HYDRAULIC CYLINDERS CATALOGUE

●TIEROD TYPE CYLINDER ●COMPACT TYPE CYLINDER ●MINI CYLINDER

GUIDANCE OF HYDRAULIC CYLINDERS FOR PROFESSIONALS

2013

HORIUCHI MACHINERY CO.,LTD.

Hydraulic cylinder catalogue

GUIDANCE OF HYDRAULIC CYLINDERS FOR PROFESSIONALS

The content described in this catalogue might change without a previous notice.
Please acknowledge it.

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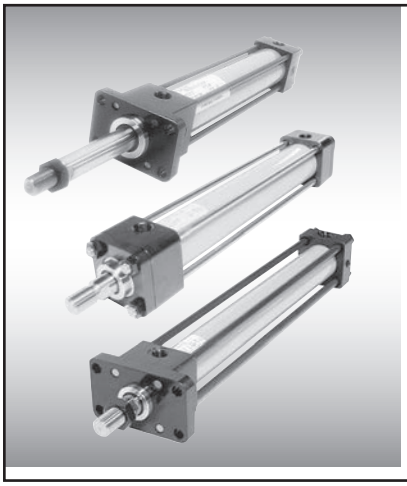	Tie Rod Type	3.5MPa	K	Standard
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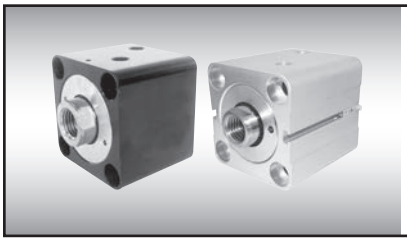	Compact Type	10MPa	CHR	Switch adjusted
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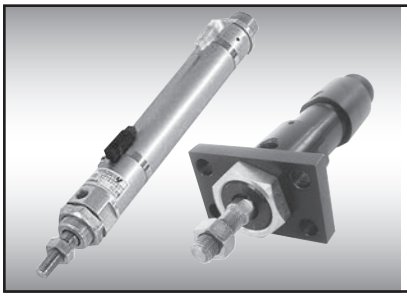	Mini Type	3.5MPa	MR35	Switch adjusted
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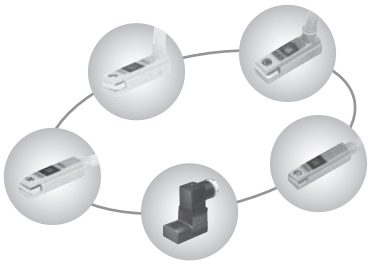

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For Safe Use

▼Please read notes before using hydraulic cylinders. ▼

⚠ Attention

If the hydraulic cylinder is improperly handled, the hydraulic cylinder cannot fully exhibit its performance, which may result in a serious accident. Before using the hydraulic unit, read through this catalog carefully, and understand the contents thoroughly to avoid an accident.
In this catalog, "DANGER", "WARNING", "CAUTION" and "NOTES" indicate instructions that need special attention. Failure to observe these instructions may cause injury to workers and damage to the equipment. When handling the hydraulic unit, be sure to observe these instructions, because all these instructions provide important safety information.

Relevant Statute and General 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 (Same to "ISO 4413")
JIS B 8367 : hydraulic cylinder,Mounting dimensions
JFPS 1014 : Selection of hydraulic cylinder, and the indicator of use
High-pressure gas security law
Industrial Safety and Health Law
Fire Defense Law
JIS B 8265 : Structure of pressure container, General matter
JIS B 8266 : Structure of pressure container,Specific standard.
NAS 1638 : Classification of contamination particles levels

Instruction in This Catalogue

The instruction in this catalogue is classified into 'DANGER', 'WARNING', 'CAUTION', and ' NOTES' according to risk and the degree of the trouble.

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

⚠ WARNING

1. Please do not bring the fire close.
   Hydraulic oil is inflammable. It may catch fire.
2. Handling
   Before removing the hydraulic cylinder, be sure to turn OFF the power supply for the hydraulic source, and make sure that there is no residual pressure in the hydraulic piping and the hydraulic cylinder. During operation of the hydraulic unit, or immediately after the hydraulic unit stops, the hydraulic piping and the hydraulic cylinder may be hot.
3. Please obtain the protection cover when you might endanger the human body.
   If a moving part of a driven object or the cylinder may cause hazard to the human body, provide a structure to prevent the human body from touching the moving part (specifically, for the stopper-type hydraulic cylinder with stroke adjusting mechanism).
4. The deceleration circuit and the accumulator (damper) might be necessary.
   If a driven object moves fast, or if the object is heavy, it may be difficult for the cylinder to absorb shock (inertia force) with the cylinder cushion only. In this case, provide a deceleration circuit before the cushion, or use an external shock absorber (damper) to reduce the shock. In this case, you should thoroughly consider rigidity of the machine body.
5. Please certainly tighten bolts to which a fixed part and connected part of the cylinder do not loosen.
   To fasten the cylinder mounting bracket, use a bolt of the specified size and strength class, and tighten the bolt securely with appropriate tightening torque. When using the rotary bracket, use a pin of the specified size. If you use a bolt of an unspecified size, the bolt may become loose or damaged due to reaction force involving thrust force of the cylinder. For the cylinder mounting part, use a rigid material.
6. When air bleeding, please do not loosen the air relief plug too much.
   If the air bleed is excessively loosened, the plug and the steel ball may come off the cylinder, or oil may spout out, resulting in injury. Particularly, be careful not to put your face near the cylinder.
7. Please consider the behavior when the emergency stops.
   If an emergency stop switch is pressed by an operator or a safety device is activated to stop the machine in case of a power failure or other system error, ensure the system design so that movement of the cylinder will not cause injury to the human body or damage to the equipment.
8. Please confirm the specification.
   The hydraulic cylinders listed in this catalog have been designed and manufactured as general industrial machine components. Therefore, do not use the hydraulic cylinders at pressure, temperature or environment out of the ranges defined in the specifications. Failure to observe this instruction causes shortened service life, damage or malfunction of the hydraulic cylinders. For electric parts (sensor, switch, amplifier, controller, etc.), thoroughly check the specifications (load voltage, current, temperature, humidity, shock resistance, etc.).
9. Please never remodel the product.
   Otherwise, the hydraulic cylinder may malfunction, causing injury, electric shock and/or fire.
10. If you intend to use the hydraulic cylinder in the following conditions or environment, be sure to notice it to us, and give consideration to safety measures.
    Use under any condition or environment out of those given in the specifications, or outdoor use.Applications related to public safety (e.g. nuclear equipment, aerial equipment, railroad, vehicle, medical equipment, amusement equipment, food & drink equipment, etc.). Use for safety equipment: Specifically, applications that need high safety.

⚠ CAUTION

General matter

1. When the cylinder weight exceeds 15 kg, use sling gear and carriers.
   Pay attention to "3S". (Keep the workplace clean and well-ordered). If oil adheres to the floor or the cylinder, you may slip, overturn or fall. Keep the work place clean, so that you can find an oil stain early.
2. When mounting the cylinder, be sure to center the cylinder.
   If the cylinder is not centered, prying force is applied to the cylinder rod and tube bearings, which may result in chipping, wear and damage of the bearings and packing seal, or may cause malfunction of the cylinder (because of increased resistance).
3. To use an external guide, conduct adjustment to prevent prying force from being applied in the whole stroke range, or consider the connection of the rod end joint and the load.
   Particularly, when a long stroke cylinder or both-end rotary support cylinder is used in horizontal installation, prying force may be applied to the bearings and other parts because of the cylinder's own weight.
4. Use hydraulic oil suited for the cylinder packing material. Do not mix different types of hydraulic oil.
   For cleanliness of the hydraulic oil, NAS12 or higher class is recommended.

For Safe Use

⚠ CAUTION

Piping

1. **Before piping work, be sure to conduct flushing to remove swarf, cutting oil or other foreign object from the piping.**
   To prevent flushing fluid from entering the cylinder, remove the cylinder in advance, or conduct flushing before installation of the cylinder.
   Failure to observe this instruction causes oil leak or malfunction of the machine.
2. **How to wind seal tape**
   To connect pipes with seal tape, wind the seal tape on the thread, with one or two pitches at the tip of the thread left unwound. When screwing the pipes and joints, be careful that swarf or seal tape on the piping thread will not enter the piping. Also, when you apply liquid packing to the joints, use the same caution. Otherwise, a chip of the seal tape or swarf causes oil leak and/or malfunction of the machine.
3. **During piping work, make sure that no air remains in the piping.**
4. **When a steel pipe is used, select a pipe of an appropriate size and strength, and take measures to prevent rust and corrosion of the pipe.**
5. **If welding work is required for piping, connect the ground terminal from a separate safe place, so that an earth current will not flow through the cylinder.**
   If an earth current flows through the bearings (rod and bushing, and tube and piston), a spark occurs, causing surface damage, oil leak and/or malfunction of the machine.

Cushion adjustment / Air bleeding

1. **If the air bleeding bolt is excessively loosened, the air bleeding bolt and the internal steel ball may come off the cylinder, or oil may spout out.**
2. **Feed oil to the cylinder at low pressure (at a pressure level that moves the cylinder at 10 mm/s or lower speed), and loosen the air bleeding bolt in the opposite side of the pressure port by one or two turns (counterclockwise) to bleed air from the oil completely until no air babbles remain in the oil.**
   If air remains in oil, high pressure and high temperature are generated inside the cylinder because of adiabatic compression, which may result in damage to the packing and the cylinder, and also causes malfunction of the machine.
3. **If the cylinder speed is high at the beginning of the cushion adjustment procedure, abnormal surge pressure is generated inside the cylinder, causing damage to the cylinder or the machine.**
   While increasing the cylinder speed gradually from 50 mm/s or lower speed, conduct cushion adjustment. Cushion adjustment must be conducted according to the inertial energy of the driven object (load). If the cushion has too much effect, oil is enclosed in the cushion, resulting in surge pressure, or the cylinder cannot move until the stroke end.
   The cushion has effect when it is used at the stroke end.

Precautions for test run and operation

1. **Before operating the cylinder, make sure that the equipment is properly mounted. Do not start operation until you can ensure that there is no oil leak from any part.**
2. **Operate the cylinder at the minimum pressure that can start the piston rod (cylinder speed: 50 mm/s or lower), and check if the cylinder smoothly operates.**

Maintenance check

1. **To ensure safe use of the cylinder for a long period, conduct maintenance and inspections (daily inspection and periodic inspection).**
2. **Before conducting maintenance and inspections, be sure to turn off the pressure source, and completely release residual pressure from the cylinder.**
3. **When releasing residual pressure from the cylinder after the pressure source is turned off, the rod may be moved by load. Predict possible movement of the rod, and take thorough safety measures.**

Storage

1. **Do not stack up the cylinder. When vibration is applied, the stack may collapse, causing a hazardous accident or damage to the components.**
2. **Do not apply vibration or impact to the cylinder during storage. Failure to observe this instruction causes damage to the components.**
3. **Take rust-preventive measures internally and externally, to prevent the cylinder from rusting during storage.**

⚠ CAUTION

Wiring and connections

1. **Before wiring work, be sure to turn OFF the power supply for the electric circuit of the equipment to be connected.**
   Otherwise, working personnel may get electric shock during wiring work, and the switches (sensor and controller) and the load may be damaged.
2. **Do not apply bending, tensile or twisting force to the switch cord and the sensor cable.**
   Such an action causes break of wires and leak of electricity. Specifically, fasten the cord and the cable so that force is not applied to the root of the switch or sensor connector. When fastening the cord and the cable, do not tighten the cord and the cable with excess torque. Such an action causes break of wires. Applying force to the root of the cord or the cable causes damage to the internal electrical circuit board.
3. **Make the bend radius as large as possible.**
   A small bend radius causes break of wires. Make the bend radius at least twice larger than the cord diameter or cable diameter.

Wiring

1. **If the distance between the cylinder and the destination terminal is long, hold the cord and the cable at 20-cm intervals and 50-cm intervals respectively, so that the cord and the cable will not slack.**
2. **When the cord or the cable is laid on the floor, place the cord or the cable in a metal conduit so that people will not step on it, and the cord or the cable will not be placed under equipment.**
   Otherwise, the cable or cord sheath will be damaged, causing break of wires, leak of electricity and/or short-circuit.
3. **The wiring length from a switch to a load or power supply should be 10 m max.**
   If the wiring length exceeds 10 m, inrush current is generated during use, causing damage to the switch. If a wiring length exceeding 10 m is absolutely required, take protective measures separately. (See p. 136)
4. **Do not bundle the switch cord and the sensor cable together with a high-voltage line, power line of other electric equipment and a cable of an actuator, or place the switch cord and the sensor cable near the a high-voltage line, power line of other electric equipment and a cable of an actuator.**
   Otherwise, noise from the high-voltage line, power line and the cable of the actuator will enter the sensor cable, causing malfunction of the switch, sensor or load. It is recommended to protect the switch cord and the sensor cable with a shielded conduit, etc.

Connections

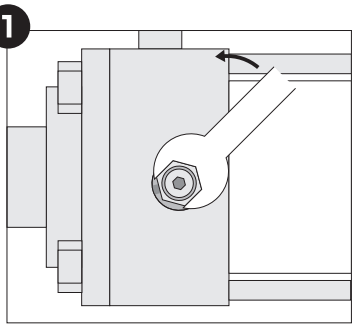
1. **Do not directly connect a power supply to the switch.**
   Be sure to connect a power supply via a specified load (small relay, programmable controller, etc.). Failure to observe this instruction results in short-circuit, causing the switch to be burnt.
2. **Before connection, thoroughly check the power supply ratings for the switch and the voltage and current of the load to be used.**
   Using the switch at an incorrect voltage or current causes malfunction or damage of the switch.
3. **Connect the cables correctly, according to the lead wire color marking.**
   Before wiring work, be sure to turn OFF the power supply for the electric circuit of the equipment to be connected. Wiring in live condition, incorrect connection or short-circuit of the load causes damage to the switch, sensor, controller and the electric circuit of the load. Even instantaneous short-circuit causes damage to the main circuit and the output circuit.

Cushion/Air Bleed Adjustment

Regarding "Method of cushion adjustment", and "Method of air bleed", we received many questions from customers. We will explain these procedures as shown below.

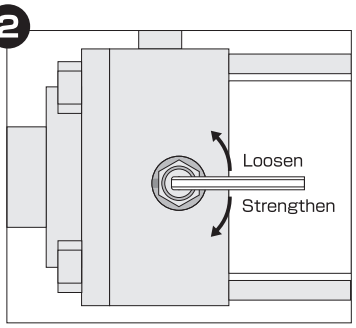
■Method of Cushion Adjustment

❶



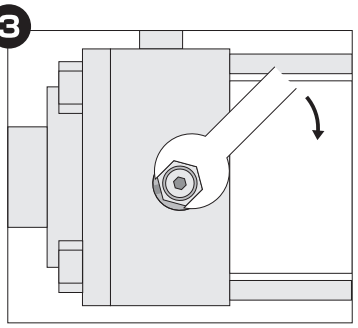
Loosen the cushion nut by 1/4 counterclockwise turn.

❷



Turning the cushion valve clockwise increases the cushion effect. Turning the cushion valve counterclockwise reduces the cushion effect. However, if the cushion valve is turned clockwise too much, abnormal surge pressure may be generated. If the cushion valve is turned counterclockwise too much, the cushion has no effect.

❸



After completion of the cushion valve adjustment, tighten the hexagon nut with a single-ended wrench with the tightening torque given in the table below, while holding the cushion valve with a hexagon rod wrench.

