0.15	32	43	13	8	58	Rc3/8	38	130	90	205	40	62	30	203	228	230
φ40	φ11	75.5	43±0.15	32	43	13	8	65	Rc3/8	38	130	90	205	46	69	30	203	228	230
φ50	φ14	88	50±0.15	35	48	15	8	76	Rc1/2	42	142	98	225	58	85	30	220	247	252
φ63	φ18	105	60±0.15	42	57	18	10	90	Rc1/2	46	148	102	247	65	98	35	240	271	278
φ80	φ18	127	72±0.25	50	68	20	12	110	Rc3/4	56	166	110	284	87	118	35	269	307	322
φ100	φ22	152.5	85±0.25	55	75	23	12	135	Rc3/4	58	172	116	302	109	150	40	287	327	342
φ125	φ26	187.5	105±0.25	66	90	29	15	165	Rc1	67	196	130	352	130	175	45	331	375	396
φ140	φ26	207.5	115±0.25	70	96	30	18	185	Rc1	69	204	138	370	145	195	50	350	396	416
φ150	φ30	221	123±0.25	75	103	30	18	196	Rc1	71	212	146	390	155	210	50	365	413	438
φ160	φ33	237	132±0.25	75	106	35	18	210	Rc1	74	222	156	403	170	225	55	383	434	454

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore Symbol		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160
WW	Rod B	40	50	63	71	80	100	125	125	140	140
	Rod C	—	50	50	63	71	80	100	125	125	125
X	Rod B	45	45	45	55	55	55	65	65	65	65
	Rod C	—	45	45	55	55	55	65	65	65	65

70-140H-8/TH8

Bore

B

CAD/DATA is available.



FA

For 7 MPa

70H-8

1

FA

Bore

B

B

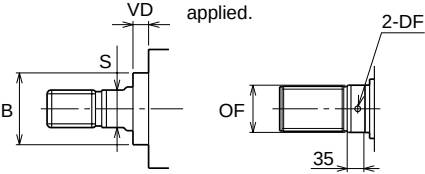
Stroke

-

A

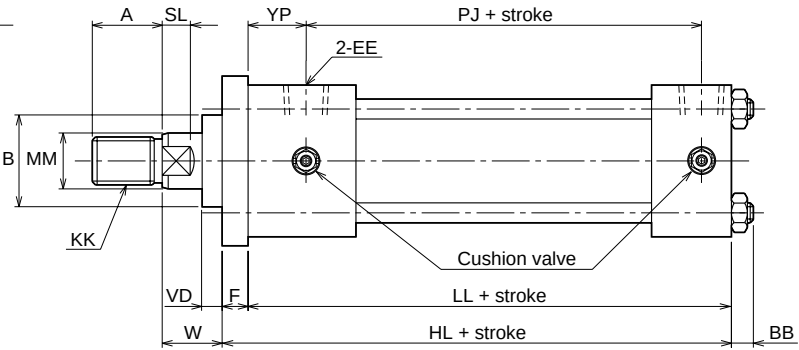
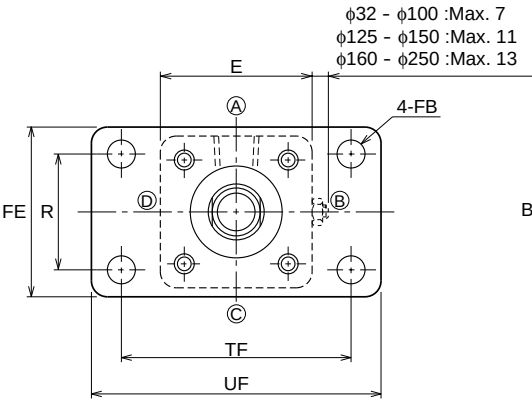
B

For the rod dia. of $\phi 100$ or more, a drill hole will be applied.



Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$
$\phi 125$	$\phi 124.5$	$\phi 15$
$\phi 140$	$\phi 139.5$	$\phi 15$

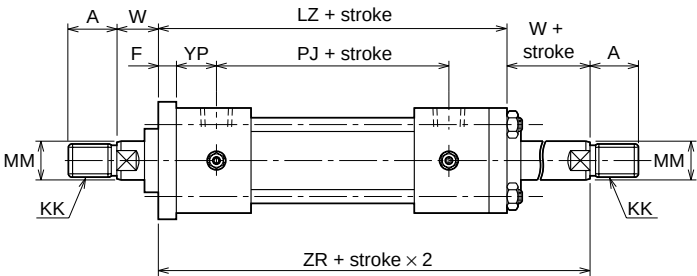
General purpose hydraulic cylinder



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type ($\phi 32$ - $\phi 160$ /rod B, C)

For both ends loaded type



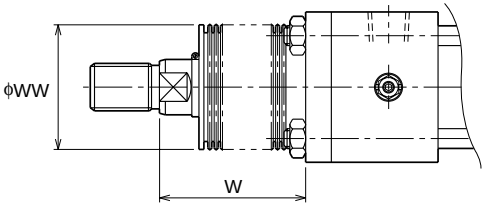
- The switch set ($\phi 32$ - $\phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Nylon tarpaulin	$\phi 32$	1/3	Stroke + X
Chloroprene	$\phi 40$ • $\phi 50$	1/3.5	Stroke + X
	$\phi 63$ - $\phi 100$	1/4	Stroke + X
	$\phi 125$ - $\phi 160$	1/5	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40$ • $\phi 50$	1/2.5	Stroke + X
	$\phi 63$ - $\phi 100$	1/3	Stroke + X
	$\phi 125$ • $\phi 140$	1/3.5	Stroke + X
	$\phi 150$ - $\phi 160$	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10

Symbol Bore	BB	E	EE	F	FB	FE	HL	LL	LZ	PJ	R	TF	UF	W	YP	ZR
φ32	11	□58	Rc 3/8	11	φ11	62	141	130	166	90	40	88	109	30	27	196
φ40	11	□65	Rc 3/8	11	φ11	69	141	130	166	90	46	95	118	30	27	196
φ50	11	□76	Rc 1/2	13	φ14	85	155	142	182	98	58	115	145	30	29	212
φ63	13	□90	Rc 1/2	15	φ18	98	163	148	194	102	65	132	165	35	31	229
φ80	16	□110	Rc 3/4	18	φ18	118	184	166	222	110	87	155	190	35	38	257
φ100	18	□135	Rc 3/4	20	φ22	150	192	172	232	116	109	190	230	40	38	272
φ125	21	□165	Rc 1	24	φ26	175	220	196	264	130	130	224	272	45	43	309
φ140	22	□185	Rc 1	26	φ26	195	230	204	276	138	145	250	300	50	43	326
φ150	25	□196	Rc 1	28	φ30	210	240	212	288	146	155	270	320	50	43	338
φ160	25	□210	Rc 1	31	φ33	225	253	222	304	156	170	285	345	55	43	359
φ180	27	□235	Rc 1 1/4	33	φ33	243	275	242	—	172	185	315	375	55	42	—
φ200	29	□262	Rc 1 1/2	37	φ36	272	301	264	—	184	206	355	425	55	48	—
φ224	34	□292	Rc 1 1/2	41	φ42	310	305	264	—	184	230	395	475	60	48	—
φ250	37	□325	Rc 2	46	φ45	335	346	300	—	200	250	425	515	65	60	—

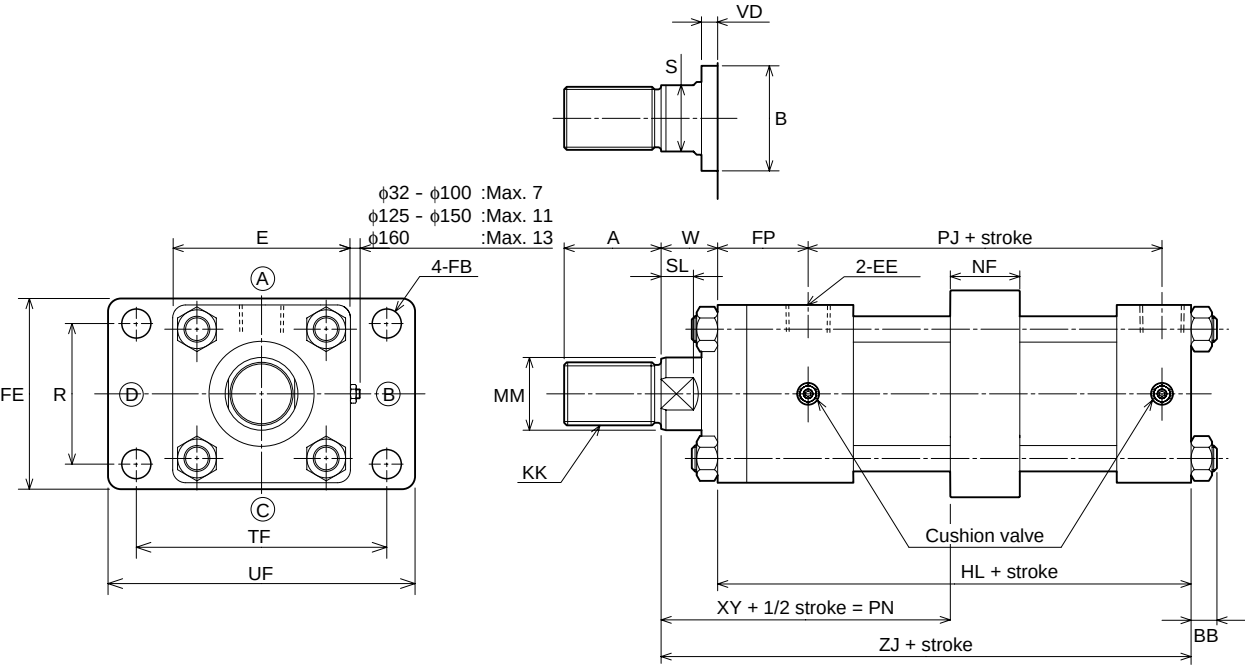
• Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	WW														
		Rod B	40	50	63	71	80	100	125	125	140	140	160	180	200
X		Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160
		Rod B	45	45	45	55	55	55	65	65	65	65	65	80	80
		Rod C	—	45	45	55	55	55	65	65	65	65	65	80	80

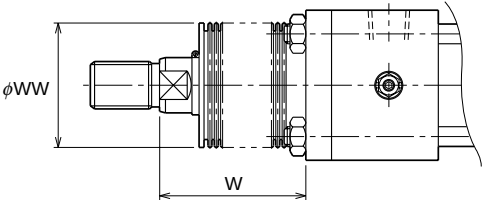
FK

70H-8	1	FK	Bore	B	B	Stroke	-	A	B
140H-8	1	FK	Bore	B	B	Stroke	-	A	B



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of “Switch set”. All the contents other than “Switch mounting dimensions” are identical.

With boots



Nylon tarpaulin	$\left(\begin{array}{ll} \phi 32 & 1/3 \\ \phi 40 - \phi 50 & 1/3.5 \\ \phi 63 - \phi 100 & 1/4 \\ \phi 125 - \phi 160 & 1/5 \end{array} \right.$	Stroke + X
Chloroprene		Stroke + X
		Stroke + X
		Stroke + X
Conex	$\left(\begin{array}{ll} \phi 32 & 1/2 \\ \phi 40 - \phi 50 & 1/2.5 \\ \phi 63 - \phi 100 & 1/3 \\ \phi 125 - \phi 140 & 1/3.5 \\ \phi 150 - \phi 160 & 1/4 \end{array} \right.$	Stroke + X
		Stroke + X
		Stroke + X
		Stroke + X
		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.
- Conex is the registered trademark of Teijin Ltd.
- If decimals are included into the calculation results, raise them to the next whole number.
- The boots have been mounted at our factory prior to delivery.

Rod A	$\phi 40$	1/3.5	Stroke + X
Nylon tarpaulin	$\phi 50 - \phi 80$	1/4	Stroke + X
Chloroprene	$\phi 100 - \phi 160$	1/5	Stroke + X
Conex	$\phi 40$	1/2.5	Stroke + X
	$\phi 50 - \phi 80$	1/3	Stroke + X
	$\phi 100$	1/3.5	Stroke + X
	$\phi 125 - \phi 160$	1/4	Stroke + X

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	33	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16

Symbol Bore	BB	E	EE	FB	FE	FP	HL	NF	PJ	Minimum PN	R	TF	UF	W		XY		ZJ	
														B•C	A	B•C	A	B•C	A
φ32	11	□58	Rc3/8	φ11	62	38	141	28	90	91	40	88	109	30	—	99	—	171	—
φ40	11	□65	Rc3/8	φ11	69	38	141	28	90	91	46	95	118	30	35	99	104	171	176
φ50	11	□76	Rc1/2	φ14	85	42	155	33	98	97	58	115	145	30	41	104.5	115.5	185	196
φ63	13	□90	Rc1/2	φ18	98	46	163	43	102	106	65	132	165	35	48	110.5	123.5	198	211
φ80	16	□110	Rc3/4	φ18	118	56	184	43	110	119	87	155	190	35	51	124.5	140.5	219	235
φ100	18	□135	Rc3/4	φ22	150	58	192	53	116	126	109	190	230	40	57	129.5	146.5	232	249
φ125	21	□165	Rc1	φ26	175	67	220	58	130	145	130	224	272	45	57	148	160	265	277
φ140	22	□185	Rc1	φ26	195	69	230	78	138	152	145	250	300	50	57	149	156	280	287
φ150	25	□196	Rc1	φ30	210	71	240	78	146	154	155	270	320	50	57	155	162	290	297
φ160	25	□210	Rc1	φ33	225	74	253	88	156	167	170	285	345	55	57	163	165	308	310

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140
	Rod C	—	50	50	63	71	80	100	125	125	125
	Rod A	—	63	71	80	100	125	140	160	160	180
X	Rod B	45	45	45	55	55	55	65	65	65	65
	Rod C	—	45	45	55	55	55	65	65	65	65
	Rod A	—	45	55	55	55	65	65	65	65	65

70-140H-8/TH8

Bore

B

CAD/DATA is available.



FB

For 7 MPa

70H-8

1

FB

Bore

B

B

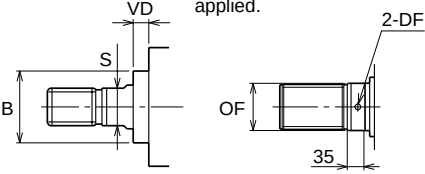
Stroke

-

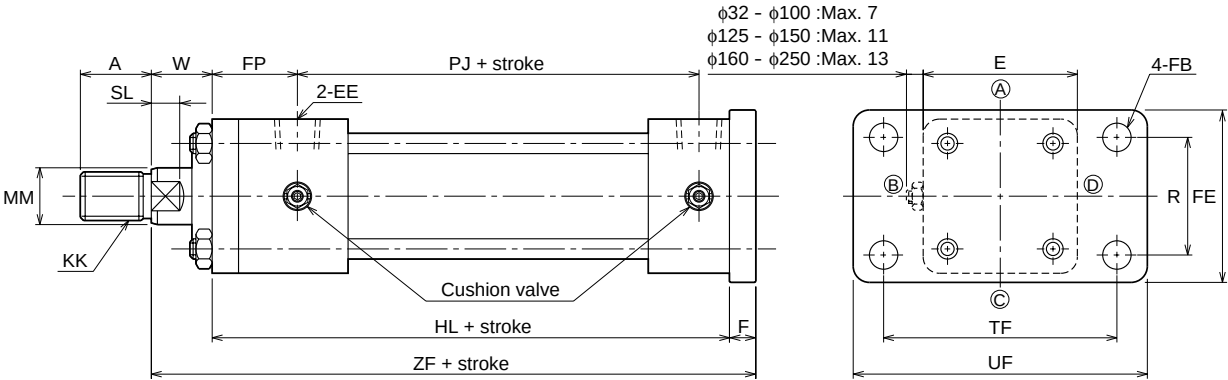
A

B

For the rod dia. of $\phi 100$ or more, a drill hole will be applied.



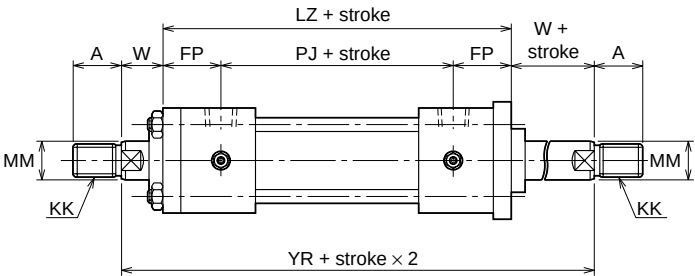
Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$
$\phi 125$	$\phi 124.5$	$\phi 15$
$\phi 140$	$\phi 139.5$	$\phi 15$



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type ($\phi 32 - \phi 160$ /rod B, C)

For both ends loaded type



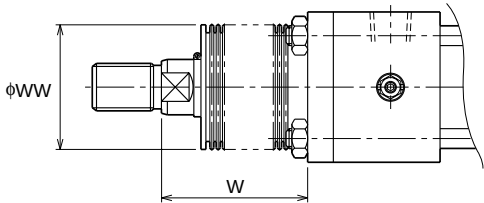
- The switch set ($\phi 32 - \phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Nylon tarpaulin	$\phi 32$	1/3	Stroke + X
Chloroprene	$\phi 40 - \phi 50$	1/3.5	Stroke + X
	$\phi 63 - \phi 100$	1/4	Stroke + X
	$\phi 125 - \phi 200$	1/5	Stroke + X
	$\phi 224 - \phi 250$	1/6	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40 - \phi 50$	1/2.5	Stroke + X
	$\phi 63 - \phi 100$	1/3	Stroke + X
	$\phi 125 - \phi 140$	1/3.5	Stroke + X
	$\phi 150 - \phi 200$	1/4	Stroke + X
	$\phi 224 - \phi 250$	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10

Symbol Bore	E	EE	F	FB	FE	FP	HL	LZ	PJ	R	TF	UF	W	YR	ZF
φ32	□58	Rc 3/8	11	φ11	62	38	141	166	90	40	88	109	30	226	182
φ40	□65	Rc 3/8	11	φ11	69	38	141	166	90	46	95	118	30	226	182
φ50	□76	Rc 1/2	13	φ14	85	42	155	182	98	58	115	145	30	242	198
φ63	□90	Rc 1/2	15	φ18	98	46	163	194	102	65	132	165	35	264	213
φ80	□110	Rc 3/4	18	φ18	118	56	184	222	110	87	155	190	35	292	237
φ100	□135	Rc 3/4	20	φ22	150	58	192	232	116	109	190	230	40	312	252
φ125	□165	Rc 1	24	φ26	175	67	220	264	130	130	224	272	45	354	289
φ140	□185	Rc 1	26	φ26	195	69	230	276	138	145	250	300	50	376	306
φ150	□196	Rc 1	28	φ30	210	71	240	288	146	155	270	320	50	388	318
φ160	□210	Rc 1	31	φ33	225	74	253	304	156	170	285	345	55	414	339
φ180	□235	Rc 1 1/4	33	φ33	243	75	275	—	172	185	315	375	55	—	363
φ200	□262	Rc 1 1/2	37	φ36	272	85	301	—	184	206	355	425	55	—	393
φ224	□292	Rc 1 1/2	41	φ42	310	89	305	—	184	230	395	475	60	—	406
φ250	□325	Rc 2	46	φ45	335	106	346	—	200	250	425	515	65	—	457

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol															
WW	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80

70-140H-8/TH8

Bore

C

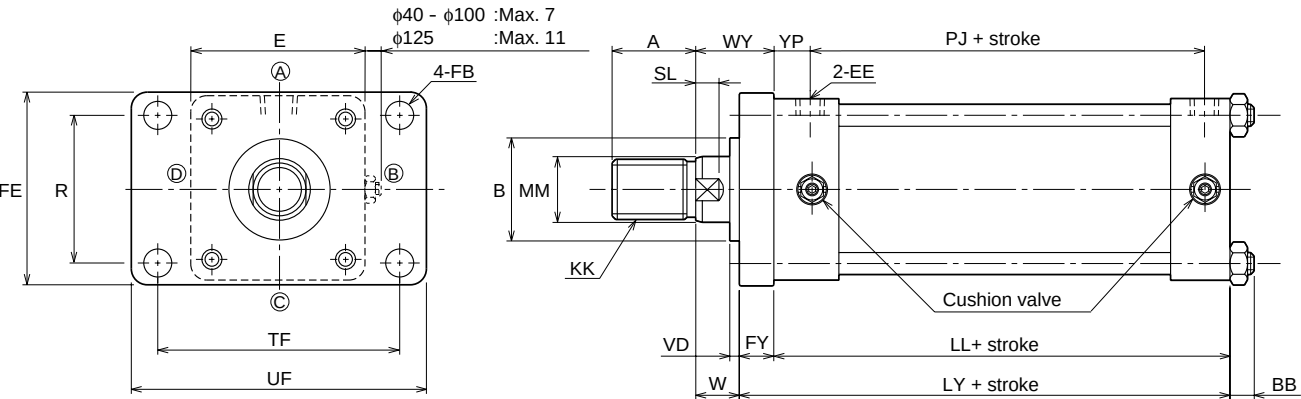
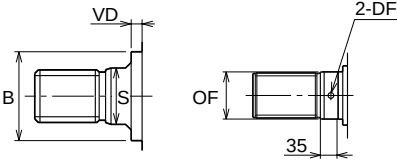
CAD/DATA is available.

FE For rod A

70H-8	1	FE	Bore	A	B	Stroke	-	A	B
140H-8	1	FE	Bore	A	B	Stroke	-	A	B

Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15

For the rod dia. of φ100 or more, a drill hole will be applied.



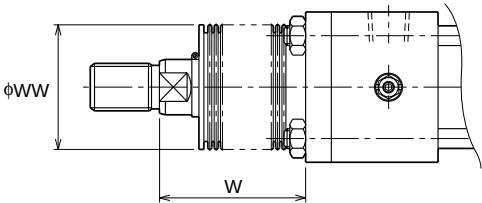
• For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).

With boots

70-140H-8/TH8

Bore

K



Nylon tarpaulin	Rod A		
Chloroprene	φ40	1/3.5	Stroke + X
	φ50 - φ80	1/4	Stroke + X
	φ100 • φ160	1/5	Stroke + X
Conex	Rod A		
	φ40	1/2.5	Stroke + X
	φ50 - φ80	1/3	Stroke + X
	φ100	1/3.5	Stroke + X
	φ125 - 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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod A							BB	E	EE	FB	FE	FY	LL	LY	PJ	R	TF	UF	W	WY	YP
	A	B	KK	MM	S	SL	VD															
φ40	35	φ43	M24×1.5	φ28	24	14	10	11	□65	Rc 3/8	φ11	69	18	130	148	90	46	95	118	35	53	27
φ50	45	φ50	M30×1.5	φ35.5	30	16	10	11	□76	Rc 1/2	φ14	85	20	142	162	98	58	115	145	41	61	29
φ63	60	φ65	M39×1.5	φ45	41	20	10	13	□90	Rc 1/2	φ18	98	24	148	172	102	65	132	165	48	72	31
φ80	75	φ80	M48×1.5	φ56	50	23	8	16	□110	Rc 3/4	φ18	118	30	166	196	110	87	155	190	51	81	38
φ100	95	φ95	M64×2	φ71	65	27	11	18	□135	Rc 3/4	φ22	150	32	172	204	116	109	190	230	57	89	38
φ125	120	φ115	M80×2	φ90	85	30	10	21	□165	Rc1	φ26	175	41	196	237	130	130	224	272	57	98	43
φ140	140	φ125	M95×2	φ100	—	Drill hole	13	22	□185	Rc1	φ26	195	43	204	247	138	145	250	300	57	100	43
φ150	140	φ125	M95×2	φ100	—	Drill hole	13	25	□196	Rc1	φ30	210	43	212	255	146	155	270	320	57	100	43
φ160	150	φ140	M100×2	φ112	—	Drill hole	15	25	□210	Rc1	φ33	225	46	222	268	156	170	285	345	57	103	43

- Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160
Symbol	Rod A									
		WW	63	71	80	100	125	140	160	180
X	Rod A	45	55	55	55	65	65	65	65	65

70-140H-8/TH8

Bore

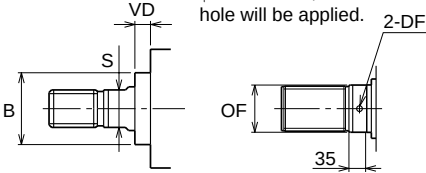
B

CAD/DATA is available.

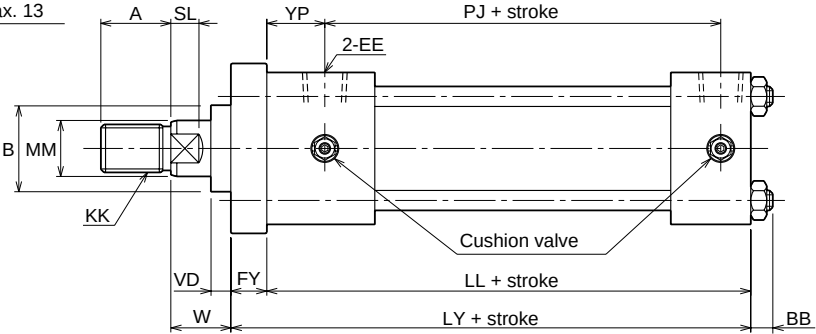
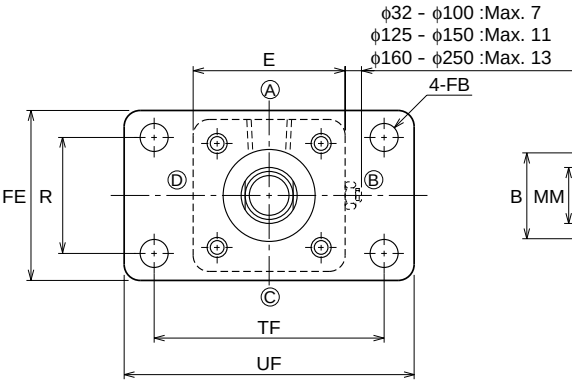
FY

70H-8	1	FY	Bore	B	B	Stroke	-	A	B
140H-8	1	FY	Bore	B	B	Stroke	-	A	B

For the rod dia. of $\phi 100$ or more, a drill hole will be applied.



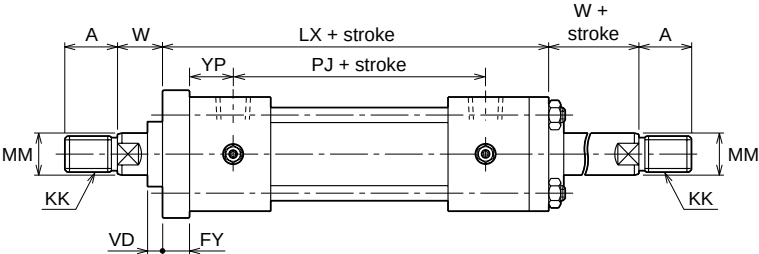
Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$
$\phi 125$	$\phi 124.5$	$\phi 15$
$\phi 140$	$\phi 139.5$	$\phi 15$



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type ($\phi 32 - \phi 160$ /rod B, C)

For both ends loaded type



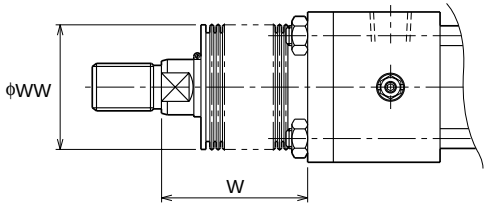
- The switch set ($\phi 32 - \phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Nylon tarpaulin	$\phi 32$	1/3	Stroke + X
Chloroprene	$\phi 40 \bullet \phi 50$	1/3.5	Stroke + X
	$\phi 63 - \phi 100$	1/4	Stroke + X
	$\phi 125 - \phi 200$	1/5	Stroke + X
	$\phi 224 \bullet \phi 250$	1/6	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40 \bullet \phi 50$	1/2.5	Stroke + X
	$\phi 63 - \phi 100$	1/3	Stroke + X
	$\phi 125 \bullet \phi 140$	1/3.5	Stroke + X
	$\phi 150 - \phi 200$	1/4	Stroke + X
	$\phi 224 \bullet \phi 250$	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	10
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10

Symbol Bore	BB	E	EE	FB	FE	FY	LL	LX	LY	PJ	R	TF	UF	W	YP
φ32	11	□58	Rc 3/8	φ11	62	13	130	168	143	90	40	88	109	30	27
φ40	11	□65	Rc 3/8	φ11	69	13	130	168	143	90	46	95	118	30	27
φ50	11	□76	Rc 1/2	φ14	85	18	142	187	160	98	58	115	145	30	29
φ63	13	□90	Rc 1/2	φ18	98	20	148	199	168	102	65	132	165	35	31
φ80	16	□110	Rc 3/4	φ18	118	24	166	228	190	110	87	155	190	35	38
φ100	18	□135	Rc 3/4	φ22	150	28	172	240	200	116	109	190	230	40	38
φ125	21	□165	Rc 1	φ26	175	33	196	273	229	130	130	224	272	45	43
φ140	22	□185	Rc 1	φ26	195	37	204	287	241	138	145	250	300	50	43
φ150	25	□196	Rc 1	φ30	210	39	212	299	251	146	155	270	320	50	43
φ160	25	□210	Rc 1	φ33	225	41	222	314	263	156	170	285	345	55	43
φ180	27	□235	Rc 1 ^{1/4}	φ33	243	46	242	—	288	172	185	315	375	55	42
φ200	29	□262	Rc 1 ^{1/2}	φ36	272	51	264	—	315	184	206	355	425	55	48
φ224	34	□292	Rc 1 ^{1/2}	φ42	310	58	264	—	322	184	230	395	475	60	48
φ250	37	□325	Rc 2	φ45	335	65	300	—	365	200	250	425	515	65	60

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol															
WW	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80

70-140H-8/TH8

Bore

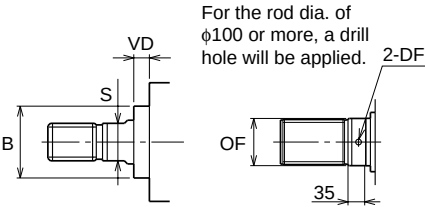
B.C

CAD/DATA is available.

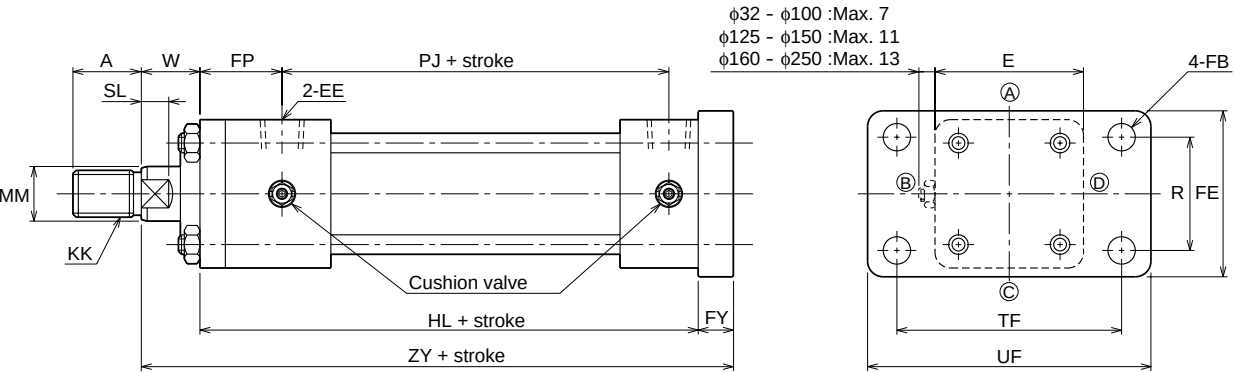


FZ

70H-8	1	FZ	Bore	B	B	Stroke	-	A	B
140H-8	1	FZ	Bore	B	B	Stroke	-	A	B

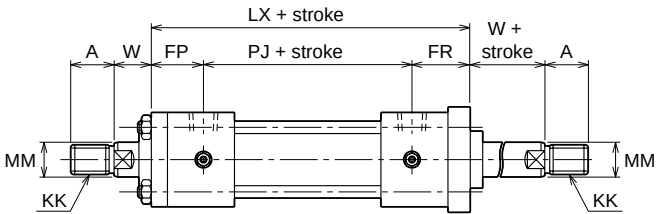


Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type (φ32 - φ160/rod B, C)
For both ends loaded type



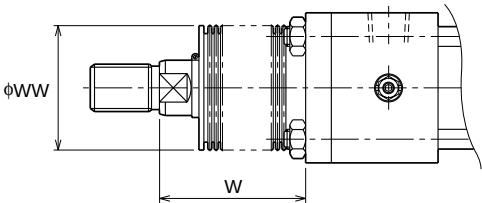
- The switch set (φ32 - φ140) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Rod B • C	φ32	1/3	Stroke + X
Nylon tarpaulin	φ40 • φ50	1/3.5	Stroke + X
Chloroprene	φ63 - φ100	1/4	Stroke + X
	φ125 - φ200	1/5	Stroke + X
	φ224 • φ250	1/6	Stroke + X
Conex	φ32	1/2	Stroke + X
	φ40 • φ50	1/2.5	Stroke + X
	φ63 - φ100	1/3	Stroke + X
	φ125 • φ140	1/3.5	Stroke + X
	φ150 - φ200	1/4	Stroke + X
	φ224 • φ250	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

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 C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	E	EE	FB	FE	FP	FR	FY	HL	LX	PJ	R	TF	UF	W		ZY	
														B•C	A	B•C	A
φ32	□58	Rc 3/8	φ11	62	38	40	13	141	168	90	40	88	109	30	—	184	—
φ40	□65	Rc 3/8	φ11	69	38	40	13	141	168	90	46	95	118	30	35	184	189
φ50	□76	Rc 1/2	φ14	85	42	47	18	155	187	98	58	115	145	30	41	203	214
φ63	□90	Rc 1/2	φ18	98	46	51	20	163	199	102	65	132	165	35	48	218	231
φ80	□110	Rc 3/4	φ18	118	56	62	24	184	228	110	87	155	190	35	51	243	259
φ100	□135	Rc 3/4	φ22	150	58	66	28	192	240	116	109	190	230	40	57	260	277
φ125	□165	Rc 1	φ26	175	67	76	33	220	273	130	130	224	272	45	57	298	310
φ140	□185	Rc 1	φ26	195	69	80	37	230	287	138	145	250	300	50	57	317	324
φ150	□196	Rc 1	φ30	210	71	82	39	240	299	146	155	270	320	50	57	329	336
φ160	□210	Rc 1	φ33	225	74	84	41	253	314	156	170	285	345	55	57	349	351
φ180	□235	Rc 1 1/4	φ33	243	75	—	46	275	—	172	185	315	375	55	—	376	—
φ200	□262	Rc 1 1/2	φ36	272	85	—	51	301	—	184	206	355	425	55	—	407	—
φ224	□292	Rc 1 1/2	φ42	310	89	—	58	305	—	184	230	395	475	60	—	423	—
φ250	□325	Rc 2	φ45	335	106	—	65	346	—	200	250	425	515	65	—	476	—

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

70-140H-8/TH8

Bore

B

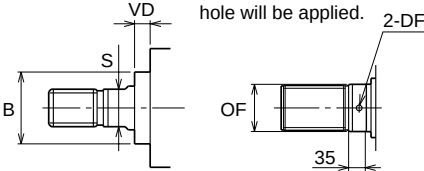
CAD/DATA is available.



FC

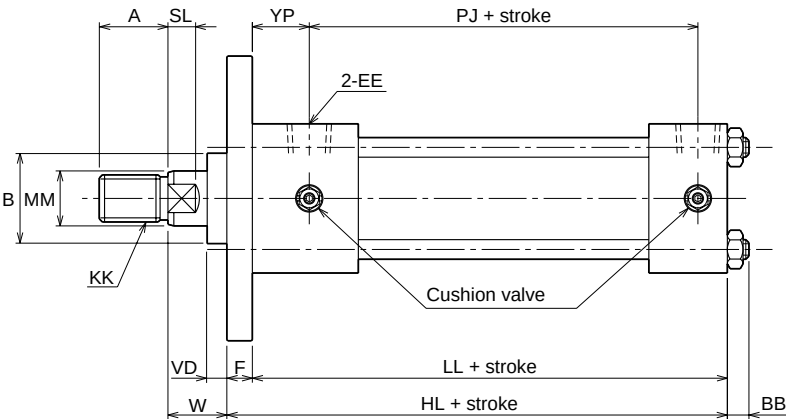
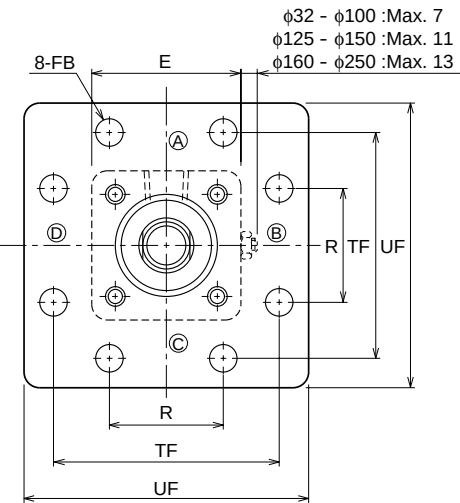
70H-8	1	FC	Bore	B	B	Stroke	-	A	B
140H-8	1	FC	Bore	B	B	Stroke	-	A	B

For the rod dia. of $\phi 100$ or more, a drill hole will be applied.



Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$
$\phi 125$	$\phi 124.5$	$\phi 15$
$\phi 140$	$\phi 139.5$	$\phi 15$

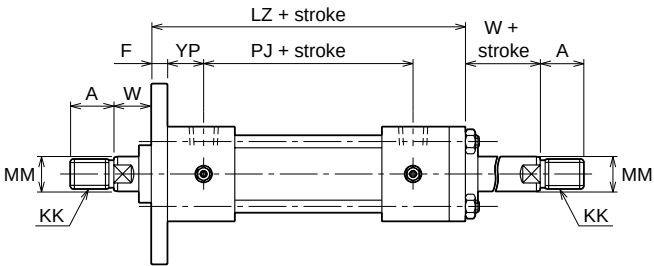
General purpose hydraulic cylinder



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

Double rod type ($\phi 32$ - $\phi 160$)

For both ends loaded type



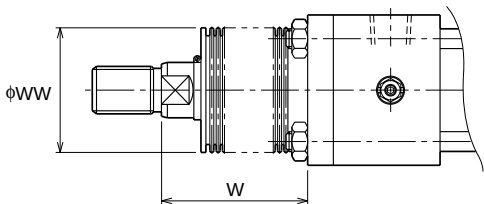
- The switch set ($\phi 32$ - $\phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Nylon tarpaulin	$\phi 32$	1/3	Stroke + X
Chloroprene	$\phi 40$ • $\phi 50$	1/3.5	Stroke + X
	$\phi 63$ - $\phi 100$	1/4	Stroke + X
	$\phi 125$ - $\phi 200$	1/5	Stroke + X
	$\phi 224$ • $\phi 250$	1/6	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40$ • $\phi 50$	1/2.5	Stroke + X
	$\phi 63$ - $\phi 100$	1/3	Stroke + X
	$\phi 125$ • $\phi 140$	1/3.5	Stroke + X
	$\phi 150$ - $\phi 200$	1/4	Stroke + X
	$\phi 224$ • $\phi 250$	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10

Symbol Bore	BB	E	EE	F	FB	HL	LL	LZ	PJ	R	TF	UF	W	YP
φ32	11	□58	Rc 3/8	11	φ11	141	130	166	90	40	88	109	30	27
φ40	11	□65	Rc 3/8	11	φ11	141	130	166	90	46	95	118	30	27
φ50	11	□76	Rc 1/2	13	φ14	155	142	182	98	58	115	145	30	29
φ63	13	□90	Rc 1/2	15	φ18	163	148	194	102	65	132	165	35	31
φ80	16	□110	Rc 3/4	18	φ18	184	166	222	110	87	155	190	35	38
φ100	18	□135	Rc 3/4	20	φ22	192	172	232	116	109	190	230	40	38
φ125	21	□165	Rc 1	24	φ26	220	196	264	130	130	224	272	45	43
φ140	22	□185	Rc 1	26	φ26	230	204	276	138	145	250	300	50	43
φ150	25	□196	Rc 1	28	φ30	240	212	288	146	155	270	320	50	43
φ160	25	□210	Rc 1	31	φ33	253	222	304	156	170	285	345	55	43
φ180	27	□235	Rc 1 1/4	33	φ33	275	242	—	172	185	315	375	55	42
φ200	29	□262	Rc 1 1/2	37	φ36	301	264	—	184	206	355	425	55	48
φ224	34	□292	Rc 1 1/2	41	φ42	305	264	—	184	230	395	475	60	48
φ250	37	□325	Rc 2	46	φ45	346	300	—	200	250	425	515	65	60

● Allowance of B is h8, allowance of MM is f8.

With boots

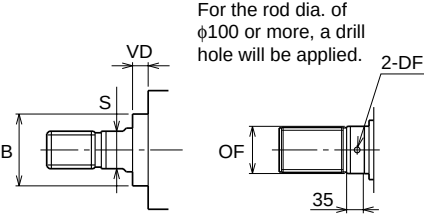
Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	WW														
		Rod B	40	50	63	71	80	100	125	125	140	140	160	180	200
X		Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160
		Rod B	45	45	45	55	55	55	65	65	65	65	65	80	80
		Rod C	—	45	45	55	55	55	65	65	65	65	65	80	80

70-140H-8/TH8 Bore B CAD/DATA is available.



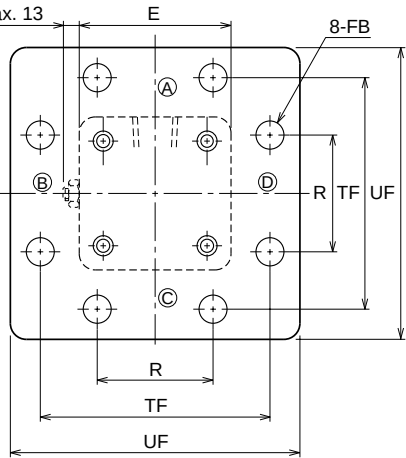
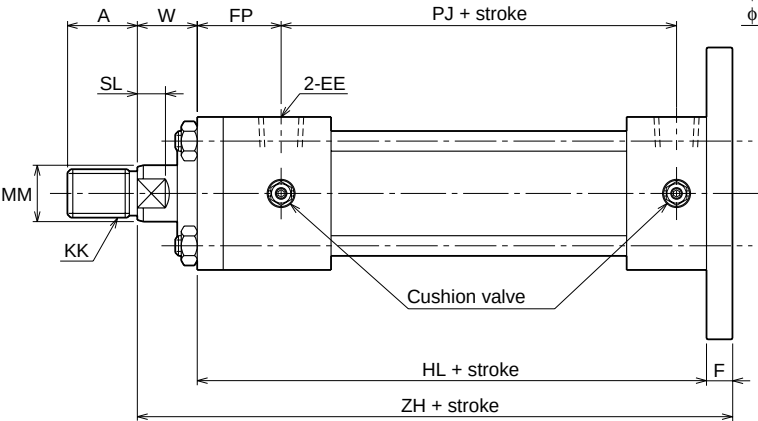
FD

70H-8	1	FD	Bore	B	B	Stroke	-	A	B
140H-8	1	FD	Bore	B	B	Stroke	-	A	B



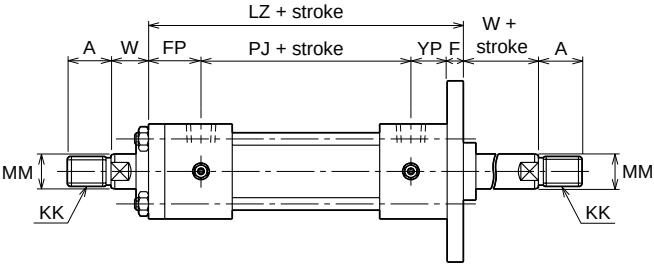
Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15

φ32 - φ100 :Max. 7
φ125 - φ150 :Max. 11
φ160 - φ250 :Max. 13



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.

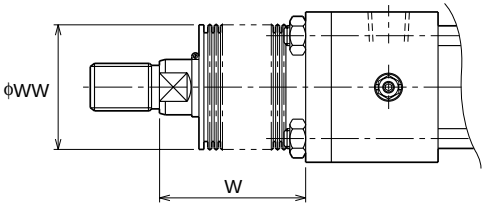
Double rod type (φ32 - φ160/rod B, C)
For both ends loaded type



- The switch set (φ32 - φ140) is also within the fabrication range.

With boots

70-140H-8/TH8 Bore B



Nylon tarpaulin	φ32	1/3	Stroke + X
Chloroprene	φ40 • φ50	1/3.5	Stroke + X
	φ63 - φ100	1/4	Stroke + X
	φ125 - φ200	1/5	Stroke + X
	φ224 • φ250	1/6	Stroke + X
Conex	φ32	1/2	Stroke + X
	φ40 • φ50	1/2.5	Stroke + X
	φ63 - φ100	1/3	Stroke + X
	φ125 • φ140	1/3.5	Stroke + X
	φ150 - φ200	1/4	Stroke + X
	φ224 • φ250	1/4.5	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Dimensional table

Symbol Bore	Rod B							Rod C						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10

Symbol Bore	E	EE	F	FB	FP	HL	LZ	PJ	R	TF	UF	W	YP	ZH
φ32	□58	Rc 3/8	11	φ11	38	141	166	90	40	88	109	30	27	182
φ40	□65	Rc 3/8	11	φ11	38	141	166	90	46	95	118	30	27	182
φ50	□76	Rc 1/2	13	φ14	42	155	182	98	58	115	145	30	29	198
φ63	□90	Rc 1/2	15	φ18	46	163	194	102	65	132	165	35	31	213
φ80	□110	Rc 3/4	18	φ18	56	184	222	110	87	155	190	35	38	237
φ100	□135	Rc 3/4	20	φ22	58	192	232	116	109	190	230	40	38	252
φ125	□165	Rc 1	24	φ26	67	220	264	130	130	224	272	45	43	289
φ140	□185	Rc 1	26	φ26	69	230	276	138	145	250	300	50	43	306
φ150	□196	Rc 1	28	φ30	71	240	288	146	155	270	320	50	43	318
φ160	□210	Rc 1	31	φ33	74	253	304	156	170	285	345	55	43	339
φ180	□235	Rc 1 ^{1/4}	33	φ33	75	275	—	172	185	315	375	55	42	363
φ200	□262	Rc 1 ^{1/2}	37	φ36	85	301	—	184	206	355	425	55	48	393
φ224	□292	Rc 1 ^{1/2}	41	φ42	89	305	—	184	230	395	475	60	48	406
φ250	□325	Rc 2	46	φ45	106	346	—	200	250	425	515	65	60	457

● Allowance of B is h8, allowance of MM is f8.

With boots

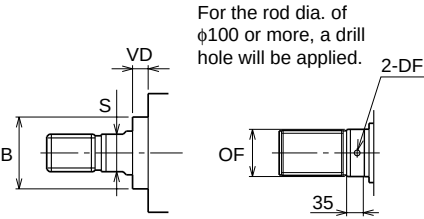
Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol															
WW	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80

70-140H-8/TH8 Bore A.C CAD/DATA is available.

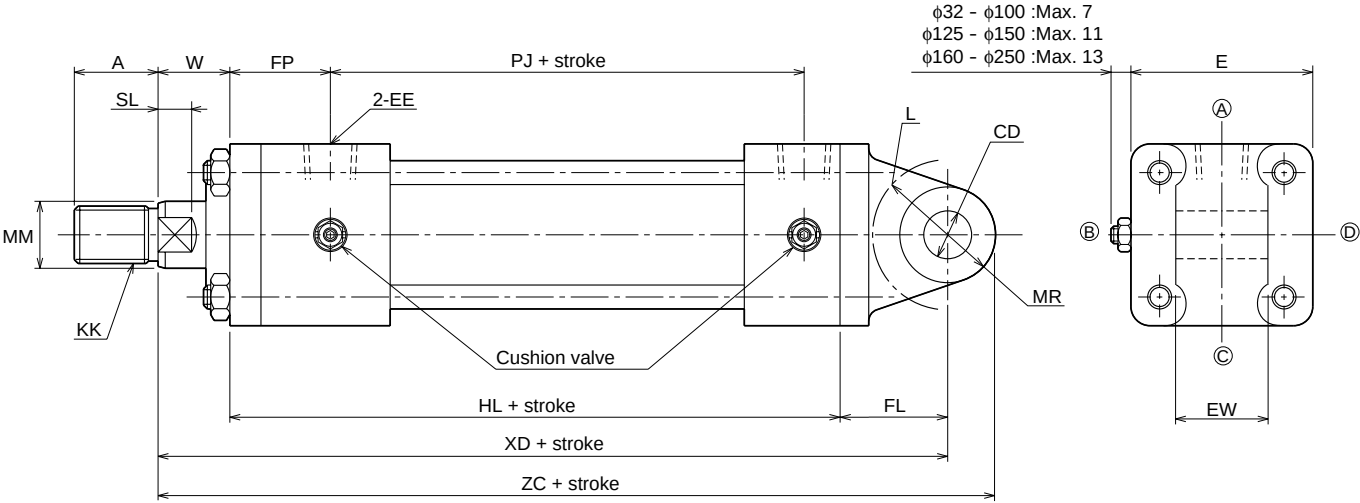


CA

70H-8	1	CA	Bore	B	B	Stroke	-	A	B
140H-8	1	CA	Bore	B	B	Stroke	-	A	B



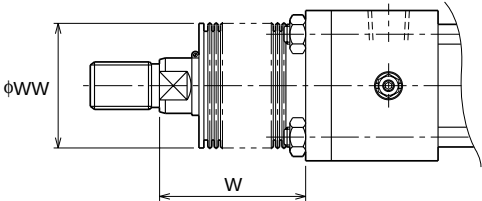
Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of “Switch set”. All the contents other than “Switch mounting dimensions” are identical.
- For the type with a bore of φ180 or more, the CA accessory is equipped with the gray cast iron bush.
- The CA accessory, which is attached to the type with a bore of φ180 or more, is made of structural rolled steel (welding type), and is equipped with the gray cast iron bush.

With boots

70-140H-8/TH8 BoreK



Rod B • C Nylon tarpaulin Chloroprene	$\left(\begin{array}{lll} \phi 32 & 1/3 & \text{Stroke} + X \\ \phi 40 \bullet \phi 50 & 1/3.5 & \text{Stroke} + X \\ \phi 63 - \phi 100 & 1/4 & \text{Stroke} + X \\ \phi 125 - \phi 200 & 1/5 & \text{Stroke} + X \\ \phi 224 \bullet \phi 250 & 1/6 & \text{Stroke} + X \end{array} \right)$
Conex	$\left(\begin{array}{lll} \phi 32 & 1/2 & \text{Stroke} + X \\ \phi 40 \bullet \phi 50 & 1/2.5 & \text{Stroke} + X \\ \phi 63 - \phi 100 & 1/3 & \text{Stroke} + X \\ \phi 125 \bullet \phi 140 & 1/3.5 & \text{Stroke} + X \\ \phi 150 - \phi 200 & 1/4 & \text{Stroke} + X \\ \phi 224 \bullet \phi 250 & 1/4.5 & \text{Stroke} + X \end{array} \right)$

	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.
• Conex is the registered trademark of Teijin Ltd.
• If decimals are included into the calculation results, raise them to the next whole number.
• The boots have been mounted at our factory prior to delivery.

Rod A Nylon tarpaulin Chloroprene	$\left(\begin{array}{lll} \phi 40 & 1/3.5 & \text{Stroke} + X \\ \phi 50 - \phi 80 & 1/4 & \text{Stroke} + X \\ \phi 100 - \phi 125 & 1/5 & \text{Stroke} + X \end{array} \right)$
Conex	$\left(\begin{array}{lll} \phi 40 & 1/2.5 & \text{Stroke} + X \\ \phi 50 - \phi 80 & 1/3 & \text{Stroke} + X \\ \phi 100 & 1/3.5 & \text{Stroke} + X \\ \phi 125 - \phi 160 & 1/4 & \text{Stroke} + X \end{array} \right)$

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	CD	E	EE	EW	FL	FP	HL	L	MR	PJ	W		XD		ZC	
											B•C	A	B•C	A	B•C	A
φ32	φ16H9	□58	Rc 3/8	25 ^{-0.1} _{-0.4}	38	38	141	R20	R16	90	30	—	209	—	225	—
φ40	φ16H9	□65	Rc 3/8	25 ^{-0.1} _{-0.4}	38	38	141	R20	R16	90	30	35	209	214	225	230
φ50	φ20H9	□76	Rc 1/2	31.5 ^{-0.1} _{-0.4}	45	42	155	R25	R20	98	30	41	230	241	250	261
φ63	φ31.5H9	□90	Rc 1/2	40 ^{-0.1} _{-0.4}	63	46	163	R46	R31.5	102	35	48	261	274	292.5	305.5
φ80	φ31.5H9	□110	Rc 3/4	40 ^{-0.1} _{-0.4}	72	56	184	R52	R31.5	110	35	51	291	307	322.5	338.5
φ100	φ40H9	□135	Rc 3/4	50 ^{-0.1} _{-0.4}	84	58	192	R62	R40	116	40	57	316	333	356	373
φ125	φ50H9	□165	Rc 1	63 ^{-0.1} _{-0.4}	100	67	220	R73	R50	130	45	57	365	377	415	427
φ140	φ63H9	□185	Rc 1	80 ^{-0.1} _{-0.6}	120	69	230	R91	R63	138	50	57	400	407	463	470
φ150	φ63H9	□196	Rc 1	80 ^{-0.1} _{-0.6}	122	71	240	R91	R63	146	50	57	412	419	475	482
φ160	φ71H9	□210	Rc 1	80 ^{-0.1} _{-0.6}	137	74	253	R103	R71	156	55	57	445	447	516	518
φ180	φ80H9	□235	Rc 1 1/4	100 ^{-0.1} _{-0.6}	150	75	275	R100	R80	172	55	—	480	—	560	—
φ200	φ90H9	□262	Rc 1 1/2	125 ^{-0.1} _{-0.6}	170	85	301	R115	R90	184	55	—	526	—	616	—
φ224	φ100H9	□292	Rc 1 1/2	125 ^{-0.1} _{-0.6}	185	89	305	R125	R100	184	60	—	550	—	650	—
φ250	φ100H9	□325	Rc 2	125 ^{-0.1} _{-0.6}	185	106	346	R125	R100	200	65	—	596	—	696	—

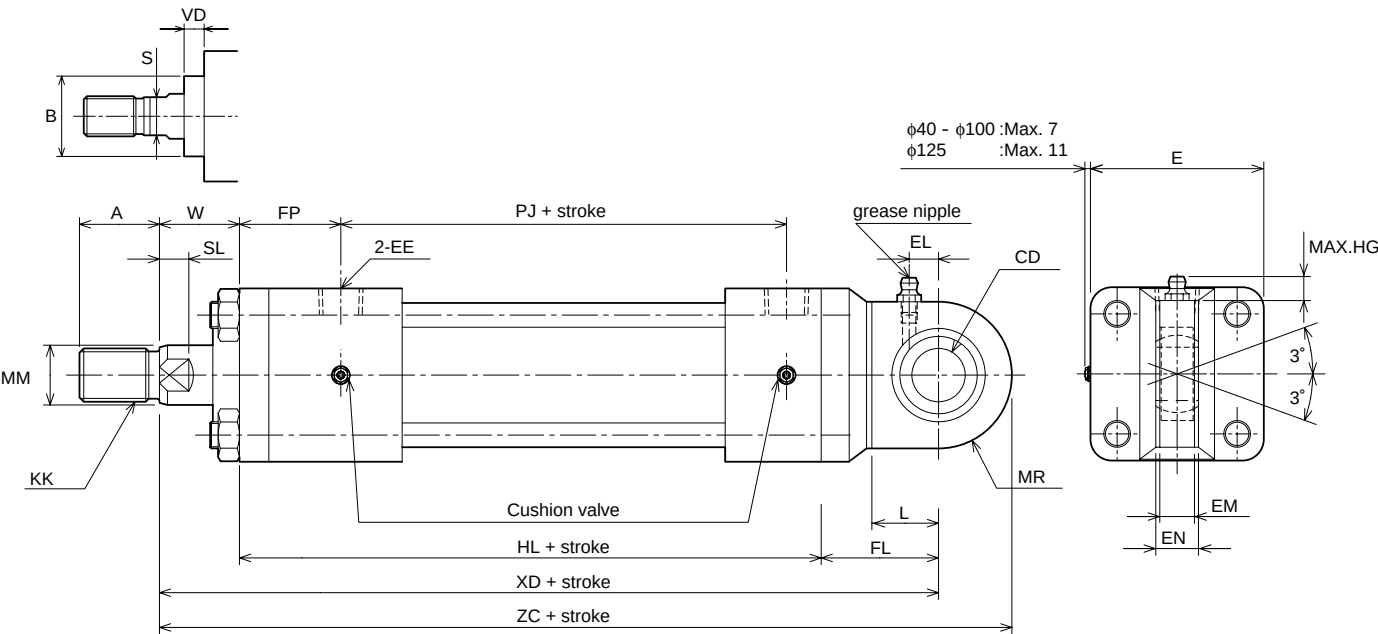
● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

CS

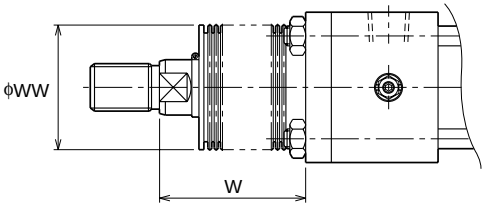
70H-8	1	CS	Bore	B	B	Stroke	-	A	B
140H-8	1	CS	Bore	B	B	Stroke	-	A	B



- The grease is not sealed at the shipment.
- Inner diameter and installation width of bearing are conformed to JIS B8367-2 MP5 type regulation. (Same standard with 160H-1 series.)
- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of “Switch set”. All the contents other than “Switch mounting dimensions” are identical.

With boots

70-140H-8/TH8 BoreK



Rod B • C	$\phi 40 \bullet \phi 50$	1/3.5	Stroke + X
Nylon tarpaulin	$\phi 63 - \phi 100$	1/4	Stroke + X
Chloroprene	$\phi 200$	1/5	Stroke + X
Conex	$\phi 40 \bullet \phi 50$	1/2.5	Stroke + X
	$\phi 63 - \phi 100$	1/3	Stroke + X
	$\phi 125$	1/3.5	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.
• Conex is the registered trademark of Teijin Ltd.
• If decimals are included into the calculation results, raise them to the next whole number.
• The boots have been mounted at our factory prior to delivery.

Rod A	$\phi 40$	1/3.5	Stroke + X
Nylon tarpaulin	$\phi 50 - \phi 80$	1/4	Stroke + X
Chloroprene	$\phi 100 \bullet \phi 125$	1/5	Stroke + X
Conex	$\phi 40$	1/2.5	Stroke + X
	$\phi 50 - \phi 80$	1/3	Stroke + X
	$\phi 100$	1/3.5	Stroke + X
	$\phi 125$	1/4	Stroke + X

7/14 MPa double acting hydraulic cylinder

Double acting single rod/double rod

Unit: mm

70/140H-8

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Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	33	17

Symbol Bore	CD	E	EE	EN	EM	FL	FP	HL	L	MR	PJ	W		XD		ZC		grease nipple		
												B•C	A	B•C	A	B•C	A	Code	EL	HG
φ40	20 ⁰ _{-0.012}	□65	Rc3/8	16 ⁰ _{-0.12}	13	44	38	141	25	R27.5	90	30	35	215	220	242.5	247.5	JIS A type MT6×1	11	11
φ50	25 ⁰ _{-0.012}	□76	Rc1/2	20 ⁰ _{-0.12}	17	53	42	155	31	R32.5	98	30	41	238	249	270.5	281.5	JIS A type MT6×1	14	11
φ63	30 ⁰ _{-0.012}	□90	Rc1/2	22 ⁰ _{-0.12}	19	64	46	163	38	R40	102	35	48	262	275	302	315	JIS A type Rc1/8	15	15
φ80	40 ⁰ _{-0.012}	□110	Rc3/4	28 ⁰ _{-0.12}	23	81	56	184	48	R50	110	35	51	300	316	350	366	JIS A type Rc1/8	20	15
φ100	50 ⁰ _{-0.012}	□135	Rc3/4	35 ⁰ _{-0.12}	30	96	58	192	58	R60	116	40	57	328	345	388	405	JIS A type Rc1/8	24	15
φ125	60 ⁰ _{-0.015}	□165	Rc1	44 ⁰ _{-0.15}	38	117	67	220	72	R75	130	45	57	382	394	457	469	JIS A type Rc1/8	28	15

● Allowance of B is h8, allowance of MM is f8.

General purpose hydraulic cylinder

With boots

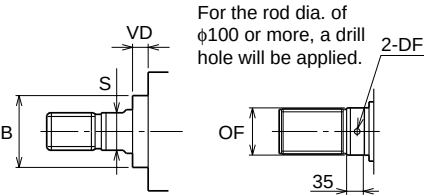
Bore		φ40	φ50	φ63	φ80	φ100	φ125
Symbol							
WW	Rod B	50	63	71	80	100	125
	Rod C	50	50	63	71	80	100
	Rod A	63	71	80	100	125	140
X	Rod B	45	45	55	55	55	65
	Rod C	45	45	55	55	55	65
	Rod A	45	55	55	55	65	65

70-140H-8/TH8 Bore A.C CAD/DATA is available.



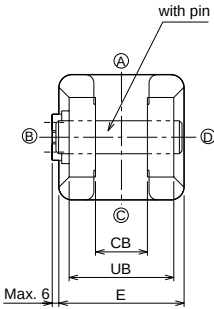
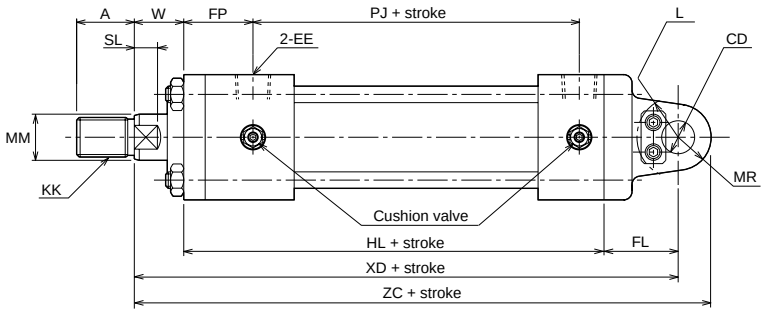
CB

70H-8	1	CB	Bore	B	B	Stroke	-	A	B
140H-8	1	CB	Bore	B	B	Stroke	-	A	B

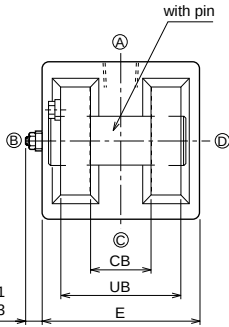
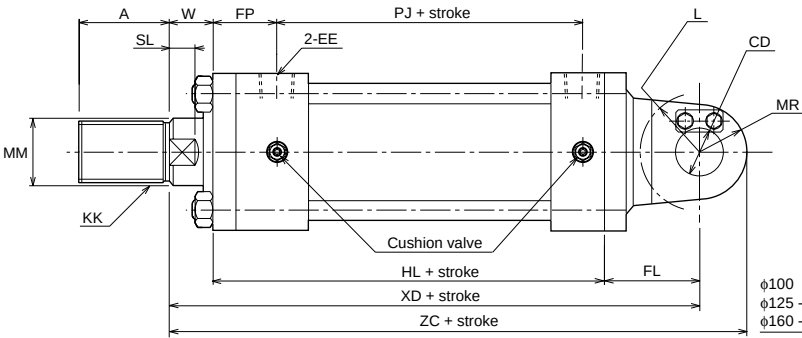


Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15

• Bore φ32 - φ80



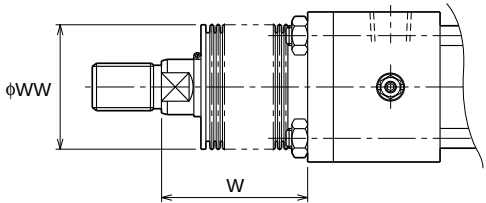
• Bore φ100 - φ250



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.
- Material of CB accessory for type with a bore of φ32 to φ160: nodular graphite cast iron
- Material of CB accessory for type with a bore of φ180 or more: structural rolled steel

With boots

70-140H-8/TH8 Bore K



Rod B • C	φ32	1/3	Stroke + X
Nylon tarpaulin	φ40 • φ50	1/3.5	Stroke + X
Chloroprene	φ63 - φ100	1/4	Stroke + X
	φ125 - φ200	1/5	Stroke + X
	φ224 • φ250	1/6	Stroke + X
Conex	φ32	1/2	Stroke + X
	φ40 • φ50	1/2.5	Stroke + X
	φ63 - φ100	1/3	Stroke + X
	φ125 • φ140	1/3.5	Stroke + X
	φ150 - φ200	1/4	Stroke + X
	φ224 • φ250	1/4.5	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.
• Conex is the registered trademark of Teijin Ltd.
• If decimals are included into the calculation results, raise them to the next whole number.
• The boots have been mounted at our factory prior to delivery.

Rod A	φ40	1/3.5	Stroke + X
Nylon tarpaulin	φ50 - φ80	1/4	Stroke + X
Chloroprene	φ100 - φ125	1/5	Stroke + X
Conex	φ40	1/2.5	Stroke + X
	φ50 - φ80	1/3	Stroke + X
	φ100	1/3.5	Stroke + X
	φ125	1/4	Stroke + X

7/14 MPa double acting hydraulic cylinder

Double acting single rod/double rod

Unit: mm

70/140H-8

78

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	10	—	—	—	—	—	—	—

Symbol Bore	CB	CD	E	EE	FL	FP	HL	L	MR	PJ	UB	W		XD		ZC	
												B•C	A	B•C	A	B•C	A
φ32	25 ^{+0.4} _{+0.1}	φ16 ^{H9} _{f8}	□58	Rc 3/8	38	38	141	R20	R16	90	50	30	—	209	—	225	—
φ40	25 ^{+0.4} _{+0.1}	φ16 ^{H9} _{f8}	□65	Rc 3/8	38	38	141	R20	R16	90	50	30	35	209	214	225	230
φ50	31.5 ^{+0.4} _{+0.1}	φ20 ^{H9} _{f8}	□76	Rc 1/2	45	42	155	R25	R20	98	63.5	30	41	230	241	250	261
φ63	40 ^{+0.4} _{+0.1}	φ31.5 ^{H9} _{f8}	□90	Rc 1/2	63	46	163	R40	R31.5	102	80	35	48	261	274	292.5	305.5
φ80	40 ^{+0.4} _{+0.1}	φ31.5 ^{H9} _{f8}	□110	Rc 3/4	72	56	184	R40	R31.5	110	80	35	51	291	307	322.5	338.5
φ100	50 ^{+0.4} _{+0.1}	φ40 ^{H9} _{f8}	□135	Rc 3/4	84	58	192	R50	R40	116	100	40	57	316	333	356	373
φ125	63 ^{+0.4} _{+0.1}	φ50 ^{H9} _{f8}	□165	Rc 1	100	67	220	R62	R50	130	126	45	57	365	377	415	427
φ140	80 ^{+0.6} _{+0.1}	φ63 ^{H9} _{f8}	□185	Rc 1	120	69	230	R79	R63	138	160	50	57	400	407	463	470
φ150	80 ^{+0.6} _{+0.1}	φ63 ^{H9} _{f8}	□196	Rc 1	122	71	240	R82	R63	146	160	50	57	412	419	475	482
φ160	80 ^{+0.6} _{+0.1}	φ71 ^{H9} _{f8}	□210	Rc 1	137	74	253	R89	R71	156	160	55	57	445	447	516	518
φ180	100 ^{+0.6} _{+0.1}	φ80 ^{H9} _{f8}	□235	Rc 1 1/4	150	75	275	R100	R80	172	200	55	—	480	—	560	—
φ200	125 ^{+0.6} _{+0.1}	φ90 ^{H9} _{f8}	□262	Rc 1 1/2	170	85	301	R115	R90	184	251	55	—	526	—	616	—
φ224	125 ^{+0.6} _{+0.1}	φ100 ^{H9} _{f8}	□292	Rc 1 1/2	185	89	305	R125	R100	184	251	60	—	550	—	650	—
φ250	125 ^{+0.6} _{+0.1}	φ100 ^{H9} _{f8}	□325	Rc 2	185	106	346	R125	R100	200	251	65	—	596	—	696	—

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

General purpose hydraulic cylinder

CAD/DATA is available.

70-140H-8/TH8 Bore A.C

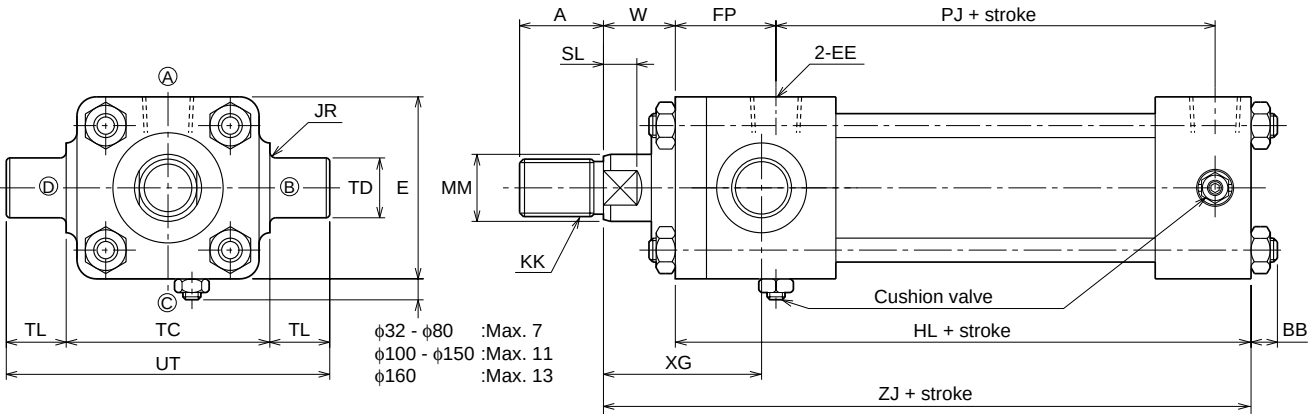
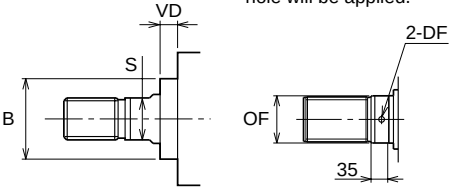


TA

70H-8	1	TA	Bore	B	B	Stroke	- A C
140H-8	1	TA	Bore	B	B	Stroke	- A C

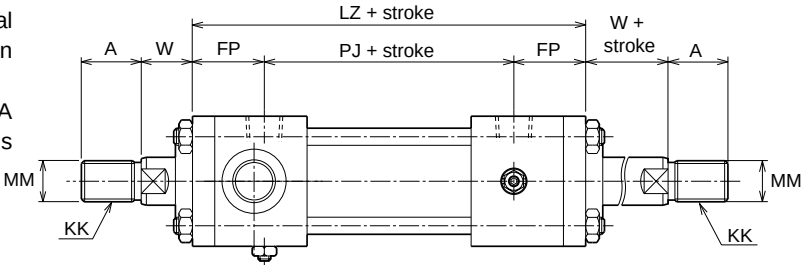
For the rod dia. of $\phi 100$ or more, a drill hole will be applied.

Rod dia.	OF	DF
$\phi 100$	$\phi 99.5$	$\phi 12$
$\phi 112$	$\phi 111.5$	$\phi 15$



- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of "Switch set". All the contents other than "Switch mounting dimensions" are identical.
- The cushion valve and air vent positions of the TA type are $\odot$, on account of the structural conditions (rod cover side).

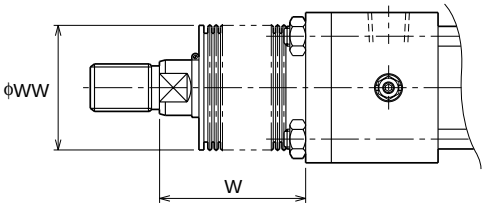
Double rod type (rod B, C)
For both ends loaded type



- The switch set ($\phi 32 - \phi 140$) is also within the fabrication range.

With boots

70-140H-8/TH8 Bore K



Rod B • C	$\phi 32$	1/3	Stroke + X
Nylon tarpaulin	$\phi 40 - \phi 50$	1/3.5	Stroke + X
Chloroprene	$\phi 63 - \phi 100$	1/4	Stroke + X
	$\phi 125 - \phi 160$	1/5	Stroke + X
Conex	$\phi 32$	1/2	Stroke + X
	$\phi 40 - \phi 50$	1/2.5	Stroke + X
	$\phi 63 - \phi 100$	1/3	Stroke + X
	$\phi 125 - \phi 140$	1/3.5	Stroke + X
	$\phi 150 - \phi 160$	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.
 - Conex is the registered trademark of Teijin Ltd.
 - If decimals are included into the calculation results, raise them to the next whole number.
 - The boots have been mounted at our factory prior to delivery.

Rod A	$\phi 40$	1/3.5	Stroke + X
Nylon tarpaulin	$\phi 50 - \phi 80$	1/4	Stroke + X
Chloroprene	$\phi 100 - \phi 160$	1/5	Stroke + X
Conex	$\phi 40$	1/2.5	Stroke + X
	$\phi 50 - \phi 80$	1/3	Stroke + X
	$\phi 100$	1/3.5	Stroke + X
	$\phi 125 - \phi 160$	1/4	Stroke + X

Dimensional table

Symbol Bore	Rod B							Rod C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16

Symbol Bore	BB	E	EE	FP	HL	JR	LZ	PJ	TC	TD	TL	UT	W		XG		ZJ	
													B•C	A	B•C	A	B•C	A
φ32	11	□58	Rc 3/8	38	141	R2	166	90	58 ⁰ _{-0.3}	φ20e9	20	98	30	—	62	—	171	—
φ40	11	□65	Rc 3/8	38	141	R2	166	90	69 ⁰ _{-0.3}	φ20e9	20	109	30	35	62	67	171	176
φ50	11	□76	Rc 1/2	42	155	R2.5	182	98	85 ⁰ _{-0.35}	φ25e9	25	135	30	41	66	77	185	196
φ63	13	□90	Rc 1/2	46	163	R2.5	194	102	98 ⁰ _{-0.35}	φ31.5e9	31.5	161	35	48	74	87	198	211
φ80	16	□110	Rc 3/4	56	184	R2.5	222	110	118 ⁰ _{-0.35}	φ31.5e9	31.5	181	35	51	82	98	219	235
φ100	18	□135	Rc 3/4	58	192	R3	232	116	145 ⁰ _{-0.4}	φ40e9	40	225	40	57	89	106	232	249
φ125	21	□165	Rc 1	67	220	R3	264	130	175 ⁰ _{-0.4}	φ50e9	50	275	45	57	103	115	265	277
φ140	22	□185	Rc 1	69	230	R4	276	138	195 ⁰ _{-0.46}	φ63e9	63	321	50	57	112	119	280	287
φ150	25	□196	Rc 1	71	240	R4	288	146	206 ⁰ _{-0.46}	φ63e9	63	332	50	57	112	119	290	297
φ160	25	□210	Rc 1	74	253	R4	304	156	218 ⁰ _{-0.46}	φ71e9	71	360	55	57	126	128	308	310

● Allowance of B is h8, allowance of MM is f8.

With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140
	Rod C	—	50	50	63	71	80	100	125	125	125
	Rod A	—	63	71	80	100	125	140	160	160	180
X	Rod B	45	45	45	55	55	55	65	65	65	65
	Rod C	—	45	45	55	55	55	65	65	65	65
	Rod A	—	45	55	55	55	65	65	65	65	65

CAD/DATA is available.