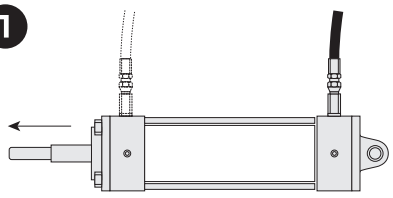
[Hexagon nut tightening torque for fastening cushion valve]

F series		T series		K series	
φ32 to φ125	About 400 to 500N·cm	φ40 to φ100	About 400 to 500N·cm	φ32 to φ80	About 500 to 650N·cm
φ140 to φ250	About 900 to 1000N·cm	φ125 to φ250	About 900 to 1000N·cm	φ100 to φ160	About 800 to 1000N·cm

■Method of Air Bleed

Air Bleed

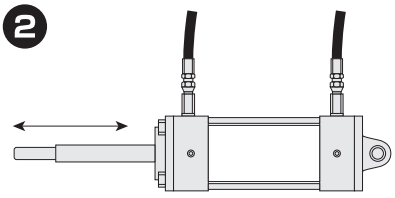
❶



Connect the pipe to the head port, and push the piston at the minimum operating pressure.

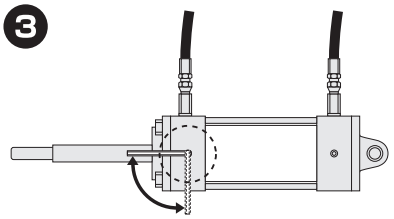
❶ When the rod side is opened, be careful to avoid spattering residual oil.
❷ Note that air will flow into the unit, if a pipe is connected to the rod side.

❷

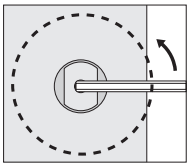


After the piston is fully pushed out, change the hydraulic pressure to the rod port at head side, and make sure that the piston smoothly moves at pressure of 0.3 MPa to 0.5 MPa.

❸

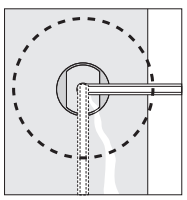


Stop the motion around 20 mm to 50 mm before the stroke end, set the pressure at "0", and loosen the set screw at the center of the air bleed valve by a half turn to bleed oil and air.



❹

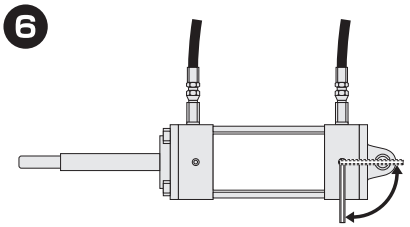
In the above step, oil turns muddy whitish color if it contains air bubbles. After the oil looks transparent, fully open the set screw at the center of the air bleed valve, and move the piston to the stroke end.



❺

Repeat the above ❸ and ❹ steps several times.
If the oil looks transparent, the air bleeding procedure is completed.

❻

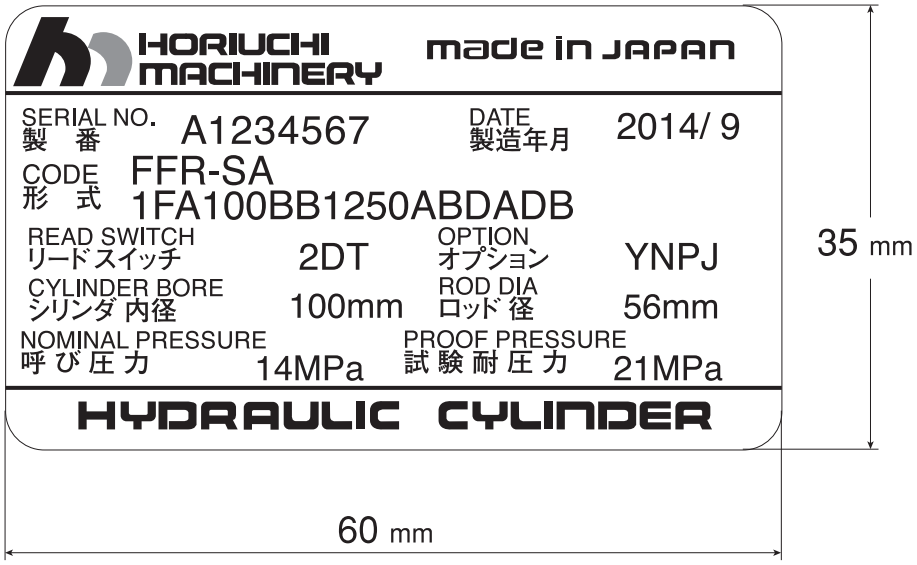


Conduct the above ❸ to ❺ steps on the opposite side.

Product label

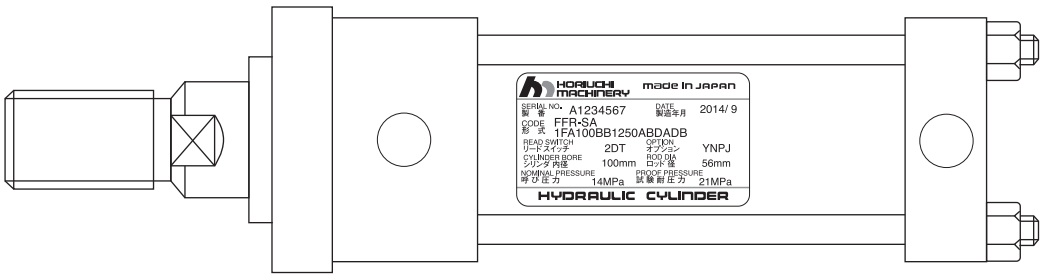
■Indication of cylinder label

What the label shows
Information pertaining to the cylinders is shown on the label.
Please indicate the serial no. shown here when inquiring about this product.



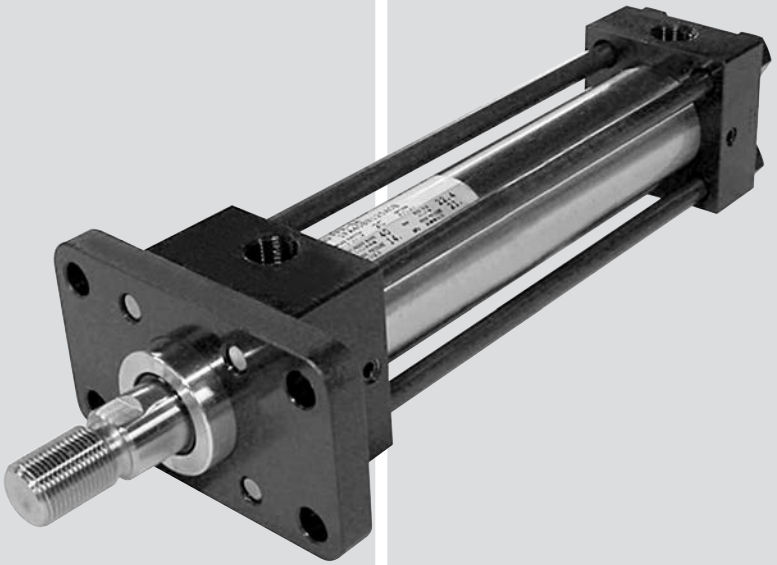
■Label position

1) The label is attached to the surface of the tube near to the Rod port.
2) The label is always attached to the top side regardless of the port position in the case of foot mounting.



F Series

7・14MPa



Tie Rod Type Cylinder

F Series ■ 7・14MPa

■Features

Excellent Dependability

The sliding part of the rod is of high-quality chrome-plated construction and a soft bronze casting is used for the rod bushing to prevent scarring of the rod with high performance U-shape packing used as the rod packing. These features provide reliability and durability while protecting against oil leakage.

Perfect Cushion Construction

Tapered cushion construction is incorporated into our standard cylinders and results in an approximate reduction of 50% of surge pressure as compared to conventional cylinders. This cushion construction provides ideal smooth stoppage over a very short time.

Switch adjusted

Our high-performance reliable dustproof switches (magnetic proximity switches) are standard. Because of their unified compact construction, there is no need to attach external sensors, thereby making cylinder installation very efficient.

■Specifications

Series Name	F	
Nominal Pressure Note1)	7MPa : FS　14MPa : FF	
Model	Standard : FS、FF	Switch adjusted : FSR、FFR
Bore	φ32・φ40・φ50・φ63・φ80・φ100 φ125・φ140・φ150・φ160・φ180 φ200・φ224・φ250	φ32・φ40・φ50・φ63・φ80・φ100 φ125・φ140
Maximum Allowable Pressure Note2)	7MPa　Cap Side:8.8MPa Head Side:Rod Type A14.7MPa、Rod Type B12.7MPa、Rod Type C10.8MPa 14MPa　Cap Side:17.7MPa Head Side:Rod Type A17.7MPa、Rod Type B17.7MPa、Rod Type C13.7MPa	
Proof Pressure	FS : 10.5MPa　FF : 21MPa	
Minimum Working Pressure Note3)	FS: Less than 0.29MPa　FF: Less than 0.56MPa	
Thread Tolerance	JIS6g/6H (Corresponds to JIS Grade 2)	
Range of Operating Temperature Note4)	Standard Specifications: -10℃ to +80℃ High Temperature Specifications: -10℃ to +120℃	Standard Specifications: -10℃ to +60℃ High Temperature Specifications: -10℃ to +100℃
Hydraulic Oil Applied	General purpose mineral hydraulic oil (When using operating oils other than above, be sure to report the brand name(s) after referring to the Packing materials on P.15)	
Adjustment Standard	Governed by Former JIS B 8354	

Note 1) "Nominal pressure" means pressure to be applied to the cylinder for the convenience in series name identification. Nominal pressure is not always equal to the rated pressure (operating pressure at which the cylinder performance is assured under specified conditions).
Note 2) "Maximum allowable pressure" means the maximum pressure generated in the cylinder that the cylinder can withstand (e.g. surge pressure).
Note 3) The Minimum Working Pressure is the value when the pressure is supplied from the cap side.
Note 4) In switch adjusted specifications, the temperature limit for the switch body should be under 60℃. (Select a special high-temperature switch when temperatures will exceed 60℃)

■Ranges of Operating Speed

Bore	Range
φ32 to φ63	8 to 400mm/s
φ80 to φ125	8 to 300mm/s
φ140 to φ250	8 to 200mm/s

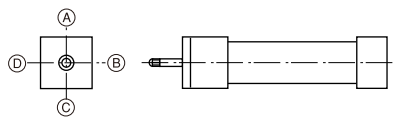
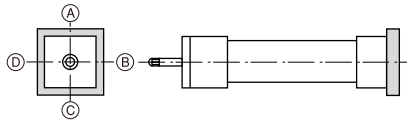
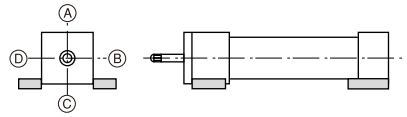
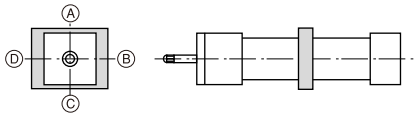
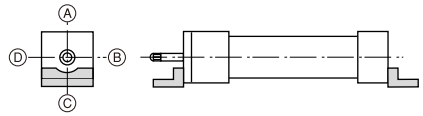
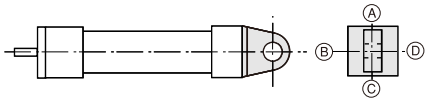
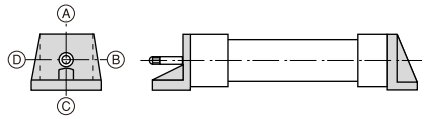
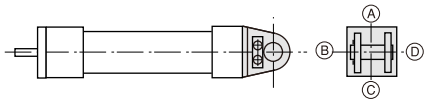
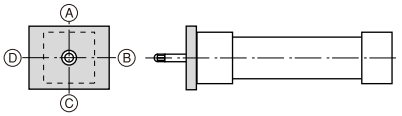
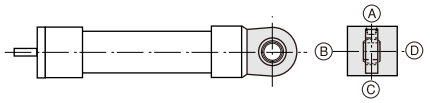
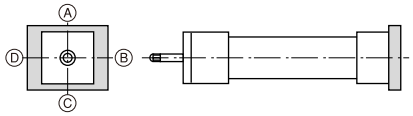
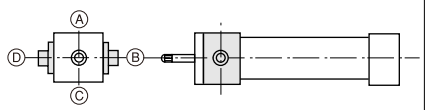
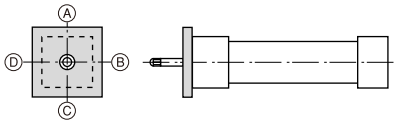
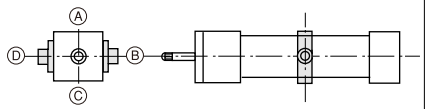
Note 1) Keep the inertial load pressures generated within the cylinder chamber below the maximum allowable pressure.
Note 2) The Minimum Cylinder Speed does not include cushion stroke operation.

■Maximum Stroke

Bore	Maximum Stroke
φ32	1,200mm
φ40 or φ50	1,500mm
φ63 or φ80	1,600mm
φ100 to φ250	2,000mm

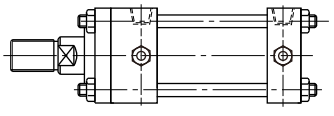
Note 1) This is the Maximum Stroke for the standard item produced.
Note 2) Please consider the rod buckling separately.

■Mounting Type

Format	Code	Appearance	Format	Code	Appearance
Basic	S		note1) Cap Side Square Flange	FD	
Axial Right Angle Direction Foot	LA		Middle Rectangular Flange	CF	
Axis Direction Foot (Only for 7MPa)	LB		Single Protrusion Clevis	CA	
Axis Direction Foot	LC		Double Protrusion Clevis	CB	
Head Side: Rectangular Flange	FA		Spherical Bearing Single Protrusion Clevis	CC	
Cap Side Rectangular Flange	FB		Head Side Integral Trunnion	TA	
note1) Head Side: Square Flange	FC		Middle Trunnion	TC	

Note 1) In the case of the φ32 cylinder, the FC Format and the FD Format are considered to be non-standard.
Note 2) ⒶⒷⒸⒹ are the positioning relationships for the port valve, etc.

■Cover Securing Formats

Securing Format	Appearance
Tie-rod System	

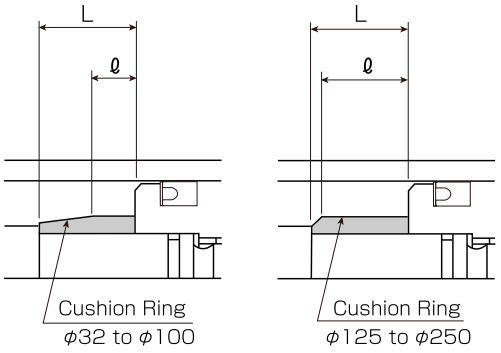
■Cushion Symbols

Code	B	R	H	N
Attachment Section	Cushion on Both Sides	Head-side Cushion	Cap-side Cushion	No Cushion

Note 1) The φ32 A rod does not have a cushion on the Head-side. The cushion for the φ40 A rod is a fixed cushion on the head side.
Note 2) For the double A rods (φ32 and φ40), the cushion (including a fixed cushion) cannot be produced.

■Cushion Shape

Taper processing derived from unique calculations for cushion rings has been implemented so that the inertia from high speed moving objects is absorbed in order to accomplish stoppage without shock in a very short time.



Units:㎜

Bore	Cushion Ring Length (L)	Cushion Ring Parallel Section Length (ℓ)
φ32	15	6
φ40 to φ63	20	8
φ80 to φ100	25	8
φ125 to φ160	25	21
φ180 to φ224	30	26
φ250	35	31

Note 1) When stoppage is not done at the end of the stroke at a distance of 3mm or more beforehand, the cushion effect is weakened and this should be taken into consideration. (Note that this is from φ32 to φ100)
Note 2) When a cushion with a stroke shorter than the cushion ring length is used, the cushion will remain expanded, so this should also be taken into consideration.

■Stroke Tolerance: Grade A

Units:㎜

Stroke	100 or less	101 to 250	251 to 630	631 to 1,000	1,001 to 1,600	1,601 to 2,000
Allowable Value	+0.8 0	+1.0 0	+1.25 0	+1.4 0	+1.6 0	+1.8 0

Note) The dimensions and precision of other parts conform to the former JIS B 8354 standard.

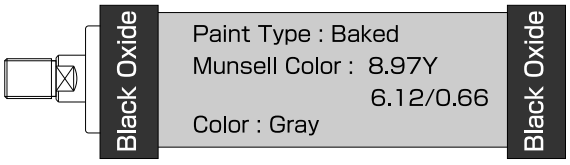
■Slide Section Processing

Piston Rod: Hard chrome plating processing (more than 2/100mm)

■Tube Coating Colors

Standard

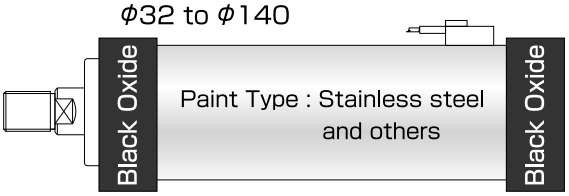
φ32 to φ180



φ200 to φ250

Switch Adjusted Specifications

φ32 to φ140

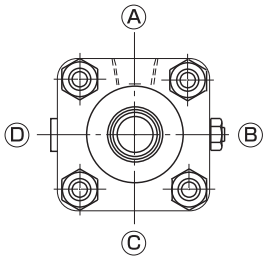


Note) If you have any questions with regard to the type of paint, please contact us.

■Port/Valve Locations

In each of the dimension diagrams for mounting, the base position is given as A as seen from the rod side with the following positions expressed as BCD continuing in a clockwise direction.

1) The standard positions are: A……port B……Cushion Valve C……Check Valve D……Air Bleed



2) In the case where differences from the standard positions have been specified, these are indicated by Ⓐ, Ⓑ, Ⓒ, Ⓓ.
3) In the case of no cushion, the standard positions are indicated by ⒶⓄⒹ.
4) In the TA mounting type, the basic position for the head side is ⒶⒸⒸ or ⒶⓄⒸ.
5) In the case of a fixed cushion, there is no cushion valve so this is annotated as Ⓞ.
6) In the case where there is no air bleed, this is indicated by ⊖.
The cylinder equipped with a cushion valve, no air bleed and two check valves is indicated as Ⓞ.
7) In the case where the head side and the cap side positions are different, they are indicated as ⒶⒷⒹ and ⒷⒸⒹ with the former being the head side and the latter being the cap side. In the case where they are depicted on two levels, the upper level is the cap side and the lower level is the head side.

■Packing Materials

Code	1	2	3	9
Material	Nitrile Rubber	Urethane Rubber Note 2)	Fluoric Rubber Note 3)	Hydrogenated Nitrile Rubber
Range of operating temperature	−10℃ to +80℃	−10℃ to +80℃	−10℃ to +120℃	−10℃ to +120℃
General-purpose mineral hydraulic oil	○	◎	○	○
Emulsions of water in mineral oil	○	△	○	◎
Emulsions of mineral oil in water	○	△	○	◎
Water + Glycol-type Operating Oil	○	×	×	◎
Phosphate Ester fluid	×	×	○	×
Fatty Acid Ester fluid	○	×	△	△

Note 1) The ◎ or ○ mark indicates its use is possible. The X mark indicates it is not possible to use it. Regarding the △ mark, consult us for details. The ◎ mark indicates the packing material recommended for applications where wear resistance is important.
Note 2) Urethane rubber specifications for φ40C rods and φ32 use cannot be produced.
Note 3) Specifications for fluoric rubber for φ32C rods/nitrile rubber specifications for use in high temperature cannot be produced.
Note 4) Nitrile rubber for coolant proof applications is identified by a "6", and the fluoric rubber by a "7".

■Code

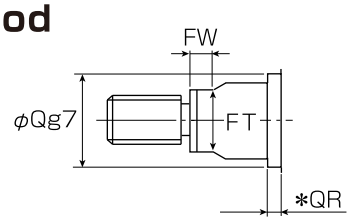
The switch codes are not necessary for the standard specifications.

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲
FS-	SA	1	TC	100	B	B	320	A	B	D-	□	-Y	P	N	J				
FFR-	SA	1	TC	100	B	B	320	A	B	D-	2C	-Y	P	N	J				

①Series Name	FS: 7 MPa, FF: 14MPa
②Switch Adjusted Specifications	"R" is affixed in the case of cylinders with switch adjusted specifications. FSR: 7MPa switch adjusted specifications; FFR: 14MPa switch adjusted specifications
③Single/Double Classification	S: Single Rod Type W: Double Rod Type
④Standard Special Classification Note1)	A: Standard Dimensions
⑤Packing Material	1. Nitrile Rubber (Standard) 2. Urethane Rubber 3. Fluoric Rubber 6. Coolant Proof Nitrile Rubber 7. Coolant Proof Fluoric Rubber 9. Hydrogenated Nitrile Rubber
⑥Mounting	S・LA・LB・LC・FA・FB・FC・FD・CF・CA・CB・CC・TA・TC
⑦Bore (㎜)	32・40・50・63・80・100・125・140・150・160・180・200・224・250 (Specifications for switch adjusted:φ32 toφ140;φ32 toφ180 is standard for the Double Rod Type. The Double Rod Type with switch adjusted specifications is standard).
⑧Type of Rod	A: A Rod (Standard Equivalent) B: B Rod (Standard) C: C Rod (Standard)
⑨Cushion Format	B: Cushion on Both Sides R: Head-side Cushion H: Cap-side Cushion N: No Cushion
⑩Stroke Length (㎜)	Indicate the stroke (refer to P.13 for Maximum Stroke)
⑪Port Location	Refer to P.15 and then indicate A, B, C or D.
⑫Cushion Valve Location	Refer to P.15 and then indicate A, B, C or D. O: No Cushion or Fixed Cushion
⑬Air Bleed Location	Refer to P.15 and then indicate A, B, C or D. No notation : Not necessary (Standard Equivalent)
⑭Switch Quantity Note2)	Mentioned the quantity. 1A. When the switch is not needed in a switch-adjusted specifications.
⑮Switch Type	C:TOV3 J:TOV5 CK:T5V3 CL:T5V5 DT:T2V3 DU:T2V5 CW:T2YV3 CH:TOH3 JH:TOH5 FJ: TOV-0.5 (For a DC connector system) FW: TOV-0.5 (For an AC connector system) XX: Special Part Please refer to P.138 for more detailed information on switches.
⑯End Joint	T: Single Protrusion End Joint Y: Double Protrusion End Joint S: Spherical Bearing End Joint F: F Connector No notation: None
⑰Pin	P: CB or the Y joint has a pin attached P2: CB and the Y joint have a pin attached G: Pin with Grease Nipple No notation: None (at φ125 or less, the pin is attached as standard equipment)
⑱Lock Nut	N: Available (3 types) N2: Two lock nuts (3 types × 2 pieces) No notation: None
⑲Bellows	J: Neoprene JS: Silicon Glass Cloth JA: Aluminum Foil Glass Cloth JC: Conex No notation: None (In the case where there are any other material specifications, please specify them).

Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) Switches are shipped unattached to prevent breakage.

S Single Rod

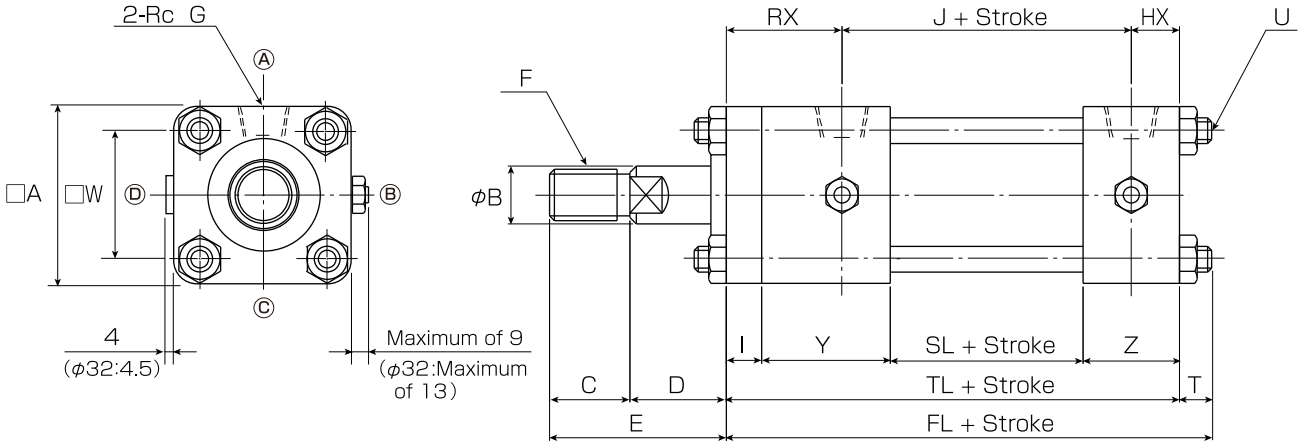


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P. 50.
Note 3) The check valve of A rod of the inside diameter 32 and the inside diameter 50 comes out of 4 mm from a cover side.

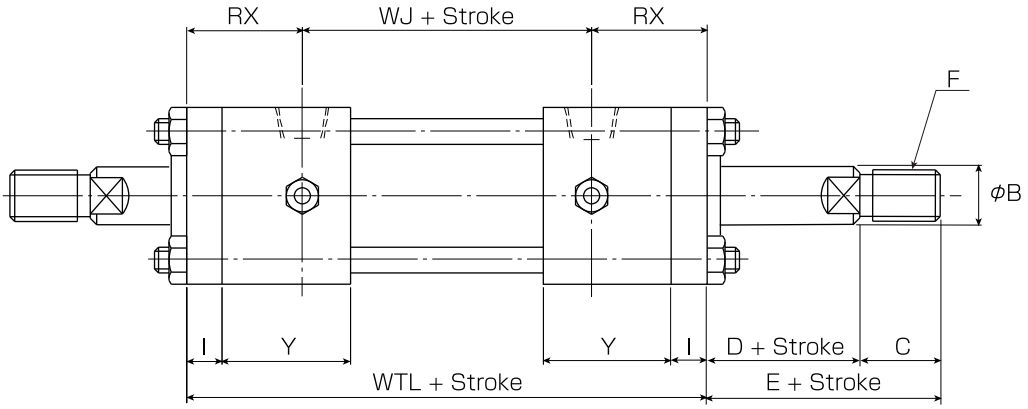
■S Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod							D	TL	J	FL	RX	HX	SL	I	Y	Z	T	U	□A	□W	Rc G
	φB	C	E	F	φQ	FT	FW															
φ32	18	25	55	M16 P1.5	35	14	10	30	141	90	151	36	15	60	11	40	30	10	M8 P1.25	55	40	3/8
φ40	22.4	30	60	M20 P1.5	40	19	10	30	141	90	153	36	15	64	11	38	28	12	M10 P1.25	65	45	3/8
φ50	28	35	65	M24 P1.5	46	24	10	30	155	96	167	42	17	66	13	44	32	12	M10 P1.25	75	52	1/2
φ63	35.5	45	80	M30 P1.5	55	30	15	35	163	102	178	44	17	72	15	44	32	15	M12 P1.5	90	65	1/2
φ80	45	60	95	M39 P1.5	65	41	15	35	184	108	202	56	20	72	18	56	38	18	M16 P1.5	110	80	3/4
φ100	56	75	115	M48 P1.5	80	50	20	40	192	114	212	58	20	78	20	56	38	20	M18 P1.5	135	98	3/4
φ125	71	95	140	M64 P2	95	65	25	45	220	129	243	66	25	83	24	65	48	23	M22 P1.5	165	122	1
φ140	80	110	160	M72 P2	105	75	25	50	230	137	254	68	25	91	26	65	48	24	M24 P1.5	185	138	1
φ150	85	115	165	M76 P2	110	80	30	50	240	145	267	70	25	99	28	65	48	27	M27 P1.5	196	148	1
φ160	90	120	175	M80 P2	115	85	30	55	253	155	280	73	25	109	31	65	48	27	M27 P1.5	210	160	1
φ180	100	140	195	M95 P2	125	95	30	55	275	171	304	74	30	115	33	69	58	29	M30 P1.5	235	182	1 1/4
φ200	112	150	205	M100 P2	140	105	30	55	301	181	332	85	35	111	37	83	70	31	M33 P1.5	262	200	1 1/2
φ224	125	180	240	M120 P2	150	120	35	60	305	180	341	90	35	110	42	83	70	36	M39 P1.5	292	225	1 1/2
φ250	140	195	260	M130 P2	170	133	45	65	346	197	385	107	42	113	47	102	84	39	M42 P1.5	325	250	2

S Double Rod



※φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

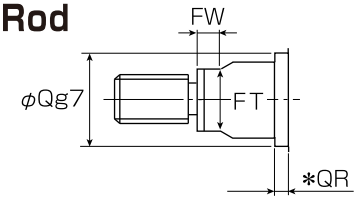
Units:㎜

Symbol / Bore	Double Rod	
	WTL	WJ
φ32	166	94
φ40	166	94
φ50	182	98
φ63	194	106
φ80	222	110
φ100	232	116
φ125	264	132
φ140	276	140
φ150	288	148
φ160	304	158
φ180	322	174
φ200	362	192
φ224	370	190
φ250	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LA Single Rod