70-140H-8/TH8

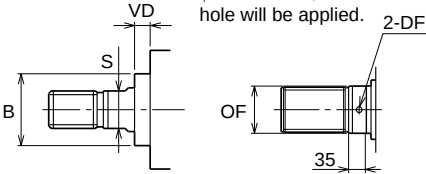
Bore

A.C

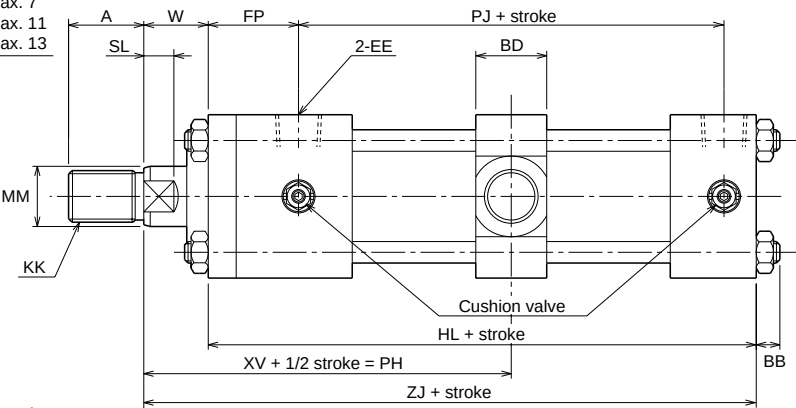
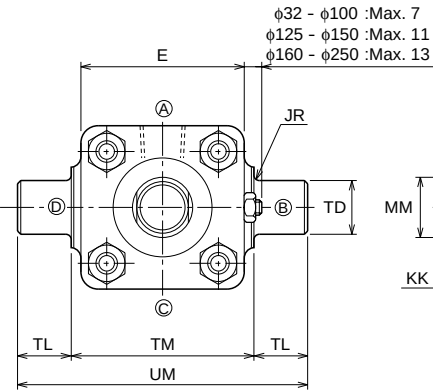
TC

70H-8	1	TC	Bore	B	B	Stroke	-	A	B
140H-8	1	TC	Bore	B	B	Stroke	-	A	B

For the rod dia. of
φ100 or more, a drill
hole will be applied.



Rod dia.	OF	DF
φ100	φ99.5	φ12
φ112	φ111.5	φ15
φ125	φ124.5	φ15
φ140	φ139.5	φ15



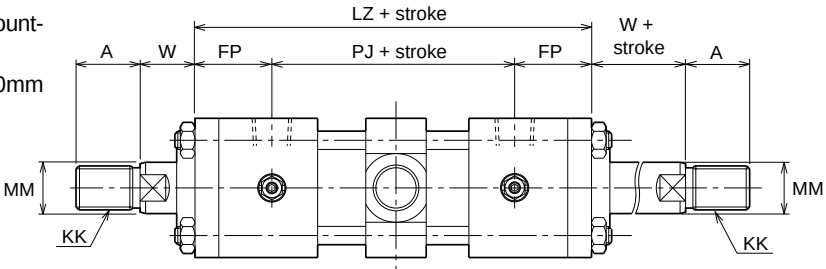
- For the dimensions other than in the diagram above, refer to the specification of the SD type (standard type).
- For the mounting of switches, refer to the dimensional drawings of “Switch set”. All the contents other than “Switch mounting dimensions and minimum PN” are identical to this table.
- Please specify the PH dimension in case of TC mounting transfer.
- The minimum available stroke for each bore (140mm to 250mm) is on the table below.

Minimum available strokes

Bore	Min. stroke	Bore	Min. stroke
φ140	6	φ200	18
φ150	0	φ224	27
φ160	8	φ250	27
φ180	12		

Double rod type (φ32 - φ160/rod B, C)

For both ends loaded type



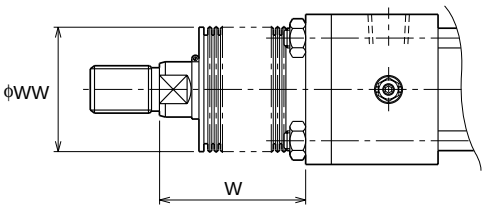
- The switch set (φ32 - φ140) is also within the fabrication range.

With boots

70-140H-8/TH8

Bore

K



Rod B • C

Nylon tarpaulin

Chloroprene

φ32	1/3	Stroke + X
φ40 • φ50	1/3.5	Stroke + X
φ63 - φ100	1/4	Stroke + X
φ125 - φ200	1/5	Stroke + X
φ224 • φ250	1/6	Stroke + X

Conex

φ32	1/2	Stroke + X
φ40 • φ50	1/2.5	Stroke + X
φ63 - φ100	1/3	Stroke + X
φ125 • φ140	1/3.5	Stroke + X
φ150 - φ200	1/4	Stroke + X
φ224 • φ250	1/4.5	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.
- Conex is the registered trademark of Teijin Ltd.
- If decimals are included into the calculation results, raise them to the next whole number.
- The boots have been mounted at our factory prior to delivery.

Rod A

Nylon tarpaulin

Chloroprene

φ40	1/3.5	Stroke + X
φ50 - φ80	1/4	Stroke + X
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 C							Rod A						
	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD	A	B	KK	MM	S	SL	VD
φ32	25	φ34	M16×1.5	φ18	14	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	30	φ40	M20×1.5	φ22.4	19	11	10	25	φ36	M16×1.5	φ18	14	10	10	35	φ43	M24×1.5	φ28	24	14	17
φ50	35	φ46	M24×1.5	φ28	24	14	10	30	φ40	M20×1.5	φ22.4	19	11	10	45	φ50	M30×1.5	φ35.5	30	16	17
φ63	45	φ55	M30×1.5	φ35.5	30	16	10	35	φ46	M24×1.5	φ28	24	14	10	60	φ65	M39×1.5	φ45	41	20	19
φ80	60	φ65	M39×1.5	φ45	41	20	10	45	φ55	M30×1.5	φ35.5	30	16	9	75	φ80	M48×1.5	φ56	50	23	20
φ100	75	φ80	M48×1.5	φ56	50	23	10	60	φ65	M39×1.5	φ45	41	20	10	95	φ95	M64×2	φ71	65	27	23
φ125	95	φ95	M64×2	φ71	65	27	10	75	φ80	M48×1.5	φ56	50	23	10	120	φ115	M80×2	φ90	85	30	17
φ140	110	φ105	M72×2	φ80	75	31	10	80	φ85	M56×2	φ63	55	24	10	140	φ125	M95×2	φ100	—	Drill hole	17
φ150	115	φ110	M76×2	φ85	80	33	10	85	φ90	M60×2	φ67	60	30	10	140	φ125	M95×2	φ100	—	Drill hole	15
φ160	120	φ115	M80×2	φ90	85	33	10	95	φ95	M64×2	φ71	65	27	10	150	φ140	M100×2	φ112	—	Drill hole	16
φ180	140	φ125	M95×2	φ100	—	Drill hole	10	110	φ105	M72×2	φ80	75	31	10	—	—	—	—	—	—	—
φ200	150	φ140	M100×2	φ112	—	Drill hole	10	120	φ115	M80×2	φ90	85	33	10	—	—	—	—	—	—	—
φ224	180	φ150	M120×2	φ125	—	Drill hole	10	140	φ125	M95×2	φ100	—	Drill hole	10	—	—	—	—	—	—	—
φ250	195	φ170	M130×2	φ140	—	Drill hole	10	150	φ140	M100×2	φ112	—	Drill hole	—	—	—	—	—	—	—	—

Symbol Bore	BB	BD	E	EE	FP	HL	JR	LZ	Minimum PH		PJ	TD	TL	TM	UM	W		XV		ZJ	
									B·C	A						B·C	A	B·C	A	B·C	A
φ32	11	28	□58	Rc 3/8	38	141	R2	166	105	—	90	φ20e9	20	58 ⁰ _{-0.3}	98	30	—	113	—	171	—
φ40	11	28	□65	Rc 3/8	38	141	R2	166	105	110	90	φ20e9	20	69 ⁰ _{-0.3}	109	30	35	113	118	171	176
φ50	11	33	□76	Rc 1/2	42	155	R2.5	182	113.5	124.5	98	φ25e9	25	85 ⁰ _{-0.35}	135	30	41	121	132	185	196
φ63	13	43	□90	Rc 1/2	46	163	R2.5	194	127.5	140.5	102	φ31.5e9	31.5	98 ⁰ _{-0.35}	161	35	48	132	145	198	211
φ80	16	43	□110	Rc 3/4	56	184	R2.5	222	140.5	156.5	110	φ31.5e9	31.5	118 ⁰ _{-0.35}	181	35	51	146	162	219	235
φ100	18	53	□135	Rc 3/4	58	192	R3	232	152.5	169.5	116	φ40e9	40	145 ⁰ _{-0.40}	225	40	57	156	173	232	249
φ125	21	58	□165	Rc 1	67	220	R3	264	174	186	130	φ50e9	50	175 ⁰ _{-0.40}	275	45	57	177	189	265	277
φ140	22	78	□185	Rc 1	69	230	R4	276	191	—	138	φ63e9	63	195 ⁰ _{-0.46}	321	50	57	188	195	280	287
φ150	25	78	□196	Rc 1	71	240	R4	288	193	—	146	φ63e9	63	206 ⁰ _{-0.46}	332	50	57	194	201	290	297
φ160	25	88	□210	Rc 1	74	253	R4	304	211	—	156	φ71e9	71	218 ⁰ _{-0.46}	360	55	57	207	209	308	310
φ180	27	98	□235	Rc 1 1/4	75	275	R4	—	225	—	172	φ80e9	80	243 ⁰ _{-0.46}	403	55	—	216	—	330	—
φ200	29	108	□262	Rc 1 1/2	85	301	R5	—	244	—	184	φ90e9	90	272 ⁰ _{-0.52}	452	55	—	232	—	356	—
φ224	34	117	□292	Rc 1 1/2	89	305	R5	—	257.5	—	184	φ100e9	100	300 ⁰ _{-0.52}	500	60	—	241	—	365	—
φ250	37	117	□325	Rc 2	106	346	R5	—	287.5	—	200	φ100e9	100	335 ⁰ _{-0.57}	535	65	—	271	—	411	—

● Allowance of B is h8, allowance of MM is f8.

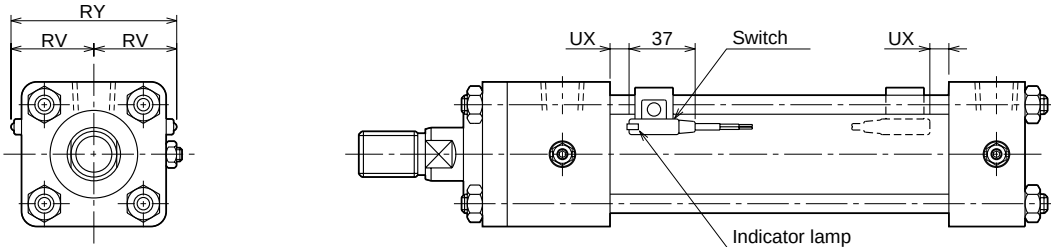
With boots

Bore		φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140	φ150	φ160	φ180	φ200	φ224	φ250
Symbol	Rod B	40	50	63	71	80	100	125	125	140	140	160	180	180	200
	Rod C	—	50	50	63	71	80	100	125	125	125	125	140	160	180
	Rod A	—	63	71	80	100	125	140	160	160	180	—	—	—	—
X	Rod B	45	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod C	—	45	45	55	55	55	65	65	65	65	65	65	80	80
	Rod A	—	45	55	55	55	65	65	65	65	65	—	—	—	—

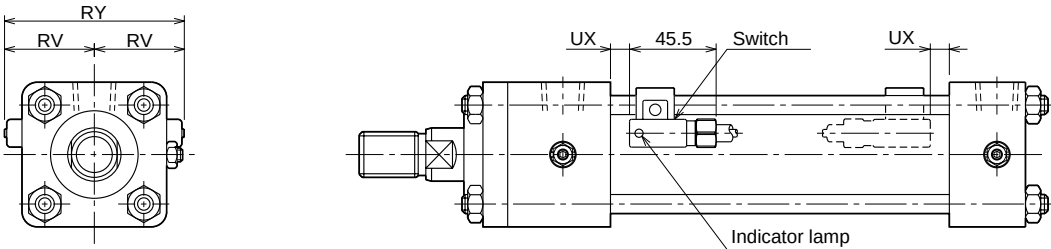
Switch set

70H-8R	2	SD	Bore	B	B	200	-	A	B	Switch symbol	Switch quantity
140H-8R	2	SD	Bore	B	B	200	-	A	B	Switch symbol	Switch quantity

AX type (contact), AX type (no contact)

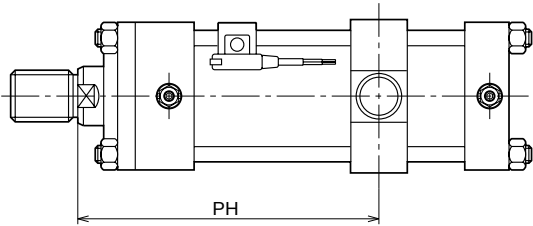


WR type (contact), WS type (no contact/2-wire, 2-LED type) (cutting fluid proof type)

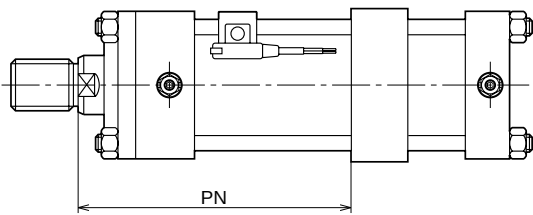


Minimum dimension PH • PN of switch set cylinder 70/140H-8R

- TC type



- FK type



- 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 W is modified. In such a case, specify the dimension PH.

Dimensional table

Symbol Bore	RV			RY			UX				The minimum dimension PH				The minimum dimension PN				
	AX type	SR type	WR-WS type	AX type	SR type	WR-WS type	AX type		SR type	WR type	WS type	AX type	SR type	WR type	WS type	AX type	SR type	WR type	WS type
							Contact	No contact											
φ32	36	40	39	72	80	78	13		6	9	12	171	181	190	193	157	167	176	179
φ40	40	46	43	80	92	86	14		6	9	13	171	181	190	193	157	167	176	179
φ50	43	50	47	86	100	94	15		7	9	14	178.5	193.5	198.5	203.5	162	177	182	187
φ63	50	56	53	100	112	106	17		10	13	16	196.5	211.5	216.5	218.5	175	190	195	197
φ80	60	64	63	120	128	126	19		11	13	17	211.5	226.5	229.5	233.5	190	205	208	212
φ100	70	74	72	140	148	142	21		13	14	21	224.5	239.5	242.5	249.5	198	213	216	223
φ125	83	89	85	166	178	170	23		17	19	23	250	265	269	273	221	236	240	244
φ140	91	—	—	182	—	—	26		—	—	—	280	—	—	—	241	—	—	—

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

Working range and difference

Bore mm	Contact						No contact			
	AX type		SR type		WR type		AX type		WS type	
	Working range	Difference	Working range	Difference	Working range	Difference	Working range	Difference	Working range	Difference
φ32	4-14	2 or less	7-10	3 or less	4-9	2 or less	3-8	1 or less	10-14	1 or less
φ40										
φ50										
φ63										
φ80										
φ100	11-18		10-16		10-17		4-10		12-18	
φ125	5-15		9-15		5-12					
φ140	11-20		—	—	—	—	6-13		—	—

CAD/DATA is available.

70-140H-8/TH8

Bore

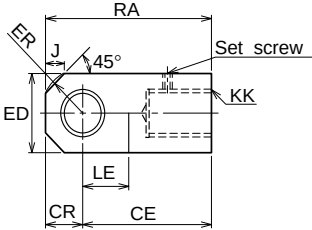
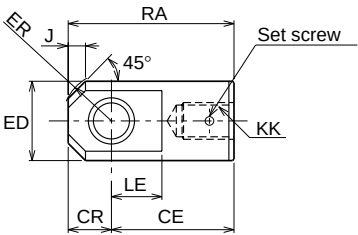
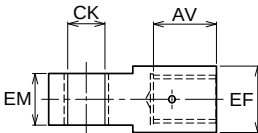
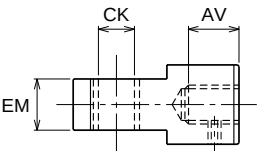
K

Rod end attachment

Rod end eye (T-end)

φ32 - φ160

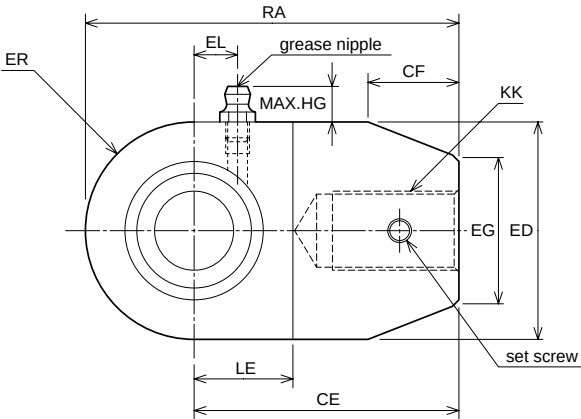
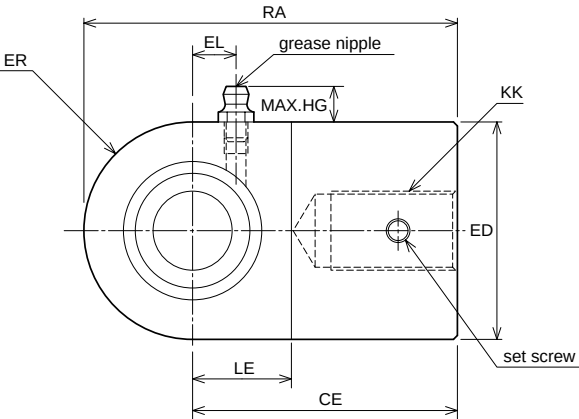
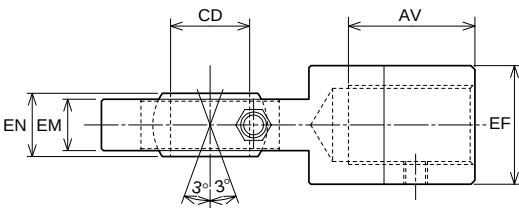
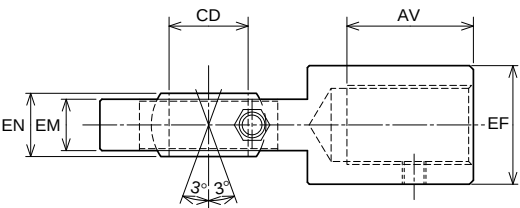
φ180 - φ250



Eye joint with spherical bearing

φ40 - φ63

φ80 - φ125



Notes) • The grease is not sealed at the shipment.
• Inner diameter and installation width of bearing are conformed to JIS-B8369 regulation.

Dimensional table/rod end eye (T-end)

Symbol Bore	Part code		AV		CE	CK	CR	ED	EF	EM	ER	J	KK		LE	RA
	Rod B	Rod C	Rod B	Rod C									Rod B	Rod C		
φ32	RTH-16-H	—	27	—	60	φ16H10	20	φ39	—	25 ^{-0.1} _{-0.4}	R23	8	M16×1.5	—	23	80
φ40	RTH-20-H	RTH-16-H	32	27	60	φ16H10	20	φ39	—	25 ^{-0.1} _{-0.4}	R23	8	M20×1.5	M16×1.5	23	80
φ50	RTH-24-H	RTH-20-1-H	37	32	70	φ20H10	25	φ49	—	31.5 ^{-0.1} _{-0.4}	R29	10	M24×1.5	M20×1.5	28	95
φ63	RTH-30-H	RTH-24-1-H	47	37	115	φ31.5H10	35	φ62	—	40 ^{-0.1} _{-0.4}	R39	15	M30×1.5	M24×1.5	43	150
φ80	RTH-39-H	RTH-30-H	62	47	115	φ31.5H10	35	φ62	—	40 ^{-0.1} _{-0.4}	R39	15	M39×1.5	M30×1.5	43	150
φ100	RTH-48-H	RTH-39-1-H	77	62	145	φ40H10	40	φ79	—	50 ^{-0.1} _{-0.4}	R45	20	M48×1.5	M39×1.5	55	185
φ125	RTH-64-H	RTH-48-1-H	97	77	180	φ50H10	50	φ100	—	63 ^{-0.1} _{-0.4}	R54	30	M64×2	M48×1.5	65	230
φ140	RTH-72-H	RTH-56-H	112	82	225	φ63H10	65	φ130	—	80 ^{-0.1} _{-0.6}	R74	30	M72×2	M56×2	85	290
φ150	RTH-76-H	RTH-60-H	117	87	225	φ63H10	65	φ130	—	80 ^{-0.1} _{-0.6}	R74	30	M76×2	M60×2	85	290
φ160	RTH-80-H	RTH-64-1-H	122	97	240	φ71H10	70	φ140	—	80 ^{-0.1} _{-0.6}	R77	40	M80×2	M64×2	90	310
φ180	RTH-95-H	RTH-72-1-H	142	112	280	φ80H10	80	160	130	100 ^{-0.1} _{-0.6}	R90	40	M95×2	M72×2	100	360
φ200	RTH-100-H	RTH-80-1-H	152	122	310	φ90H10	90	180	140	125 ^{-0.1} _{-0.6}	R99	50	M100×2	M80×2	120	400
φ224	RTH-120-H	RTH-95-1-H	182	142	370	φ100H10	100	200	170	125 ^{-0.1} _{-0.6}	R112	50	M120×2	M95×2	130	470
φ250	RTH-130-H	RTH-100-1-H	197	152	370	φ100H10	100	200	180	125 ^{-0.1} _{-0.6}	R112	50	M130×2	M100×2	130	470

Dimensional table/Eye joint with spherical bearing

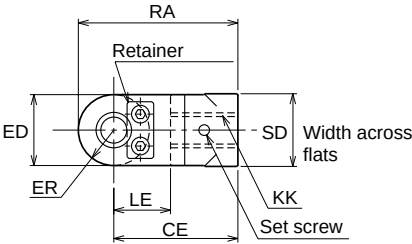
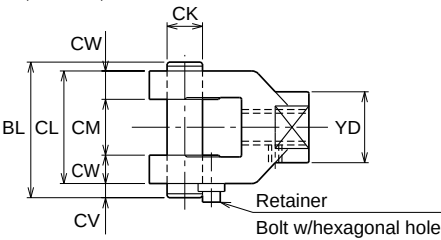
Symbol Bore	Part code		AV		CD	CE	CF	ED	EF	EG	EM	EN	ER	KK		LE	RA
	Rod B	Rod C	Rod B	Rod C										Rod B	Rod C		
φ40	RSH-20	RSH-16	32	27	20 ⁰ _{-0.012}	67	—	55	30	—	13	16 ⁰ _{-0.12}	R27.5	M20×1.5	M16×1.5	25	94.5
φ50	RSH-24	RSH-20-1	37	32	25 ⁰ _{-0.012}	78	—	65	35	—	17	20 ⁰ _{-0.12}	R32.5	M24×1.5	M20×1.5	31	110.5
φ63	RSH-30	RSH-24-1	47	37	30 ⁰ _{-0.012}	98	—	80	45	—	19	22 ⁰ _{-0.12}	R40	M30×1.5	M24×1.5	38	138
φ80	RSH-39	RSH-30-1	62	47	40 ⁰ _{-0.012}	125	60	100	55	69	23	28 ⁰ _{-0.12}	R50	M39×1.5	M30×1.5	48	175
φ100	RSH-48	RSH-39-1	77	62	50 ⁰ _{-0.012}	152	50	120	70	93	30	35 ⁰ _{-0.12}	R60	M48×1.5	M39×1.5	58	212
φ125	RSH-64	RSH-48-1	97	77	60 ⁰ _{-0.015}	187	72	150	90	105	38	44 ⁰ _{-0.15}	R75	M64×2	M48×1.5	72	262

Dimensional table/grease nipple

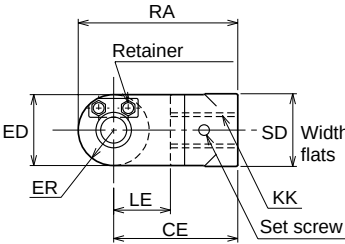
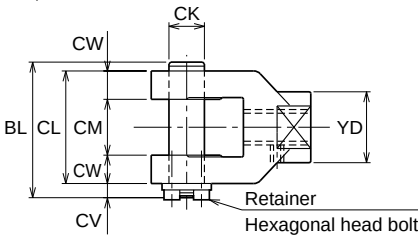
Symbol Bore	Rod B			Rod C		
	grease nipple model	EL	HG	grease nipple model	EL	HG
φ40	JIS A type MT6×1	11	11	JIS A type MT6×1	11	11
φ50	JIS A type MT6×1	14	11	JIS A type MT6×1	14	11
φ63	JIS A type Rc1/8	15	15	JIS A type MT6×1	15	15
φ80	JIS A type Rc1/8	20	15	JIS A type Rc1/8	20	15
φ100	JIS A type Rc1/8	24	15	JIS A type Rc1/8	24	15
φ125	JIS A type Rc1/8	28	15	JIS A type Rc1/8	28	15

Rod end clevis (Y-end) with pin

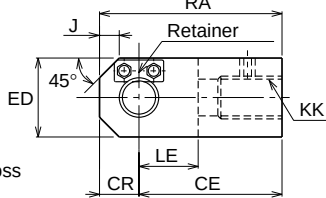
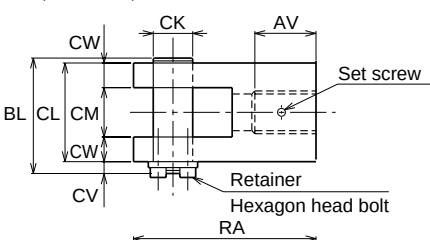
φ32 - φ80



φ100

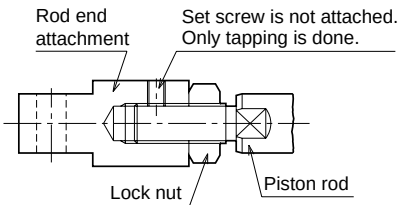


φ125 - φ250

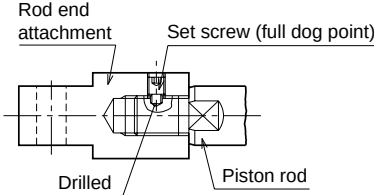


● Delivery of rod end attachment (T-end, Y-end)

(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.

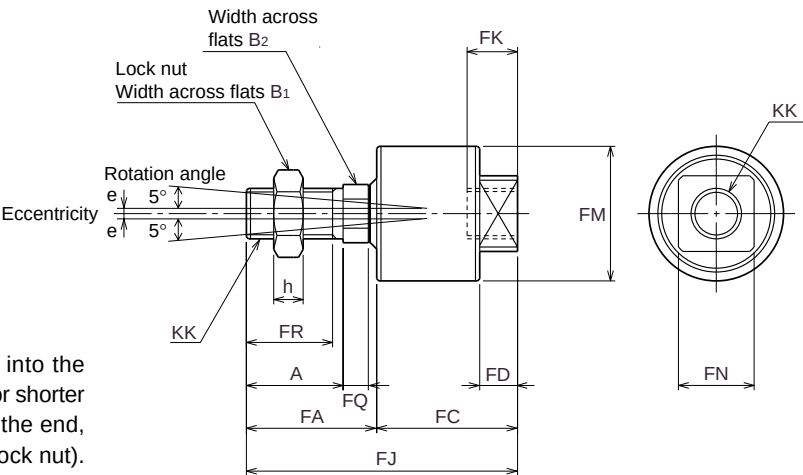
Floating joint (F-end)

Note) only 70H-8 series

Applicable series

- 70H-8
- 70H-8R
- 70H-8D
- 70H-8RD

- Notes)
- The inserted distance of the floating joint into the socket must be the same as the screw dia. or shorter (screw the joint in, and after it attaches to the end, return it one or two turns, and fix with the lock nut). Excessive insertion may lead to malfunctions.
 - DO NOT use together with the CA, CS, CB, TA, and TC accessories.
 - The lock nut is indispensable in using Floating-joint.
 - Please don't miss to order the lock nut with Floating-joint.



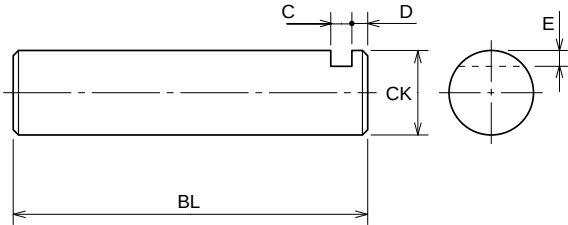
Dimensional table/rod end clevis (Y-end) with pin

Symbol Bore	Part code		AV		BL	CE	CK	CL	CM	CR	CV	CW	ED	ER	J	KK		LE	RA	SD	YD
	Rod B	Rod C	Rod B	Rod C												Rod B	Rod C				
φ32	RYH-16-H	—	—	—	62	60	$\phi 16 \frac{H10}{f8}$	50	$25^{+0.4}_{+0.1}$	—	7	12.5	32	R16	—	M16×1.5	—	27	76	32	32
φ40	RYH-20-H	RYH-16-H	—	—	62	60	$\phi 16 \frac{H10}{f8}$	50	$25^{+0.4}_{+0.1}$	—	7	12.5	32	R16	—	M20×1.5	M16×1.5	27	76	32	32
φ50	RYH-24-H	RYH-20-1-H	—	—	76.5	70	$\phi 20 \frac{H10}{f8}$	63.5	$31.5^{+0.4}_{+0.1}$	—	8	16	40	R20	—	M24×1.5	M20×1.5	32	90	41	40
φ63	RYH-30-H	RYH-24-1-H	—	—	93	115	$\phi 31.5 \frac{H10}{f8}$	80	$40^{+0.4}_{+0.1}$	—	8	20	60	R30	—	M30×1.5	M24×1.5	50	145	60	60
φ80	RYH-39-H	RYH-30-H	—	—	93	115	$\phi 31.5 \frac{H10}{f8}$	80	$40^{+0.4}_{+0.1}$	—	8	20	60	R30	—	M39×1.5	M30×1.5	50	145	60	60
φ100	RYH-48-H	RYH-39-1-H	—	—	117	145	$\phi 40 \frac{H10}{f8}$	100	$50^{+0.4}_{+0.1}$	—	12	25	80	R40	—	M48×1.5	M39×1.5	60	185	80	80
φ125	RYH-64-H	RYH-48-1-H	97	77	143	180	$\phi 50 \frac{H10}{f8}$	126	$63^{+0.4}_{+0.1}$	50	12	31.5	100	R54	30	M64×2	M48×1.5	70	230	—	—
φ140	RYH-72-H	RYH-56-H	112	82	183	225	$\phi 63 \frac{H10}{f8}$	160	$80^{+0.6}_{+0.1}$	65	18	40	120	R72	30	M72×2	M56×2	90	290	—	—
φ150	RYH-76-H	RYH-60-H	117	87	183	225	$\phi 63 \frac{H10}{f8}$	160	$80^{+0.6}_{+0.1}$	65	18	40	120	R72	30	M76×2	M60×2	90	290	—	—
φ160	RYH-80-H	RYH-64-1-H	122	97	183	240	$\phi 71 \frac{H10}{f8}$	160	$80^{+0.6}_{+0.1}$	70	18	40	140	R77	40	M80×2	M64×2	100	310	—	—
φ180	RYH-95-H	RYH-72-1-H	142	112	210	280	$\phi 80 \frac{H10}{f8}$	180	$100^{+0.6}_{+0.1}$	80	24	40	160	R90	40	M95×2	M72×2	110	360	—	—
φ200	RYH-100-H	RYH-80-1-H	152	122	260	310	$\phi 90 \frac{H10}{f8}$	230	$125^{+0.6}_{+0.1}$	90	24	52.5	180	R99	50	M100×2	M80×2	130	400	—	—
φ224	RYH-120-H	RYH-95-1-H	182	142	280	370	$\phi 100 \frac{H10}{f8}$	250	$125^{+0.6}_{+0.1}$	100	24	62.5	200	R112	50	M120×2	M95×2	140	470	—	—
φ250	RYH-130-H	RYH-100-1-H	197	152	280	370	$\phi 100 \frac{H10}{f8}$	250	$125^{+0.6}_{+0.1}$	100	24	62.5	200	R112	50	M130×2	M100×2	140	470	—	—

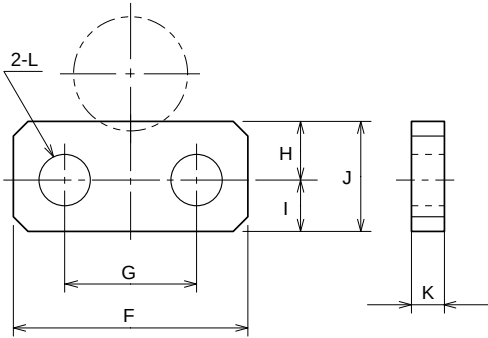
Dimensional table/floating joint (F-end)

Applicable bore		Part code	A	B ₁	B ₂	e	FA	FC	FD	FJ	FK	FM	FN	FQ	FR	h	KK
Rod B	Rod C																
φ32	φ40	RFH-16	32	22	17	1.5	43	46	13	89	16	φ40	24	8	28	10	M16×1.5
φ40	φ50	RFH-20	40	27	22	2	53	57	15	110	22	φ50	30	9	35	12	M20×1.5
φ50	φ63	RFH-24	46	32	24	2.5	62	67	18	129	24	φ64	36	12	41	14	M24×1.5
φ63	φ80	RFH-30	58	41	32	2.5	78	83	21	161	30	φ76	46	14	52	17	M30×1.5

Parallel pin



Keeper plate



Dimensional table/Parallel pin

Symbol Bore	BL	C	CK	D	E
φ32	62	4	φ16	3	3
φ40	62	4	φ16	3	3
φ50	76.5	5	φ20	3	3
φ63	93	5	φ31.5	3	4.75
φ80	93	5	φ31.5	3	4.75
φ100	117	7	φ40	5	5
φ125	143	7	φ50	5	5
φ140	183	10	φ63	8	8
φ150	183	10	φ63	8	8
φ160	183	10	φ71	8	8

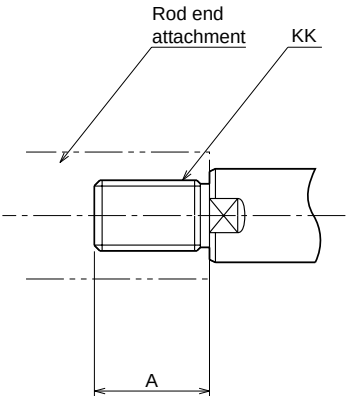
- Allowance of CK is f8.

Dimensional table/Keeper plate

Symbol Bore	F	G	H	I	J	K	L	Volt size
φ32	25	14	7	6	13	3	φ6.5	M6
φ40	25	14	7	6	13	3	φ6.5	M6
φ50	32	18	8	7	15	4.5	φ7	M6
φ63	32	18	8	7	15	4.5	φ7	M6
φ80	32	18	8	7	15	4.5	φ7	M6
φ100	50	30	10	8	18	6	φ10	M8
φ125	65	40	12	10	22	6	φ12	M10
φ140	75	48	17	13	30	9	φ14	M12
φ150	75	48	17	13	30	9	φ14	M12
φ160	75	48	17	13	30	9	φ14	M12

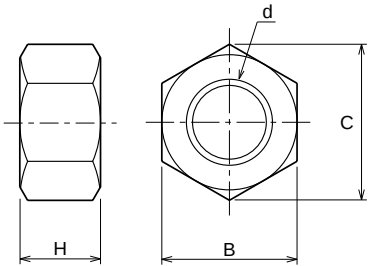


When rod end attachment is required
(rod dia. A type)



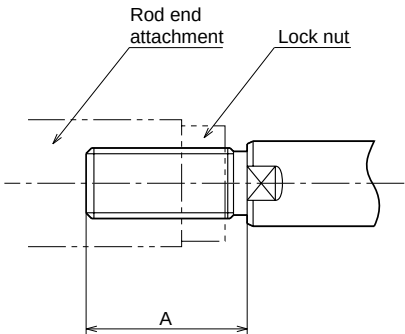
- It is recommended to modify the thread dia., dimension KK, to that of the rod B (Ex.: for 50 mm dia., M30 × 1.5→M24 × 1.5), and attach the rod end attachment for the rod B. In such a case, specify the dimensions, A and KK.

Lock nut



- The type with a bore of $\phi 180$ or more is also within the semi-standard fabrication range.

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.