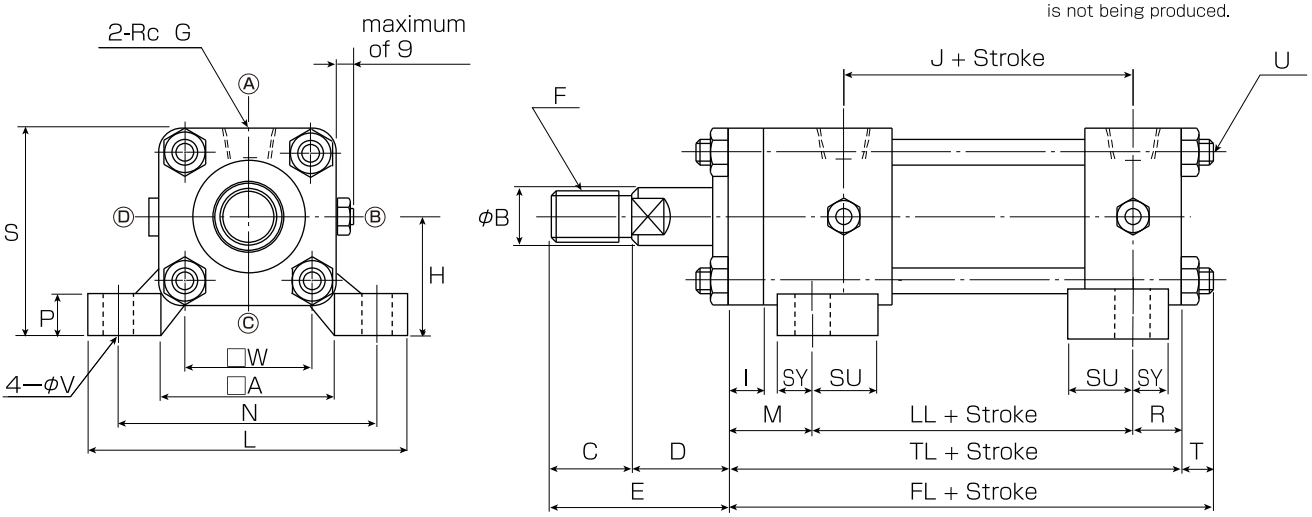


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

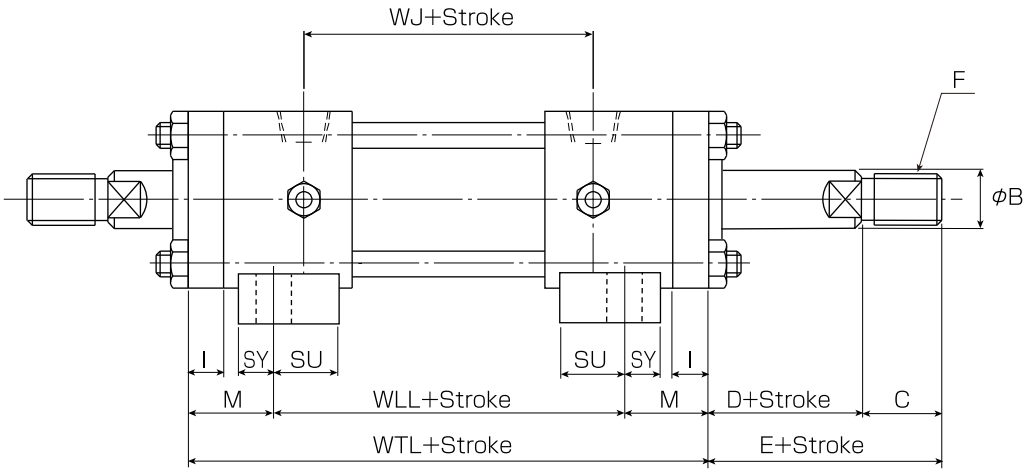
■LA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Bore \ Symbol	B Rod φB	C	E	F	D	TL	J	LL	FL	I	M	R	T	SU	SY	U	□A	□W	N	L	P	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	98	151	11	27	16	10	31	13	M8 P1.25	55	40	88	108	14	35 ±0.15	62.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	98	153	11	27	16	12	31	13	M10 P1.25	65	45	95	118	14	37.5 ±0.15	70	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	108	167	13	30	17	12	34	14	M10 P1.25	75	52	115	145	17	45 ±0.15	82.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	106	178	15	36	21	15	32	18	M12 P1.5	90	65	132	165	19	50 ±0.15	95	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	124	202	18	39	21	18	42	18	M16 P1.5	110	80	155	190	25	60 ±0.25	115	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	122	212	20	45	25	20	38	22	M18 P1.5	135	98	190	230	27	71 ±0.25	138.5	22	3/4
φ125	71	95	140	M64 P2	45	220	129	136	243	24	54	30	23	41	25	M22 P1.5	165	122	224	272	32	85 ±0.25	167.5	26	1
φ140	80	110	160	M72 P2	50	230	137	144	254	26	56	30	24	41	25	M24 P1.5	185	138	250	300	35	95 ±0.25	187.5	26	1
φ150	85	115	165	M76 P2	50	240	145	146	267	28	61	33	27	38	28	M27 P1.5	196	148	270	320	37	106 ±0.25	204	30	1
φ160	90	120	175	M80 P2	55	253	155	150	280	31	67	36	27	40	31	M27 P1.5	210	160	285	345	42	112 ±0.25	217	33	1
φ180	100	140	195	M95 P2	55	275	171	172	304	33	68	35	29	50	34	M30 P1.5	235	182	315	375	47	125 ±0.25	242.5	33	11/4
φ200	112	150	205	M100 P2	55	301	181	186	332	37	76	39	31	56	38	M33 P1.5	262	200	355	425	52	140 ±0.25	271	36	11/2
φ224	125	180	240	M120 P2	60	305	180	186	341	42	80.5	38.5	36	56	38	M39 P1.5	292	225	395	475	52	150 ±0.25	296	42	11/2
φ250	140	195	260	M130 P2	65	346	197	206	385	47	93.5	46.5	39	68	46	M42 P1.5	325	250	425	515	57	170 ±0.25	332.5	45	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

LA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod ' s.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

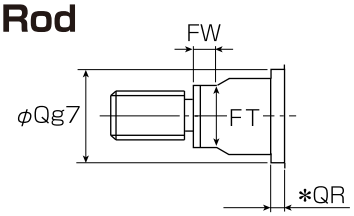
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WLL	WTL	WJ
φ32	112	166	94
φ40	112	166	94
φ50	122	182	98
φ63	122	194	106
φ80	144	222	110
φ100	142	232	116
φ125	156	264	132
φ140	164	276	140
φ150	166	288	148
φ160	170	304	158
φ180	186	322	174
φ200	210	362	192
φ224	209	370	190
φ250	229	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LB (Only for 7MPa) Single Rod

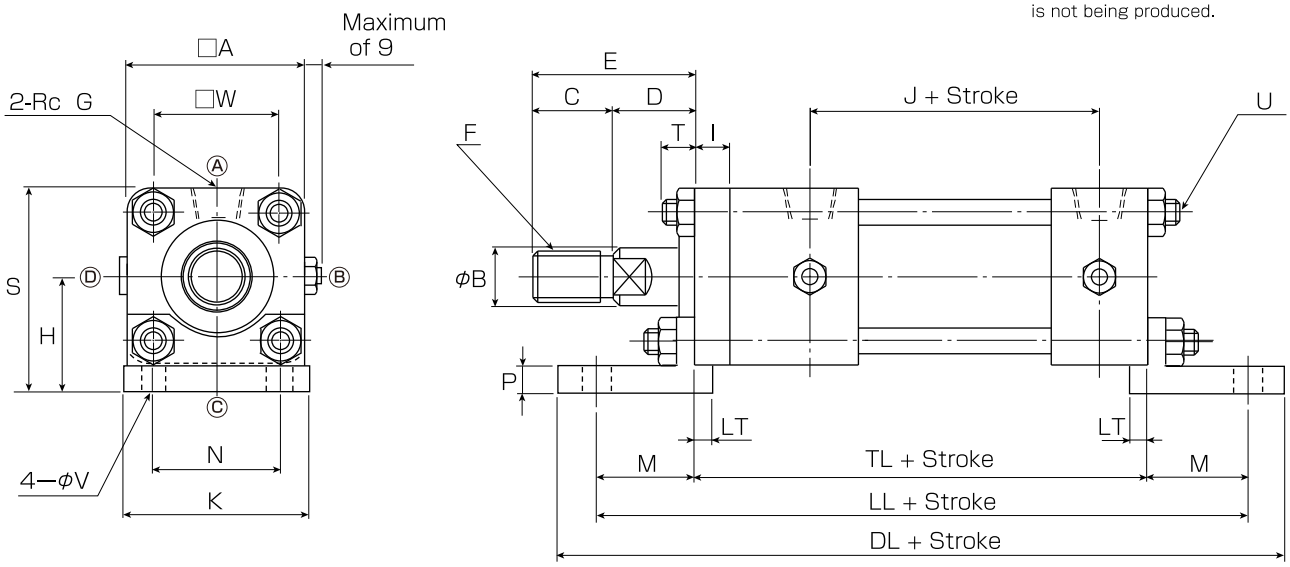


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■LB Type Basic Table of Dimensions

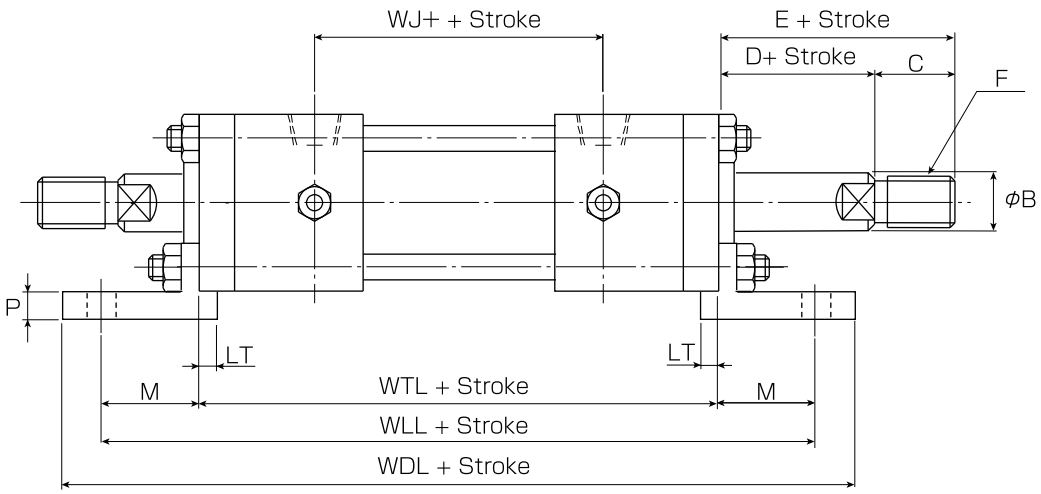
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	I	LL	DL	M	LT	P	T	U	□A	□W	N	K	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	11	205	231	32	(3)	7	10	M8 P1.25	55	40	40	63	40 ±0.15	67.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	11	205	231	32	(3)	7	12	M10 P1.25	65	45	46	69	43 ±0.15	75.5	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	13	225	255	35	(3)	7	12	M10 P1.25	75	52	58	85	50 ±0.15	87.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	15	247	283	42	(3)	10	15	M12 P1.5	90	65	65	98	60 ±0.15	105	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	18	284	324	50	0	14	18	M16 P1.5	110	80	87	118	72 ±0.25	127	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	20	302	348	55	0	14	20	M18 P1.5	135	98	109	150	85 ±0.25	152.5	22	3/4
φ125	71	95	140	M64 P2	45	220	129	24	352	410	66	0	14	23	M22 P1.5	165	122	130	175	105 ±0.25	187.5	26	1
φ140	80	110	160	M72 P2	50	230	137	26	370	430	70	0	17	24	M24 P1.5	185	138	145	195	115 ±0.25	207.5	26	1
φ150	85	115	165	M76 P2	50	240	145	28	390	450	75	0	17	27	M27 P1.5	196	148	155	210	123 ±0.25	221	30	1
φ160	90	120	175	M80 P2	55	253	155	31	403	473	75	0	17	27	M27 P1.5	210	160	170	225	132 ±0.25	237	33	1
φ180	100	140	195	M95 P2	55	275	171	33	445	525	85	0	20	29	M30 P1.5	235	182	185	243	148 ±0.25	265.5	33	11/4
φ200	112	150	205	M100 P2	55	301	181	37	497	577	98	0	26	31	M33 P1.5	262	200	206	272	165 ±0.25	296	36	11/2
φ224	125	180	240	M120 P2	60	305	180	42	535	625	115	0	30	36	M39 P1.5	292	225	230	310	185 ±0.25	331	42	11/2
φ250	140	195	260	M130 P2	65	346	197	47	606	706	130	0	36	39	M42 P1.5	325	250	250	335	208 ±0.25	370.5	45	2

Note 1) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.
Note 2) The size of () of the sign LT has variation in a numerical value.

LB (Only for 7MPa) Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

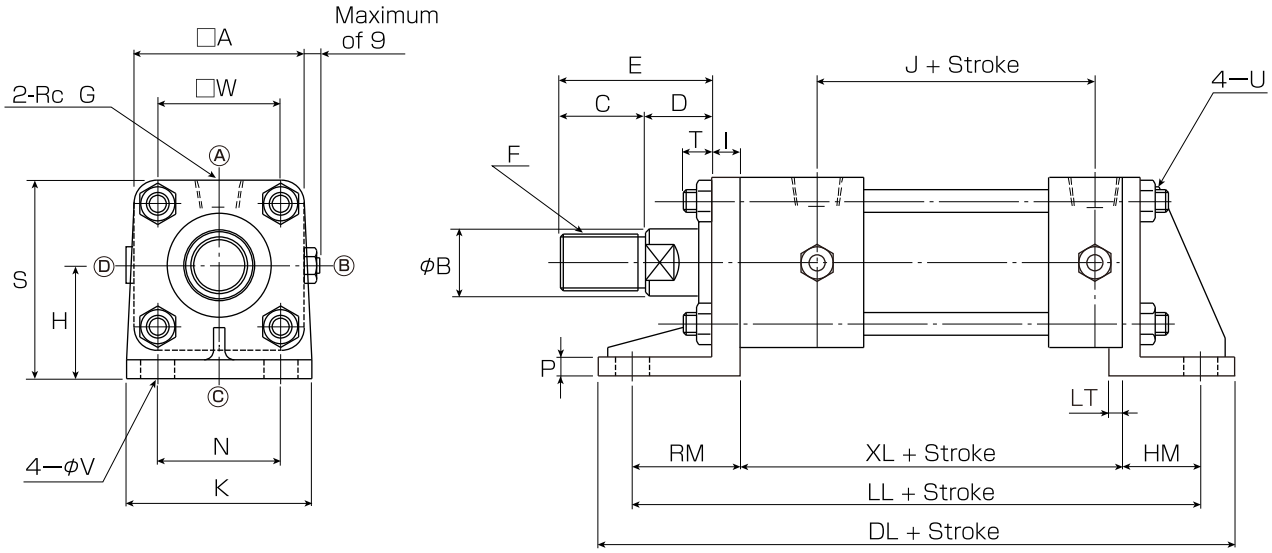
■Double Rod

Units:㎜

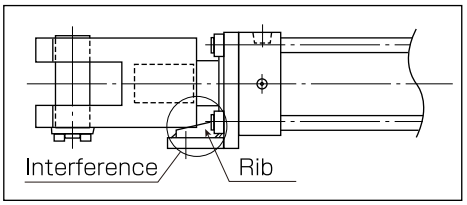
Symbol / Bore	Double Rod			
	WLL	WTL	WJ	WDL
φ32	230	166	94	256
φ40	230	166	94	256
φ50	252	182	98	282
φ63	278	194	106	314
φ80	322	222	110	362
φ100	342	232	116	388
φ125	396	264	132	454
φ140	416	276	140	476
φ150	438	288	148	498
φ160	454	304	158	524
φ180	492	322	174	572
φ200	558	362	192	638
φ224	600	370	190	690
φ250	676	416	202	776

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

LC Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
Note 4) When the double protrusion end joint (Y end) is mounted as shown on the right, it may touch the rib of the LC bracket. In this case, consult us.



■LC Type Basic Table of Dimensions

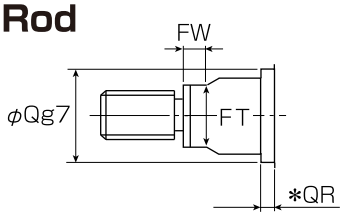
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Bore \ Symbol	B Rod φB	C	E	F	D	XL	J	I	LL	DL	RM	HM	LT	P	T	U	□A	□W	N	K	H	S	φV	RcG
φ32	18	25	55	M16 P1.5	30	130	90	11	205	231	43	32	(3)	7	10	M8 P1.25	55	40	40	63	40 ±0.15	67.5	11	3/8
φ40	22.4	30	60	M20 P1.5	30	130	90	11	205	231	43	32	(3)	7	12	M10 P1.25	65	45	46	69	43 ±0.15	75.5	11	3/8
φ50	28	35	65	M24 P1.5	30	142	96	13	225	255	48	35	(3)	7	12	M10 P1.25	75	52	58	85	50 ±0.15	87.5	14	1/2
φ63	35.5	45	80	M30 P1.5	35	148	102	15	247	283	57	42	(3)	10	15	M12 P1.5	90	65	65	98	60 ±0.15	105	18	1/2
φ80	45	60	95	M39 P1.5	35	166	108	18	284	324	68	50	0	14	18	M16 P1.5	110	80	87	118	72 ±0.25	127	18	3/4
φ100	56	75	115	M48 P1.5	40	172	114	20	302	348	75	55	0	14	20	M18 P1.5	135	98	109	150	85 ±0.25	152.5	22	3/4
φ125	71	95	140	M64 P2	45	196	129	24	352	410	90	66	0	14	23	M22 P1.5	165	122	130	175	105 ±0.25	187.5	26	1
φ140	80	110	160	M72 P2	50	204	137	26	370	430	96	70	0	18	24	M24 P1.5	185	138	145	195	115 ±0.25	207.5	26	1
φ150	85	115	165	M76 P2	50	212	145	28	390	450	103	75	0	18	27	M27 P1.5	196	148	155	210	123 ±0.25	221	30	1
φ160	90	120	175	M80 P2	55	222	155	31	403	473	106	75	0	18	27	M27 P1.5	210	160	170	225	132 ±0.25	237	33	1
φ180	100	140	195	M95 P2	55	242	171	33	445	525	118	85	0	20	29	M30 P1.5	235	182	185	243	148 ±0.25	265.5	33	1 1/4
φ200	112	150	205	M100 P2	55	264	181	37	497	577	135	98	0	25	31	M33 P1.5	262	200	206	272	165 ±0.25	296	36	1 1/2
φ224	125	180	240	M120 P2	60	263	180	42	535	625	156	116	0	30	36	M39 P1.5	292	225	230	310	185 ±0.25	331	42	1 1/2
φ250	140	195	260	M130 P2	65	299	197	47	606	706	176	131	0	35	39	M42 P1.5	325	250	250	335	208 ±0.25	370.5	45	2

Note 1) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.
Note 2) The size of () of the sign LT has variation in a numerical value.

LC Double Rod

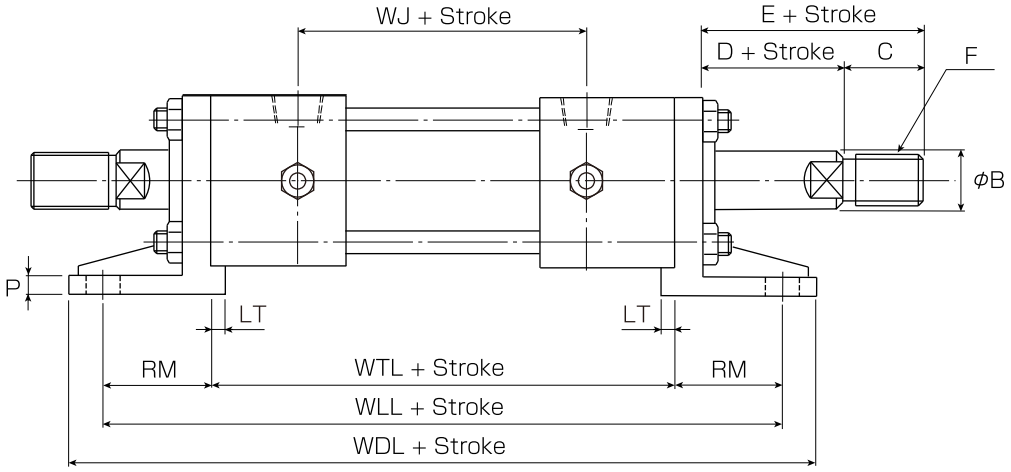


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ250 :10
A Rods	φ40 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

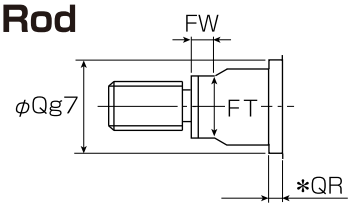
Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

■Double Rod

Units:mm

Symbol / Bore	Double Rod			
	WLL	WTL	WJ	WDL
φ32	230	144	94	256
φ40	230	144	94	256
φ50	252	156	98	282
φ63	278	164	106	314
φ80	322	186	110	362
φ100	342	192	116	388
φ125	396	216	132	454
φ140	416	224	140	476
φ150	438	232	148	498
φ160	454	242	158	524
φ180	492	256	174	572
φ200	558	288	192	638
φ224	598	286	190	688
φ250	674	322	202	774

FA Single Rod

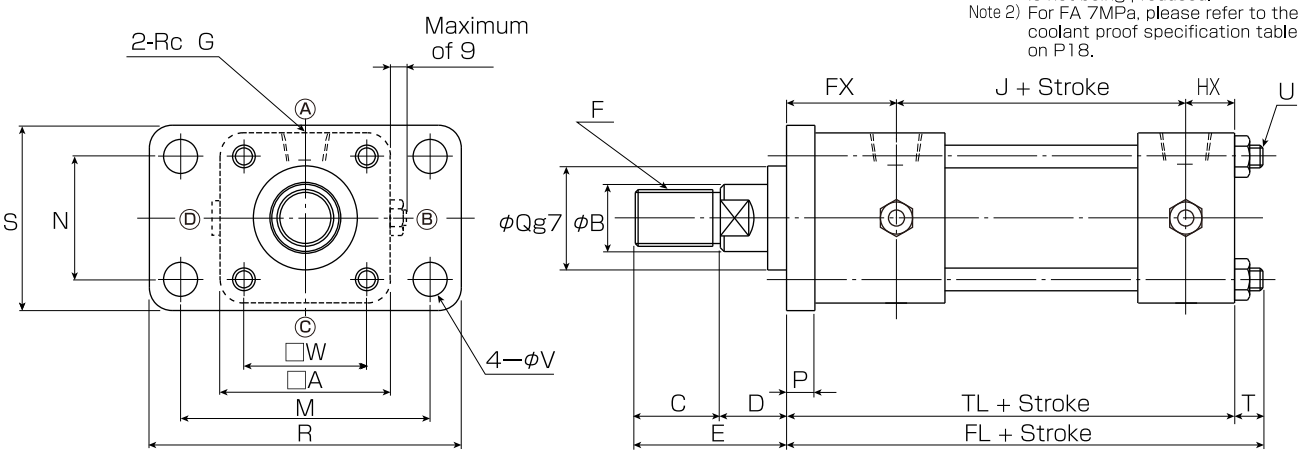


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 to φ250 :10
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications (For FA・14MPa)			
Bore	A rod	B rod	C rod
φ32	7	9	8
φ40	9	9	9
φ50	6	9	9
φ63	8	9	9
φ80	14	9	9
φ100	—	10	9

Note 1) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.
Note 2) For FA 7MPa, please refer to the coolant proof specification table on P18.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

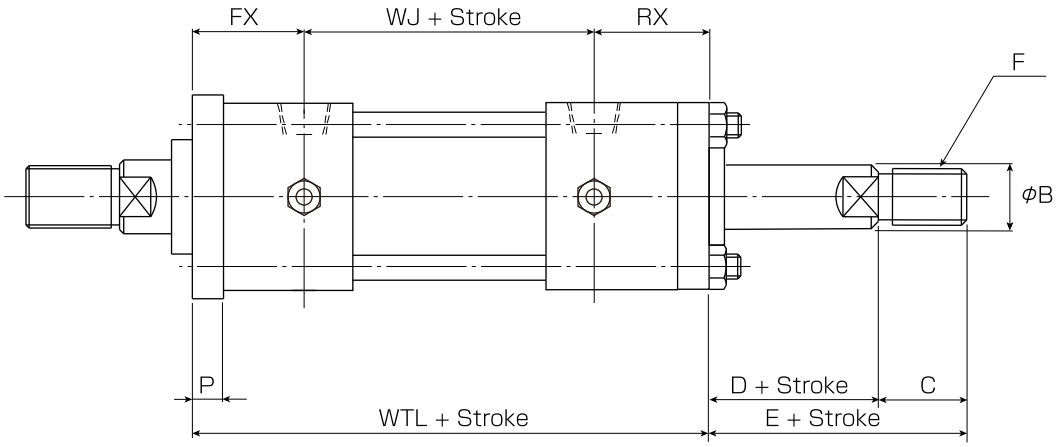
■FA Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	φQ	D	TL	J	FL	FX	HX	P	T	U	□A	□W	M	R	N	S	φV	Rc G
φ32	18	25	55	M16 P1.5	35	30	143	90	153	38	15	13	10	M8 P1.25	55	40	88	109	40	63	11	3/8
φ40	22.4	30	60	M20 P1.5	40	30	141 (143)	90	153 (155)	36 (38)	15	11 (13)	12	M10 P1.25	65	45	95	118	46	69	11	3/8
φ50	28	35	65	M24 P1.5	46	30	155 (160)	96	167 (172)	42 (47)	17	13 (18)	12	M10 P1.25	75	52	115	145	58	85	14	1/2
φ63	35.5	45	80	M30 P1.5	55	35	163 (168)	102	178 (183)	44 (49)	17	15 (20)	15	M12 P1.5	90	65	132	165	65	98	18	1/2
φ80	45	60	95	M39 P1.5	65	35	184 (190)	108	202 (208)	56 (62)	20	18 (24)	18	M16 P1.5	110	80	155	190	87	118	18	3/4
φ100	56	75	115	M48 P1.5	80	40	192 (200)	114	212 (220)	58 (66)	20	20 (28)	20	M18 P1.5	135	98	190	224	109	145	22	3/4
φ125	71	95	140	M64 P2	95	45	220 (229)	129	243 (252)	66 (75)	25	24 (33)	23	M22 P1.5	165	122	224	272	130	175	26	1
φ140	80	110	160	M72 P2	105	50	230 (241)	137	254 (265)	68 (79)	25	26 (37)	24	M24 P1.5	185	138	250	300	145	195	26	1
φ150	85	115	165	M76 P2	110	50	240 (251)	145	267 (278)	70 (81)	25	28 (39)	27	M27 P1.5	196	148	270	315	155	206	30	1
φ160	90	120	175	M80 P2	115	55	253 (263)	155	280 (290)	73 (83)	25	31 (41)	27	M27 P1.5	210	160	285	335	170	218	33	1
φ180	100	140	195	M95 P2	125	55	275 (288)	171	304 (317)	74 (87)	30	33 (46)	29	M30 P1.5	235	182	315	375	185	243	33	1 1/4
φ200	112	150	205	M100 P2	140	55	301 (315)	181	332 (346)	85 (99)	35	37 (51)	31	M33 P1.5	262	200	355	425	206	272	36	1 1/2
φ224	125	180	240	M120 P2	150	60	304 (321)	180	340 (357)	89 (106)	35	41 (58)	36	M39 P1.5	292	225	395	462	230	300	42	1 1/2
φ250	140	195	260	M130 P2	170	65	345 (364)	197	384 (403)	106 (125)	42	46 (65)	39	M42 P1.5	325	250	425	515	250	335	45	2

Note1) theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) Please refer to the S Type specifics on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	8	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12 (10)	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12 (7)	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13 (8)	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12 (14)	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14 (15)	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17 (8)	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17 (6)	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15 (4)	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16 (6)	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18 (5)	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19 (5)	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	10	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	10	65

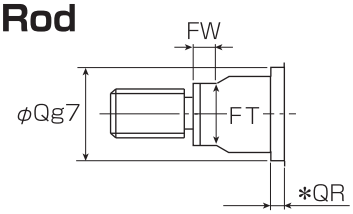
Note1) theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note3) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WTL	WJ	RX
φ32	168	94	36
φ40	166 (168)	94	36
φ50	182 (187)	98	42
φ63	194 (199)	106	44
φ80	222 (228)	110	56
φ100	232 (240)	116	58
φ125	264 (273)	132	66
φ140	276 (287)	140	68
φ150	288 (299)	148	70
φ160	304 (314)	158	73
φ180	322 (335)	174	74
φ200	362 (376)	192	85
φ224	369 (386)	190	90
φ250	415 (434)	202	107

FB Single Rod

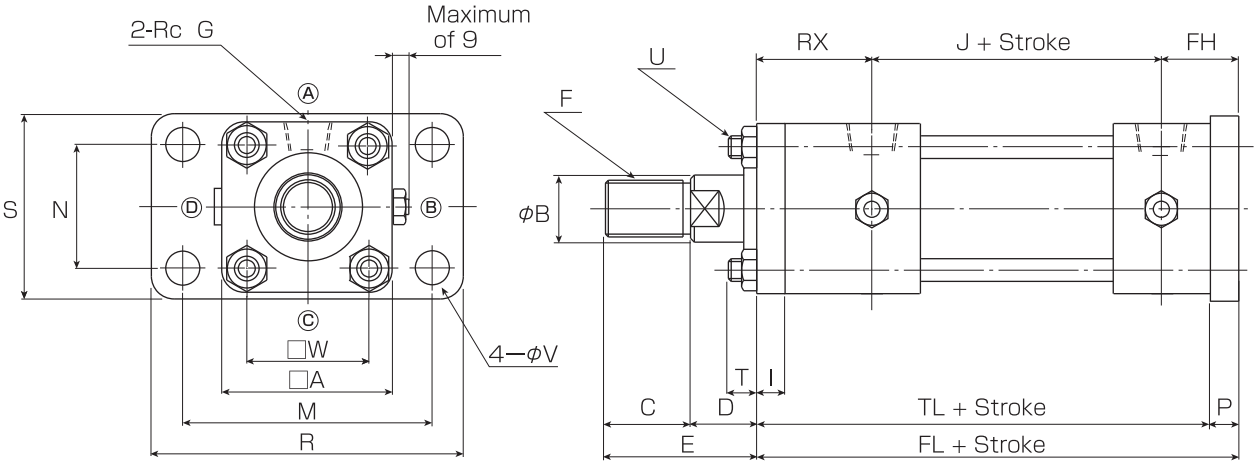


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod				D	TL	J	FL	RX	FH	P	T	I	U	□A	□W	M	R	N	S	φV	RcG
	φB	C	E	F																		
φ32	18	25	55	M16 P1.5	30	141	90	154	36	28	13	10	11	M8 P1.25	55	40	88	109	40	63	11	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	152 (154)	36	26 (28)	11 (13)	12	11	M10 P1.25	65	45	95	118	46	69	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	168 (173)	42	30 (35)	13 (18)	12	13	M10 P1.25	75	52	115	145	58	85	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178 (183)	44	32 (37)	15 (20)	15	15	M12 P1.5	90	65	132	165	65	98	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202 (208)	56	38 (44)	18 (24)	18	18	M16 P1.5	110	80	155	190	87	118	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212 (220)	58	40 (48)	20 (28)	20	20	M18 P1.5	135	98	190	224	109	145	22	3/4
φ125	71	95	140	M64 P2	45	220	129	244 (253)	66	49 (58)	24 (33)	23	24	M22 P1.5	165	122	224	272	130	175	26	1
φ140	80	110	160	M72 P2	50	230	137	256 (267)	68	51 (62)	26 (37)	24	26	M24 P1.5	185	138	250	300	145	195	26	1
φ150	85	115	165	M76 P2	50	240	145	268 (279)	70	53 (64)	28 (39)	27	28	M27 P1.5	196	148	270	315	155	206	30	1
φ160	90	120	175	M80 P2	55	253	155	284 (294)	73	56 (66)	31 (41)	27	31	M27 P1.5	210	160	285	335	170	218	33	1
φ180	100	140	195	M95 P2	55	275	171	308 (321)	74	63 (76)	33 (46)	29	33	M30 P1.5	235	182	315	375	185	243	33	11/4
φ200	112	150	205	M100 P2	55	301	181	338 (352)	85	72 (86)	37 (51)	31	37	M33 P1.5	262	200	355	425	206	272	36	11/2
φ224	125	180	240	M120 P2	60	305	180	346 (363)	90	76 (93)	41 (58)	36	42	M39 P1.5	292	225	395	462	230	300	42	11/2
φ250	140	195	260	M130 P2	65	346	197	392 (411)	107	88 (107)	46 (65)	39	47	M42 P1.5	325	250	425	515	250	335	45	2

Note1) Theses ( ) is at 14MPa. All other dimensions are common dimensions for 7/14MPa.
Note2) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FB

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

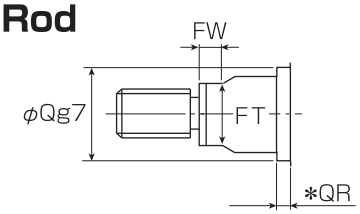
Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