Dimensional table

Symbol Bore	Rod A thread part dimensions		Rod B thread part dimensions		Rod end attachment parts code in the case of the thread dimensions of rod B		
	A	KK	A	KK	Rod end eye	Rod end clevis	F-joint
φ40	35	M24×1.5	30	M20×1.5	RTH-20-H	RYH-20-H	RFH-20
φ50	45	M30×1.5	35	M24×1.5	RTH-24-H	RYH-24-H	RFH-24
φ63	60	M39×1.5	45	M30×1.5	RTH-30-H	RYH-30-H	RFH-30
φ80	75	M48×1.5	60	M39×1.5	RTH-39-H	RYH-39-H	—
φ100	95	M64×2	75	M48×1.5	RTH-48-H	RYH-48-H	—
φ125	120	M80×2	95	M64×2	RTH-64-H	RYH-64-H	—
φ140	140	M95×2	110	M72×2	RTH-72-H	RYH-72-H	—
φ150	140	M95×2	115	M76×2	RTH-76-H	RYH-76-H	—
φ160	150	M100×2	120	M80×2	RTH-80-H	RYH-80-H	—

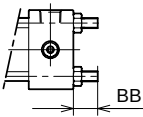
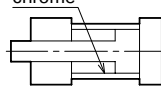
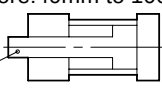
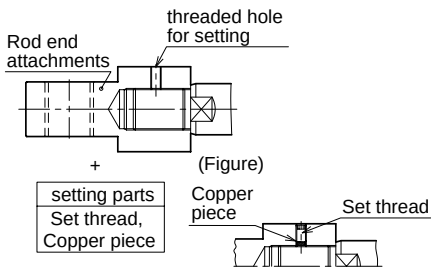
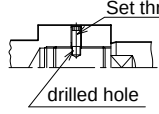
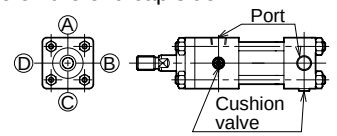
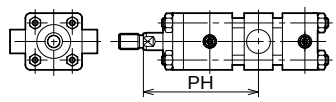
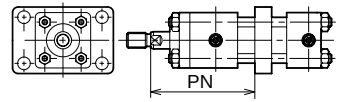
Dimensional table/lock nut

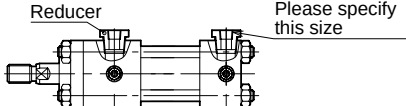
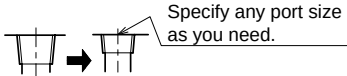
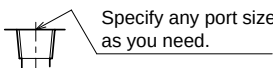
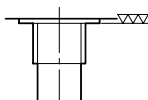
Symbol Bore	Rod B					Rod C					Rod A				
	Parts code	B	C	d	H	Parts code	B	C	d	H	Parts code	B	C	d	H
φ32	LNH-16F-H	22	25.4	M16×1.5	10	—	—	—	—	—	—	—	—	—	—
φ40	LNH-20F-H	27	31.2	M20×1.5	12	LNH-16F-H	22	25.4	M16×1.5	10	LNH-24F-H	32	37.0	M24×1.5	14
φ50	LNH-24F-H	32	37.0	M24×1.5	14	LNH-20F-H	27	31.2	M20×1.5	12	LNH-30F-H	41	47.3	M30×1.5	17
φ63	LNH-30F-H	41	47.3	M30×1.5	17	LNH-24F-H	32	37.0	M24×1.5	14	LNH-39F-H	55	63.5	M39×1.5	20
φ80	LNH-39F-H	55	63.5	M39×1.5	20	LNH-30F-H	41	47.3	M30×1.5	17	LNH-48F-H	70	80.8	M48×1.5	26
φ100	LNH-48F-H	70	80.8	M48×1.5	26	LNH-39F-H	55	63.5	M39×1.5	20	LNH-64F-H	90	104	M64×2	35
φ125	LNH-64F-H	90	104	M64×2	35	LNH-48F-H	70	80.8	M48×1.5	26	LNH-80F-H	110	127	M80×2	43
φ140	LNH-72F-H	100	115	M72×2	38	LNH-56F-H	80	92.4	M56×2	30	LNH-95F-H	130	150	M95×2	47
φ150	LNH-76F-H	105	121	M76×2	40	LNH-60F-H	85	98.1	M60×2	33	LNH-95F-H	130	150	M95×2	47
φ160	LNH-80F-H	110	127	M80×2	43	LNH-64F-H	90	104	M64×2	35	LNH-100F-H	135	156	M100×2	50
φ180	LNH-95F-H	130	150	M95×2	47	LNH-72F-H	100	115	M72×2	38	—	—	—	—	—
φ200	LNH-100F-H	135	156	M100×2	50	LNH-80F-H	110	127	M80×2	43	—	—	—	—	—
φ224	LNH-120F-H	165	191	M120×2	60	LNH-95F-H	130	150	M95×2	47	—	—	—	—	—
φ250	LNH-130F-H	180	208	M130×2	65	LNH-100F-H	135	156	M100×2	50	—	—	—	—	—

Symbol Bore	Dimension A		
	Rod A	Rod B	Rod C
φ32	—	40	—
φ40	50	45	40
φ50	60	50	45
φ63	80	60	50
φ80	95	80	60
φ100	125	95	80
φ125	155	125	95
φ140	180	140	105
φ150	180	150	120
φ160	190	155	125
φ180	—	180	140
φ200	—	190	155
φ224	—	230	180
φ250	—	250	190

★ Easy ordering system

The following contents can be easily specified using the Semi-standard symbols and the (Position/Dimension/ Material) symbols.

How to order		Series name	Model number	- X	The semi-standard symbols	Position/Dimension/Material symbols		
Easy order contents		① The semi-standard symbols	Position		Dimension		Material	
		② Symbol	contents		③ Symbol	contents	④ Symbol	contents
Tie rods extension Note1) Tolerance of BB dimension is approximately due to tie rod's stretch. It should be consulted us in case of precise BB dimension necessary. 2) LB, LC Only 2, end side and upper, tie rods can be extended. Flange, Clevis mounting Only one side's 4 tie rods without mounting bracket can be extended.		STD	TD-RS	Head cap side	BB- 	 Maximum BB for semi-standard is 70mm.	—	—
			TD-HS	End cap side				
			TD-BS	Both sides				
ex.		In case of selecting SD mounting and tie rods extension on both sides to be 50mm. 70H-8R 2SD80BB100-ABAH2-X STD TD-BS, BB-50						
Hard chrome plated on inside of cylinder tubing (Only for carbon steel tube) Note) Consult us for any special thickness of chrome plating except 0.02mm.		STB	—	—	BG-0.02	Thickness of chrome plating 0.02mm	—	—
		ex.	70H-8 2LB80BB100-AB-X STB BG-0.02					
Stainless steel rod (bore:40mm to 100mm) rod : SUS 		SPR	—	—	—	—	PR-10	Material:SUS304 Thickness of chrome plating 0.02mm
		ex.	70H-8R 2LB80BB100-ABAH2-X SPR PR-10					
Rod end attachments (T,Y,S) with a set screw and a copper piece (bore:32mm to 160mm) 		MDC	—	—	—	—	—	—
		ex.	No need to specify Position/Dimension/Material symbols. Occasion) In order to receive the cylinder and the rod end attachment separately. (Just temporary assembly) 70H-8R 2CB80BB100-ABAH2-T-X MDC Reference) Without the order of MDC, the attachment is fixed as below at shipment. Reference) Without the order of MDC, the attachment is fixed as below at shipment. After fine adjustment, please be sure to fix the attachment using a copper piece and a screw. ★Validity of the way to fix the attachment coated with adhesive might not be multirole. Please be sure to fasten it to avoid the trouble. 					
Changing the location of the port and cushion needle on the end cap side 		PPC	PC- 	Port/Cushion needle location on end cap side	—	—	—	—
		ex.	Phase changed Port/Cushion needle on both sides. 70H-8 2LA80BB100-AB-X PPC PC-BC					
Water-glycol working fluid Note1) Carbon steel tubing has hard chrome plated on inside and the water-glycol fluid is used for testing. 2) Stainless steel tubing has no chrome plated and the water-glycol fluid is used for testing.		FWF	—	—	—	—	WF-WG	WF-WG: Water-glycol working fluid
		ex.	70H-8 6LB80BB100-AB-X FWF WF-WG					
Trunion location change (PH dimension) 		MTC	—	—	TCPH- 	 should be specified by the integral number.	—	—
		ex.	In case of 360mm PH dimension 70H-8R 2TC63BB500-AB-X MTC TCPH-360					
Intermediate flange location change (PN dimension) 		MFK	—	—	FKPN- 	 should be specified by the integral number.	—	—
		ex.	In case of 1100mm PN dimension 140H-8 2FK80BB1800-AB-X MFK FKPN-1100					

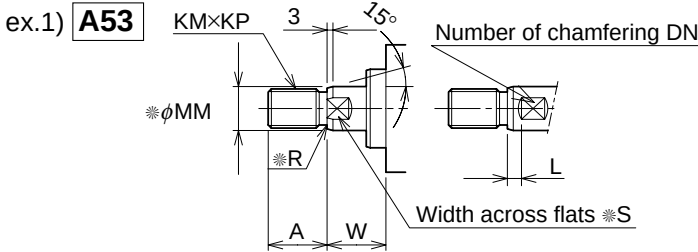
Special order contents	① The semi-standard symbols	Position		Dimension		Material							
		② Symbol	contents	③ Symbol	contents	④ Symbol	contents						
Additional bushing 	PBS	—	—	RC-1.00	Rc1/8	—	—						
				RC-2.00	Rc1/4								
				RC-3.00	Rc3/8								
				RC-4.00	Rc1/2								
				RC-6.00	Rc3/4								
				RC-8.00	Rc1								
				RC-10.00	Rc1 1/4								
				RC-12.00	Rc1 1/2								
Note1) Please specify the reduced port size as dimensional data. Note2) Only one or two steps reducing can be specified on this system. Any other case, please consult us.	ex.	140H-8, CA mounting, bore:80mm (Standard port:Rc3/4) is going to be Rc1/2 port. (one step reducing) 140H-8 2CA80BB300-AB-X PBS RC-4.00											
Rc port size below standard (bore:32mm to 160mm) ★ In case of port size below standard necessary without reducer  You can't use this symbol at : ● all A rod variations ● B, C rod with LA mounting	① The semi-standard symbols	Only dimensional data is required.		Counter-chart of cylinder bore size and optional port size(◎ : Standard port size)									
	PRT	③ Symbol	contents	32	40	50	63	80	100	125	140	150	160
		RC-1.00	Rc1/8	○	○	×	×	×	×	×	×	×	×
		RC-2.00	Rc1/4	○	○	○	○	×	×	×	×	×	×
		RC-3.00	Rc3/8	◎	◎	○	○	○	×	×	×	×	
		RC-4.00	Rc1/2	×	×	◎	◎	○	○	○	○	○	
		RC-6.00	Rc3/4	×	×	×	×	◎	◎	○	○	○	
		RC-8.00	Rc1	×	×	×	×	×	◎	◎	◎	◎	
RC-10.00	Rc1 1/4	×	×	×	×	×	×	×	×	×	×		
Note) Consult us for any over size port necessary for check dimensions.	ex.	bore:63mm (standard port Rc1/2), without bushing is going to be Rc3/8 port. 70H-8R 2CA80BB100-ABAH2-X PRT RC-3.00											
Cover port size reducing (for NPT) (bore:32mm to 160mm) Note) Optional port size range is common to the Rc port.  You can't use this symbol at : ● all A rod variations ● B, C rod with LA mounting	① The semi-standard symbols	Only dimensional data is required.		Counter-chart of cylinder bore size and optional port size(◎ : Standard port size)									
	PTN	③ Symbol	contents	32	40	50	63	80	100	125	140	150	160
		N-1.00	NPT1/8	○	○	×	×	×	×	×	×	×	×
		N-2.00	NPT1/4	○	○	○	○	×	×	×	×	×	×
		N-3.00	NPT3/8	◎	◎	○	○	○	×	×	×	×	
		N-4.00	NPT1/2	×	×	◎	◎	○	○	○	○	○	
		N-6.00	NPT3/4	×	×	×	×	◎	◎	○	○	○	
		N-8.00	NPT1	×	×	×	×	×	◎	◎	◎	◎	
N-10.00	NPT1 1/4	×	×	×	×	×	×	×	×	×	×		
Note) Consult us for any over size port necessary for check dimensions.	Note	The way to order the standard port size(◎) is showed in the article below.											
	ex.	bore:50mm (standard port NPT1/2) is going to be NPT3/8 port. 70H-8 2CB50BB100-NAB-X PTN N-3.00											
G / NPT port (bore:32mm to 160mm) (Only for standard size G or NPT) 	Standard size G or NPT can be easily ordered as below. ex.) 70H-8 2LA50BB100- G A B -TL G:G screw piping port type N:NPT screw type Port position Location of cushion needle												

Special specification at the rod end

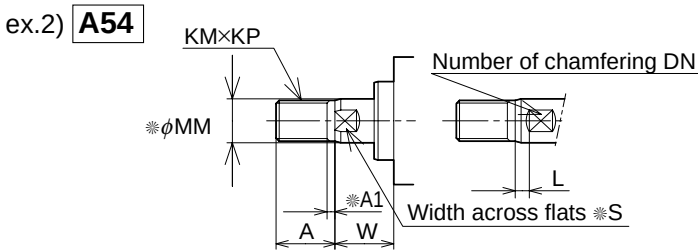
■ You can easily order following categorized items using the Semi-standard symbols and dimensional parameters.
(No need to specify dimensional parameters if you would apply the basic dimensions.)

How to order **Series name** **Model number** – X **The semi-standard symbols** **Dimensional parameters**

Parameter KM and KP need to be specified as a pair.



- φ63C Rod end shape A53, A=50, W=50, thread M22×1.5, Number of chamfering 2, position of flats L = 10
70H-8 2FA63CB200-AB-X A53
A-50, KM-22, KP-1.5, L-10, W-50

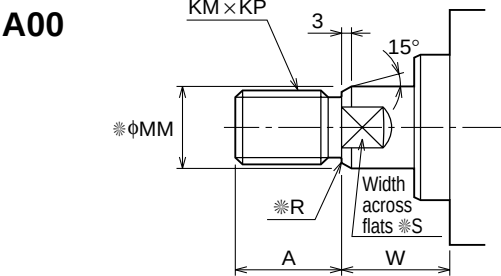


- φ63C Rod end shape A54, basic dimensions
140H-8 2LA63BC500-BC-X A54

Note) For the A54 type, if the dimensions KM and KP are modified, the dimension A1 is modified as shown in the table below.

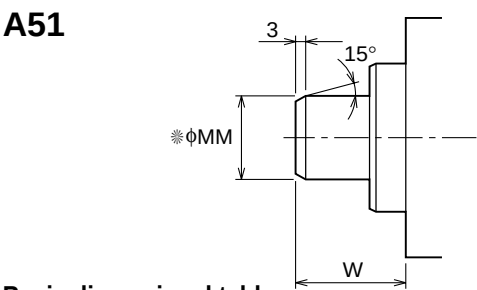
KP (pitch)	Dimension A1
1.75 or less	4
2	5
2.5 or more	KP (pitch) × 2

Special rod end shape type (rod C)



Basic dimensional table (standard dimensions)

Bore	A	KM	KP	φMM	φR	φS	W
φ40	25	M16	1.5	φ18	1	14	30
φ50	30	M20	1.5	φ22.4	1	19	30
φ63	35	M24	1.5	φ28	1	24	35
φ80	45	M30	1.5	φ35.5	1.6	30	35
φ100	60	M39	1.5	φ45	1.6	41	40
φ125	75	M48	1.5	φ56	1.6	50	45
φ140	80	M56	2	φ63	2	55	50
φ150	85	M60	2	φ67	2	60	50
φ160	95	M64	2	φ71	2	65	55
φ180	110	M72	2	φ80	2	75	55
φ200	120	M80	2	φ90	2	85	55
φ224	140	M95	2	φ100	2	Drill	60
φ250	150	M100	2	φ112	2	hole	65

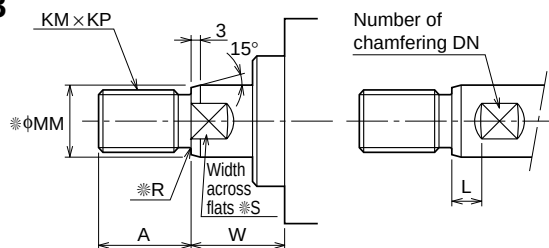


Basic dimensional table

Bore	φMM	W
φ40	φ18	30
φ50	φ22.4	30
φ63	φ28	35
φ80	φ35.5	35
φ100	φ45	40
φ125	φ56	45
φ140	φ63	50
φ150	φ67	50
φ160	φ71	55
φ180	φ80	55
φ200	φ90	55
φ224	φ100	60
φ250	φ112	65

- Dimensions indicated by φ Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

A53

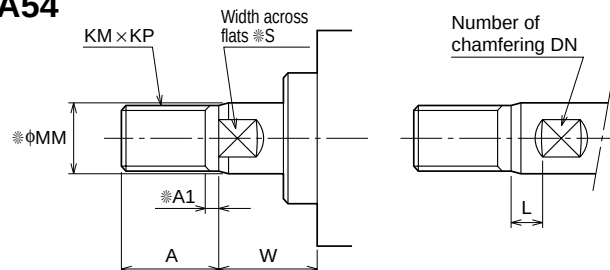


Basic dimensional table

Bore	A	DN	KM	KP	L	φMM	R	S	W
φ40	25	2	M16	1.5	0	φ18	1	14	30
φ50	30	2	M20	1.5	0	φ22.4	1	19	30
φ63	35	2	M24	1.5	0	φ28	1	24	35
φ80	45	2	M30	1.5	0	φ35.5	1.6	30	35
φ100	60	2	M39	1.5	0	φ45	1.6	41	40
φ125	75	2	M48	1.5	0	φ56	1.6	50	45
φ140	80	2	M56	2	0	φ63	2	55	50
φ150	85	2	M60	2	0	φ67	2	60	50
φ160	95	2	M64	2	0	φ71	2	65	55

Use this type when the width across flats S of the A00 are required to be moved.

A54

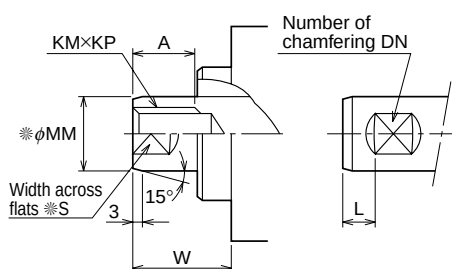


Basic dimensional table

Bore	A	A1	DN	KM	KP	L	φMM	S	W
φ32	25	4	2	M16	1.5	0	φ18	14	30
φ40	30	4	2	M20	1.5	0	φ22.4	19	30
φ50	35	4	2	M24	1.5	0	φ28	24	30
φ63	45	4	2	M30	1.5	0	φ35.5	30	35
φ80	60	4	2	M39	1.5	0	φ45	41	35
φ100	75	4	2	M48	1.5	0	φ56	50	40
φ125	95	5	2	M64	2	0	φ71	65	45
φ140	110	5	2	M72	2	0	φ80	75	50
φ150	115	5	2	M76	2	0	φ85	80	50
φ160	120	5	2	M80	2	0	φ90	85	55
φ180	140	5		M95	2		φ100		55
φ200	150	5	Drill hole	M100	2	Drill hole	φ112	Drill hole	55
φ224	180	5		M120	2		φ125	Drill hole	60
φ250	195	5		M130	2		φ140		65

Note) • The possible number of chamfering DN is 2 (standard) or 4 only.

A81



Basic dimensional table

Bore	A	DN	KM	KP	L	φMM	S	W
φ40	15	2	M12	1.75	0	φ18	14	30
φ50	20	2	M16	2	0	φ22.4	19	30
φ63	24	2	M20	2.5	0	φ28	24	35
φ80	33	2	M27	3	0	φ35.5	30	35
φ100	36	2	M30	3.5	0	φ45	41	40
φ125	45	2	M39	4	0	φ56	50	45
φ140	54	2	M45	2	0	φ63	55	50
φ150	54	2	M45	2	0	φ67	60	50
φ160	58	2	M48	2	0	φ71	65	55

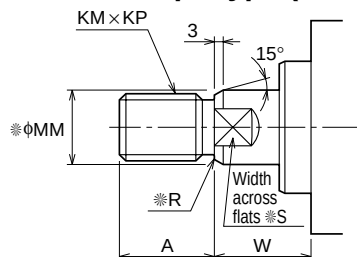
This type of shape is applicable to only the 7 MPa type.
For the 14 MPa type, contact us.

Note) • The possible number of chamfering DN is 2 (standard) or 4 only.

- Dimensions indicated by * Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

Special rod end shape type (rod B)

A00

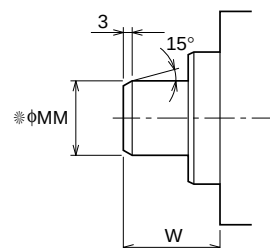


Basic dimensional table (standard dimensions)

Bore	A	KM	KP	⌘MM	⌘R	⌘S	W
φ32	25	M16	1.5	φ18	1	14	30
φ40	30	M20	1.5	φ22.4	1	19	30
φ50	35	M24	1.5	φ28	1	24	30
φ63	45	M30	1.5	φ35.5	1.6	30	35
φ80	60	M39	1.5	φ45	1.6	41	35
φ100	75	M48	1.5	φ56	1.6	50	40
φ125	95	M64	2	φ71	2	65	45
φ140	110	M72	2	φ80	2	75	50
φ150	115	M76	2	φ85	2	80	50
φ160	120	M80	2	φ90	2	85	55
φ180	140	M95	2	φ100	2	Drill hole	55
φ200	150	M100	2	φ112	2		55
φ224	180	M120	2	φ125	2		60
φ250	195	M130	2	φ140	2		65

Note) • The possible number of chamfering DN is 2 (standard) or 4 only.

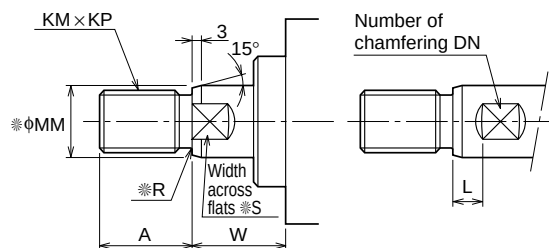
A51



Basic dimensional table

Bore	※MM	W
φ32	φ18	30
φ40	φ22.4	30
φ50	φ28	30
φ63	φ35.5	35
φ80	φ45	35
φ100	φ56	40
φ125	φ71	45
φ140	φ80	50
φ150	φ85	50
φ160	φ90	55
φ180	φ100	55
φ200	φ112	55
φ224	φ125	60
φ250	φ140	65

A53



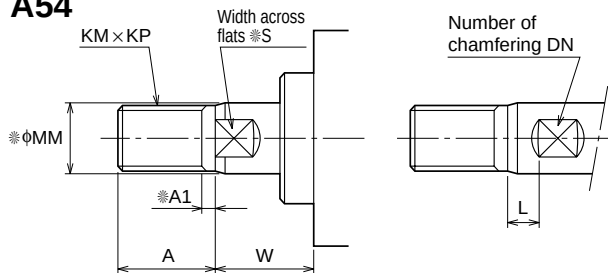
Basic dimensional table

Bore	A	DN	KM	KP	L	✳MM	✳R	✳S	W
φ32	25	2	M16	1.5	0	φ18	1	14	30
φ40	30	2	M20	1.5	0	φ22.4	1	19	30
φ50	35	2	M24	1.5	0	φ28	1	24	30
φ63	45	2	M30	1.5	0	φ35.5	1.6	30	35
φ80	60	2	M39	1.5	0	φ45	1.6	41	35
φ100	75	2	M48	1.5	0	φ56	1.6	50	40
φ125	95	2	M64	2	0	φ71	2	65	45
φ140	110	2	M72	2	0	φ80	2	75	50
φ150	115	2	M76	2	0	φ85	2	80	50
φ160	120	2	M80	2	0	φ90	2	85	55

Use this type when the width across flats S of the A00 are required to be moved.

- Dimensions indicated by ✱ Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

A54

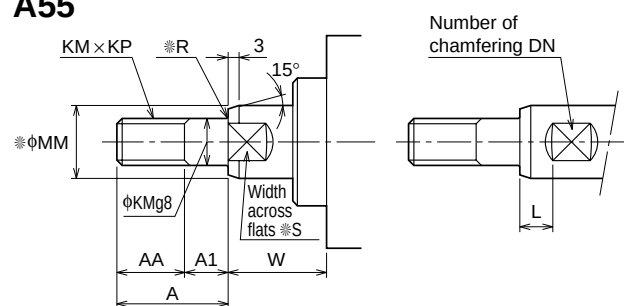


Basic dimensional table

Bore	A	※A1	DN	KM	KP	L	※MM	※S	W
φ32	25	4	2	M16	1.5	0	φ18	14	30
φ40	30	4	2	M20	1.5	0	φ22.4	19	30
φ50	35	4	2	M24	1.5	0	φ28	24	30
φ63	45	4	2	M30	1.5	0	φ35.5	30	35
φ80	60	4	2	M39	1.5	0	φ45	41	35
φ100	75	4	2	M48	1.5	0	φ56	50	40
φ125	95	5	2	M64	2	0	φ71	65	45
φ140	110	5	2	M72	2	0	φ80	75	50
φ150	115	5	2	M76	2	0	φ85	80	50
φ160	120	5	2	M80	2	0	φ90	85	55
φ180	140	5		M95	2		φ100		55
φ200	150	5	Drill hole	M100	2	Drill hole	φ112	Drill hole	55
φ224	180	5		M120	2		φ125		60
φ250	195	5		M130	2		φ140		65

Note) ● The possible number of chamfering DN is 2 (standard) or 4 only.

A55



Basic dimensional table

Bore	A	AA	A1	DN	KM	KP	L	※MM	※R	※S	W
φ50	44	30	14	2	M20	1.5	0	φ28	1.6	24	30
φ63	49	35	14	2	M24	1.5	0	φ35.5	2	30	35
φ80	59	45	14	2	M30	1.5	0	φ45	2	41	35
φ100	74	60	14	2	M39	1.5	0	φ56	2	50	40
φ125	89	75	14	2	M48	1.5	0	φ71	2.5	65	45
φ140	100	80	20	2	M56	2	0	φ80	2.5	75	50
φ150	105	85	20	2	M60	2	0	φ85	2.5	80	50
φ160	115	95	20	2	M64	2	0	φ90	2.5	85	55

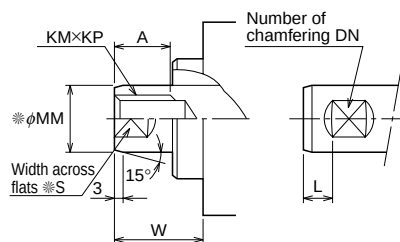
For the products of a bore of φ32 and φ40, basic dimensions have not been specified.

Contact us when you request for them.

When modifying the dimension A1, specify the number of 10 or more.

Specify the dimensions AA and A1 at the same time.

A81

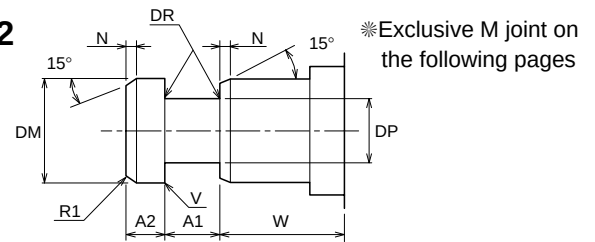


Basic dimensional table

Bore	A	DN	KM	KP	L	※MM	※S	W
φ32	15	2	M12	1.75	0	φ18	14	30
φ40	20	2	M16	2	0	φ22.4	19	30
φ50	24	2	M20	2.5	0	φ28	24	30
φ63	33	2	M27	3	0	φ35.5	30	35
φ80	36	2	M30	3.5	0	φ45	41	35
φ100	45	2	M39	4	0	φ56	50	40
φ125	58	2	M48	2	0	φ71	65	45
φ140		2			0	φ80	75	50
φ150		2			0	φ85	80	50
φ160		2			0	φ90	85	55

For the products of a bore from φ140 to φ160, basic dimensions have not been specified. When ordering them, fill the blank areas in the table above.

A82



Basic dimensional table

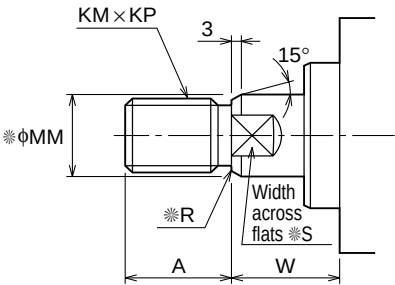
Bore	※A1 ^{+0.5} _{-0.3}	※A2 ^{-0.2} _{-0.3}	※DM	※DP ^{-0.2} _{-0.3}	※DR	※MM	※N	※V	W
φ32	12.5	12.5	φ18	φ13	1.0	φ18	3	C0.2	30
φ40	12.5	12.5	φ22.4	φ16	1.5	φ22.4	3	C0.2	30
φ50	12.5	12.5	φ28	φ21	1.5	φ28	3	C0.2	30
φ63	15	15	φ35.5	φ26	2.0	φ35.5	3	C0.2	35
φ80	15	15	φ45	φ31	2.0	φ45	3	C0.2	35
φ100	20	20	φ56	φ38	3.0	φ56	3	C0.2	40
φ125	25	25	φ71	φ49	3.5	φ71	3	R1	45
φ140	25	25	φ80	φ56	4.0	φ80	3	R1	50
φ150	30	30	φ85	φ58	5.0	φ85	6	R1	50
φ160	30	30	φ90	φ60	5.0	φ90	6	R1	55

MM is rod dia.

- Dimensions indicated by ※ Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

Special rod end shape type (rod A)

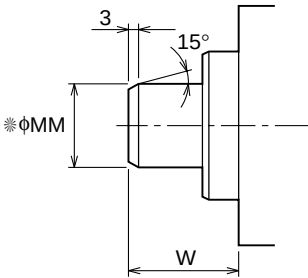
A00



Basic dimensional table (standard dimensions)

Bore	A	KM	KP	φMM	R	S	W
φ40	35	M24	1.5	φ28	1	24	35
φ50	45	M30	1.5	φ35.5	1.6	30	41
φ63	60	M39	1.5	φ45	1.6	41	48
φ80	75	M48	1.5	φ56	1.6	50	51
φ100	95	M64	2	φ71	2	65	57
φ125	120	M80	2	φ90	2	85	57
φ140	140	M95	2	φ100	2	Drill hole	57
φ150	140	M95	2	φ100	2		57
φ160	150	M100	2	φ112	2		57

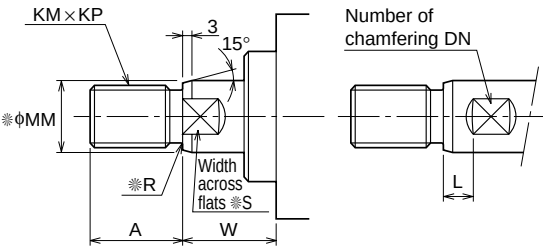
A51



Basic dimensional table

Bore	φMM	W
φ40	φ28	35
φ50	φ35.5	41
φ63	φ45	48
φ80	φ56	51
φ100	φ71	57
φ125	φ90	57
φ140	φ100	57
φ150	φ100	57
φ160	φ112	57

A53

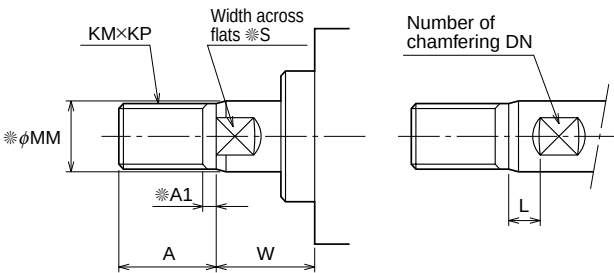


Basic dimensional table

Bore	A	DN	KM	KP	L	φMM	R	S	W
φ40	35	2	M24	1.5	0	φ28	1	24	35
φ50	45	2	M30	1.5	0	φ35.5	1.6	30	41
φ63	60	2	M39	1.5	0	φ45	1.6	41	48
φ80	75	2	M48	1.5	0	φ56	1.6	50	51
φ100	95	2	M64	2	0	φ71	2	65	57
φ125	120	2	M80	2	0	φ90	2	85	57

Use this type when the width across flats S of the A00 are required to be moved.

A54

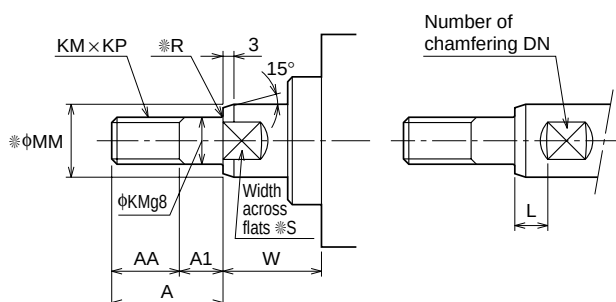


Basic dimensional table

Bore	A	A1	DN	KM	KP	L	φMM	S	W
φ40	35	4	2	M24	1.5	0	φ28	24	35
φ50	45	4	2	M30	1.5	0	φ35.5	30	41
φ63	60	4	2	M39	1.5	0	φ45	41	48
φ80	75	4	2	M48	1.5	0	φ56	50	51
φ100	95	5	2	M64	2	0	φ71	65	57
φ125	120	5	2	M80	2	0	φ90	85	57
φ140	140	5	Drill hole	M95	2	Drill hole	φ100	Drill hole	57
φ150	140	5	↑	M95	2	↑	φ100		57
φ160	150	5	↑	M100	2	↑	φ112		57

- Dimensions indicated by φ Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

A55



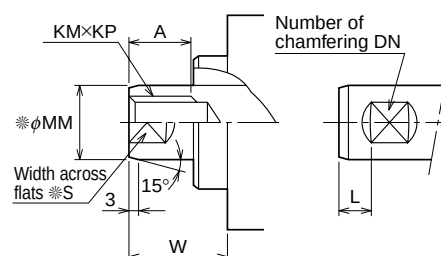
Basic dimensional table

Bore	A	AA	A1	DN	KM	KP	L	ϕMM	ϕR	ϕS	W
$\phi 40$	44	30	14	2	M20	1.5	0	$\phi 28$	1.6	24	35
$\phi 50$	49	35	14	2	M24	1.5	0	$\phi 35.5$	2	30	41
$\phi 63$	59	45	14	2	M30	1.5	0	$\phi 45$	2	41	48
$\phi 80$	74	60	14	2	M39	1.5	0	$\phi 56$	2	50	51
$\phi 100$	89	75	14	2	M48	1.5	0	$\phi 71$	2.5	65	57
$\phi 125$	115	95	20	2	M64	2	0	$\phi 90$	2.5	85	57

When modifying the dimension A1, specify the number of 10 or more.

Specify the dimensions AA and A1 at the same time.

A81

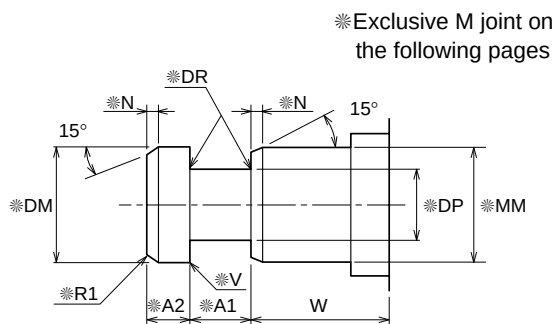


Basic dimensional table

Bore	A	DN	KM	KP	L	ϕMM	ϕS	W
$\phi 40$	24	2	M20	2.5	0	$\phi 28$	24	35
$\phi 50$	33	2	M27	3	0	$\phi 35.5$	30	41
$\phi 63$	36	2	M30	3.5	0	$\phi 45$	41	48
$\phi 80$	45	2	M39	4	0	$\phi 56$	50	51
$\phi 100$	58	2	M48	2	0	$\phi 71$	65	57

Note) • The possible number of chamfering DN is 2 (standard) or 4 only.

A82



※Exclusive M joint on the following pages

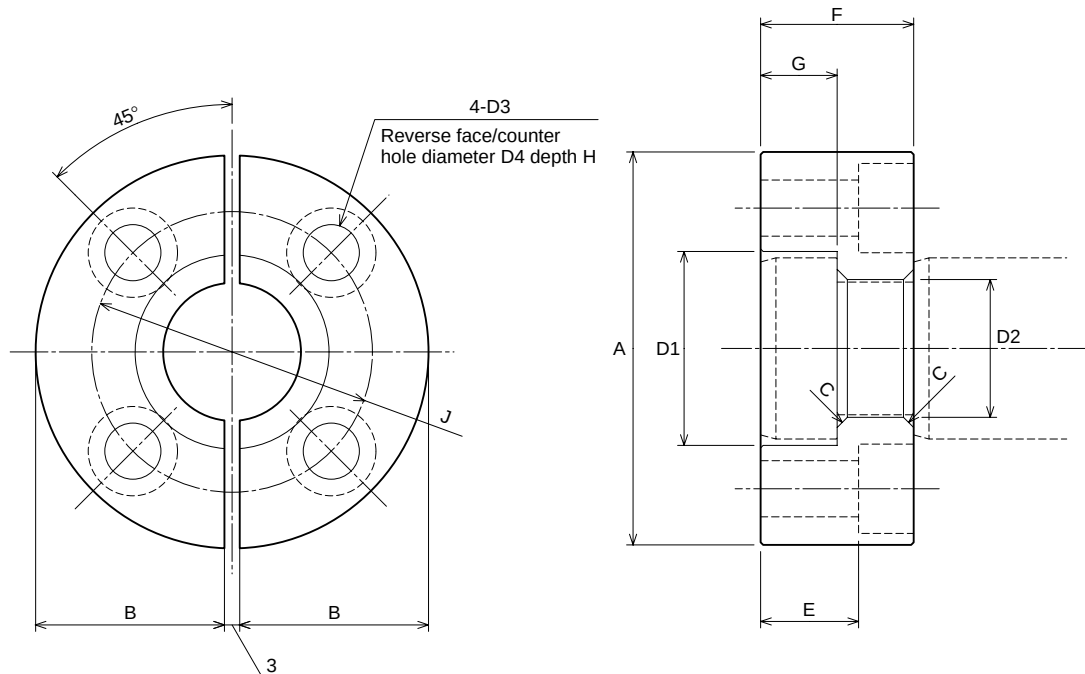
Basic dimensional table

Bore	$A1^{+0.5}_{-0.3}$	$A2^{+0.2}_{-0.3}$	DM	$DP^{+0.2}_{-0.3}$	DR	MM	N	V	W
$\phi 40$	12.5	12.5	$\phi 28$	$\phi 21$	1.5	$\phi 28$	3	C0.2	35
$\phi 50$	15	15	$\phi 35.5$	$\phi 26$	2.0	$\phi 35.5$	3	C0.2	41
$\phi 63$	15	15	$\phi 45$	$\phi 31$	2.0	$\phi 45$	3	C0.2	48
$\phi 80$	20	20	$\phi 56$	$\phi 38$	3.0	$\phi 56$	3	C0.2	51
$\phi 100$	25	25	$\phi 71$	$\phi 49$	3.5	$\phi 71$	3	R1	57
$\phi 125$	30	30	$\phi 90$	$\phi 60$	5.0	$\phi 90$	6	R1	57

MM is rod dia.

- Dimensions indicated by ※ Mark are fixed as our semi-standard.
- You are requested to consult us if you would like to change fixed dimensions.