FC Single Rod

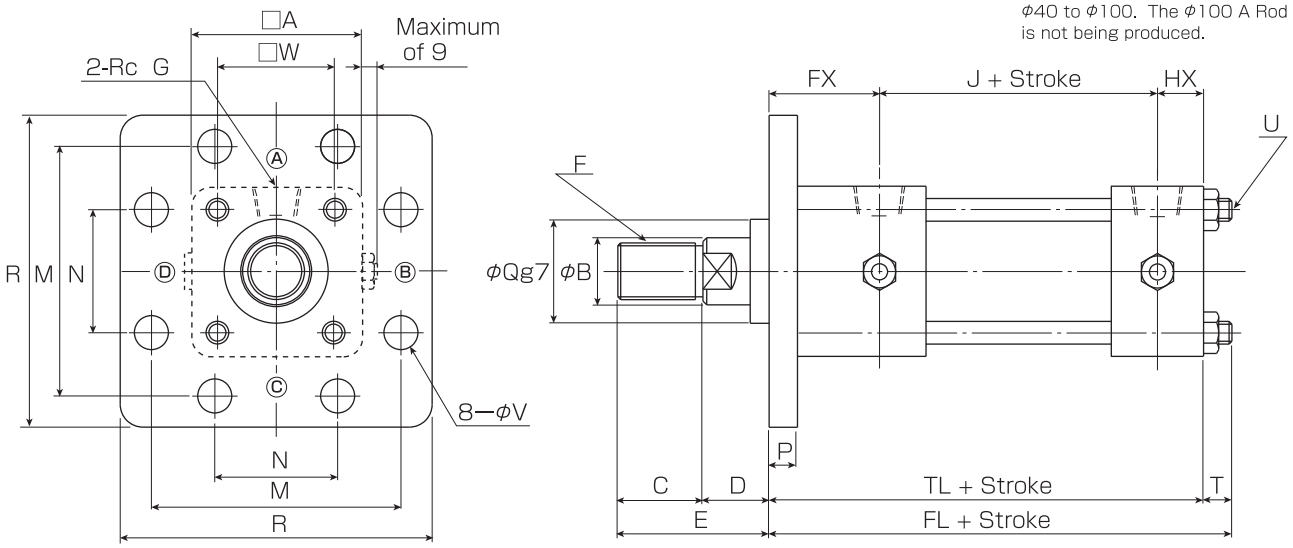


*QR Dimensions

Standard Specifications	
B, C Rods	φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ40 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FC Type Basic Table of Dimensions

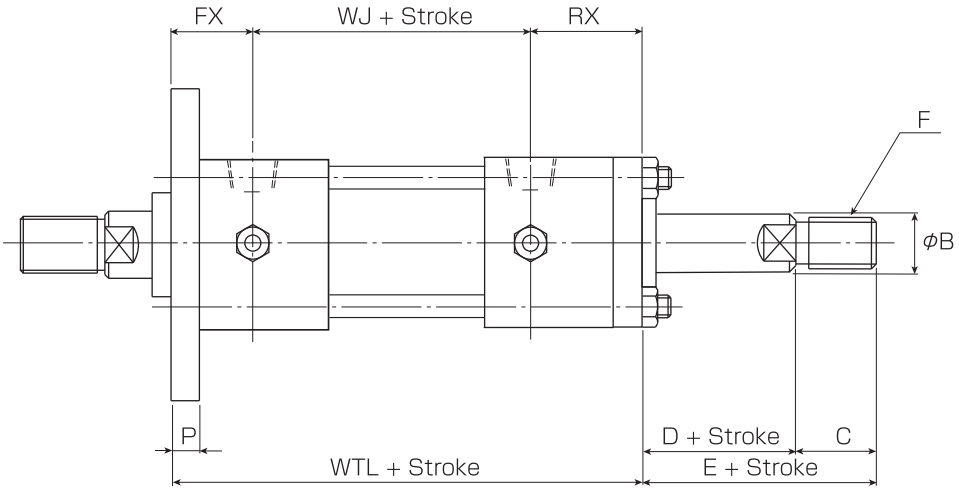
[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	φQ	D	TL	J	FL	FX	HX	P	T	U	□A	□W	N	M	R	φV	RcG
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	22.4	30	60	M20 P1.5	40	30	141	90	153	36	15	11	12	M10 P1.25	65	45	46	95	118	11	3/8
φ50	28	35	65	M24 P1.5	46	30	155	96	167	42	17	13	12	M10 P1.25	75	52	58	115	145	14	1/2
φ63	35.5	45	80	M30 P1.5	55	35	163	102	178	44	17	15	15	M12 P1.5	90	65	65	132	165	18	1/2
φ80	45	60	95	M39 P1.5	65	35	184	108	202	56	20	18	18	M16 P1.5	110	80	87	155	190	18	3/4
φ100	56	75	115	M48 P1.5	80	40	192	114	212	58	20	20	20	M18 P1.5	135	98	109	190	224	22	3/4
φ125	71	95	140	M64 P2	95	45	220	129	243	66	25	24	23	M22 P1.5	165	122	130	224	272	26	1
φ140	80	110	160	M72 P2	105	50	230	137	254	68	25	26	24	M24 P1.5	185	138	145	250	300	26	1
φ150	85	115	165	M76 P2	110	50	240	145	267	70	25	28	27	M27 P1.5	196	148	155	270	315	30	1
φ160	90	120	175	M80 P2	115	55	253	155	280	73	25	31	27	M27 P1.5	210	160	170	285	335	33	1
φ180	100	140	195	M95 P2	125	55	275	171	304	74	30	33	29	M30 P1.5	235	182	185	315	375	33	1 1/4
φ200	112	150	205	M100 P2	140	55	301	181	332	85	35	37	31	M33 P1.5	262	200	206	355	425	36	1 1/2
φ224	125	180	240	M120 P2	150	60	304	180	340	89	35	41	36	M39 P1.5	292	225	230	395	475	42	1 1/2
φ250	140	195	260	M130 P2	170	65	345	197	384	106	42	46	39	M42 P1.5	325	250	250	425	515	45	2

Note) Please refer to the S Type specifics on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FC Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	10	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	10	65

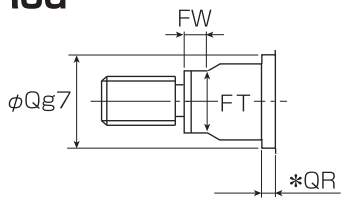
■Double Rod

Units:mm

Symbol / Bore	Double Rod		
	WTL	WJ	RX
φ32	—	—	—
φ40	166	94	36
φ50	182	98	42
φ63	194	106	44
φ80	222	110	56
φ100	232	116	58
φ125	264	132	66
φ140	276	140	68
φ150	288	148	70
φ160	304	158	73
φ180	322	174	74
φ200	362	192	85
φ224	369	190	90
φ250	415	202	107

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

FD Single Rod

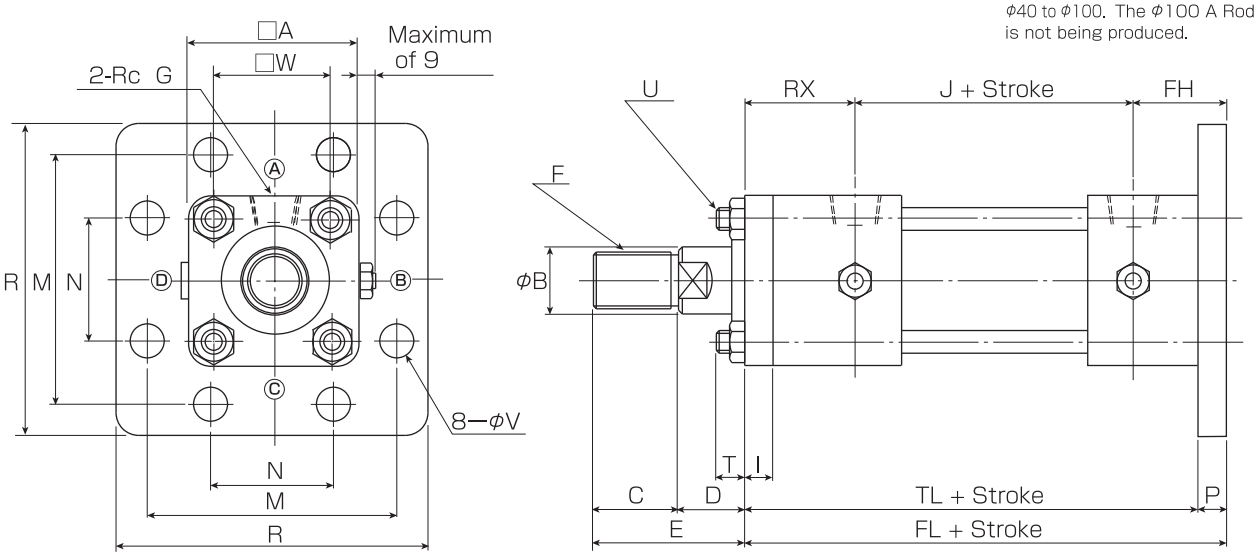


*QR Dimensions

Standard Specifications	
B, C Rods	φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ40 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■FD Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	FH	P	T	I	U	□A	□W	N	M	R	φV	RcG
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	22.4	30	60	M20 P1.5	30	141	90	152	36	26	11	12	11	M10 P1.25	65	45	46	95	118	11	3/8
φ50	28	35	65	M24 P1.5	30	155	96	168	42	30	13	12	13	M10 P1.25	75	52	58	115	145	14	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	44	32	15	15	15	M12 P1.5	90	65	65	132	165	18	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	56	38	18	18	18	M16 P1.5	110	80	87	155	190	18	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	58	40	20	20	20	M18 P1.5	135	98	109	190	224	22	3/4
φ125	71	95	140	M64 P2	45	220	129	244	66	49	24	23	24	M22 P1.5	165	122	130	224	272	26	1
φ140	80	110	160	M72 P2	50	230	137	256	68	51	26	24	26	M24 P1.5	185	138	145	250	300	26	1
φ150	85	115	165	M76 P2	50	240	145	268	70	53	28	27	28	M27 P1.5	196	148	155	270	315	30	1
φ160	90	120	175	M80 P2	55	253	155	284	73	56	31	27	31	M27 P1.5	210	160	170	285	335	33	1
φ180	100	140	195	M95 P2	55	275	171	308	74	63	33	29	33	M30 P1.5	235	182	185	315	375	33	1 1/4
φ200	112	150	205	M100 P2	55	301	181	338	85	72	37	31	37	M33 P1.5	262	200	206	355	425	36	1 1/2
φ224	125	180	240	M120 P2	60	305	180	346	90	76	41	36	42	M39 P1.5	292	225	230	395	475	42	1 1/2
φ250	140	195	260	M130 P2	65	346	197	392	107	88	46	39	47	M42 P1.5	325	250	250	425	515	45	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FD

■C/A Rods

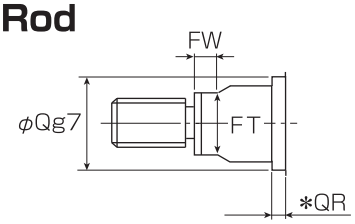
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

CF Single Rod

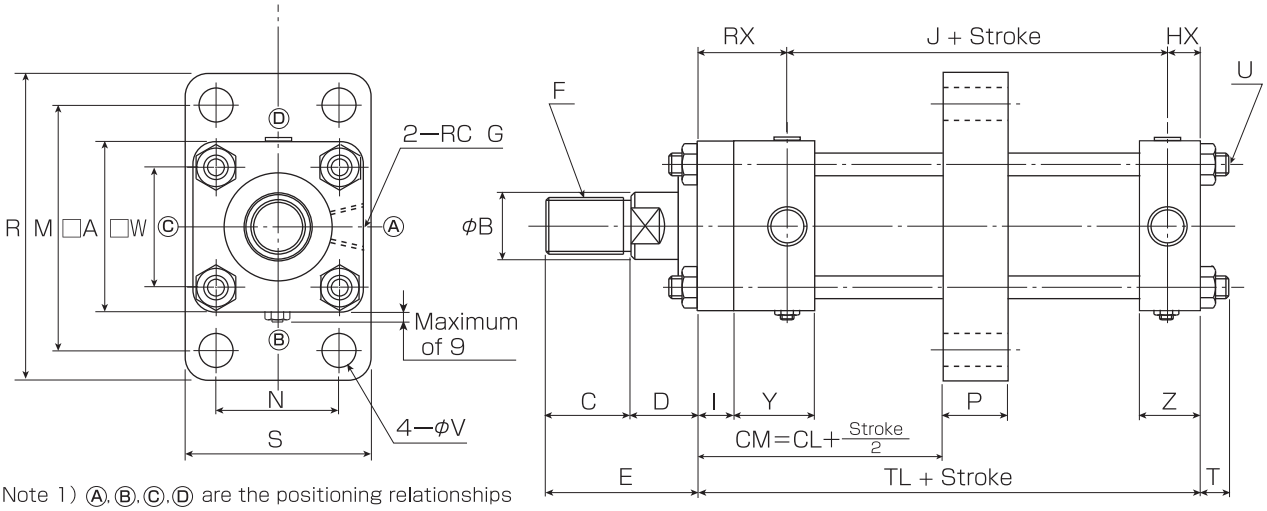


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

* If the CL dimension is different from that given in the catalog, specify it separately.
For a cylinder with switch, the switch cannot be mounted depending on the stroke and the CL dimension. Decimal digits of the CL dimension are omitted.

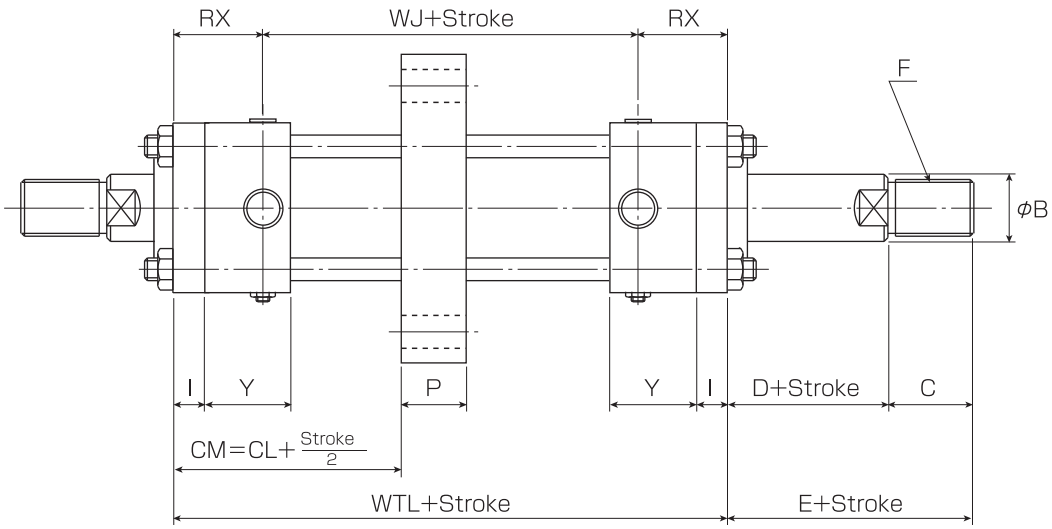
■CF Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	G	D	TL	J	RX	HX	I	Y	Z	T	U	□A	□W	N	M	CL	φV	S	R	P
φ32	18	25	55	M16 P1.5	3/8	30	141	90	36	15	11	40	30	10	M8 P1.25	55	40	40	88	69	11	63	109	28
φ40	22.4	30	60	M20 P1.5	3/8	30	141	90	36	15	11	38	28	12	M10 P1.25	65	45	46	95	69	11	69	118	28
φ50	28	35	65	M24 P1.5	1/2	30	155	96	42	17	13	44	32	12	M10 P1.25	75	52	58	115	75	14	85	145	33
φ63	35.5	45	80	M30 P1.5	1/2	35	163	102	44	17	15	44	32	15	M12 P1.5	90	65	65	132	76	18	98	165	42
φ80	45	60	95	M39 P1.5	3/4	35	184	108	56	20	18	56	38	18	M16 P1.5	110	80	87	155	90	18	118	190	42
φ100	56	75	115	M48 P1.5	3/4	40	192	114	58	20	20	56	38	20	M18 P1.5	135	98	109	190	90	22	145	224	52
φ125	71	95	140	M64 P2.0	1	45	220	129	66	25	24	65	48	23	M22 P1.5	165	122	130	224	104	26	175	272	57
φ140	80	110	160	M72 P2.0	1	50	230	137	68	25	26	65	48	24	M24 P1.5	185	138	145	250	100	26	195	300	77
φ150	85	115	165	M76 P2.0	1	50	240	145	70	25	28	65	48	27	M27 P1.5	196	148	155	270	106	30	206	315	77
φ160	90	120	175	M80 P2.0	1	55	253	155	73	25	31	65	48	27	M27 P1.5	210	160	170	285	109	33	218	335	87
φ180	100	140	195	M95 P2.0	1 1/4	55	275	171	74	30	33	69	58	29	M30 P1.5	235	182	185	315	113	33	243	375	97
φ200	112	150	205	M100 P2.0	1 1/2	55	301	181	85	35	37	83	70	31	M33 P1.5	262	200	206	355	124	36	272	425	107
φ224	125	180	240	M120 P2.0	1 1/2	60	305	180	90	35	42	83	70	36	M39 P1.5	292	225	230	395	123	42	300	462	117
φ250	140	195	260	M130 P2.0	2	65	346	197	107	42	49	102	84	39	M42 P1.5	325	250	250	425	148	45	335	515	117

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

CF Double Rod



■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

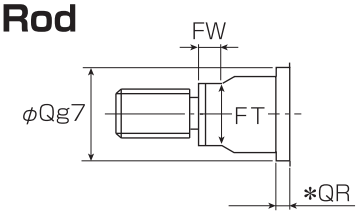
Units:mm

Symbol / Bore	Double Rod	
	WTL	WJ
φ32	166	94
φ40	166	94
φ50	182	98
φ63	194	106
φ80	222	110
φ100	232	116
φ125	264	132
φ140	276	140
φ150	288	148
φ160	304	158
φ180	322	174
φ200	362	192
φ224	370	190
φ250	416	202

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

CA Single Rod

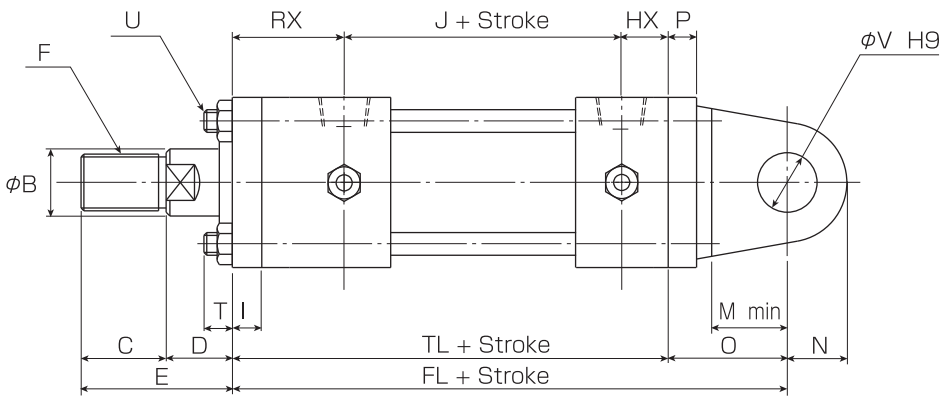


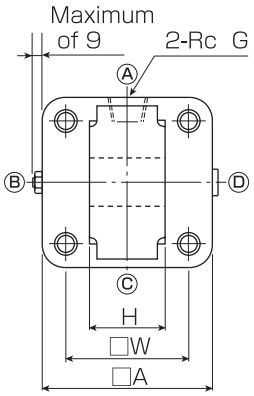
*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.





Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

■CA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	RcG
φ32	18	25	55	M16 P1.5	30	141	90	179	36	15	11	10	11	22	16	38	16	M8 P1.25	55	40	25 $^{-0.1}_{-0.4}$	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	179	36	15	11	12	11	20	16	38	16	M10 P1.25	65	45	25 $^{-0.1}_{-0.4}$	3/8
φ50	28	35	65	M24 P1.5	30	155	96	200	42	17	13	12	13	25	20	45	20	M10 P1.25	75	52	31.5 $^{-0.1}_{-0.4}$	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	226	44	17	15	15	15	40	31.5	63	31.5	M12 P1.5	90	65	40 $^{-0.1}_{-0.4}$	1/2
φ80	45	60	95	M39 P1.5	35	184	108	256	56	20	18	18	18	40	31.5	72	31.5	M16 P1.5	110	80	40 $^{-0.1}_{-0.4}$	3/4
φ100	56	75	115	M48 P1.5	40	192	114	276	58	20	20	20	20	50	40	84	40	M18 P1.5	135	98	50 $^{-0.1}_{-0.4}$	3/4
φ125	71	95	140	M64 P2	45	220	129	320	66	25	24	23	24	63	50	100	50	M22 P1.5	165	122	63 $^{-0.1}_{-0.4}$	1
φ140	80	110	160	M72 P2	50	230	137	350	68	25	26	24	26	80	63	120	63	M24 P1.5	185	138	80 $^{-0.1}_{-0.6}$	1
φ150	85	115	165	M76 P2	50	240	145	362	70	25	28	27	28	80	63	122	63	M27 P1.5	196	148	80 $^{-0.1}_{-0.6}$	1
φ160	90	120	175	M80 P2	55	253	155	390	73	25	31	27	31	90	71	137	71	M27 P1.5	210	160	80 $^{-0.1}_{-0.6}$	1
φ180	100	140	195	M95 P2	55	275	171	425	74	30	33	29	33	100	80	150	80	M30 P1.5	235	182	100 $^{-0.1}_{-0.6}$	1 1/4
φ200	112	150	205	M100 P2	55	301	181	471	85	35	36	31	37	115	90	170	90	M33 P1.5	262	200	125 $^{-0.1}_{-0.6}$	1 1/2
φ224	125	180	240	M120 P2	60	305	180	490	90	35	43	36	42	125	100	185	100	M39 P1.5	292	225	125 $^{-0.1}_{-0.6}$	1 1/2
φ250	140	195	260	M130 P2	65	346	197	531	107	42	48	39	47	125	100	185	100	M42 P1.5	325	250	125 $^{-0.1}_{-0.6}$	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

CA

■C/A Rods

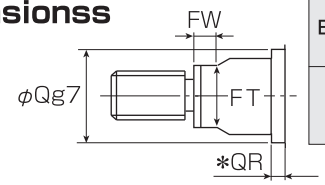
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

CC : Single Protrusion Clevis with Spherical Bearing Table of Dimensionss

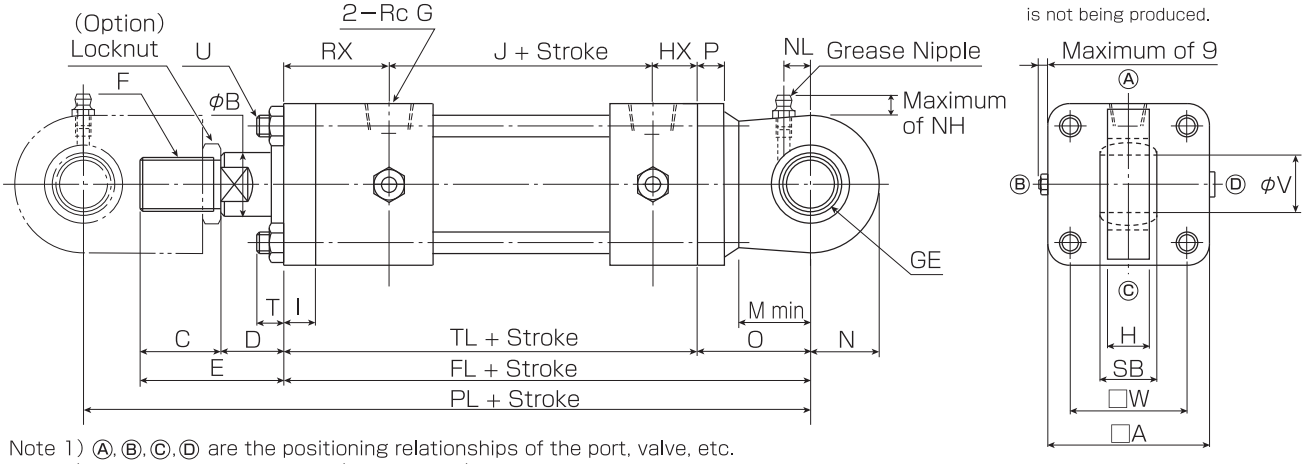


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ125 :10
A Rods	φ40 to φ125 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ, Ⓑ, Ⓒ, Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
Note 4) No grease is applied. Lubricate the bearing from the grease nipple appropriately.
Note 5) The bearing bore diameter and mounting width conform to JIS B8369.

■CC Type (Spherical Bearing) Basic Table of Dimensions

Units:mm

Symbol / Bore	B Rod							D	TL	J	FL	PL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	SB	RcG	GE
	φB	C	E	F	φQ	FT	FW																					
φ32	18	40	70	M16 P1.5	35	14	10	30	141	90	185	292	36	15	11	10	11	25	27.5	44	20	M8 P1.25	55	40	13	16	3/8	SA1-20 or equivalent
φ40	22.4	45	75	M20 P1.5	40	19	10	30	141	90	185	294	36	15	11	12	11	25	27.5	44	20	M10 P1.25	65	45	13	16	3/8	SA1-20 or equivalent
φ50	28	50	80	M24 P1.5	46	24	10	30	155	96	208	330	42	17	13	12	13	31	32.5	53	25	M10 P1.25	75	52	17	20	1/2	SA1-25 or equivalent
φ63	35.5	60	95	M30 P1.5	55	30	15	35	163	102	227	378	44	17	15	15	15	38	40	64	30	M12 P1.5	90	65	19	22	1/2	SA1-30 or equivalent
φ80	45	80	115	M39 P1.5	65	41	15	35	184	108	265	448	56	20	18	18	18	48	50	81	40	M16 P1.5	110	80	23	28	3/4	SA1-40 or equivalent
φ100	56	95	135	M48 P1.5	80	50	20	40	192	114	288	509	58	20	20	20	20	58	62	96	50	M18 P1.5	135	98	30	35	3/4	SA1-50 or equivalent
φ125	71	125	170	M64 P2	95	65	25	45	220	129	337	610	66	25	24	23	24	72	77	117	60	M22 P1.5	165	122	38	44	1	SA1-60 or equivalent

Note 1) The Spherical Bearing uses an oil supply system; however, it should be oiled periodically from the Grease Nipple.
Note 2) "Dimension PL" indicates a dimension of the cylinder with lock nut.

■Pin with Grease Nipple

Units:mm

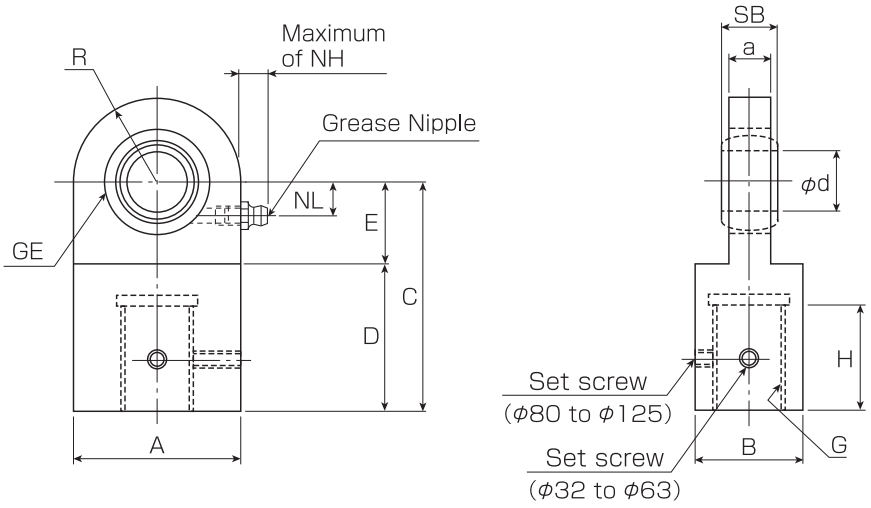
Symbol / Bore	Grease Nipple form	NL	NH
φ32	JIS A-M6F	11	11
φ40	JIS A-M6F	11	11
φ50	JIS A-M6F	14	11
φ63	JIS A-M6F	15	11
φ80	JIS A-Rc 1/8	20	15
φ100	JIS A-Rc 1/8	24	15
φ125	JIS A-Rc 1/8	28	15

■Mass Table

Units:kg

Symbol / Bore	Basic Mass (Stroke: 0mm)			Stroke Mass per 100mm		
	A Rod	B Rod	C Rod	A Rod	B Rod	C Rod
φ32	3.8	3.7	3.6	1.1	0.9	0.8
φ40	4.7	4.6	4.5	1.2	1.0	0.9
φ50	7.3	7.0	6.9	1.7	1.4	1.2
φ63	12.1	11.4	11.0	2.5	2.0	1.7
φ80	20.6	19.7	18.7	4.1	3.4	3.0
φ100	33.2	31.2	29.8	6.1	4.9	4.2
φ125	60.4	56.6	53.6	9.5	7.6	6.4

End Joint with Spherical Bearing : S type



Note1) No grease is applied. Lubricate the bearing from the grease nipple appropriately.
Note2) The bearing bore diameter and mounting width conform to JIS B8369.

■Spherical Bearing End Joint Dimension Table 〈B(A), C Rods〉

Units:mm

Symbol / Bore	φd	a	SB	A	B	C	D	E	G		H		R	GE	Parts Code	
									B Rod	C Rod	B Rod	C Rod			B Rod	C Rod
φ32	20	13	16	55	32	67	42	25	M16 P1.5	M12 P1.5	27	22	27.5	SA1-20 or equivalent	SJ-F32B	SJ-F32C
φ40	20	13	16	55	32	67	42	25	M20 P1.5	M16 P1.5	32	27	27.5	SA1-20 or equivalent	SJ-F40B	SJ-F40C
φ50	25	17	20	65	40	78	47	31	M24 P1.5	M20 P1.5	37	32	32.5	SA1-25 or equivalent	SJ-F50B	SJ-F50C
φ63	30	19	22	80	50	98	60	38	M30 P1.5	M24 P1.5	47	37	40	SA1-30 or equivalent	SJ-F63B	SJ-F63C
φ80	40	23	28	100	65	125	77	48	M39 P1.5	M30 P1.5	62	47	50	SA1-40 or equivalent	SJ-F80B	SJ-F80C
φ100	50	30	35	120	80	152	94	58	M48 P1.5	M39 P1.5	77	62	60	SA1-50 or equivalent	SJ-F100B	SJ-F100C
φ125	60	38	44	150	100	190	118	72	M64 P2.0	M48 P1.5	97	77	75	SA1-60 or equivalent	SJ-F125B	SJ-F125C

Note) The Spherical Bearing uses an oil supply system; however, it should be oiled periodically to the bearing pin.