Separate flange joint : Only for A82 rod end style



- Need additional order for this item. Part No. : RMH-(bore(mm))

Dimensional table (rod B)

Symbol Bore	Part code	A	B	C	D1	D2	D3	D4	E	F	G	H	J	X
φ32	RMH-18	φ49	23	1	φ19	φ13.5	φ6.6	φ11	18.5	25	12.5	6.5	φ34	—
φ40	RMH-22	φ57	27	1.5	φ23	φ16.5	φ9	φ14	16.4	25	12.5	8.6	φ40	—
φ50	RMH-28	φ71	34	1.5	φ29	φ21.5	φ11	φ17.5	14.2	25	12.5	10.8	φ50	—
φ63	RMH-36	φ77	37	2	φ38	φ27	φ11	φ17.5	19.2	30	15	10.8	φ55	—
φ80	RMH-45	φ100	48.5	2	φ48	φ33	φ14	φ20	17	30	15	13	φ76	16
φ100	RMH-56	φ124	60.5	3	φ60	φ41	φ18	φ26	22.5	40	20	17.5	φ92	7
φ125	RMH-70	φ150	73.5	3.5	φ74	φ53	φ22	φ32	28.5	50	25	21.5	φ112	14
φ140	RMH-80	φ174	85.5	4	φ84	φ60	φ26	φ39	24.5	50	25	25.5	φ129	40
φ150	RMH-85	φ180	88.5	5	φ90	φ62	φ26	φ39	34.5	60	30	25.5	φ135	26
φ160	RMH-90	φ193	95	5	φ95	φ64	φ30	φ43	31	60	30	29	φ144	9

Note) For LC mounting and B rod at A82 rod end, please add X dimension as minimum in order to avoid the interference.

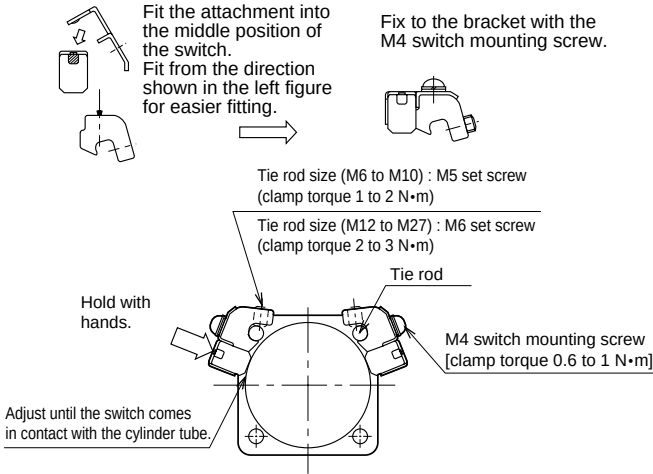
Dimensional table (rod A)

Symbol Bore	Part code	A	B	C	D1	D2	D3	D4	E	F	G	H	J	Y
φ40	RMH-28	φ71	34	1.5	φ29	φ21.5	φ11	φ17.5	14.2	25	12.5	10.8	φ50	15
φ50	RMH-36	φ77	37	2	φ38	φ27	φ11	φ17.5	19.2	30	15	10.8	φ55	—
φ63	RMH-45	φ100	48.5	2	φ48	φ33	φ14	φ20	17	30	15	13	φ76	17
φ80	RMH-56	φ124	60.5	3	φ60	φ41	φ18	φ26	22.5	40	20	17.5	φ92	24
φ100	RMH-70	φ150	73.5	3.5	φ74	φ53	φ22	φ32	28.5	50	25	21.5	φ112	26
φ125	RMH-90	φ193	95	5	φ95	φ64	φ30	φ43	31	60	30	29	φ144	43

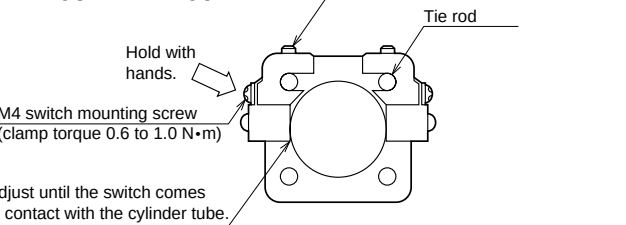
Note) For LB mounting and A rod at A82 rod end, please add Y dimension as minimum in order to avoid the interference.

Setting method of switch detecting position

AX type



WR type • WS type



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.

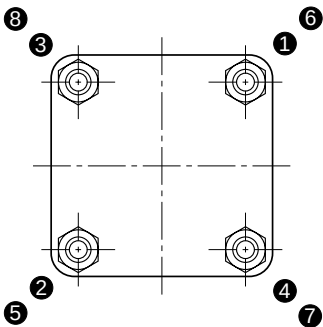


Table of specified tie rod clamp torque

Bore mm		φ32	φ40	φ50	φ63	φ80	φ100	φ125
Tie rod screw		M10×1.25	M10×1.25	M10×1.25	M12×1.5	M16×1.5	M18×1.5	M22×1.5
Clamp torque N·m	70H-8	41	41	41	35	87	130	240
	140H-8				70	170	250	460

Bore mm		φ140	φ150	φ160	φ180	φ200	φ224	φ250
Tie rod screw		M24×1.5	M27×1.5	M27×1.5	M30×1.5	M33×1.5	M39×1.5	M42×1.5
Clamp torque N·m	70H-8	310	450	450	630	830	1400	1800
	140H-8	610	880	880	1100	1400	2400	3000

- Loosen the two set screws with an allen wrench, and move them along with the tie rod.
- 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.
- The indicator lamp lights up when the switch is set to the ON position.
- 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.
- Mount a switch to the most suitable position to detect the stroke end with the “Switch mounting dimension” (dimension UX).

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 : 140H-8 ϕ 80 Rod A

Load : $W = 1000 \text{ kg}$ ($\approx 10000 \text{ N}$)

Set pressure : $P_H = 8 \text{ MPa}$

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.

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

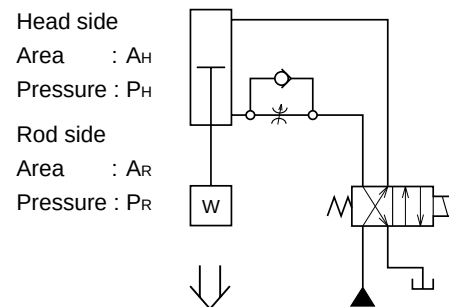
- The pressure P_2 , boosted by the supply from the head side, can be calculated with the formula below.
where, $P_2 A_R = P_H A_H$

$$P_2 = \frac{P_H A_H}{A_R} = \frac{8 \text{ (MPa)} \times 5027 \text{ (mm}^2\text{)}}{2564 \text{ (mm}^2\text{)}} = 15.7 \text{ (MPa)}$$

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

$$P_R = P_1 + P_2 = 3.9 + 15.7 = 19.6 \text{ (MPa)}$$

∴ Therefore, the pressure in the cylinder exceeds the maximum allowable pressure of the 140H-8, rod A type, on the rod side, 18 MPa shown in the standard specifications, and the cylinder is not applicable. Modify the working conditions, and recalculate.





Switch specifications

Precautions common to all switches ... 107

Switch selection materials 109

Magnetic proximity type/with contact ... 116

Magnetic proximity type/with no contact ... 124

Magnetic proximity type/cutting fluid proof type ... 136

Code for arrangement of switches 142

Important precautions

⚠ Caution

• Supply voltage, current, load capacity

Avoid the voltage and current out of the specifications of the switches, and the load exceeding the contact open/close capacity. DO NOT apply AC voltage to the switches applicable to DC voltage. Application of wrong voltage or current may lead to malfunctions, breakage, or inflammable damages of the switches.

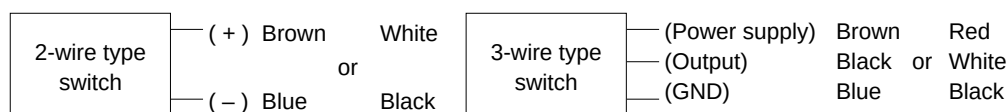
• Shutdown of power supply

Prior to wiring and connection, be sure to shut down the power supply. Otherwise, the operator may get an electric shock.

• Wrong wiring

Perform wiring correctly according to the colors of lead wires.

If wiring is performed incorrectly, the inflammable damage or breakage of the switch will occur, even if the wrong wiring is momentary.



• No load connection

DO NOT connect the switches direct to the power supply.

Be sure to connect them through load devices, such as relays and programmable controllers.

If the switches are connected direct to the power supply, the switches or load devices will be damaged or inflammable damages will occur, even if the connection is momentary.

Correct use (common to all switches)

1. Selection

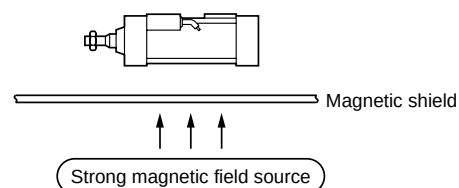
When selecting switches, be sure to follow the sequences in the "Switch selection materials".

2. Working environmental conditions

- 1) These products do not have explosion-protected structure. DO NOT use them in the places where dangerous materials, including firing and ignitable objects, are present.
- 2) Use the switches indoors only.
- 3) Use the switches within the temperature range shown in the specifications of the switches. In the case of a hydraulic cylinder, the temperature of oil in it may be increased depending on the working conditions. Provide countermeasures in a hydraulic circuit, or install an oil cooler.
- 4) Use the switches within the allowable range of vibrations and shocks shown in the specifications.
- 5) DO NOT use the switches in the atmosphere of chemicals.
- 6) DO NOT use the switches in the places where the cylinders or switches are subjected to chips, cutting oil, and water. Otherwise, cords may be damaged or the switches may be malfunctioned.

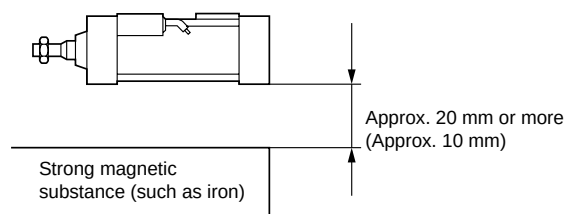
7) Strong magnetic field

- Prior to the use of the switches near a strong magnetic field, install the magnetic shield with steel plates (install it 20 mm or more distant from the cylinders and switches).
- Otherwise, the switches may work incorrectly due to the influence of the magnetic field.



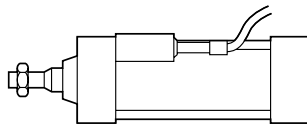
8) Strong magnetic substance

- Keep away strong magnetic substances (such as iron) from cylinders outside and switches. Separate them by approx. 20 mm or more (as a guide). For compact cylinders, separate them by approx. 10 mm or more (KR and ZR type switches, etc.).
- Otherwise, the switches may work incorrectly due to the influence of the magnetic field.



3. Wiring

- 1) Prior to wiring, be sure to shut down the power supply.
 - Otherwise, the operator may get an electric shock during working, or the switches or load devices may be damaged.
- 2) Pay attention to avoid bending, pulling, twist of the switch cord. Especially, provide appropriate measures to avoid any load applied to the end of the switch cord, including the fixing of the switch cord to the tie rod.



- Otherwise, the cord may be damaged, causing broken wires. Especially, any load applied to the end of the cord may lead to the damaged electric circuit boards in the switches.
 - When fixing the cord to the tie rod, do not clamp the cord excessively. Otherwise, the cord may be damaged, causing broken wires.
- 3) The larger bending radius (twice of the cord dia. or larger) is better for the cord.
 - Otherwise, the cord may be damaged, causing broken wires.
 - 4) If the connection distance is long, fix the cord every 20 cm to avoid a sag in the cord.
 - 5) When laying the cord on the floor, protect it by covering with metallic tubes.
 - Otherwise, the coating of the cord may be damaged, leading to the broken wires or short-circuit.
 - 6) 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. For the countermeasures against inrush current, refer to the "Precautions for contact protection".
 - 7) 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 malfunctions of the switches or load devices. It is recommended that the cord is protected with a shield tube.

4. Mounting

- 1) Tighten the switch mounting screws with the specified clamp torque.

If the clamp torque exceeds the specified torque, the switch may be damaged.

If the clamp torque is smaller than the specified torque, the switch may be loosened.
- 2) Adjust the switch position until the switch detecting position is centered on the switch working range.

5. Maintenance and inspection

For stable working of the switches for a long period, perform maintenance and inspection of the items shown below similarly to general electric appliances.

DO NOT disassemble the switches.

- 1) Off-center of switch mounting position and looseness of mounting screws
- 2) Working statuses of indicator lamps and load devices
- 3) Abnormalities in environmental conditions (vibrations, shocks, temperature, etc.)
- 4) Attachment of metallic dusts and chips
- 5) Presence of cutting oil and water
- 6) Abnormalities in wiring, wired parts, and cords.

6. Storage

- 1) Prior to storage, consider the storage temperature, and provide countermeasures against rusts, inferiority in cords, vibrations, and shocks.
- 2) Store the switches in cool and dark (−10 - 25°C) places.

7. Disposal

- 1) DO NOT put them into fire. Otherwise, poisonous gas may be generated.
- 2) Dispose them as nonflammable wastes.

General comparison of contact type with no contact type

Items \ Contact type	Contact	No contact
Reliability	Low, due to the mechanical contacts	High, due to the non-presence of the mechanical contacts
Number of working time (durability)	Several millions to ten millions times	Semi-eternal
Chattering	Yes	No
Responsibility	Slow	Fast
Vibration and shock resistance	Low	High
Difference	Large	Small
Number of lead wires	2	2 or 3
Price	Low	Expensive

Switch terminologies

Power supply voltage

The voltage to actuate the switch main circuit.
(3-wire no contact type)

Working voltage (load voltage)

The voltage applicable to switches.
(For the 3-wire no contact type, the voltage applicable to the output part.)

Working current (load current)

The current applicable to switches.
(For the 3-wire no contact type, the current flowing in the output part.)

Consumption current

The current flowing in the switch main circuit.
(3-wire no contact type)

Inner drop voltage

The voltage generated between the poles of a switch, + and –, (for the 3-wire no contact type, between the output and the GND) when a switch is set to the ON position. Thus, the voltage applied to load devices when the switch is set to the ON position decreases according to the inner drop voltage.

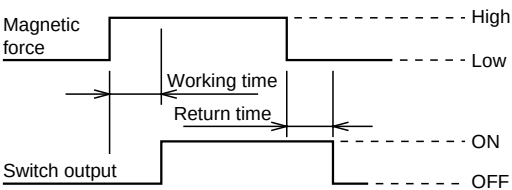
Leakage current

The current flowing between the poles of a switch, + and –, (for the 3-wire no contact type, between the output and the GND) when a switch is set to the OFF position.

Working time, return time

Working time: the time required for a switch to enter the ON status from the OFF status after a magnetic force reaches the level required for the switch to enter the ON status.

Return time: the time required for a switch to enter the OFF status from the ON status after a magnetic force reaches the level required for the switch to enter the OFF status.



Response time

This term means both of the working time and return time. Since they are almost same in the case of the no contact type, this term is used for indicating both of them.

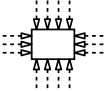
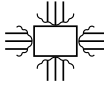
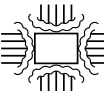
Switch specifications

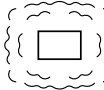
Protective structure

■ IEC (International Electrotechnical Commission) standards (IEC529)

IP-6

Grade of protection from
ingress of waterGrade of protection of human
body and from solid foreign
matters

Grades	Contents of protection		Test methods
4	Protection from splashes 	No detrimental influence occurs even if water is splashed from any direction.	Splash water from all the directions for 10 minutes.
5	Protection from water injection 	No detrimental influence occurs even if water is injected direct from any direction.	Inject water from all the directions for 15 minutes in total.
6	Protection from strong water injection 	No ingress of water occurs even if water is strongly injected direct from any direction.	Inject water from all the directions for 15 minutes in total.
7	Protection from a soak 	No ingress of water occurs even if the object is soaked in water under the specified pressure and for the specified period.	Soak in 1 m from the water surface for 30 minutes.
8	Protection from submergence 	The object can be used with submerged.	Individually specified.

Grades	Contents of protection	
6	Dusts proof type 	No ingress of dusts occur.

(International Protection)

Switch specifications

■ JEM (The Japan Electrical Manufacturers' Association) standards

IP-6

Grade of protection from
ingress of oilGrade of protection from
ingress of waterGrade of protection of human
body and from solid foreign
matters

Grades	Contents of protection	
G	Oil proof type 	No ingress of oil drops or splashes from any direction occurs.

Same as IEC529

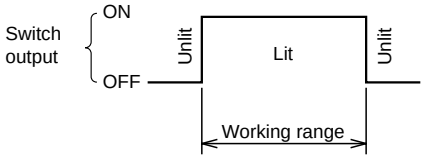
Same as IEC529

Types of switch indicator lamp

1) 1-LED type

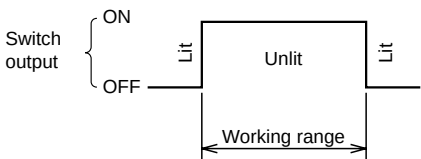
a) Lights with switch ON

The indicator lamp lights up when the switch detects the piston position to indicate that the switch enters the ON status. While the piston position is not detected, the indicator lamp remains unlit to indicate that the switch is in the OFF status.



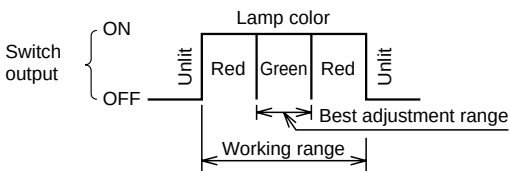
b) Lights with switch OFF

The indicator lamp becomes unlit when the switch detects the piston position to indicate that the switch enters the ON status. While the piston position is not detected, the indicator lamp remains lit to indicate that the switch is in the OFF status.



2) 2-LED type

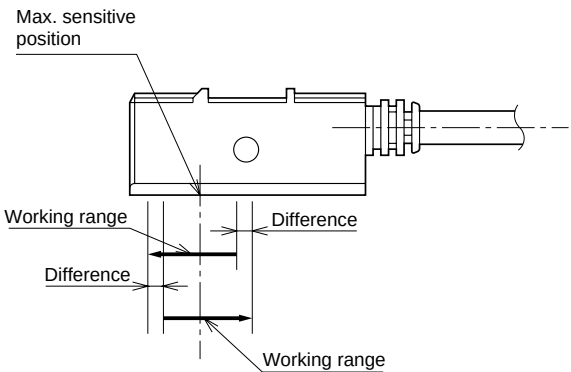
The indicator lamp lights up when the switch detects the piston position to indicate that the switch enters the ON status. At that time, either of the red or green indicator lamps lights up according to the detected piston position. The range within which the green indicator lamp remains lit is called the best adjustment range.



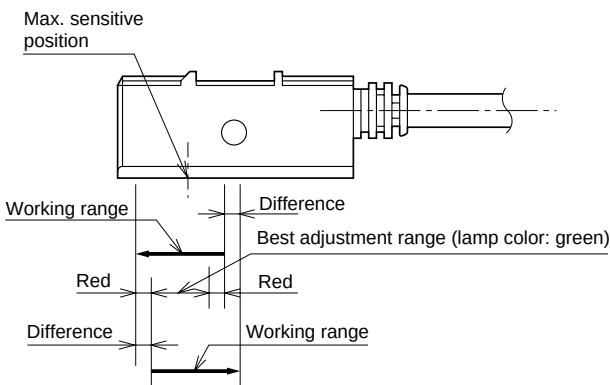
When mounting a switch, adjust the mounting position so that the detecting position of the switch is centered on the best adjustment range.

The max. sensitive position and working range/difference of switch

[1-LED type]



[2-LED type]



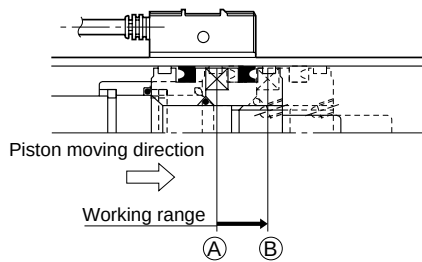
- When mounting a switch, adjust the mounting position so that the detecting position of the switch is centered on the working range (for the 2-LED type, the center of the range within which the green indicator lamp remains lit).
- In case of the position detection at both ends of the cylinder stroke, mount the switch at the “Most suitable setting position of switch” (refer to the catalogue of each cylinder) to center the detecting position of the switch on the working range.

Notes) • For the max. sensitive position of each switch, refer to the dimensional drawings of each switch.
• For the working range and difference of each switch, refer to the catalogue of the applicable cylinder.

Descriptions of switch working

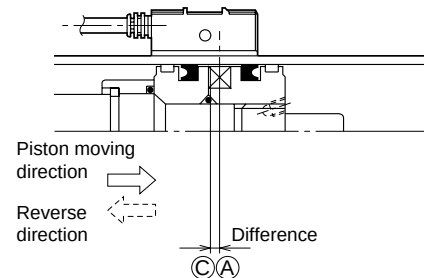
1) Magnetic proximity type working

The piston position is detected when the piston with a magnet equipped passes under the magnetic proximity switch mounted on the periphery of the tube. The cylinder stroke position can be externally detected without contact.



If the piston moves toward the → direction, the switch enters the ON status when the magnet reaches the position (A).

The ON status continues from when the magnet reaches the position (A) until it reaches the (B). The period is called the working range.



If the piston is moved toward the → direction, the switch enters the ON status when it reaches the position (A). When the piston is moved in the reverse ← direction, the ON status continues until it reaches the position (C).

The period required for moving between the (A) and (C) is called a difference.

It occurs at the both ends of the working range.

Check of conditions when selecting switches

Items	Contents
1. Series of cylinder	The applicable shape of a switch differs depending on the cylinder series.
2. Type of load device	Small relay, programmable controller, small solenoid, etc.
3. Working voltage and working current of load device	Stationary voltage value, surge voltage value, stationary current value, inrush current value
4. Actuating voltage and actuating current, and return voltage and return current of load device	Check the adaptability of electrical specifications of a switch.
5. Working time of load device (ms)	The time when a load device is actuated after receiving the input from a switch
6. Cylinder working speed (mm/S)	Required for detection at the intermediate stroke.
7. Working frequency of switch (number of times/period)	The number of working times indicating durability of the contact type differs from that of the no contact type.
8. Control system	The sequence circuit of a switch against the motion of a cylinder. Especially, check for the connection in series and the connection in parallel.
9. Environmental conditions	Temperature, vibrations, shocks, splashing condition of cutting fluid and water, strength of neighboring magnetic field, presence of strong magnetic substance (iron and chips), presence of power source of other electric appliances (motor, etc.)

Switch selection procedures

When selecting a switch, the items below need to be decided.

Check	Selection item	Selection method
☐ 1	Selection of cylinder	Select a cylinder, referring to the cylinder selection materials. Select appropriate switches among the switches applicable to the selected cylinder (referring to the switch specifications of each series).
☐ 2	Selection of load device type	Select the type of load devices required for control, referring to the specifications of loads applicable to each switch (IC circuit, small relay, programmable controller, small solenoid, etc.).
☐ 3	Selection of power supply to control circuit	DC (voltage value, voltage fluctuations, current capacity) AC (voltage value, voltage fluctuations, current capacity, etc.)
☐ 4	Selection of working voltage and working current of switch	Select the working voltage and working current of a switch so that the voltage value (for AC and DC) and current value during the stationary state are within the working voltage (current) range of the switch. For the contact type, select so that they do not exceed the max. open/close capacity (voltage X current). Check the adaptability to load devices, referring to the inner drop voltage value, leakage current value, consumption current value, etc.
☐ 5	Selection of contact (output) protective circuit	When using induction load devices (small relay, small solenoid) or capacity load devices (cable extension of 10 m or more, condenser, programmable controller of AC input type, etc.), surge voltages and inrush current will occur when the switch is set to the ON or OFF position. Prior to the use of them, provide the contact (output) protection (refer to the specifications of switches and the handling instructions of each switch). When using induction load devices, it is recommended to use the induction load devices incorporating the protective circuit for surge voltages on the load side.
☐ 6	Selection of contact type or no contact type	If high durability is required due to high use frequency, select the no contact type. When selecting, refer to the table of the comparison of the contact and no contact types.
☐ 7	Selection depending on environmental conditions	Select referring to the table in the next page.
☐ 8	Check of response speed	Check the working status of the load devices with the working time, return time, and response speed of the switch, and the working time of the load devices, referring to the descriptions in the next page.
☐ 9	Cord length	The types of 1.5 m and 5 m have been standardized (excepting cords for some switches). For details, refer to the catalogue of each cylinder.

Environmental conditions

1) Working temperature

Use switches within the ambient temperature range described in the specifications of each switch.
For hydraulic cylinders, oil temperature may be increased depending on the working conditions.
Provide some countermeasures in the hydraulic circuit or install an air conditioner.

2) Criteria for selection in case that switches are splashed with cutting fluid or water

Conditions	Criteria for selection
When switches are splashed with cutting fluid or water always or frequently	Use the cutting fluid proof type switches (WR, WS types) even if cutting fluid or water is mist, or they are splashed only several times a day. However, in the case of the use of switches in the places where are splashed with nonaqueous cutting fluid of the type 2, contact us.
In cutting fluid or water	DO NOT use even if momentarily.

3) Other environmental conditions

The places where dangerous materials, including firing and ignitable objects, are present } ⇒ DO NOT use under these conditions.

The places where the atmosphere of chemicals, etc. is present }

The places where are subjected to chips }

The places where strong magnetic fields are generated }

When strong magnetic substances (iron, etc.) approach switches or cylinder }

⇒ Provide countermeasures referring to the recommended mounting locations specified in the handling instructions of the switches.

The places where are subjected to vibrations and shocks

⇒ Refer to the vibration and shock resistance specifications of each switch.

The places where are subjected to direct sunlight (outdoor)

⇒ Use only indoors.
In the places where are subjected direct sunlight, provide covers.

Detectable cylinder piston speed

- When mounting the switch on the intermediate position, be sure to adjust the maximum cylinder speed to 300 mm/s or slower on account of the response speed of the load relays, etc.
- If the piston speed is excessively high, the switch working time becomes shorter, although the switch works, and load devices including relays may not work.

Determine the detectable cylinder piston speed, referring to the formula below.

$$\text{Detectable piston speed (mm/s)} = \frac{\text{working range of switch (mm)}}{\text{working time of load device (ms)}} \times 1000$$

- Notes)
- Refer to the materials related to the working time of load devices including relays of each manufacturer.
 - Apply the minimum value to the working range of a switch, and apply the maximum value to the working time of a load device.



Switch specifications

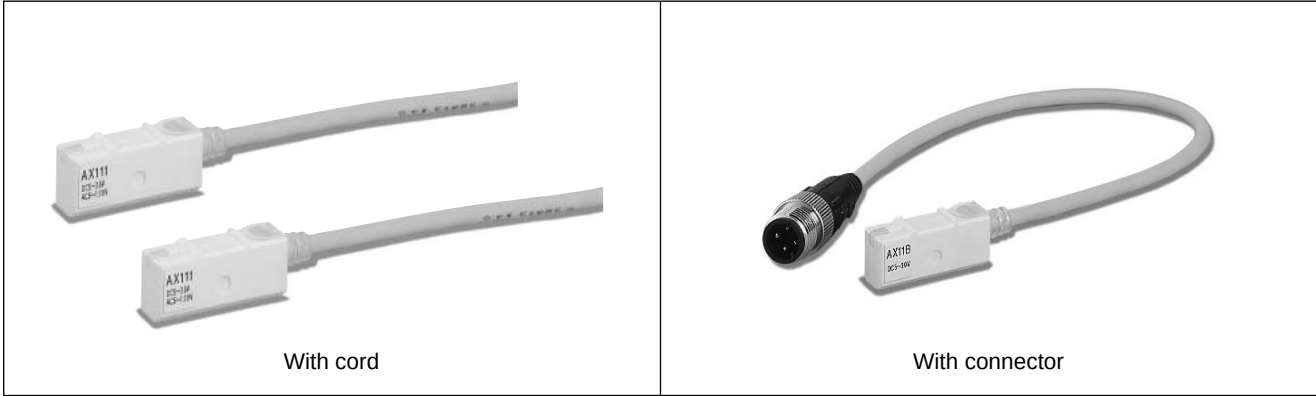
Magnetic Proximity Type/ With Contact

AX Type Switch

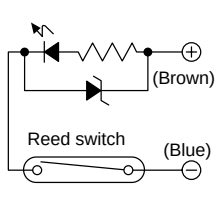
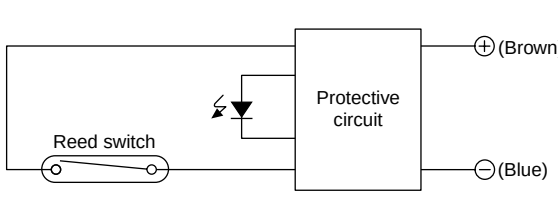
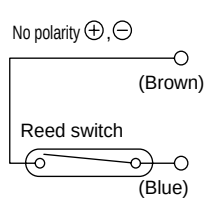


AZ Type Switch





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	0μA	10μA or less			0μA	
Working time	1ms or less					
Return time	1ms or less					
Insulation resistance	100 MΩ 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	

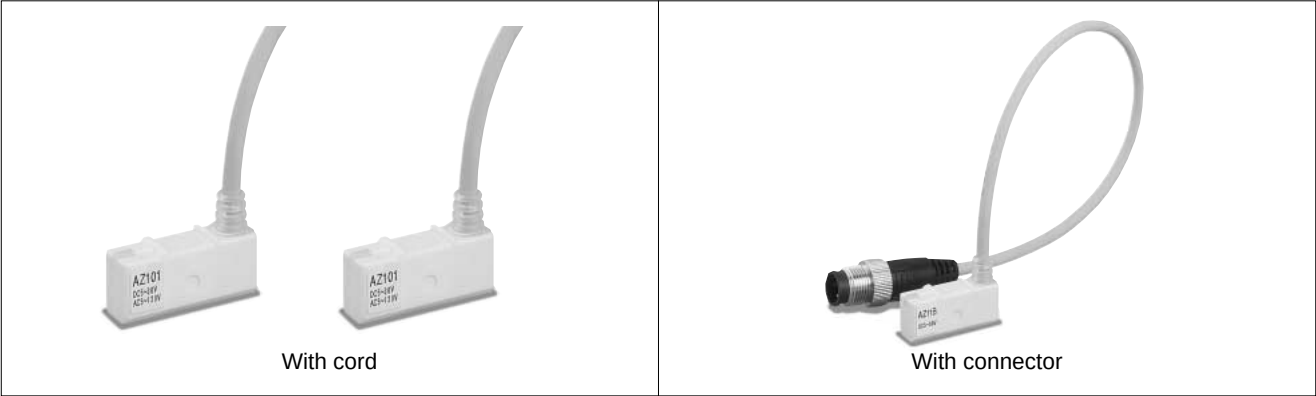
Notes) ● When using induction load devices (small relay, etc.), be sure to provide the protective circuit (SK-100).
● For the cord length and connector pin position of the connector type, refer to the dimensional drawings.
● When using the AC voltage input programmable controller as a load, select the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

Applicable hydraulic cylinder

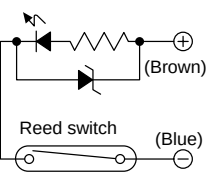
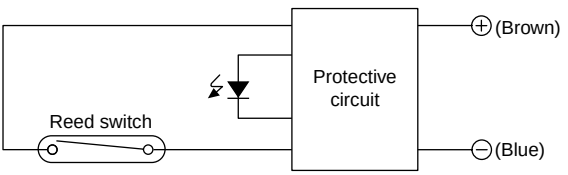
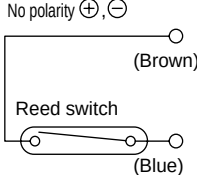
Series	Bore	Series	Bore	Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63	100Z-1R	φ20, φ25, φ32	210C-1R	φ40, φ50, φ63, φ80
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100	100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125	70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100	70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140	35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80	160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160	70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100
210S-1R	φ32, φ40, φ50, φ63, φ80				
35Z-1R	φ20, φ25, φ32				
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100				

Switch specifications

- 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	0μA	10μA or less			0μA	
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 (30G) (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℃ (at non-freezing condition)					
Wiring method	0.3mm ² 2-core Outer diameter 4mm Oil-proof cabtyre cord				-10 - +100℃ (at non-freezing condition)	
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	Series	Bore	Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63	100Z-1R	φ20, φ25, φ32	210C-1R	φ40, φ50, φ63, φ80
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100	100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125	70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100	70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140	35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80	160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160	70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100
210S-1R	φ32, φ40, φ50, φ63, φ80				
35Z-1R	φ20, φ25, φ32				
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100				

Unit: mm

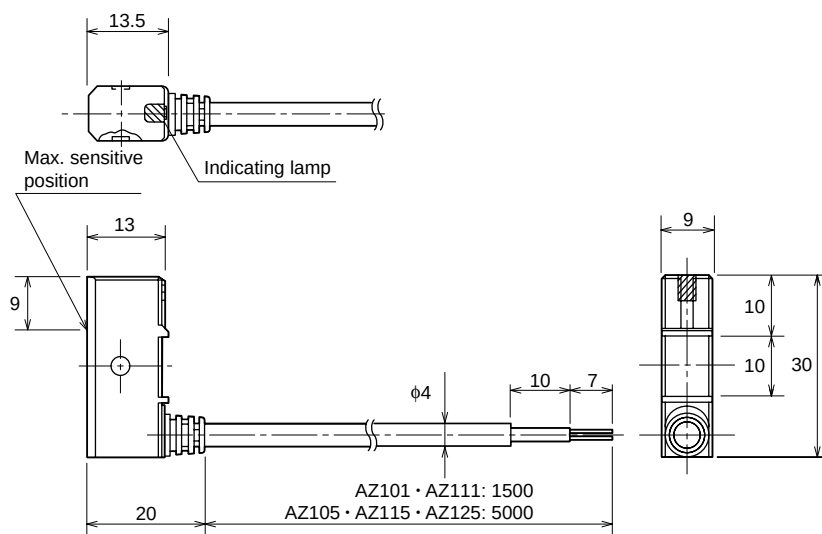
Dimensional Drawing

• Cord type

AZ101 • AZ105

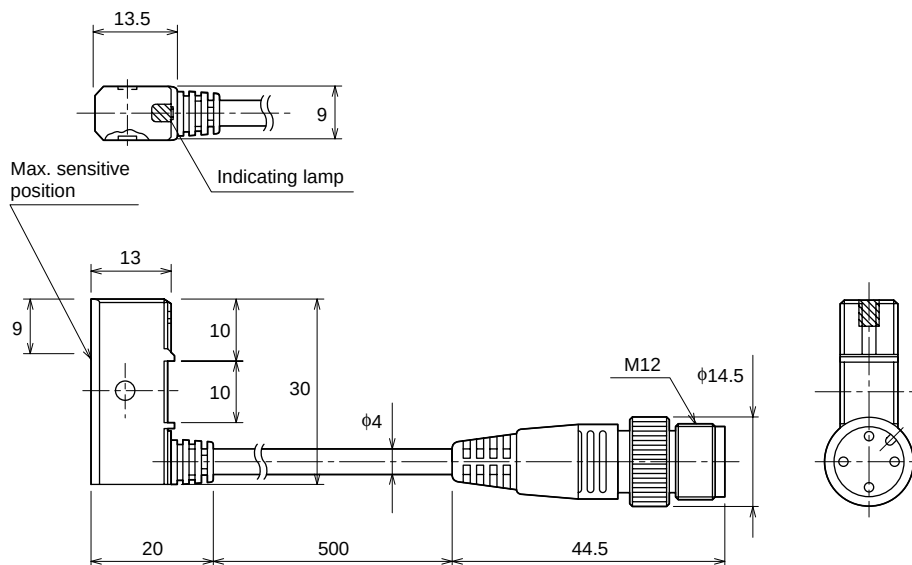
AZ111 • AZ115

AZ125



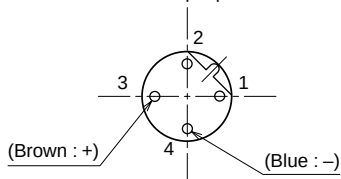
• Connector type

AZ11A • AZ11B



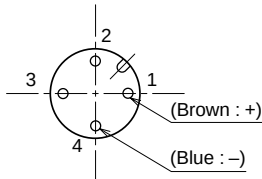
AZ11A (AC type)

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

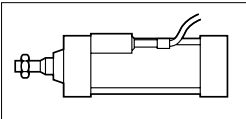
• IEC 947-5-2

• DIN/VDE 0660 part 208 A2

• NECA (The Japan Electric Control Equipment Industry Association) 4202
Connector for FA sensor

Handling instructions

Precautions for wiring

- 1. 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.
- 2. Pay attention to avoid bending, pulling, twist of the switch cord. Especially, provide appropriate measures to avoid any load applied to the end of the switch cord, including the fixing of the switch cord to the tie rod (see the figure below).
 - Otherwise, the cord may be damaged, causing broken wires. Especially, any load applied to the end of the cord may lead to the damaged electric circuit boards in the switches.
 - When fixing the cord to the tie rod, do not clamp the cord excessively. Otherwise, the cord may be damaged, causing broken wires.
- 3. The larger bending radius is better for the cord.
 - If the bending radius is excessively small, the cord may be damaged. The recommended bending radius is twice of the cord dia. or larger.
- 4. If the connection distance is long, fix the cord every 20 cm to avoid a sag in the cord.
- 5. 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.
- 6. 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. For the countermeasures against inrush current, refer to the "Precautions for contact protection".
- 7. 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.

Precautions for connection

- 1. Be sure to shut down the power supply to the switches.
 - Otherwise, the operator may get an electric shock during working, or the switches and load devices may be damaged.
- 2. Avoid the voltage and current out of the specifications of the switches, and the load exceeding the contact open/close capacity.
 - Application of wrong voltage or current may lead to malfunctions and damages to the switches.

- 3. DO NOT connect the switches direct to the power supply. Be sure to connect them through load devices, such as small relays and programmable controllers.
 - Otherwise, short-circuit may occur to the circuit, causing the malfunctions of the switches.
 - Use only one relay among the choices shown below or an equivalence.

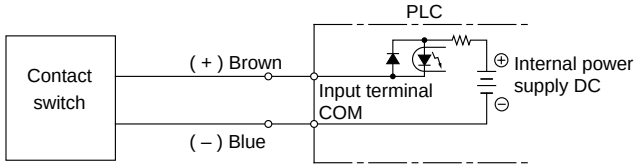
Omron Corporation	: MY type
Idec Izumi Corporation	: RY type
Fuji Electric Co., Ltd.	: HH-5 type
Matsushita Electric Works, Ltd.	: HC type

- 4. Perform wiring correctly according to the colors of lead wires.
 - If an electric current is supplied without the correction of the wrong wiring, the switches will be damaged, and the load devices may also be damaged. If wiring is performed incorrectly, it will lead to the inflammable damage of the electric circuit inside the switches, even if the wrong wiring is momentary.

<Connecting method>

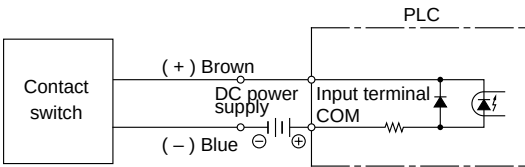
1. Basic connection

- 1) Connection to PLC (programmable controller)
 - a) In the case that the power supply is contained in the PLC



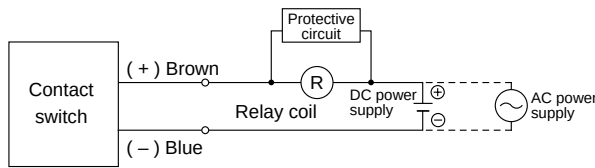
- The circuit diagram above shows the connection example in the case of the DC input type PLC.
(For details, refer to the handling instructions of the PLC.)
- The connection of the AC input type PLC is similar to the above example. Refer to "Precautions for contact protection".

- b) In the case that the power supply is not contained in the PLC



- The circuit diagram above shows the connection example in the case of the DC input type PLC.
(For details, refer to the handling instructions of the PLC.)
- The connection of the AC input type PLC is similar to the above example. Refer to "Precautions for contact protection".

2) Connection to small relay



- For the protective circuits, refer to "Precautions for contact protection".

2. Multiple connection

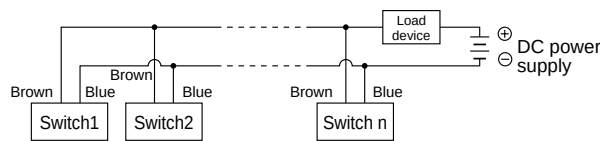
Avoid multiple connection of the switches (connection in series and connection in parallel), since it may be inapplicable depending on the combination of load devices.

1) Connection in parallel

The circuit diagram is shown below.

- Indicator lamps may not light up, depending on the combination of load devices.
- Remember that if any leakage current is present in the switches, it will be increased according to the number of the switches.

The leakage current may lead to the unexpected working or impossibility of return of load devices.

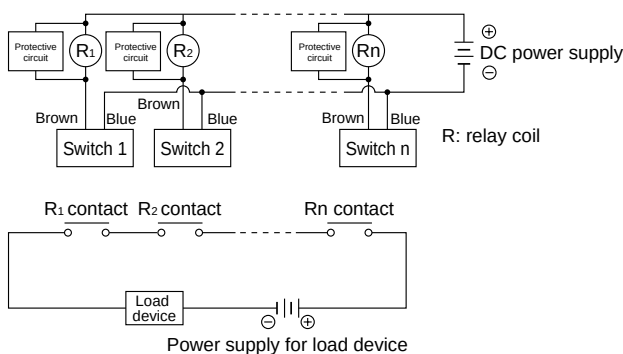


- Set the connection so that the following condition is satisfied: sum of leakage currents < return current value of load devices.
- Set the connection in the case of AC power supply similarly to the above.

2) Connection in series

The circuit shown below is recommended.

Provide a small relay for a switch, and connect the contacts of the small relays in series.



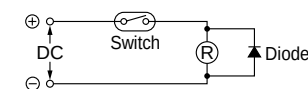
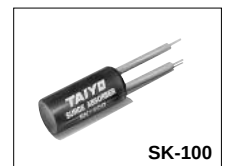
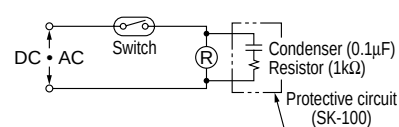
- Remember that the connection of the switches in series will lead to the increased inner drop voltage of the switch output according to the number of the switches. If the inner drop voltage is increased, load devices may not work.
- When connecting the switches in series, set the connection so that the following condition is satisfied: sum of inner drop voltage < working voltage of load devices.
- Set the connection in the case of AC power supply similarly to the above.
- Be sure to connect the protective circuits to the both ends of the relay coil.

Precautions for contact protection

1. Connection to induct load devices (small relay, solenoid valves, etc.)

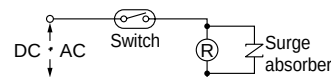
Remember that surge voltages will occur when the switch is set to the OFF position. Be sure to provide the protective circuit on the side of the load devices to protect the contacts.

- Unless the protective circuit shown below is provided, the internal electric circuit of the switch may be damaged due to the surge voltage.



R: relay coil

Diode (200 V, 1A or upper)
Take sufficient care not to mistake the polarity of the power supply, + and -.

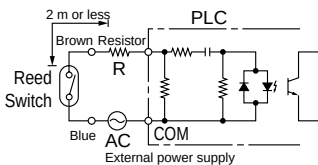


Surge absorber

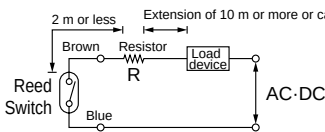
Use at 24 V DC	Varistor voltage: approx. 30 V
Use at 48 V DC	Varistor voltage: approx. 60 V
Use at 100 V AC	Varistor voltage: approx. 180 V

Handling instructions

- In the case of the extension of the switch cord by 10 m or more, or the connection to the AC input type PLC (programmable controller) and capacity loads (condenser, etc.), inrush current will occur when the switch is set to the ON position. Be sure to provide the protective circuit as shown in the circuit diagram below.

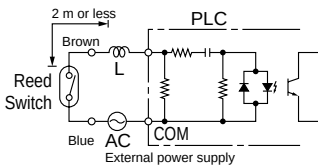


R : inrush current limit resistor
R = apply the possible great resistance within the allowable range of the circuit on the load device.

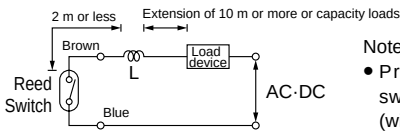


Notes

- If the applied resistance is excessively great, the load device may not work.
- Provide the wiring for the switches as near as possible (within 2 m).



L : choke coil
L = equivalence to approx. 2mH



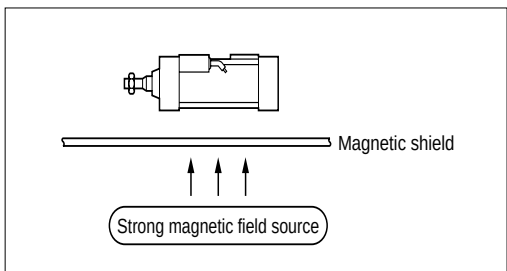
Note

- Provide the wiring for the switches as near as possible (within 2 m).

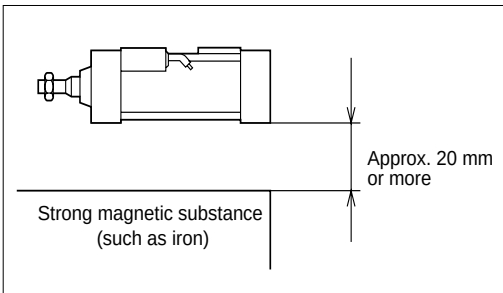
- Unless the protective circuit shown below is provided, the internal electric circuit of the switch may be damaged due to inrush currents.

Precautions for installation

- DO NOT use cylinders and switches in the places where are directly subjected to chips and cutting oil.
 - Otherwise, the cord may be damaged by chips, or cutting oil may enter the switch inside, and short-circuit may occur, causing the malfunctions of the switches.
- Prior to the use of the switches near a strong magnetic field, install the magnetic shield with steel plates (install it 20 mm or more distant from the cylinder and switch).
 - Otherwise, the switches may work incorrectly due to the influence of the magnetic field.



- Keep away strong magnetic substances (such as iron) from cylinders outside and switches. Separate them by approx. 20 mm or more (as a guide). For compact cylinders, separate them by approx. 10 mm or more (KR and ZR type switches).
 - Otherwise, the switches may work incorrectly due to the influence of the strong magnetic substances.



Detectable cylinder piston speed

- When mounting the switch on the intermediate position, be sure to adjust the maximum cylinder speed to 300 mm/s or slower on account of the response speed of the load relays, etc.
 - If the piston speed is excessively high, the switch working time becomes shorter, although the switch works, and load devices including relays may not work.
- Determine the detectable cylinder piston speed, referring to the formula below.

$$\text{Detectable piston speed (mm/s)} = \frac{\text{working range of switch (mm)}}{\text{working time of load device (ms)}} \times 1000$$

(Notes)

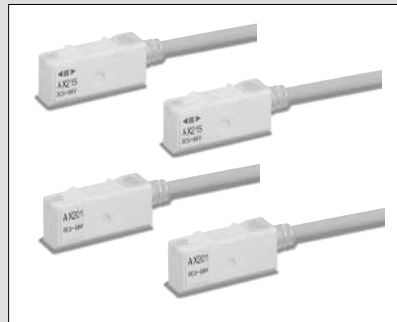
- Refer to the materials related the working time of load devices, including relays, of each manufacturer.
- Apply the minimum value to the working range of a switch, and apply the maximum value to the working time of a load device.



Switch specifications

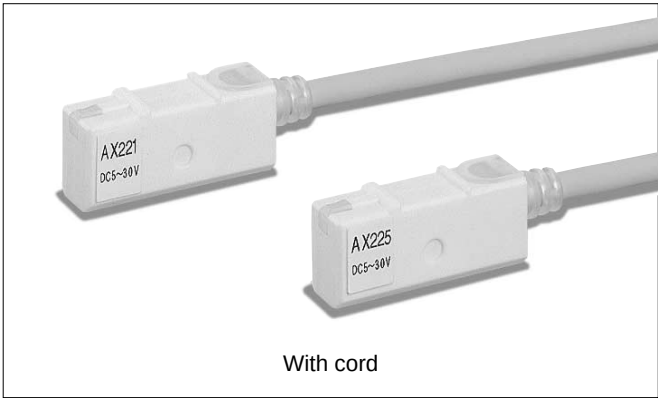
Magnetic Proximity Type/ With No Contact

AX Type Switch



AZ Type Switch





With cord

Switch specifications

Specifications

Code	With cord (1.5m)	AX221
	With cord (5m)	AX225
Wiring direction	Rear wiring	
Power supply voltage range	DC : 5 - 30V	
Load voltage range	DC : 30 V or less	
Load current	Max. 200mA (NPN open collector output)	
Consumption current	Max. 15mA	
Inner drop voltage	At 200 mA, 0.6 V or less	
Leak current	At 30 V DC, 10μA 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 - +70°C (at non-freezing condition)	
Wiring method	0.3 mm ² 3-core Outer diameter 4 mm Oil-proof cabtyre cord	
Protective structure	IP67 (IEC standards), JIS C0920 (dust-proof, immersion-proof type)	
Protective circuit	Equipped	
Indicating lamp	LED (red lamp lights up during ON)	
Electric circuit	○ Power supply (+, brown) ○ Output (OUT, black) ○ GND (-, blue)	
Applied load	IC circuit, small relay, programmable controller	

Applicable hydraulic cylinder

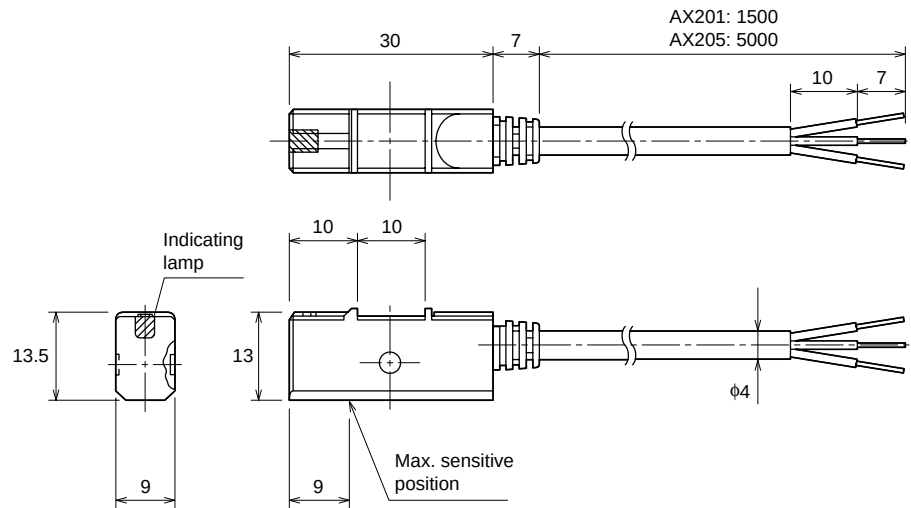
Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80
210S-1R	φ32, φ40, φ50, φ63, φ80
35Z-1R	φ20, φ25, φ32
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100

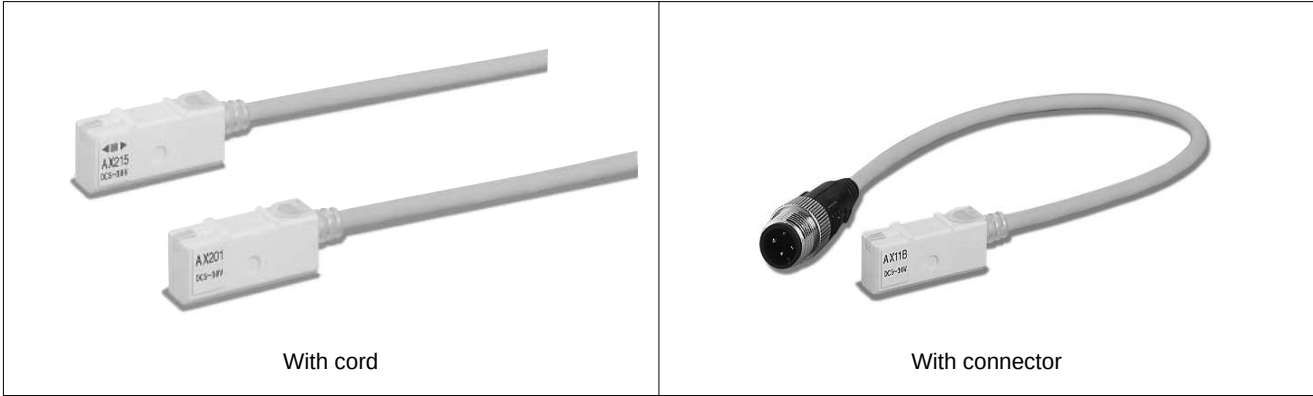
Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

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, φ125

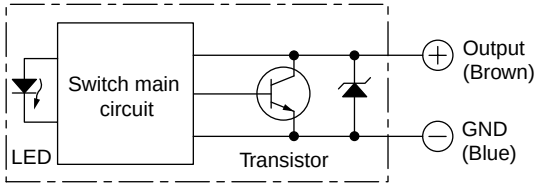
Dimensional Drawing

- Cord type
AX221 • AX225





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 - +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	Series	Bore	Series	Bore
35S-1R	φ20, φ25, φ32, φ40, φ50, φ63	100Z-1R	φ20, φ25, φ32	210C-1R	φ40, φ50, φ63, φ80
HQS2R	φ32, φ40, φ50, φ63, φ80, φ100	100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125	70/140Y-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
100S-1R	φ32, φ40, φ50, φ63, φ80, φ100	70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140	35P-3R	φ32, φ40, φ50, φ63, φ80, φ100
160S-1R	φ32, φ40, φ50, φ63, φ80	160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160	70/140P-8R	φ32, φ40, φ50, φ63, φ80, φ100
210S-1R	φ32, φ40, φ50, φ63, φ80				
35Z-1R	φ20, φ25, φ32				
35H-3R	φ32, φ40, φ50, φ63, φ80, φ100				

Magnetic proximity type (No contact/Two-wire one-lamp type)

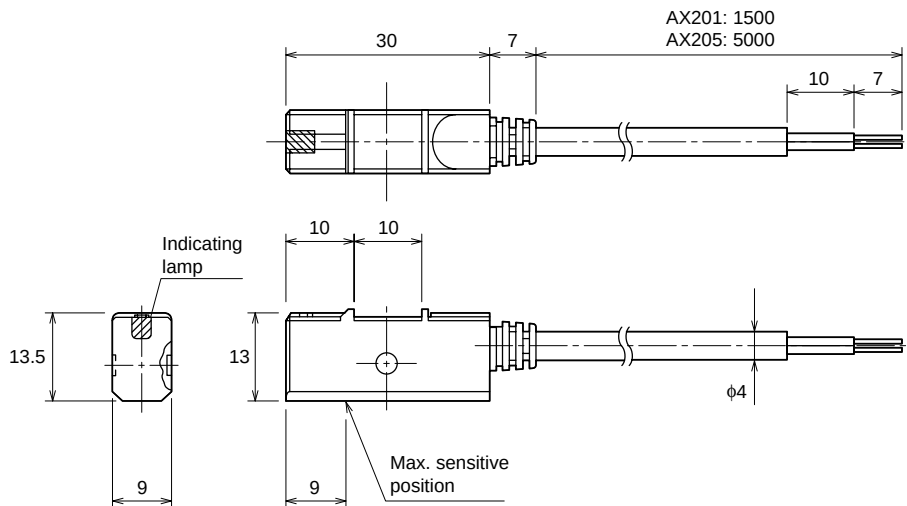
AX Type Switch

128

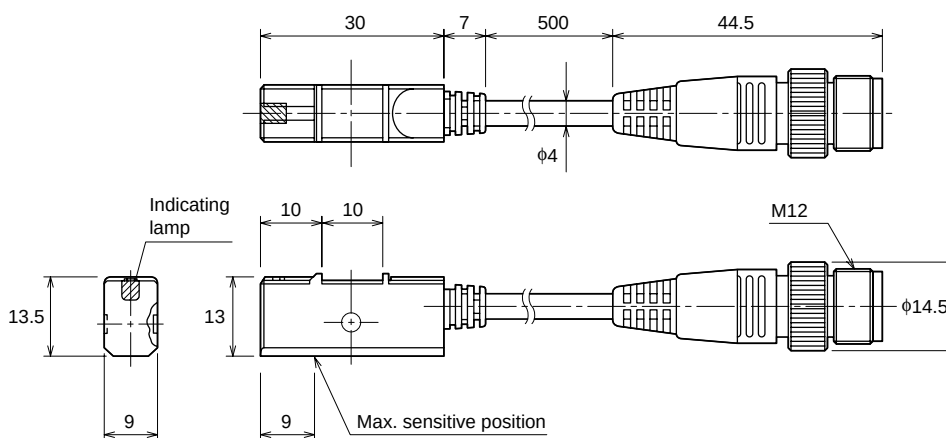
Unit: mm

Dimensional Drawing

- Cord type
AX201 • AX205

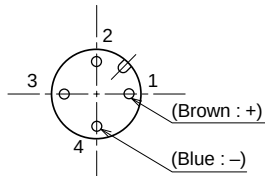


- Connector type
AX20B



AX20B (DC type)

Connector pin position

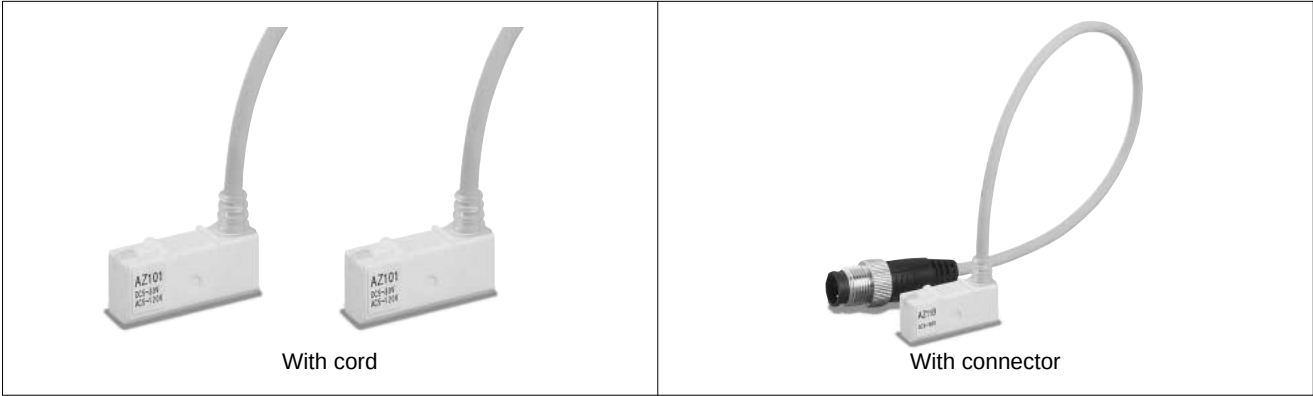


Applicable counter connectors

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 - +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	

Switch specifications

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

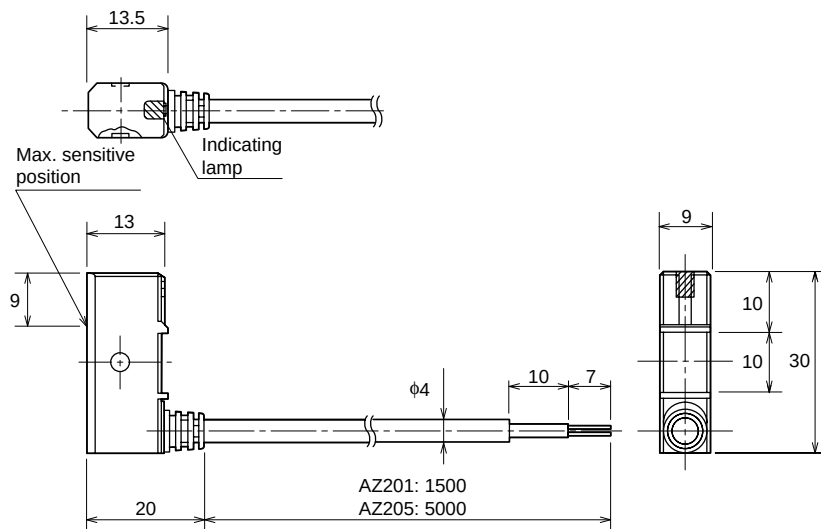
Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

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

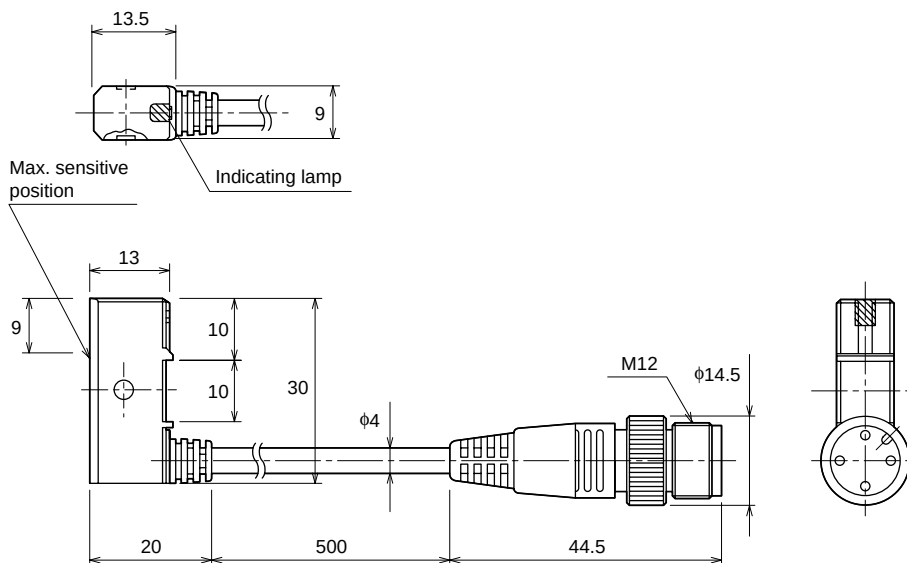
Unit: mm

Dimensional Drawing

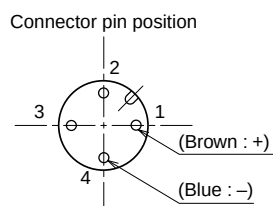
- Cord type
AZ201 • AZ205



- Connector type
AZ20B



AZ20B (DC type)



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



With cord



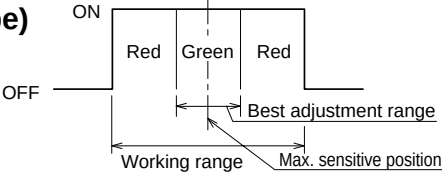
With connector

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 - +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 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

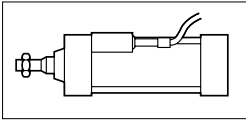
Series	Bore
100Z-1R	φ20, φ25, φ32
100H-2R	φ32, φ40, φ50, φ63, φ80, φ100, φ125
70/140H-8R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140
160H-1R	φ32, φ40, φ50, φ63, φ80, φ100, φ125, φ140, φ160

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

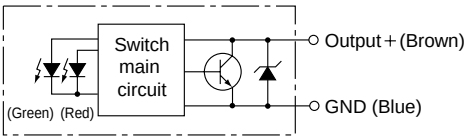
Handling instructions

Precautions for wiring

1. 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.
2. Pay attention to avoid bending, pulling, twist of the switch cord. Especially, provide appropriate measures to avoid any load applied to the end of the switch cord, including the fixing of the switch cord to the tie rod (see the figure below).
 - Otherwise, the cord may be damaged, causing broken wires. Especially, any load applied to the end of the cord may lead to the damaged electric circuit boards in the switches.
 - When fixing the cord to the tie rod, do not clamp the cord excessively. Otherwise, the cord may be damaged, causing broken wires.
3. The larger bending radius is better for the cord.
 - If the bending radius is excessively small, the cord may be damaged. The recommended bending radius is twice of the cord dia. or larger.
4. If the connection distance is long, fix the cord every 20 cm to avoid a sag in the cord.
5. 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.
6. 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. For the countermeasures against inrush current, refer to the "Precautions for output circuit protection".
7. 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.

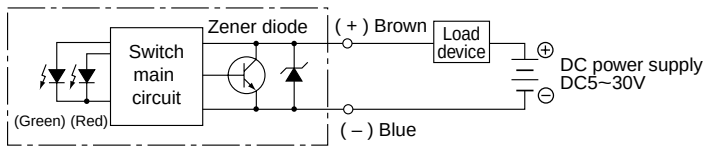


- Wrong wiring and short-circuit of load devices may lead to the damaged switches and electric circuit in the load devices. Even if the short-circuit is momentary, it causes the inflammable damage of the main circuit or output circuit. Operation with electric current supplied may lead to the damages in switches and electric circuit of the load devices.



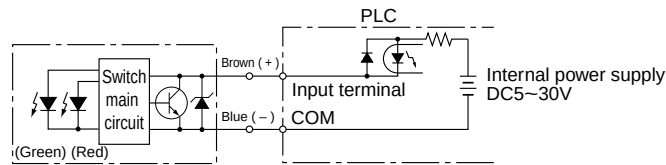
< Connecting method >

1. Basic circuit



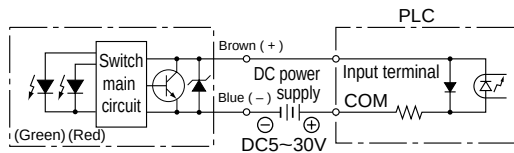
2. Contact to PLC (Programmable controller)

- In the case that the power supply is contained in the PLC



Note) For details, refer to the handling instructions of the PLC used.

- In the case that the power supply is not contained in the PLC



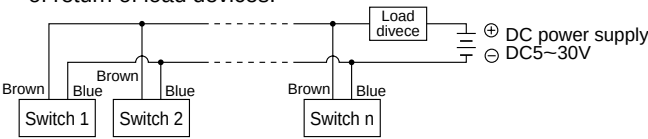
Note) For details, refer to the handling instructions of the PLC used.

3. Multiple connection

Avoid multiple connection of the switches (connection in series and connection in parallel), since it may be inapplicable depending on the combination of load devices.

1) Connection in parallel

- The working status of the switches can be checked with the indicator lamps of the switches. Remember that leakage currents will be increased according to the number of the switches. The leakage currents may lead to the unexpected working or impossibility of return of load devices.

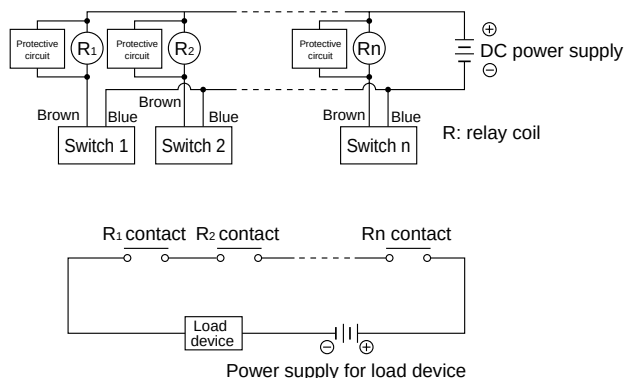


- Set the connection so that the following condition is satisfied: sum of leakage currents < return current value of load devices.

2) Connection in series

- The connection in series of the switches is impossible.

Provide a small relay as shown in the circuit diagram below, and connect the contacts of the small relays in series, or program the connection so that the PLC internal contacts can be connected in series with the switches.



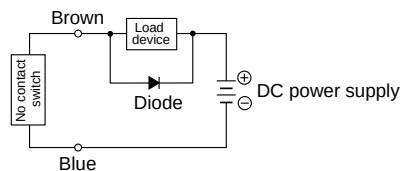
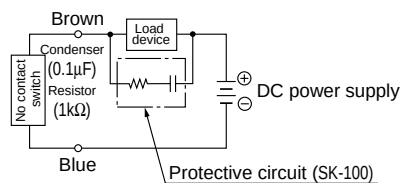
Note) • Be sure to connect the protective circuits to the both ends of the relay coil. For the protective circuit and connecting method, refer to the items related to the output circuit protection.

Precautions for output circuit protection

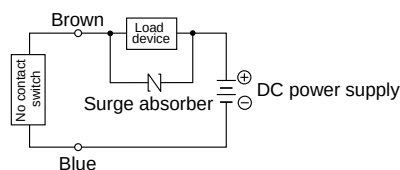
1. In the case of the connection to induct load devices (small relay, solenoid valves, etc.)

Remember that the surge voltage will occur when the switch is set to the OFF position. Be sure to provide the protective circuit on the side of load devices to protect the contacts.

- Unless the protective circuit shown below is provided, the internal electric circuit of the switch may be damaged due to the surge voltage.



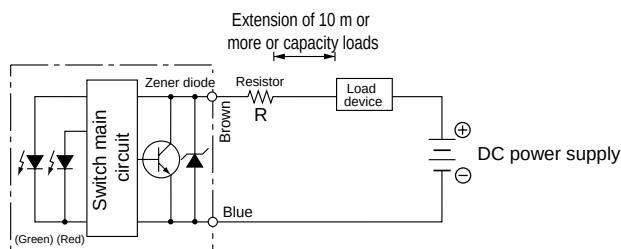
Diode
(200 V, 1A or upper)



Surge absorber
[Varistor voltage: 30 V
DC or lower]

- In the case of the connection to the capacity loads (condenser, etc.) or the extension of the switch cord by 10 m or more, inrush currents will occur when the switch is set to the ON position. Be sure to provide the protective circuit near the switch (within 2 m from the switch) as shown in the circuit diagram below.

- Unless the protective circuit shown below is provided, the internal electric circuit of the switch may be damaged due to the inrush currents.

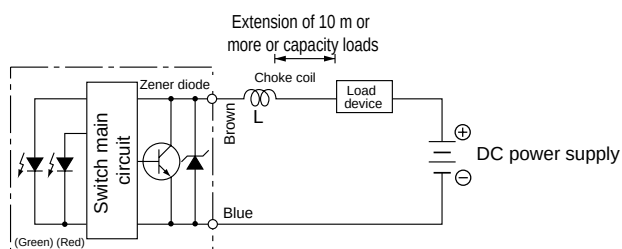


R: inrush current limit resistor

R = apply the possible great resistance within the allowable range of the circuit on the load device.

Notes)

- If the applied resistance is excessively great, the load device may not work.
- Provide the wiring for the switches as near as possible (within 2 m).



L: choke coil

L = equivalence to approx. 2mH

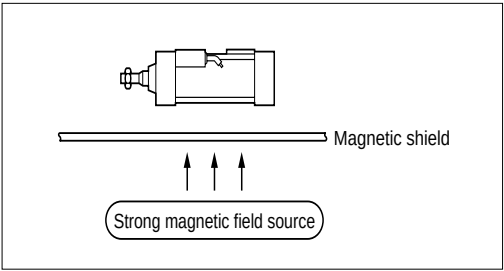
Note)

- Provide the wiring for the switches as near as possible (within 2 m).

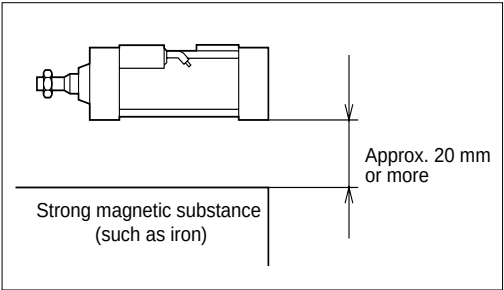
Handling instructions

Precautions for installation

- 1. DO NOT use cylinders and switches in the places where are directly subjected to chips and cutting oil.
 - Otherwise, the cord may be damaged by chips, or cutting oil may enter the switch inside, and short-circuit may occur, causing the malfunctions of the switches.
- 2. Prior to the use of the switches near a strong magnetic field, install the magnetic shield with steel plates (install it 20 mm or more distant from the cylinder and switch).
 - Otherwise, the switches may work incorrectly due to the influence of the magnetic field.



- 3. Keep away strong magnetic substances (such as iron) from cylinders outside and switches. Separate them by approx. 20 mm or more (as a guide). For compact cylinders, separate them by approx. 10 mm or more).
 - Otherwise, the switches may work incorrectly due to the influence of the strong magnetic substances.



Detectable cylinder piston speed

- When mounting the switch on the intermediate position, be sure to adjust the maximum cylinder speed to 300 mm/s or slower on account of the response speed of the load relays, etc.
 - If the piston speed is excessively high, the switch working time becomes shorter, although the switch works, and load devices including relays may not work.
- Determine the detectable cylinder piston speed, referring to the formula below.

$$\text{Detectable piston speed (mm/s)} = \frac{\text{working range of switch (mm)}}{\text{working time of load device (ms)}} \times 1000$$

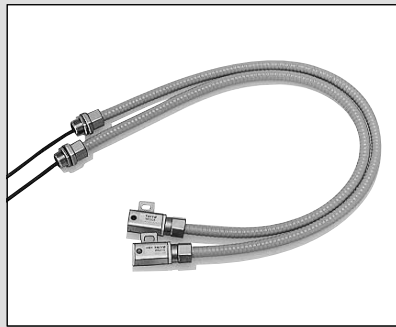
- (Notes)
- Refer to the materials related the working time of load devices, including relays, of each manufacturer.
 - Apply the minimum value to the working range of a switch, and apply the maximum value to the working time of a load device.



Switch specifications

Magnetic proximity type (cutting fluid proof type)

WR/WS type switch 137





Reliable sealing performance
regardless of an environment
where is splashed direct with
cutting oil

- Protective structure IP67G
 - Flexible tubes have been standardized for the protection of cabtyre cords.
 - Long service life even if cutting fluid is splashed (approx. 10 times longer compared to our conventional products)
 - Oil-proof soft PVC has been adopted to the coatings of flexible tubes.
 - The cord of upper take-out type and cord type (without flexible tube) have been added to allow the selection in wide varieties depending on applications.
 - No contact type with only 2-wires for less wiring
- The adoption of the 2-LED system permits easier setting of the most suitable setting position.

Specifications

Contact types		Contact		No contact	
Code	With cord (5m)	WR505, WR515, WR525, WR545	WR535, WR555	WS215, WS225, WS235, WS255	WS245, WS265
Wiring direction		Rear	Upper	Rear	Upper
Load voltage, current		DC5-50V•AC5-120V	DC3-40mA•AC3-20mA	DC10-30V	6-70mA
Inner drop voltage		2V or less		4V or less	
Max. open/ close capacity		DC1.5W•AC2VA		—	
Current leak		0μA		1mA or less	
Response time		1ms or less			
Insulation resistance		100MΩ 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)		490m/s ² (Non-repetition)	
Vibration-proof		Lateral oscillation 1.5 mm 10 to 55 Hz (1 sweep for 1 min) 2 hours in X, Y, and Z directions		Lateral oscillation 0.6 mm 10 to 200 Hz log sweep for 1 hour in X, Y, and Z directions	
Ambient temperature		-10 - +60°C (at non-freezing condition)			
Wiring method		0.3 mm ² 2-core Outer diameter 4 mm Oil-proof cabtyre cord			
Protective structure		IP67G (JEN standards)(oil-proof type)			
Indicating lamp		LED (red lamp lights up during ON)		Working position: red/green LED Most suitable position: green LED	
Electric circuit					
Applied load		Small relay • Programmable Controller			

Note) When using the induction load (small relay, etc.), the protective circuit SK-100 shall be surely provided for load.

Switch structure diagram

Unit : mm

- Switch types
 - Flexible tube type
 - Contact
 - WR505, WR525, WR545 (rearward)
 - WR535, WR555 (upward)
 - No contact
 - WS215, WS235, WS255 (rearward)
 - WS245, WS265 (upward)
- Flexible tube
 - Code: F-05
 - (available unit 4.8 m)

Connector: F-FC

Switch

Flexible tube: F-05

Straight box connector: F-SB

4.8m

(Optional: F-05)

Bore : φ6mm

Outer dia. : φ9mm

Cord type

Contact	WR515
No contact	WS225

Connector: F-KC

- For the flexible tube type switch, be sure to use it together with a flexible tube.
- Standard flexible tube type switches are equipped with the straight box connectors (F-SB).
- Remember that the flexible tube type (F-05) is optional.

Applicable actuator and mounting bracket list

Actuator series	Hydraulic actuator					
	35H-3R	100H-2R 100H-2RD 100HW-2R	70/140H-8R * 70/140HW-8R 70/140Y-2R * 70/140YW-2R	35S-1R 35SY-1R	HQS2R HQSW2R 100S-1R 100SW-1R	160S-1R *160SW-1R
Switch type	WR505 WS215 (Flexible tube type)			WR525 WS235 (Rear wiring)		
	WR515 WS225 (Cord type)			WR535 WS245 (Upper wiring)		
Bore						
φ 20	—	—	—		—	—
φ 25	—	—	—		—	—
φ 32	R21WR (WS) ☐ -H	R21WR (WS) ☐ -H	R22WR (WS) ☐ -H	T07WR (WS) ☐ -H		
φ 40						
φ 50	R22WR (WS) ☐ -H	R22WR (WS) ☐ -H	R23WR (WS) ☐ -H			
φ 63						
φ 80	R22WR (WS) ☐ -H	R23WR (WS) ☐ -H	R24WR (WS) ☐ -H	—		
φ 100	R23WR (WS) ☐ -H	—	R25WR (WS) ☐ -H	—		—
φ 125	—	—	R26WR (WS) ☐ -H	—	—	—
φ 140	—		—	—	—	—
φ 160			—	—	—	—

Notes) ● The *-marked actuators are of the cutting oil proof type. The WR and WS type switches can be provided for them as the standard outfits.

- As for the actuators other than the *-marked ones, the WR and WS type switches can be provided as the semi-standard outfits.
- Before using the WR or WS type switch for the actuators other than the *-marked ones, check the operating environment, and select appropriate switch.

<Code example>

R21	WR505	—H
Bracket (band) code	Switch type	

Dimensional drawings

WR505 (contact)
WS215 (no contact)

(Cord rear wiring)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

15 (Width across flats)

WR515 (contact)
WS225 (no contact)

(Cord type)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

15 (Width across flats)

WR525 (contact)
WS235 (no contact)

(Cord rear wiring)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

15 (Width across flats)

WR535 (contact)
WS245 (no contact)

(Cord upper wiring)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

15 (Width across flats)

WR545 (contact)
WS255 (no contact)

(Cord rear wiring)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

15 (Width across flats)

WR555 (contact)
WS265 (no contact)

(Cord upper wiring)

Dimension A	
WR type (contact)	12
WS type (no contact)	10

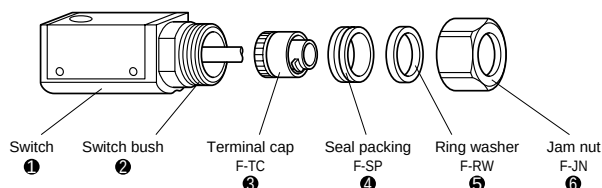
15 (Width across flats)

Switch specifications

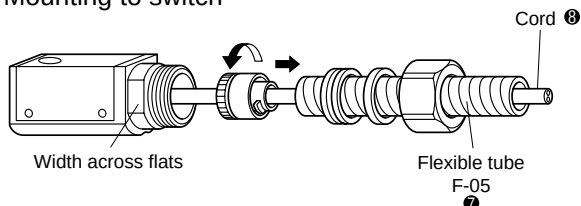
Handling instructions

Switch and flexible tube

• Connector parts configuration

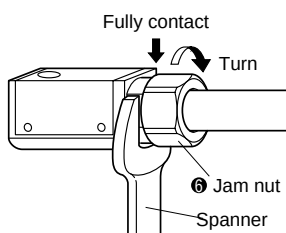


• Mounting to switch

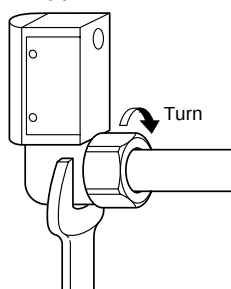


1. Cut the flexible tube ② at the required length (avoid any burr and deformation on the cut surface. Otherwise, the terminal cap may not be able to be fit).
 2. Insert the jam nut ⑥, ring washer ⑤, seal packing ④, and terminal cap ③ into the flexible tube ② in this order (insert the terminal cap ③ into the bore of the flexible tube ②).
 3. From the terminal cap ③ side, pass the cord ③ through the flexible tube with the parts from ③ to ⑥ inserted.
 4. Insert the unit above into the switch bush ②, and tighten the jam nut ⑥ onto the threads of the switch bush ②.
 5. Tighten the jam nut ⑥ until its end face comes in contact with the width across flats of the switch bush ② (in the arrow direction). Then, the mounting is complete.
- ※ When tightening the jam nut ⑥, wrench the width across flats of the switch bush ② with a spanner.

Horizontal type

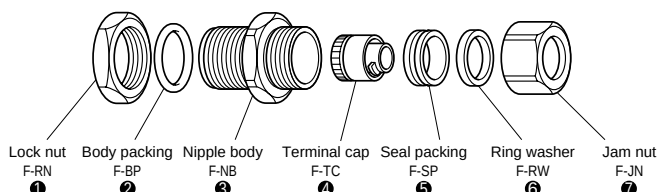


Vertical type

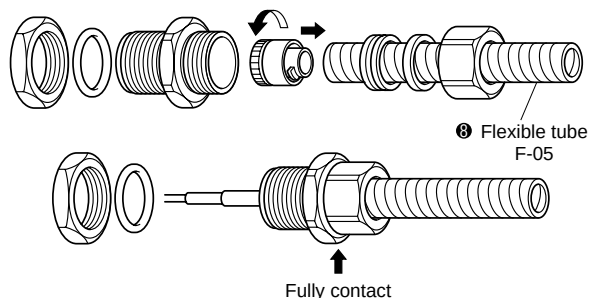


Straight box connector and flexible tube

• Parts of straight box connector (F-SB)

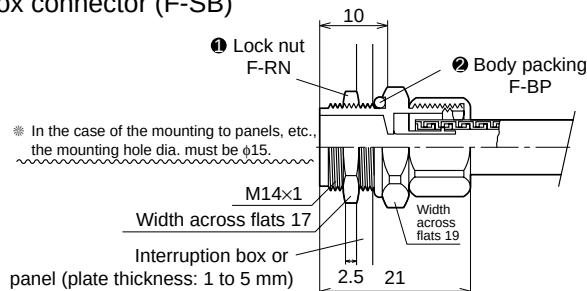


• Mounting to Straight box connector (F-SB)



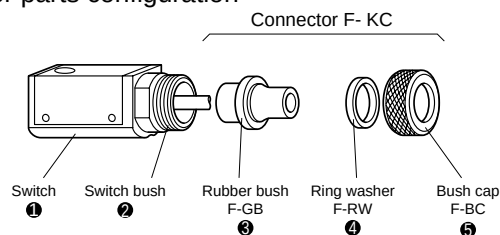
1. Insert the jam nut ⑦, ring washer ⑥, seal packing ⑤, and terminal cap ④ into the flexible tube ③ in this order (screw the terminal cap ④ into the bore of the flexible tube ③).
2. Insert the end of the flexible tube ③ with the parts from ④ to ⑦ inserted into the threads of the nipple body ③, and tighten the jam nut ⑦ onto the threads of the nipple body ③.
3. Tighten the jam nut ⑦ until its end face comes in contact with the width across flats of the nipple body ③ (in the arrow direction). Then, the mounting is complete.

• Sectional drawing of completed mounting to straight box connector (F-SB)

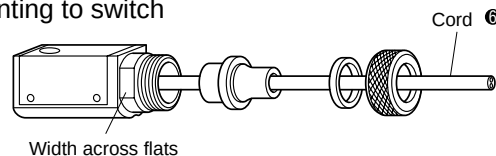


Cord type

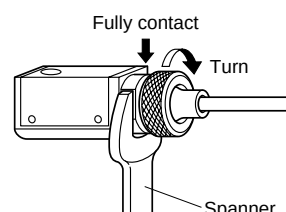
• Connector parts configuration



• Mounting to switch



1. Pass the cord ⑥ through the rubber bush ③, ring washer ④, and bush cap ⑤ in this order.
 2. Insert the parts passed through the cord into the switch bush ②, and tighten the bush cap ⑤ onto the threads of the switch bush ②.
 3. Tighten the bush cap ⑤ until its end face comes in contact with the width across flats of the switch bush ② (in the arrow direction). Then, the mounting is complete.
- ※ When tightening the bush cap ⑤, hold the width across flats of the switch bush ② with a spanner, and tighten with hands.



Handling instructions

Precautions for working environmental conditions

- 1. It is possible to use in the places where are splashed with cutting fluid (coolant) for machine tools.
- 2. The splash of the applicable cutting fluids shown below will not affect switches.

Adaptability of cutting fluid to WR and WS switches

Nonaqueous cutting fluid		Aqueous cutting fluid
Type 1	Type 2	
○	×	○

○ : applicable × : inapplicable

- To keep oil resistance for a long period and reduce the influences on cylinders, protect with protective covers to avoid direct splashes of cutting fluid.
3. In case that switches are used in the places where are splashed with cutting fluid, use the cutting fluid proof type cylinders.
- When using the cylinders of types other than the cutting fluid proof type, carefully check the adaptability of the packing material to the cutting fluid used (refer to “Selection of packing material”).
4. It is possible to use in the places where are splashed with water.
- Rust-proof measurers are required for cylinders (refer to the cylinder selection materials).
 - Rusts may occur to the connector part (brass) of switches, since no surface treatment is provided.

Other precautions

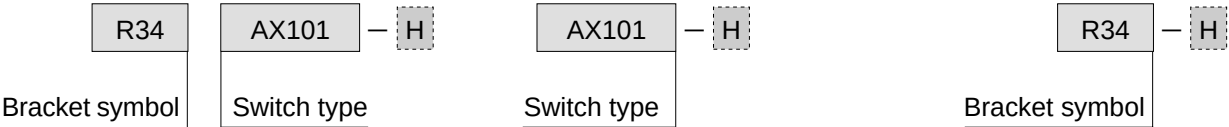
- For details of wiring, connection, etc. of the WR type, refer to “Handling instructions of contact type”. For those of the WS type, refer to “Handling instructions of no contact (2-wire, 2-LED) type”.



Code for arrangement of switches

Code

- Code for arrangement of switches and bracket assemblies
- Code for arrangement of switches
- Code for arrangement of brackets



7/14 MPa JIS double acting hydraulic cylinder

70/140H-8R • 70/140HW-8R

Switch type	Bore	Assy type		Switch single unit type		Bracket type
		Contact	No contact	Contact	No contact	
AX type (Cord rear wiring)	φ32~φ50	R34AX1**	R34AX2**	AX1**	AX2**	R34
	φ63	R35AX1**	R35AX2**			R35
	φ80 • φ100	R36AX1**	R36AX2**			R36
	φ125	R37AX1**	R37AX2**			R37
	φ140	R38AX1**	R38AX2**			R38
AZ type (Cord upper wiring)	φ32~φ50	R34AZ1**	R34AZ2**	AZ1**	AZ2**	R34
	φ63	R35AZ1**	R35AZ2**			R35
	φ80 • φ100	R36AZ1**	R36AZ2**			R36
	φ125	R37AZ1**	R37AZ2**			R37
	φ140	R38AZ1**	R38AZ2**			R38
WR type • WS type	φ32~φ50	R22WR***-H	R22WS***-H	WR***-H	WS***-H	R22-H
	φ63	R23WR***-H	R23WS***-H			R23-H
	φ80	R24WR***-H	R24WS***-H			R24-H
	φ100	R25WR***-H	R25WS***-H			R25-H
	φ125	R26WR***-H	R26WS***-H			R26-H

Symbol/code for order of switches

- Contact

General purpose type

Cord rear wiring

AF: AX101 (with 1.5 m cord)

AG: AX105 (with 5 m cord)

AH: AX111 (with 1.5 m cord)

AJ: AX115 (with 5 m cord)

AE: AX125 (with 5 m cord/no lamp)

AK: AX11A (connector type/AC)

AL : AX11B (connector type/DC)

Cord upper wiring

AP: AZ101 (with 1.5 m cord)

AR: AZ105 (with 5 m cord)

AS: AZ111 (with 1.5 m cord)

AT : AZ115 (with 5 m cord)

AN: AZ125 (with 5 m cord/no lamp)

AU: AZ11A (connector type/AC)

AW: AZ11B (connector type/DC)

Cutting oil proof type

5: WR505 (with 5 m cord)

7: WR505F (with 5 m cord/flexible tube attached)

6: WR515 (with 5 m cord)
- No contact

General purpose type

●2-wire, 1-lamp type

Cord rear wiring

BE: AX201 (with 1.5 m cord)

BF: AX205 (with 5 m cord)

Cord upper wiring

BM: AZ201 (with 1.5 m cord)

BN: AZ205 (with 5 m cord)

●2-wire, 2-lamp type

Cord rear wiring

CE: AX211 (with 1.5 m cord)

CF: AX215 (with 5 m cord)

Cord upper wiring

CM: AZ211 (with 1.5 m cord)

CN: AZ215 (with 5 m cord)

●3-wire, 1-lamp type

Cord rear wiring

BH: AX221 (with 1.5 m cord)

BJ: AX225 (with 5 m cord)

Cord upper wiring

BR: AZ221 (with 1.5 m cord)

BS: AZ225 (with 5 m cord)

Cutting oil proof type

2: WS215 (2-lamp type, with 5 m cord)

4: WS215F (2-lamp type, with 5 m cord/flexible tube attached)

3: WS225 (2-lamp type, with 5 m cord)
- CE standard

■ No contact

General purpose type

●2-wire, 2-lamp type

Cord rear wiring

CT: AX211CE (with 1.5 m cord)

CU: AX215CE (with 5 m cord)

CV: AX21B (connector type/DC)

Cord upper wiring

CW: AZ211CE (with 1.5 m cord)

CX: AZ215CE (with 5 m cord)

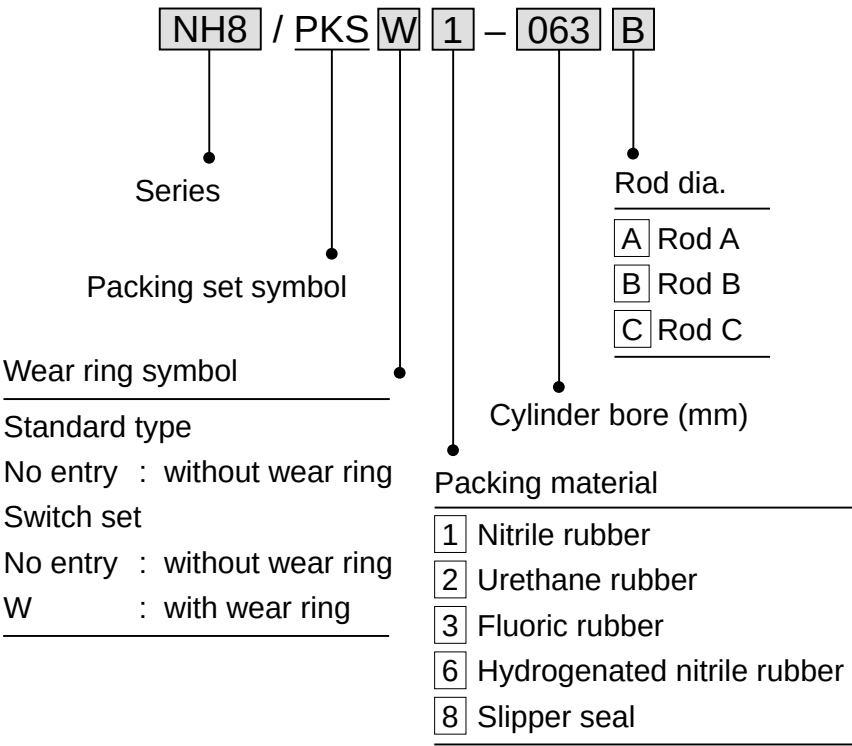
CY: AZ21B (connector type/DC)



Sectional drawings/packing list

Code for arrangement of packing set

When placing orders, specify the codes as shown below.



- Notes)
- For details, refer to the sectional drawings.
 - The standard type is not equipped with the wear ring. It is provided for only the switch set.

Working temperature range of packing material depending on working oil type

Working oil	Packing material	Temperature (°C)					
		-10	0	80	100	120	
Petroleum-based fluid	Nitrile rubber						
	Urethane rubber						
	Fluoric rubber						
	Hydrogenated nitrile rubber						
Water-glycol fluid	Nitrile rubber						
	Hydrogenated nitrile rubber						
Phosphate ester fluid	Fluoric rubber						
Water in oil fluid	Nitrile rubber						
	Hydrogenated nitrile rubber						
Oil in water fluid	Nitrile rubber						
	Hydrogenated nitrile rubber						

Notes) • Use the packings applicable to working oil used within the working temperature range. Otherwise, substantial abrasion and inferiority may occur to the packings.

- The temperature range shown in the table above is applicable to each packing material. For the switch sets, use them within the working temperature range applicable to the switches.

Adaptability of working oil to packing material

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

Notes) * The ◎ and ○ -marked items are applicable, while the × -marked items are inapplicable. For the use of the △ -marked items, contact us.

- * The ◎ -marked items are the recommended packing materials in case of giving the first priority to abrasion resistance.

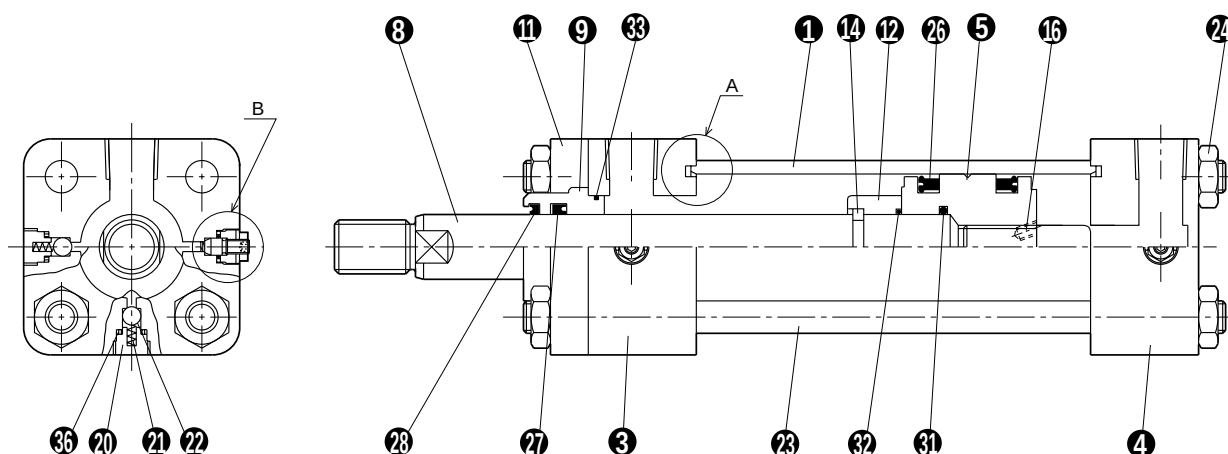
Cutting fluid proof type/adaptability of cutting fluid to packing material

Packing material	Nonaqueous cutting fluid		Aqueous cutting fluid
	Type 1	Type 2	
6 Hydrogenated nitrile rubber	○	×	○

Note) The ○ -marked items are applicable, while the × -marked items are inapplicable.

Double acting single rod/standard type/70H-8, 140H-8 (rod A, B, C)

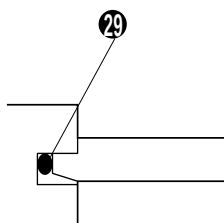
- Bore $\phi 32 - \phi 250$



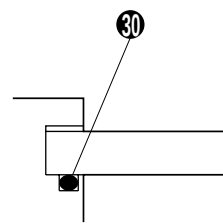
The detailed structure of the piston varies depending on the bore.

Enlarged drawing of part A

- Bore $\phi 32 - \phi 160$

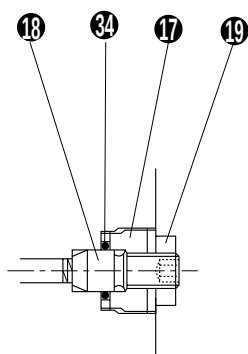


- Bore $\phi 180 - \phi 250$

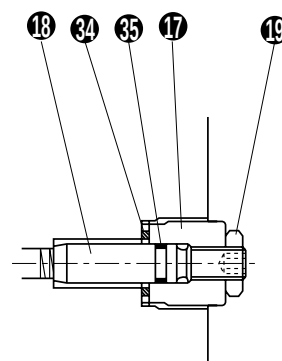


Enlarged drawing of part B (cushion valve)

- Bore $\phi 32 - \phi 100$



- Bore $\phi 125 - \phi 250$



Parts list

No.	Name	Material	Q'ty
❶	Cylinder tube	Carbon steel for machine structural use	1
❸	Rod cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ250)	1
❹	Head cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ250)	1
❺	Piston	Gray cast iron	1
❽	Piston rod	Carbon steel for machine structural use	1
❾	Bush	Copper alloy	1
❾	Retainer	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ250)	1
❿	Cushion ring	Cast iron	1
⓫	Stop ring	Carbon steel for machine structural use (φ32 - φ125) Piano wire (φ140 - φ250)	(1)
⓬	Set screw	Chrome molybdenum steel	1
⓭	Cushion plug	Carbon steel for machine structural use	2
⓮	Cushion valve	Chrome molybdenum steel	2
⓯	Cushion lock nut	Structural rolled steel	2
⓰	Check plug	Carbon steel for machine structural use	4
⓱	Check spring	Piano wire	4
⓲	Check ball	High carbon chromium bearing steel	4
⓳	Tie rod	Carbon steel for machine structural use (7 MPa: for φ63 - φ250) Chrome molybdenum steel (7 MPa: for φ32 - φ50, 14 MPa)	4
⓴	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.

Fig.1



- Precautions for fitting of valve seals ❸❹, ❸❺

The valve seals, ❸❹ and ❸❺, 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.

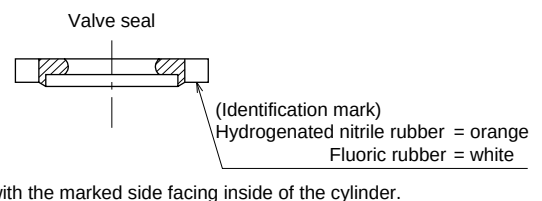
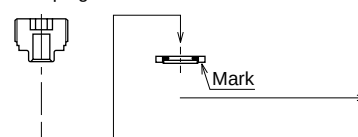


Fig.2

Check plug



Cushion valve

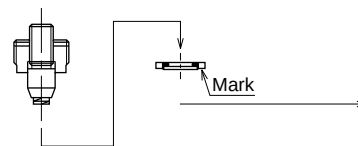
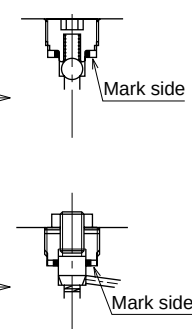


Fig.3



(Valve seal fitting sequences)

Packing list

Standard type / 1 nitrile rubber (rod B) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code						
				φ32	φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Nitrile rubber	2	UHP-32	SKY-30	SKY-40	SKY-53	SKY-71	SKY-85	SKY-112
27	Rod packing	Nitrile rubber	1	SKY-18	SKY-22.4	SKY-28	SKY-35.5	SKY-45A	SKY-56	SKY-71
28	Dust wiper	Nitrile rubber	1	SDR-18	SDR-22.4	SDR-28	SDR-35.5	SDR-45	SDR-56	SDR-71
29	Cover seal	Nitrile rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
30	O-ring for cover	Nitrile rubber	2	—	—	—	—	—	—	—
31	O-ring for piston rod	Nitrile rubber	1	S-14	S-20	S-25	P-35.5	G-45	G-55	G-65
32	O-ring for cushion ring	Nitrile rubber	1	S-16	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Nitrile rubber	1	P-22	G-25	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H	CR-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-032B	NH8/PKS1-040B	NH8/PKS1-050B	NH8/PKS1-063B	NH8/PKS1-080B	NH8/PKS1-100B	NH8/PKS1-125B

No.	Parts name	Material	Q'ty	Parts code						
				φ140	φ150	φ160	φ180	φ200	φ224	φ250
26	Piston packing	Nitrile rubber	2	SKY-125	SKY-136	SKY-145	SKY-165	SKY-180	SKY-204	SKY-230
27	Rod packing	Nitrile rubber	1	SKY-80	SKY-85	SKY-90	SKY-100	SKY-112	SKY-125	SKY-140
28	Dust wiper	Nitrile rubber	1	SDR-80	SDR-85	SDR-90	SDR-100	SDR-112	SDR-125	SDR-140
29	Cover seal	Nitrile rubber	2	TT-140	TT-150	TT-160	—	—	—	—
30	O-ring for cover	Nitrile rubber	2	—	—	—	G-170	G-190	*G-214	G-240
31	O-ring for piston rod	Nitrile rubber	1	G-70	G-75	G-80	G-75	G-85	G-95	*G-107
32	O-ring for cushion ring	Nitrile rubber	1	G-75	G-80	G-85	G-80	G-90	G-100	G-110
33	O-ring for bush	Nitrile rubber	1	G-85	G-90	G-95	G-110	G-125	G-140	G-155
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-22H	CR-22H	CR-22H	CR-22H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-11.2	S-11.2	S-11.2	S-11.2	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-22H	CR-22H	CR-22H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-140B	NH8/PKS1-150B	NH8/PKS1-160B	NH8/PKS1-180B	NH8/PKS1-200B	NH8/PKS1-224B	NH8/PKS1-250B

- The O-ring for cover 30 conforms to JIS B2401-1B (Hs90). Other O-rings conform to JIS B2401-1A. The models with * marks conform to TAIYO standards.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Standard type/2 Urethane rubber (rod B) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ32	φ40	φ50	φ63	φ80
26	Piston packing	Urethane rubber	2	Note 1) UHP-32	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing Note 2)	Urethane rubber	1	ISI-18B (UHR-18)	ISI-22.4B (UHR-22.4)	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)	ISI-45AB (UHR-45)
28	Dust wiper	Urethane rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45
29	Cover seal	Nitrile rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80
31	O-ring for piston rod	Nitrile rubber	1	S-14	S-20	S-25	P-35.5	G-45
32	O-ring for cushion ring	Nitrile rubber	1	S-16	S-22.4	S-28	S-35.5	S-45
33	O-ring for bush	Nitrile rubber	1	P-22	G-25	G-30	G-40	G-50
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -032B	NH8/PKS2 -040B	NH8/PKS2 -050B	NH8/PKS2 -063B	NH8/PKS2 -080B

No.	Parts name	Material	Q'ty	Parts code				
				φ100	φ125	φ140	φ150	φ160
26	Piston packing	Urethane rubber	2	UHP-100	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing Note 2)	Urethane rubber	1	ISI-56B (UHR-56)	ISI-71AB (UHR-71)	ISI-80B (UHR-80)	ISI-85B (UHR-85)	ISI-90B (UHR-90)
28	Dust wiper	Urethane rubber	1	DHS-56	DHS-71	DHS-80	DHS-85	DHS-90
29	Cover seal	Nitrile rubber	2	TT-100	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Nitrile rubber	1	G-55	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Nitrile rubber	1	S-56	G-65	G-75	G-80	G-85
33	O-ring for bush	Nitrile rubber	1	G-60	G-75	G-85	G-90	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	Note 3) CX-14H	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	Note 3) CX-14H	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -100B	NH8/PKS2 -125B	NH8/PKS2 -140B	NH8/PKS2 -150B	NH8/PKS2 -160B

- The O-rings conform to JIS B2401-1A.

Note 1) The material of the piston packing of a bore of φ32 is nitrile rubber.

Note 2) Rod seals ISI and UHR both are interchangeable with each other.

Note 3) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Standard type/ 3 fluoric rubber (rod B/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code						
				φ32	φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Fluoric rubber	2	UHP-32	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Fluoric rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71
28	Dust wiper	Fluoric rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71
29	Cover seal	Fluoric rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
30	O-ring for cover	Fluoric rubber	2	—	—	—	—	—	—	—
31	O-ring for piston rod	Fluoric rubber	1	S-14	S-20	S-25	P-35.5	G-45	G-55	G-65
32	O-ring for cushion ring	Fluoric rubber	1	S-16	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Fluoric rubber	1	P-22	G-25	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—	—	—	S-7
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3-032B	NH8/PKS3-040B	NH8/PKS3-050B	NH8/PKS3-063B	NH8/PKS3-080B	NH8/PKS3-100B	NH8/PKS3-125B

No.	Parts name	Material	Q'ty	Parts code						
				φ140	φ150	φ160	φ180	φ200	φ224	φ250
26	Piston packing	Fluoric rubber	2	UHP-140	UHP-150	UHP-160	SKY-165F	SKY-180F	SKY-204F	SKY-230F
27	Rod packing	Fluoric rubber	1	UHR-80	UHR-85	UHR-90	SKY-100F	SKY-112F	SKY-125F	SKY-140F
28	Dust wiper	Fluoric rubber	1	DHS-80	DHS-85	DHS-90	SDR-100F	SDR-112F	SDR-125F	SDR-140F
29	Cover seal	Fluoric rubber	2	TT-140	TT-150	TT-160	—	—	—	—
30	O-ring for cover	Fluoric rubber	2	—	—	—	G-170	G-190	*G-214	G-240
31	O-ring for piston rod	Fluoric rubber	1	G-70	G-75	G-80	G-75	G-85	G-95	*G-107
32	O-ring for cushion ring	Fluoric rubber	1	G-75	G-80	G-85	G-80	G-90	G-100	G-110
33	O-ring for bush	Fluoric rubber	1	G-85	G-90	G-95	G-110	G-125	G-140	G-155
34	Valve seal	Canned fluoric rubber	2	CR-18F	CR-18F	CR-22F	CR-22F	CR-22F	CR-22F	CR-22F
35	O-ring for cushion valve	Fluoric rubber	2	S-7	S-7	S-11.2	S-11.2	S-11.2	S-11.2	S-11.2
36	Valve seal	Canned fluoric rubber	4	CR-18F	CR-18F	CR-22F	CR-22F	CR-22F	CR-22F	CR-22F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3-140B	NH8/PKS3-150B	NH8/PKS3-160B	NH8/PKS3-180B	NH8/PKS3-200B	NH8/PKS3-224B	NH8/PKS3-250B

- The hardness of the O-ring for cover 30 is Hs 90. Other O-rings conform to JIS B2401-4D (Hs70). The models with *marks conform to TAIYO standards.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18F. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Standard type/6 hydrogenated nitrile rubber (rod B/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ32	φ40	φ50	φ63	φ80
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-32	UHP-40	UHP-50	UHP-63	UHP-80
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45
29	Cover seal	Hydrogenated nitrile rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	S-14	S-20	S-25	P-35.5	G-45
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-16	S-22.4	S-28	S-35.5	S-45
33	O-ring for bush	Hydrogenated nitrile rubber	1	P-22	G-25	G-30	G-40	G-50
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6-032B	NH8/PKS6-040B	NH8/PKS6-050B	NH8/PKS6-063B	NH8/PKS6-080B

No.	Parts name	Material	Q'ty	Parts code				
				φ100	φ125	φ140	φ150	φ160
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-100	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-56	UHR-71	UHR-80	UHR-85	UHR-90
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-56	DHS-71	DHS-80	DHS-85	DHS-90
29	Cover seal	Hydrogenated nitrile rubber	2	TT-100	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	G-55	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-56	G-65	G-75	G-80	G-85
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-60	G-75	G-85	G-90	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	Note 1) CX-14H	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	Note 1) CX-14H	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6-100B	NH8/PKS6-125B	NH8/PKS6-140B	NH8/PKS6-150B	NH8/PKS6-160B

- The hardness of the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs 90.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Standard type/ **1** nitrile rubber (rod C) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Nitrile rubber	2	SKY-30	SKY-40	SKY-53	SKY-71	SKY-85	SKY-112	SKY-125
27	Rod packing	Nitrile rubber	1	SKY-18	SKY-22.4	SKY-28	SKY-35.5	SKY-45A	SKY-56	SKY-63
28	Dust wiper	Nitrile rubber	1	SDR-18	SDR-22.4	SDR-28	SDR-35.5	SDR-45	SDR-56	SDR-63
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
30	O-ring for cover	Nitrile rubber	2	—	—	—	—	—	—	—
31	O-ring for piston rod	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	※G-58
32	O-ring for cushion ring	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-040C	NH8/PKS1-050C	NH8/PKS1-063C	NH8/PKS1-080C	NH8/PKS1-100C	NH8/PKS1-125C	NH8/PKS1-140C

No.	Parts name	Material	Q'ty	Parts code					
				φ150	φ160	φ180	φ200	φ224	φ250
26	Piston packing	Nitrile rubber	2	SKY-136	SKY-145	SKY-165	SKY-180	SKY-204	SKY-230
27	Rod packing	Nitrile rubber	1	SKY-67	SKY-71	SKY-80	SKY-90	SKY-100	SKY-112
28	Dust wiper	Nitrile rubber	1	SDR-67	SDR-71	SDR-80	SDR-90	SDR-100	SDR-112
29	Cover seal	Nitrile rubber	2	TT-150	TT-160	—	—	—	—
30	O-ring for cover	Nitrile rubber	2	—	—	G-170	G-190	※G-214	G-240
31	O-ring for piston rod	Nitrile rubber	1	G-60	G-65	G-75	G-85	G-95	※G-107
32	O-ring for cushion ring	Nitrile rubber	1	G-65	G-70	G-80	G-90	G-100	G-110
33	O-ring for bush	Nitrile rubber	1	G-90	G-95	G-110	G-125	G-140	G-155
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-22H	CR-22H	CR-22H	CR-22H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-11.2	S-11.2	S-11.2	S-11.2	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-22H	CR-22H	CR-22H	CR-22H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-150C	NH8/PKS1-160C	NH8/PKS1-180C	NH8/PKS1-200C	NH8/PKS1-224C	NH8/PKS1-250C

- The O-ring for cover 30 conforms to JIS B2401-1B (Hs90). Other O-rings conform to JIS B2401-1A (Hs70). The models with ※-marks conform to TAIYO standards.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Standard type / 2 urethane rubber (rod C) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Urethane rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100
27	Rod packing Note 1)	Urethane rubber	1	ISI-18B (UHR-18)	ISI-22.4B (UHR-22.4)	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)	ISI-45AB (UHR-45)
28	Dust wiper	Urethane rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45
32	O-ring for cushion ring	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45
33	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-50	G-60
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -040C	NH8/PKS2 -050C	NH8/PKS2 -063C	NH8/PKS2 -080C	NH8/PKS2 -100C

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Urethane rubber	2	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing Note 1)	Urethane rubber	1	ISI-56B (UHR-56)	ISI-63B (UHR-63)	ISI-67B (UHR-67)	ISI-71AB (UHR-71)
28	Dust wiper	Urethane rubber	1	DHS-56	DHS-63	DHS-67	DHS-71
29	Cover seal	Nitrile rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Nitrile rubber	1	G-55	※G-58	G-60	G-65
32	O-ring for cushion ring	Nitrile rubber	1	G-55	G-60	G-65	G-70
33	O-ring for bush	Nitrile rubber	1	G-75	G-85	G-90	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -125C	NH8/PKS2 -140C	NH8/PKS2 -150C	NH8/PKS2 -160C

- The O-rings conform to JIS B2401-1A. The models with ※-marks conform to TAIYO standards.

Note 1) Rod seals ISI and UHR both are interchangeable with each other.

Note 2) The parts code of the cushion valve seal 34 applicable to the TA type rod cover of a 100 mm bore is CR-18H, and the check valve seal 36 applicable to the same is CR-18. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Standard type/ 3 fluoric rubber (rod C/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Fluoric rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-63
28	Dust wiper	Fluoric rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-63
29	Cover seal	Fluoric rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
30	O-ring for cover	Fluoric rubber	2	—	—	—	—	—	—	—
31	O-ring for piston rod	Fluoric rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	※G-58
32	O-ring for cushion ring	Fluoric rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Fluoric rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3-040C	NH8/PKS3-050C	NH8/PKS3-063C	NH8/PKS3-080C	NH8/PKS3-100C	NH8/PKS3-125C	NH8/PKS3-140C

No.	Parts name	Material	Q'ty	Parts code					
				φ150	φ160	φ180	φ200	φ224	φ250
26	Piston packing	Fluoric rubber	2	UHP-150	UHP-160	SKY-165F	SKY-180F	SKY-204F	SKY-230F
27	Rod packing	Fluoric rubber	1	UHR-67	UHR-71	SKY-80F	SKY-90F	SKY-100F	SKY-112F
28	Dust wiper	Fluoric rubber	1	DHS-67	DHS-71	SDR-80F	SDR-90F	SDR-100F	SDR-112F
29	Cover seal	Fluoric rubber	2	TT-150	TT-160	—	—	—	—
30	O-ring for cover	Fluoric rubber	2	—	—	G-170	G-190	※G-214	G-240
31	O-ring for piston rod	Fluoric rubber	1	G-60	G-65	G-75	G-85	G-95	※G-107
32	O-ring for cushion ring	Fluoric rubber	1	G-65	G-70	G-80	G-90	G-100	G-110
33	O-ring for bush	Fluoric rubber	1	G-90	G-95	G-110	G-125	G-140	G-155
34	Valve seal	Canned fluoric rubber	2	CR-18F	CR-22F	CR-22F	CR-22F	CR-22F	CR-22F
35	O-ring for cushion valve	Fluoric rubber	2	S-7	S-11.2	S-11.2	S-11.2	S-11.2	S-11.2
36	Valve seal	Canned fluoric rubber	4	CR-18F	CR-22F	CR-22F	CR-22F	CR-22F	CR-22F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3-150C	NH8/PKS3-160C	NH8/PKS3-180C	NH8/PKS3-200C	NH8/PKS3-224C	NH8/PKS3-250C

- The hardness of the O-ring for cover 30 is Hs 90. Other O-rings conform to JIS B2401-4D (Hs70). The models with ※-marks conform to TAIYO standards.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18F. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Standard type/6 hydrogenated nitrile rubber (rod C/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-50	G-60
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6 -040C	NH8/PKS6 -050C	NH8/PKS6 -063C	NH8/PKS6 -080C	NH8/PKS6 -100C

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-56	UHR-63	UHR-67	UHR-71
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-56	DHS-63	DHS-67	DHS-71
29	Cover seal	Hydrogenated nitrile rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	G-55	※G-58	G-60	G-65
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	G-55	G-60	G-65	G-70
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-75	G-85	G-90	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6 -125C	NH8/PKS6 -140C	NH8/PKS6 -150C	NH8/PKS6 -160C

- The hardness of the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs 90. The models with ※-marks conform to TAIYO standards.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Standard type / 1 nitrile rubber (rod A) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Nitrile rubber	2	SKY-30	SKY-40	SKY-53	SKY-71	SKY-85
27	Rod packing	Nitrile rubber	1	SKY-28	SKY-35.5	SKY-45A	SKY-56	SKY-71
28	Dust wiper	Nitrile rubber	1	SDR-28	SDR-35.5	SDR-45	SDR-56	SDR-71
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Nitrile rubber	1	S-20	S-25	P-35.5	G-45	G-55
32	O-ring for cushion ring	Nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56
33	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-040A	NH8/PKS1-050A	NH8/PKS1-063A	NH8/PKS1-080A	NH8/PKS1-100A

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Nitrile rubber	2	SKY-112	SKY-125	SKY-136	SKY-145
27	Rod packing	Nitrile rubber	1	SKY-90	SKY-100	SKY-100	SKY-112
28	Dust wiper	Nitrile rubber	1	SDR-90	SDR-100	SDR-100	SDR-112
29	Cover seal	Nitrile rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Nitrile rubber	1	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Nitrile rubber	1	G-65	G-75	G-80	G-85
33	O-ring for bush	Nitrile rubber	1	G-95	G-110	G-110	G-125
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS1-125A	NH8/PKS1-140A	NH8/PKS1-150A	NH8/PKS1-160A

● The O-rings conform to JIS B2401-1A.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Standard type/2 Urethane rubber (rod A) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Urethane rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100
27	Rod packing Note 1)	Urethane rubber	1	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)	ISI-45AB (UHR-45)	ISI-56B (UHR-56)	ISI-71AB (UHR-71)
28	Dust wiper	Urethane rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Nitrile rubber	1	S-20	S-25	P-35.5	G-45	G-55
32	O-ring for cushion ring	Nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56
33	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -040A	NH8/PKS2 -050A	NH8/PKS2 -063A	NH8/PKS2 -080A	NH8/PKS2 -100A

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Urethane rubber	2	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing Note 1)	Urethane rubber	1	ISI-90B (UHR-90)	UHR-100	UHR-100	UHR-112
28	Dust wiper	Urethane rubber	1	DHS-90	DHS-100	DHS-100	DHS-112
29	Cover seal	Nitrile rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Nitrile rubber	1	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Nitrile rubber	1	G-65	G-75	G-80	G-85
33	O-ring for bush	Nitrile rubber	1	G-95	G-110	G-110	G-125
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS2 -125A	NH8/PKS2 -140A	NH8/PKS2 -150A	NH8/PKS2 -160A

• The O-rings conform to JIS B2401-1A.

Note 1) Rod seals ISI and UHR both are interchangeable with each other.

Note 2) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Standard type/3 fluoric rubber (rod A/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100
27	Rod packing	Fluoric rubber	1	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71
28	Dust wiper	Fluoric rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71
29	Cover seal	Fluoric rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Fluoric rubber	1	S-20	S-25	P-35.5	G-45	G-55
32	O-ring for cushion ring	Fluoric rubber	1	S-22.4	S-28	S-35.5	S-45	S-56
33	O-ring for bush	Fluoric rubber	1	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—	—
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3 -040A	NH8/PKS3 -050A	NH8/PKS3 -063A	NH8/PKS3 -080A	NH8/PKS3 -100A

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Fluoric rubber	2	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing	Fluoric rubber	1	UHR-90	SKY-100F	SKY-100F	SKY-112F
28	Dust wiper	Fluoric rubber	1	DHS-90	SDR-100F	SDR-100F	SDR-112F
29	Cover seal	Fluoric rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Fluoric rubber	1	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Fluoric rubber	1	G-65	G-75	G-80	G-85
33	O-ring for bush	Fluoric rubber	1	G-95	G-110	G-110	G-125
34	Valve seal	Canned fluoric rubber	2	CR-18F	CR-18F	CR-18F	CR-22F
35	O-ring for cushion valve	Fluoric rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned fluoric rubber	4	CR-18F	CR-18F	CR-18F	CR-22F
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS3 -125A	NH8/PKS3 -140A	NH8/PKS3 -150A	NH8/PKS3 -160A

• The O-rings conform to JIS B2401-4D (Hs70).

Note 1) The parts code of the cushion valve seal 34 applicable to the TA type rod cover of a 100 mm bore is CR-18F, and the check valve seal 36 applicable to the same is CF-18F. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Standard type/6 hydrogenated nitrile rubber (rod A/semi-standard) / 70H-8, 140H-8

No.	Parts name	Material	Q'ty	Parts code				
				φ40	φ50	φ63	φ80	φ100
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	S-20	S-25	P-35.5	G-45	G-55
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6 -040A	NH8/PKS6 -050A	NH8/PKS6 -063A	NH8/PKS6 -080A	NH8/PKS6 -100A

No.	Parts name	Material	Q'ty	Parts code			
				φ125	φ140	φ150	φ160
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-125	UHP-140	UHP-150	UHP-160
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-90	UHR-100	UHR-100	UHR-112
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-90	DHS-100	DHS-100	DHS-112
29	Cover seal	Hydrogenated nitrile rubber	2	TT-125	TT-140	TT-150	TT-160
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	G-65	G-70	G-75	G-80
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	G-65	G-75	G-80	G-85
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-95	G-110	G-110	G-125
34	Valve seal	Canned hydrogenated nitrile rubber	2	CR-18H	CR-18H	CR-18H	CR-22H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	S-7	S-7	S-7	S-11.2
36	Valve seal	Canned hydrogenated nitrile rubber	4	CR-18H	CR-18H	CR-18H	CR-22H
Packing set	Double acting single rod cylinder	—	1 set	NH8/PKS6 -125A	NH8/PKS6 -140A	NH8/PKS6 -150A	NH8/PKS6 -160A

- The hardness of the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs 90.

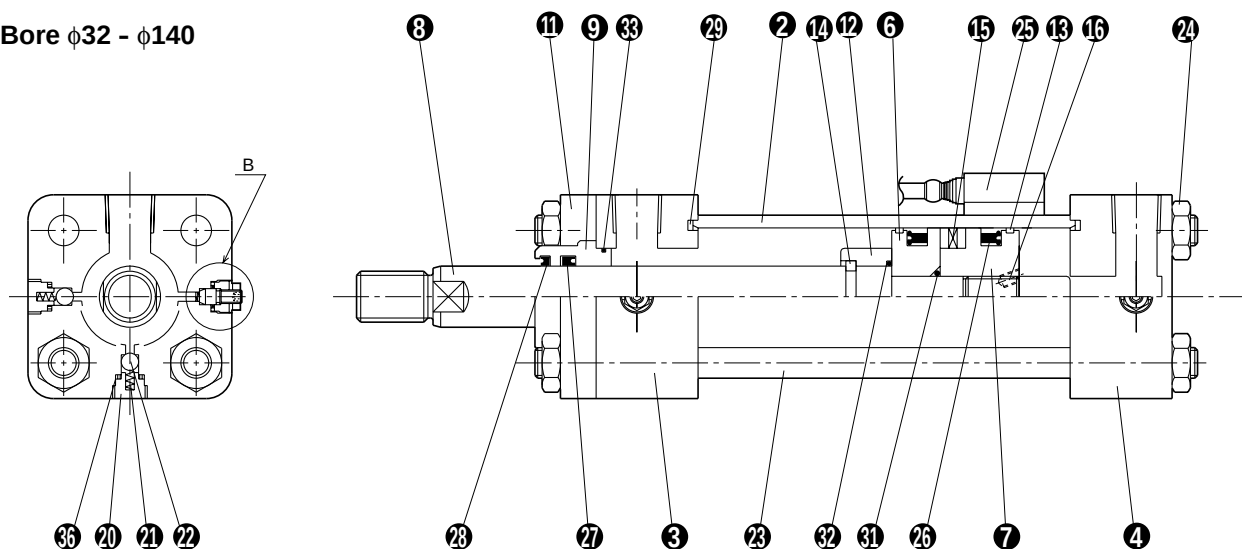
Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Double acting single rod/switch set/70H-8R, 140H-8R (rod A, B, and C)

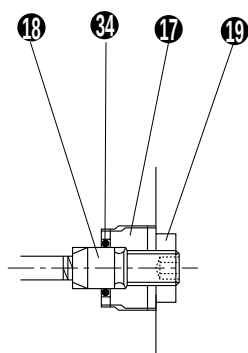
- Bore $\phi 32 - \phi 140$



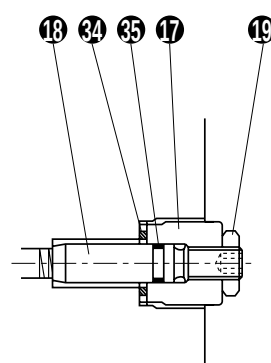
The detailed structure of the piston varies depending on the bore.

Enlarged drawing of B (cushion valve)

- Bore $\phi 32 - \phi 100$



- Bore $\phi 125 - \phi 140$



Parts list

No.	Name	Material	Q'ty
②	Cylinder tube	Stainless steel	1
③	Rod cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ140)	1
④	Head cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ140)	1
⑥	Piston R	Special copper alloy	1
⑦	Piston H	Special 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 (φ32 - φ80) Structural rolled steel (φ100 - φ140)	1
⑫	Cushion ring	Cast iron	1
⑬	Wear ring	Synthetic resin	2
⑭	Stop ring	Carbon steel for machine structural use	(1)
⑮	Magnet	—	—
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	Structural rolled steel	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	Carbon steel for machine structural use (7 MPa: for φ63 - φ140) Chrome molybdenum steel (7 MPa: for φ32 - φ50, 14 MPa)	4
㉔	Tie rod nut (type 2)	Carbon steel for machine structural use	8
㉕	Switch	—	—

- 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 ㉔, ㉕

The valve seals, ㉔ and ㉕, 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

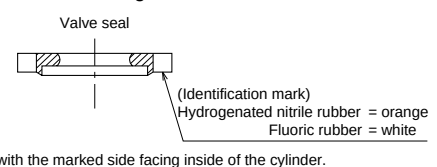


Fig.2

Check plug

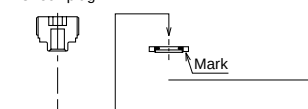
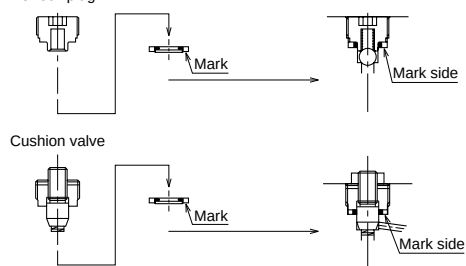


Fig.3

Cushion valve



(Valve seal fitting sequences)

Packing list

Switch set/**1** nitrile rubber (rod B) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code			
				φ32	φ40	φ50	φ63
26	Piston packing	Nitrile rubber	2	UHP-32	SKY-30	SKY-40	SKY-53
27	Rod packing	Nitrile rubber	1	SKY-18	SKY-22.4	SKY-28	SKY-35.5
28	Dust wiper	Nitrile rubber	1	SDR-18	SDR-22.4	SDR-28	SDR-35.5
29	Cover seal	Nitrile rubber	2	TT-32	TT-40	TT-50	TT-63
31	O-ring for piston rod	Nitrile rubber	1(2)	S-12.5	S-16	P-22	P-28
32	O-ring for cushion ring	Nitrile rubber	1	S-16	S-22.4	S-28	S-35.5
33	O-ring for bush	Nitrile rubber	1	P-22	G-25	G-30	G-40
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS1-032B	NH8R/PKS1-040B	NH8R/PKS1-050B	NH8R/PKS1-063B

No.	Parts name	Material	Q'ty	Parts code			
				φ80	φ100	φ125	φ140
26	Piston packing	Nitrile rubber	2	SKY-71	SKY-85	SKY-112	SKY-125
27	Rod packing	Nitrile rubber	1	SKY-45A	SKY-56	SKY-71	SKY-80
28	Dust wiper	Nitrile rubber	1	SDR-45	SDR-56	SDR-71	SDR-80
30	Cover seal	Nitrile rubber	2	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Nitrile rubber	1(2)	P-36	P-45	G-55	G-65
32	O-ring for cushion ring	Nitrile rubber	1	S-45	S-56	G-65	G-75
33	O-ring for bush	Nitrile rubber	1	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS1-080B	NH8R/PKS1-100B	NH8R/PKS1-125B	NH8R/PKS1-140B

- The O-rings conform to JIS B2401-1A.
- The quantities of the O-ring for a piston rod in the () are applicable to the types of φ32 and φ40 bores.
- For the arrangement of the packing set including wear rings, refer to the code for the arrangement of packing sets.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.
The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/2 urethane rubber (rod B) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code			
				φ32	φ40	φ50	φ63
26	Piston packing	Urethane rubber	2	Note 1) UHP-32	UHP-40	UHP-50	UHP-63
27	Rod packing Note 2)	Urethane rubber	1	ISI-18B (UHR-18)	ISI-22.4B (UHR-22.4)	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)
28	Dust wiper	Urethane rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5
30	Cover seal	Nitrile rubber	2	TT-32	TT-40	TT-50	TT-63
31	O-ring for piston rod	Nitrile rubber	1(2)	S-12.5	S-16	P-22	P-28
32	O-ring for cushion ring	Nitrile rubber	1	S-16	S-22.4	S-28	S-35.5
33	O-ring for bush	Nitrile rubber	1	P-22	G-25	G-30	G-40
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS2 -032B	NH8R/PKS2 -040B	NH8R/PKS2 -050B	NH8R/PKS2 -063B

No.	Parts name	Material	Q'ty	Parts code			
				φ80	φ100	φ125	φ140
26	Piston packing	Urethane rubber	2	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing Note 2)	Urethane rubber	1	ISI-45AB (UHR-45)	ISI-56B (UHR-56)	ISI-71AB (UHR-71)	ISI-80B (UHR-80)
28	Dust wiper	Urethane rubber	1	DHS-45	DHS-56	DHS-71	DHS-80
30	Cover seal	Nitrile rubber	2	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Nitrile rubber	1(2)	P-36	P-45	G-55	G-65
32	O-ring for cushion ring	Nitrile rubber	1	S-45	S-56	G-65	G-75
33	O-ring for bush	Nitrile rubber	1	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-14H	Note 3) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-14H	Note 3) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS2 -080B	NH8R/PKS2 -100B	NH8R/PKS2 -125B	NH8R/PKS2 -140B

- The O-rings conform to JIS B2401-1A.
- The quantities of the O-ring for a piston rod in the () are applicable to the types of φ32 and φ40 bores.
- For the arrangement of the packing set including wear rings, refer to the code for the arrangement of packing sets.

Note 1) The material of the piston packing of a bore of φ32 is nitrile rubber.

Note 2) Rod seals ISI and UHR both are interchangeable with each other.

Note 3) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/3 fluoric rubber (rod B/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code			
				φ32	φ40	φ50	φ63
26	Piston packing	Fluoric rubber	2	UHP-32	UHP-40	UHP-50	UHP-63
27	Rod packing	Fluoric rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5
28	Dust wiper	Fluoric rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5
29	Cover seal	Fluoric rubber	2	TT-32	TT-40	TT-50	TT-63
31	O-ring for piston rod	Fluoric rubber	1(2)	S-12.5	S-16	P-22	P-28
32	O-ring for cushion ring	Fluoric rubber	1	S-16	S-22.4	S-28	S-35.5
33	O-ring for bush	Fluoric rubber	1	P-22	G-25	G-30	G-40
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-12F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-12F
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS3-032B	NH8R/PKS3-040B	NH8R/PKS3-050B	NH8R/PKS3-063B

No.	Parts name	Material	Q'ty	Parts code			
				φ80	φ100	φ125	φ140
26	Piston packing	Fluoric rubber	2	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Fluoric rubber	1	UHR-45	UHR-56	UHR-71	UHR-80
28	Dust wiper	Fluoric rubber	1	DHS-45	DHS-56	DHS-71	DHS-80
29	Cover seal	Fluoric rubber	2	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Fluoric rubber	1(2)	P-36	P-45	G-55	G-65
32	O-ring for cushion ring	Fluoric rubber	1	S-45	S-56	G-65	G-75
33	O-ring for bush	Fluoric rubber	1	G-50	G-60	G-75	G-85
34	Valve seal	Canned fluoric rubber	2	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	S-7	S-7
36	Valve seal	Canned fluoric rubber	4	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS3-080B	NH8R/PKS3-100B	NH8R/PKS3-125B	NH8R/PKS3-140B

- The O-rings conform to JIS B2401-4D (Hs70).
- The quantities of the O-ring for a piston rod in the () are applicable to the types of φ32 and φ40 bores.
- For the arrangement of the packing set including wear rings, refer to the code for the arrangement of packing sets.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18F. The O-ring for cushion valve 35, S-7 is required for this type.
The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/6 hydrogenated nitrile rubber (rod B/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code			
				φ32	φ40	φ50	φ63
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-32	UHP-40	UHP-50	UHP-63
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5
29	Cover seal	Hydrogenated nitrile rubber	2	TT-32	TT-40	TT-50	TT-63
31	O-ring for piston rod	Hydrogenated nitrile rubber	1(2)	S-12.5	S-16	P-22	P-28
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-16	S-22.4	S-28	S-35.5
33	O-ring for bush	Hydrogenated nitrile rubber	1	P-22	G-25	G-30	G-40
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS6 -032B	NH8R/PKS6 -040B	NH8R/PKS6 -050B	NH8R/PKS6 -063B

No.	Parts name	Material	Q'ty	Parts code			
				φ80	φ100	φ125	φ140
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-45	UHR-56	UHR-71	UHR-80
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-45	DHS-56	DHS-71	DHS-80
29	Cover seal	Hydrogenated nitrile rubber	2	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Hydrogenated nitrile rubber	1(2)	P-36	P-45	G-55	G-65
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-45	S-56	G-65	G-75
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS6 -080B	NH8R/PKS6 -100B	NH8R/PKS6 -125B	NH8R/PKS6 -140B

- The hardness of the O-ring for piston rod S-12.5 31 of a bore of φ32 and the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs 90.
- The quantities of the O-ring for a piston rod in the () are applicable to the types of φ32 and φ40 bores.
- For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Switch set/1 nitrile rubber (rod C) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Nitrile rubber	2	SKY-30	SKY-40	SKY-53	SKY-71	SKY-85	SKY-112	SKY-125
27	Rod packing	Nitrile rubber	1	SKY-18	SKY-22.4	SKY-28	SKY-35.5	SKY-45A	SKY-56	SKY-63
28	Dust wiper	Nitrile rubber	1	SDR-18	SDR-22.4	SDR-28	SDR-35.5	SDR-45	SDR-56	SDR-63
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Nitrile rubber	1	P-15	P-18	P-24	P-30	P-36	P-45	P-50
32	O-ring for cushion ring	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS1-040C	NH8R/PKS1-050C	NH8R/PKS1-063C	NH8R/PKS1-080C	NH8R/PKS1-100C	NH8R/PKS1-125C	NH8R/PKS1-140C

• The O-rings conform to JIS B2401-1A.

• For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Switch set/2 urethane rubber (rod C) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Urethane rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Urethane rubber	1	ISI-18B (UHR-18)	ISI-22.4B (UHR-22.4)	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)	ISI-45AB (UHR-45)	ISI-56B (UHR-56)	ISI-63B (UHR-63)
28	Dust wiper	Urethane rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-63
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Nitrile rubber	1	P-15	P-18	P-24	P-30	P-36	P-45	P-50
32	O-ring for cushion ring	Nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS2-040C	NH8R/PKS2-050C	NH8R/PKS2-063C	NH8R/PKS2-080C	NH8R/PKS2-100C	NH8R/PKS2-125C	NH8R/PKS2-140C

• The O-rings conform to JIS B2401-1A.

• For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) Rod seals ISI and UHR both are interchangeable with each other.

Note 2) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Switch set/**3** fluoric rubber (rod C/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Fluoric rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-63
28	Dust wiper	Fluoric rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-63
29	Cover seal	Fluoric rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Fluoric rubber	1	P-15	P-18	P-24	P-30	P-36	P-45	P-50
32	O-ring for cushion ring	Fluoric rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Fluoric rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS3-040C	NH8R/PKS3-050C	NH8R/PKS3-063C	NH8R/PKS3-080C	NH8R/PKS3-100C	NH8R/PKS3-125C	NH8R/PKS3-140C

- The O-rings conform to JIS B2401-4D (Hs70).
- For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18F. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/**6** hydrogenated nitrile rubber (rod C/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code						
				φ40	φ50	φ63	φ80	φ100	φ125	φ140
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125	UHP-140
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-63
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-18	DHS-22.4	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-63
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125	TT-140
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	P-15	P-18	P-24	P-30	P-36	P-45	P-50
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55	G-60
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75	G-85
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS6-040C	NH8R/PKS6-050C	NH8R/PKS6-063C	NH8R/PKS6-080C	NH8R/PKS6-100C	NH8R/PKS6-125C	NH8R/PKS6-140C

- The hardness of the O-ring for cushion valve 35 is Hs70, and that of other O-ring is Hs90.
- For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Packing list

Switch set/1 nitrile rubber (rod A) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
25	Piston packing	Nitrile rubber	2	SKY-30	SKY-40	SKY-53	SKY-71	SKY-85	SKY-112
27	Rod packing	Nitrile rubber	1	SKY-28	SKY-35.5	SKY-45A	SKY-56	SKY-71	SKY-90
28	Dust wiper	Nitrile rubber	1	SDR-28	SDR-35.5	SDR-45	SDR-56	SDR-71	SDR-90
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Nitrile rubber	1(2)	S-16	P-22	P-28	P-36	P-45	G-55
32	O-ring for cushion ring	Nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-50	G-60	G-75	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS1-040A	NH8R/PKS1-050A	NH8R/PKS1-063A	NH8R/PKS1-080A	NH8R/PKS1-100A	NH8R/PKS1-125A

• The O-rings conform to JIS B2401-1A.

• The parenthetic quantities of piston rod O-ring are for 32mm and 40mm bore.

• For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/2 urethane rubber (rod A) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
25	Piston packing	Urethane rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Urethane rubber	1	ISI-28B (UHR-28)	ISI-35.5B (UHR-35.5)	ISI-45AB (UHR-45)	ISI-56B (UHR-56)	ISI-71AB (UHR-71)	ISI-90B (UHR-90)
28	Dust wiper	Urethane rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71	DHS-90
29	Cover seal	Nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Nitrile rubber	1	S-16	P-22	P-28	P-36	P-45	G-55
32	O-ring for cushion ring	Nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Nitrile rubber	1	G-30	G-40	G-50	G-60	G-75	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 2) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS2-040A	NH8R/PKS2-050A	NH8R/PKS2-063A	NH8R/PKS2-080A	NH8R/PKS2-100A	NH8R/PKS2-125A

• The O-rings conform to JIS B2401-1A.

• The parenthetic quantities of piston rod O-ring are for 32mm and 40mm bore.

• For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.

Note 1) Rod seals ISI and UHR both are interchangeable with each other.

Note 2) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/**3** fluoric rubber (rod A/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Fluoric rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Fluoric rubber	1	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71	UHR-90
28	Dust wiper	Fluoric rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71	DHS-90
29	Cover seal	Fluoric rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Fluoric rubber	1(2)	S-16	P-22	P-28	P-36	P-45	G-55
32	O-ring for cushion ring	Fluoric rubber	1	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Fluoric rubber	1	G-30	G-40	G-50	G-60	G-75	G-95
34	Valve seal	Canned fluoric rubber	2	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F
35	O-ring for cushion valve	Fluoric rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned fluoric rubber	4	CX-12F	CX-12F	CX-12F	CX-14F	Note 1) CX-14F	CR-18F
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS3-040A	NH8R/PKS3-050A	NH8R/PKS3-063A	NH8R/PKS3-080A	NH8R/PKS3-100A	NH8R/PKS3-125A

- The O-rings conform to JIS B2401-4D (Hs70).
- For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.
- The parenthetic quantities of piston rod O-ring are for 32mm and 40mm bore.

Note 1) The parts code of the cushion valve seal **34** and the check valve seal **36** applicable to the TA type rod cover of a 100 mm bore is CR-18F. The O-ring for cushion valve **35**, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18F and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/**6** hydrogenated nitrile rubber (rod A/semi-standard) / 70H-8R, 140H-8R

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71	UHR-90
28	Dust wiper	Hydrogenated nitrile rubber	1	DHS-28	DHS-35.5	DHS-45	DHS-56	DHS-71	DHS-90
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Hydrogenated nitrile rubber	1(2)	S-16	P-22	P-28	P-36	P-45	G-55
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-30	G-40	G-50	G-60	G-75	G-95
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NH8R/PKS6-040A	NH8R/PKS6-050A	NH8R/PKS6-063A	NH8R/PKS6-080A	NH8R/PKS6-100A	NH8R/PKS6-125A

- The hardness of the O-ring for cushion valve **35** is Hs70, and that of other O-ring is Hs90.
- For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.
- The parenthetic quantities of piston rod O-ring are for 32mm and 40mm bore.

Note 1) The parts code of the cushion valve seal **34** and the check valve seal **36** applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve **35**, S-7 is required for this type.

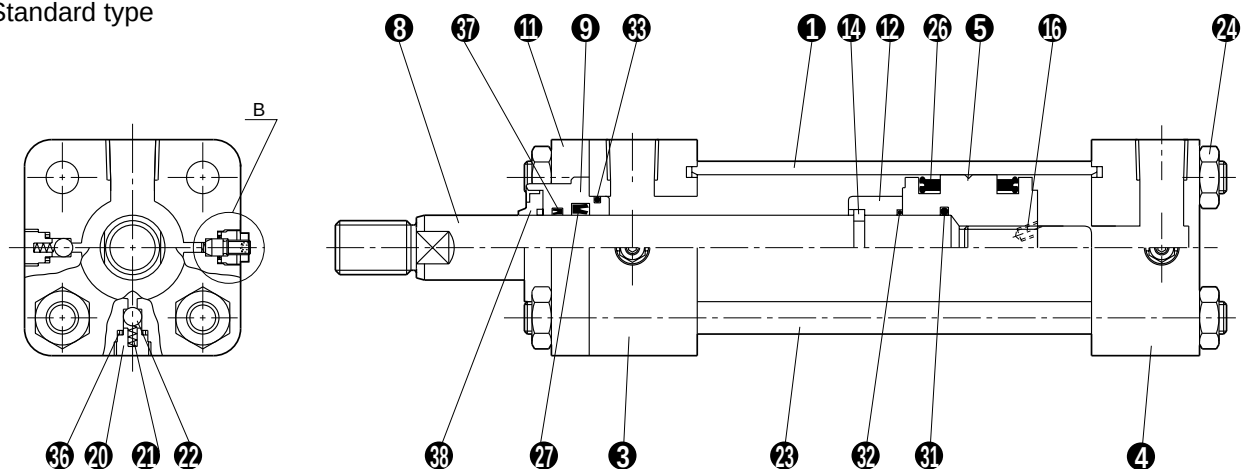
The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Double acting single rod/cutting fluid proof type 70HW-8, 140HW-8, 70HW-8R, 140HW-8R (rod B/rod C)

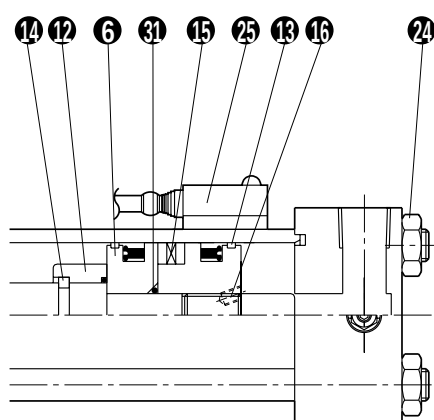
• Bore $\phi 32 - \phi 125$

Standard type



- The detailed structure of the piston varies depending on the bore.
- Wiper-seal part is specially designed in order to prevent the invasion of foreign body.

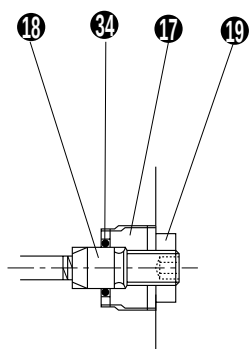
• Switch set (piston structure)



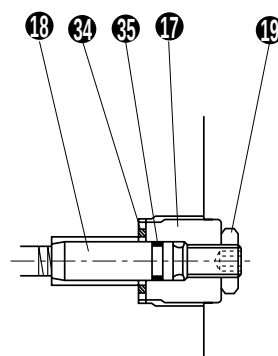
The detailed structure of the piston varies depending on the bore. The structure of other sections is common to the standard type.

Enlarged drawing of B (cushion valve)

• Bore $\phi 32 - \phi 100$



• Bore $\phi 125$



Parts list

No.	Name	Material	Q'ty
❶	Cylinder tube	Standard type: carbon steel for machine structural use Switch set: stainless steel	1
❸	Rod cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ125)	1
❹	Head cover	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ125)	1
❺	Piston	Gray cast iron	1
❻	Piston R	Special copper alloy	1
❼	Piston H	Special copper alloy	1
❽	Piston rod	Carbon steel for machine structural use	1
❾	Bush	Copper alloy	1
❾❶	Retainer	Carbon steel for machine structural use (φ32 - φ80) Structural rolled steel (φ100 - φ125)	1
❾❷	Cushion ring	Cast iron	1
❾❸	Wear ring	Synthetic resin	2
❾❹	Stop ring	Carbon steel for machine structural use	(1)
❾❺	Magnet	—	—
❾❻	Set screw	Chrome molybdenum steel	1
❾❼	Cushion plug	Carbon steel for machine structural use	2
❾❽	Cushion valve	Chrome molybdenum steel	2
❾❾	Cushion lock nut	Structural rolled steel	2
❿	Check plug	Carbon steel for machine structural use	4
❿❶	Check spring	Piano wire	4
❿❷	Check ball	High carbon chromium bearing steel	4
❿❸	Tie rod	Carbon steel for machine structural use (7 MPa: for φ63 - φ125) Chrome molybdenum steel (7 MPa: for φ32 - φ50, 14 MPa)	4
❿❹	Tie rod nut (type 2)	Carbon steel for machine structural use	8
❿❺	Switch	—	—

- 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.

Fig.1



- Precautions for fitting of valve seals ❸❹, ❸❺

The valve seals, ❸❹ and ❸❺, 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.

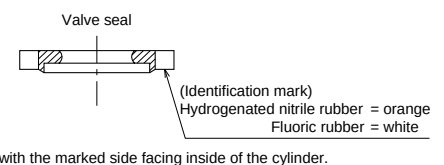


Fig.2

Check plug



Mark

Fig.3



Mark side

Cushion valve



Mark



Mark side

(Valve seal fitting sequences)

Packing list

Standard type/ 6 cutting fluid proof type (rod B) / 70HW-8, 140HW-8

No.	Parts name	Material	Q'ty	Parts code						
				φ32	φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-32	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71
38	Dust wiper 1	Canned hydrogenated nitrile rubber	1	(DYL-18)	(DYL-22.4)	(DYL-28)	(DYL-35.5)	(DYL-45)	(DYL-56)	(DYL-71)
37	Dust wiper 2	Hydrogenated nitrile rubber	1	UMD-18	UMD-22.4	UMD-28	UMD-35.5	UMD-45	UMD-56	UMD-71
29	Cover seal	Hydrogenated nitrile rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
41	O-ring for piston rod	Hydrogenated nitrile rubber	1	S-14	S-20	S-25	P-35.5	G-45	G-55	G-65
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-16	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NHW8/PKS6-032B	NHW8/PKS6-040B	NHW8/PKS6-050B	NHW8/PKS6-063B	NHW8/PKS6-080B	NHW8/PKS6-100B	NHW8/PKS6-125B

- The hardness of the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs90.
- The dust wiper 1 38 is pressed in the bush to be incorporated with it, and cannot be replaced singly. When replacing, replace together with the bush.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Standard type/ 6 cutting fluid proof type (rod C) / 70HW-8, 140HW-8

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56
38	Dust wiper 1	Canned hydrogenated nitrile rubber	1	(DYL-22.4)	(DYL-28)	(DYL-35.5)	(DYL-45)	(DYL-56)	(DYL-71)
37	Dust wiper 2	Hydrogenated nitrile rubber	1	UMD-18	UMD-22.4	UMD-28	UMD-35.5	UMD-45	UMD-56
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
41	O-ring for piston rod	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NHW8/PKS6-040C	NHW8/PKS6-050C	NHW8/PKS6-063C	NHW8/PKS6-080C	NHW8/PKS6-100C	NHW8/PKS6-125C

- The hardness of the O-ring for cushion valve 35 is Hs 70, and that of other O-rings is Hs90.
- The dust wiper 1 38 is pressed in the bush to be incorporated with it, and cannot be replaced singly. When replacing, replace together with the bush.

Note 1) The parts code of the cushion valve seal 34 and the check valve seal 36 applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve 35, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

[Note] The nominal code of packings may be changed.

Switch set/**6** cutting fluid proof type (rod B) / 70HW-8R, 140HW-8R

No.	Parts name	Material	Q'ty	Parts code						
				φ32	φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-32	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56	UHR-71
33	Dust wiper 1	Canned hydrogenated nitrile rubber	1	(DYL-18)	(DYL-22.4)	(DYL-28)	(DYL-35.5)	(DYL-45)	(DYL-56)	(DYL-71)
37	Dust wiper 2	Hydrogenated nitrile rubber	1	UMD-18	UMD-22.4	UMD-28	UMD-35.5	UMD-45	UMD-56	UMD-71
29	Cover seal	Hydrogenated nitrile rubber	2	TT-32	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Hydrogenated nitrile rubber	1(2)	S-12.5	S-16	P-22	P-28	P-36	P-45	G-55
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	S-16	S-22.4	S-28	S-35.5	S-45	S-56	G-65
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NHW8R/PKS6-032B	NHW8R/PKS6-040B	NHW8R/PKS6-050B	NHW8R/PKS6-063B	NHW8R/PKS6-080B	NHW8R/PKS6-100B	NHW8R/PKS6-125B

- The hardness of the O-ring for piston rod S-12.5 of a bore of φ32 ³¹ and the O-ring for cushion valve ³⁵ is Hs 70, and that of other O-rings is Hs 90.
 - The quantities of the O-ring for piston rod in the () are applicable to the types of φ32 and φ40 bores.
 - For the arrangement of the packing set including wear rings, refer to the code for the packing set arrangement.
 - The dust wiper 1 ³³ is pressed in the bush to be incorporated with it, and cannot be replaced singly. When replacing, replace together with the bush.
- Note 1) The parts code of the cushion valve seal ³⁴ and the check valve seal ³⁶ applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve ³⁵, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

Switch set/**6** cutting fluid proof type (rod C) / 70HW-8R, 140HW-8R

No.	Parts name	Material	Q'ty	Parts code					
				φ40	φ50	φ63	φ80	φ100	φ125
26	Piston packing	Hydrogenated nitrile rubber	2	UHP-40	UHP-50	UHP-63	UHP-80	UHP-100	UHP-125
27	Rod packing	Hydrogenated nitrile rubber	1	UHR-18	UHR-22.4	UHR-28	UHR-35.5	UHR-45	UHR-56
33	Dust wiper 1	Canned hydrogenated nitrile rubber	1	(DYL-22.4)	(DYL-28)	(DYL-35.5)	(DYL-45)	(DYL-56)	(DYL-71)
37	Dust wiper 2	Hydrogenated nitrile rubber	1	UMD-18	UMD-22.4	UMD-28	UMD-35.5	UMD-45	UMD-56
29	Cover seal	Hydrogenated nitrile rubber	2	TT-40	TT-50	TT-63	TT-80	TT-100	TT-125
31	O-ring for piston rod	Hydrogenated nitrile rubber	1	P-15	P-18	P-24	P-30	P-36	P-45
32	O-ring for cushion ring	Hydrogenated nitrile rubber	1	P-18	P-22.4	P-28	P-35.5	G-45	G-55
33	O-ring for bush	Hydrogenated nitrile rubber	1	G-25	G-30	G-40	G-50	G-60	G-75
34	Valve seal	Canned hydrogenated nitrile rubber	2	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
35	O-ring for cushion valve	Hydrogenated nitrile rubber	2	—	—	—	—	—	S-7
36	Valve seal	Canned hydrogenated nitrile rubber	4	CX-12H	CX-12H	CX-12H	CX-14H	Note 1) CX-14H	CR-18H
Packing set	Double acting single rod cylinder	—	1 set	NHW8R/PKS6-040C	NHW8R/PKS6-050C	NHW8R/PKS6-063C	NHW8R/PKS6-080C	NHW8R/PKS6-100C	NHW8R/PKS6-125C

- The hardness of the O-ring for cushion valve ³⁵ is Hs 70, and that of other O-rings is Hs90.
 - The dust wiper 1 ³³ is pressed in the bush to be incorporated with it, and cannot be replaced singly. When replacing, replace together with the bush.
- Note 1) The parts code of the cushion valve seal ³⁴ and the check valve seal ³⁶ applicable to the TA type rod cover of a 100 mm bore is CR-18H. The O-ring for cushion valve ³⁵, S-7 is required for this type.

The packing set for the 100 mm bore type includes 2 pcs. of the CR-18H and 1 pce. of the S-7.

Note The nominal code of packings may be changed.

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