■Pin with Grease Nipple

Units:mm

Symbol / Bore	Grease Nipple Form	NL	NH
φ32	JIS A-M6F	11	11
φ40	JIS A-M6F	11	11
φ50	JIS A-M6F	14	11
φ63	JIS A-M6F	15	11
φ80	JIS A-Rc 1/8	20	15
φ100	JIS A-Rc 1/8	24	15
φ125	JIS A-Rc 1/8	28	15

■Mass Table

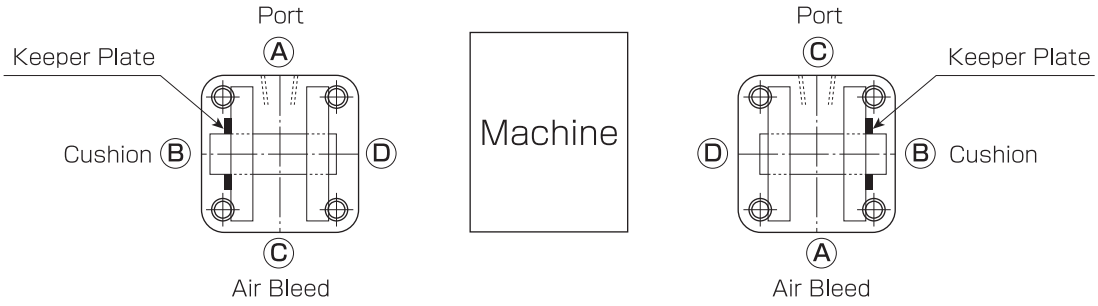
Units:kg

Symbol / Bore	B Rod	C Rod
φ32	0.84	0.86
φ40	0.80	0.84
φ50	1.02	1.08
φ63	2.53	2.66
φ80	4.86	5.18
φ100	9.02	9.53
φ125	17.32	18.67

CB

About opposite layout

The CB mounting is equipped with a keeper plate for fastening the pin. Normally, the keeper plate is located at the B position. If you order the opposite layout to use two cylinders, specify the model code that indicates the opposite layout: For example: "ABC" (as shown on the left), or "CBA" (as shown on the right).



■C/A Rods

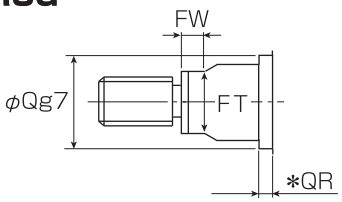
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

TA Single Rod

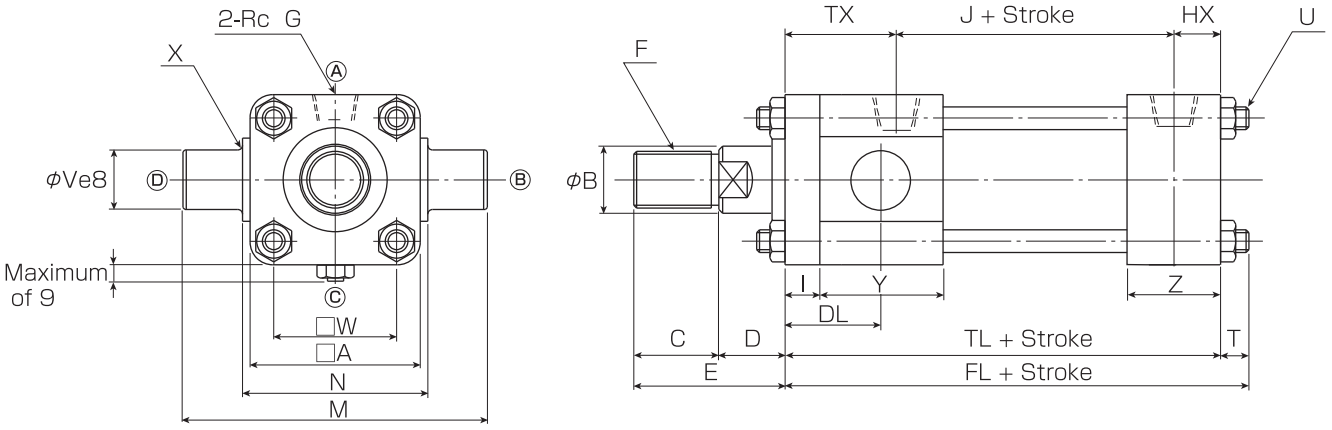


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.

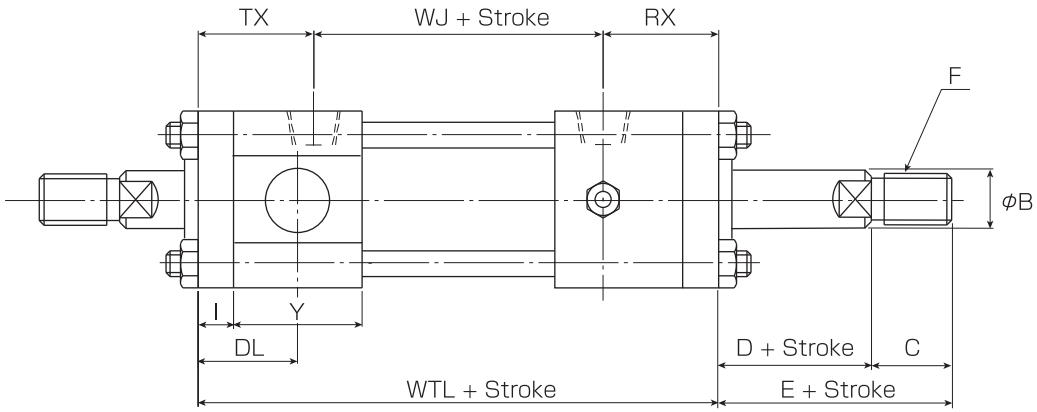
■TA Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.] Units:mm

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	TX	HX	I	Y	Z	DL	T	U	□A	□W	N	M	X	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	151	36	15	11	40	30	32	10	M8 P1.25	55	40	58 $^{0}_{-0.3}$	98	R2	20	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	153	36	15	11	38	28	32	12	M10 P1.25	65	45	69 $^{0}_{-0.3}$	109	R2	20	3/8
φ50	28	35	65	M24 P1.5	30	155	96	167	42	17	13	44	32	36	12	M10 P1.25	75	52	85 $^{0}_{-0.35}$	135	R2.5	25	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	44	17	15	44	32	39	15	M12 P1.5	90	65	98 $^{0}_{-0.35}$	161	R2.5	31.5	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	56	20	18	56	38	47	18	M16 P1.5	110	80	118 $^{0}_{-0.35}$	181	R2.5	31.5	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	58	20	20	56	38	49	20	M18 P1.5	135	98	145 $^{0}_{-0.4}$	225	R3	40	3/4
φ125	71	95	140	M64 P2	45	220	129	243	66	25	24	65	48	58	23	M22 P1.5	165	122	175 $^{0}_{-0.4}$	275	R3	50	1
φ140	80	110	160	M72 P2	50	241	137	265	79	25	26	76	48	62	24	M24 P1.5	185	138	195 $^{0}_{-0.46}$	321	R4	63	1
φ150	85	115	165	M76 P2	50	251	145	278	81	25	28	76	48	62	27	M27 P1.5	196	148	206 $^{0}_{-0.46}$	332	R4	63	1
φ160	90	120	175	M80 P2	55	273	155	300	93	25	31	85	48	71	27	M27 P1.5	210	160	218 $^{0}_{-0.46}$	360	R4	71	1
φ180	100	140	195	M95 P2	55	301	171	330	100	30	33	95	58	81	29	M30 P1.5	235	182	243 $^{0}_{-0.46}$	403	R4	80	1 1/4
φ200	112	150	205	M100 P2	55	325	181	356	109	35	37	107	70	90	31	M33 P1.5	262	200	272 $^{0}_{-0.52}$	452	R5	90	1 1/2
φ224	125	180	240	M120 P2	60	339	180	375	124	35	42	117	70	100	36	M39 P1.5	292	225	300 $^{0}_{-0.52}$	500	R5	100	1 1/2
φ250	140	195	260	M130 P2	65	361	197	400	122	42	47	117	84	105	39	M42 P1.5	325	250	335 $^{0}_{-0.57}$	535	R5	100	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

TA Double Rod



*φ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	φB	C	E	F	φQ	FT	FW	φB	C	E	F	φQ	FT	FW	QR	D
φ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
φ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
φ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
φ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
φ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
φ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
φ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
φ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
φ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
φ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
φ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
φ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
φ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
φ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

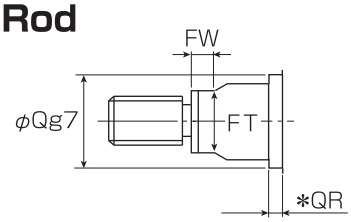
■Double Rod

Units:㎜

Symbol / Bore	Double Rod		
	WTL	WJ	RX
φ32	166	94	36
φ40	166	94	36
φ50	182	98	42
φ63	194	106	44
φ80	222	110	56
φ100	232	116	58
φ125	264	132	66
φ140	287	140	68
φ150	299	148	70
φ160	324	158	73
φ180	348	174	74
φ200	386	192	85
φ224	404	190	90
φ250	431	202	107

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) The φ32 A Rod corresponds to the standard.There is no cushion on the head side.

TC Single Rod

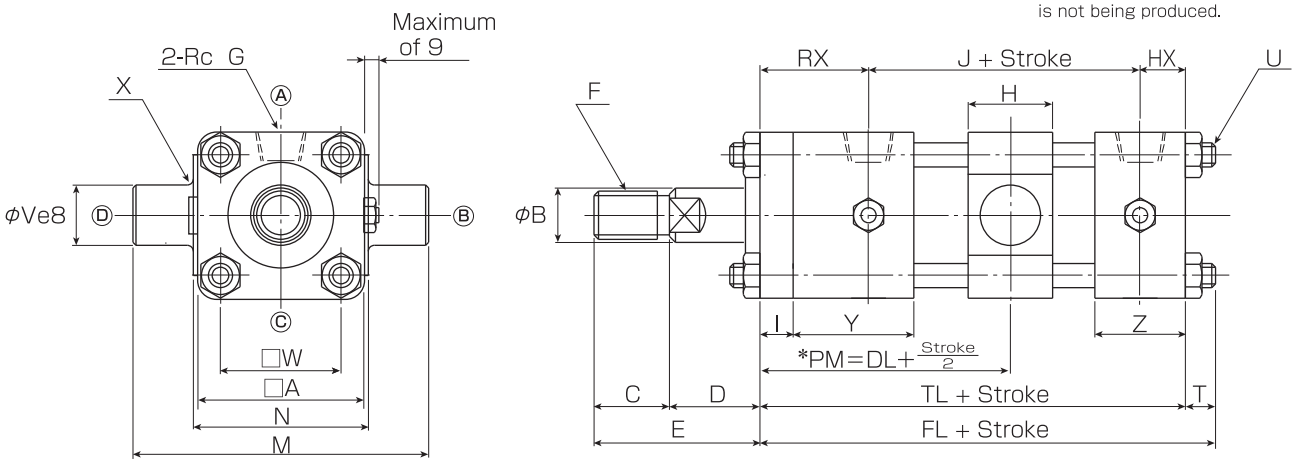


*QR Dimensions

Standard Specifications	
B, C Rods	φ32 :12 φ40 to φ200 :10 φ224 or φ250 : 9
A Rods	φ32 to φ250 : Please refer to the table.

Coolant Proof Specifications			
Bore	A rod	B rod	C rod
φ32	9	11	10
φ40	11	9	9
φ50	11	9	9
φ63	13	9	9
φ80	12	9	9
φ100	—	10	9

Note) Coolant Proof Specifications are from φ32 to φ100. The φ100 A Rod is not being produced.



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.50.
Note 3) The 32 bore check valve will just be out of 4mm from the cover surface.
※When the size of PM differs from the notation of a catalogue, please direct independently.
Keep in mind that a switch may not be attached with a stroke depending on PM size in the case of switch adjusted specifications. smallness of PM size several or less points are omitted.

■TC Type Basic Table of Dimensions

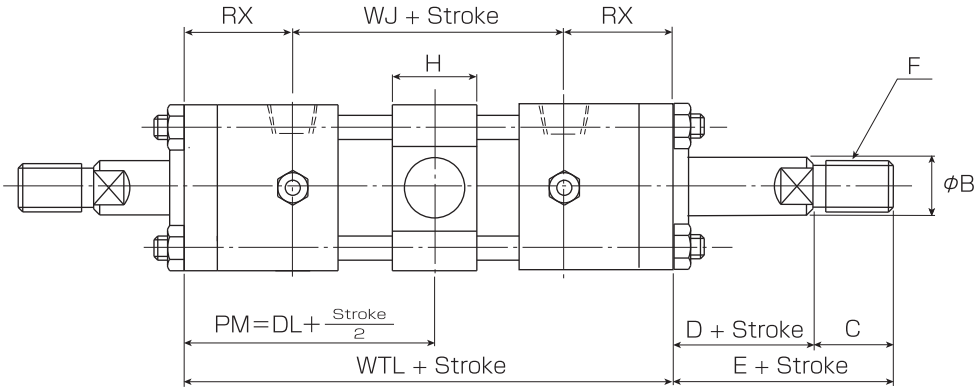
[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	D	TL	J	FL	DL	RX	HX	I	Y	Z	T	H	U	□A	□W	N	M	X	φV	RcG
φ32	18	25	55	M16 P1.5	30	141	90	151	83	36	15	11	40	30	10	28	M8 P1.25	55	40	58 $^{0}_{-0.3}$	98	R2	20	3/8
φ40	22.4	30	60	M20 P1.5	30	141	90	153	83	36	15	11	38	28	12	28	M10 P1.25	65	45	69 $^{0}_{-0.3}$	109	R2	20	3/8
φ50	28	35	65	M24 P1.5	30	155	96	167	91	42	17	13	44	32	12	33	M10 P1.25	75	52	85 $^{0}_{-0.35}$	135	R2.5	25	1/2
φ63	35.5	45	80	M30 P1.5	35	163	102	178	97	44	17	15	44	32	15	42	M12 P1.5	90	65	98 $^{0}_{-0.35}$	161	R2.5	31.5	1/2
φ80	45	60	95	M39 P1.5	35	184	108	202	111	56	20	18	56	38	18	42	M16 P1.5	110	80	118 $^{0}_{-0.35}$	181	R2.5	31.5	3/4
φ100	56	75	115	M48 P1.5	40	192	114	212	116	58	20	20	56	38	20	52	M18 P1.5	135	98	145 $^{0}_{-0.4}$	225	R3	40	3/4
φ125	71	95	140	M64 P2	45	220	129	243	132	66	25	24	65	48	23	57	M22 P1.5	165	122	175 $^{0}_{-0.4}$	275	R3	50	1
φ140	80	110	160	M72 P2	50	230	137	254	138	68	25	26	65	48	24	77	M24 P1.5	185	138	195 $^{0}_{-0.46}$	321	R4	63	1
φ150	85	115	165	M76 P2	50	240	145	267	144	70	25	28	65	48	27	77	M27 P1.5	196	148	206 $^{0}_{-0.46}$	332	R4	63	1
φ160	90	120	175	M80 P2	55	253	155	280	152	73	25	31	65	48	27	87	M27 P1.5	210	160	218 $^{0}_{-0.46}$	360	R4	71	1
φ180	100	140	195	M95 P2	55	275	171	304	161	74	30	33	69	58	29	97	M30 P1.5	235	182	243 $^{0}_{-0.46}$	403	R4	80	1 1/4
φ200	112	150	205	M100 P2	55	301	181	332	177	85	35	37	83	70	31	107	M33 P1.5	262	200	272 $^{0}_{-0.52}$	452	R5	90	1 1/2
φ224	125	180	240	M120 P2	60	305	180	341	181	90	35	42	83	70	36	117	M39 P1.5	292	225	300 $^{0}_{-0.52}$	500	R5	100	1 1/2
φ250	140	195	260	M130 P2	65	346	197	385	206	107	42	47	102	84	39	117	M42 P1.5	325	250	335 $^{0}_{-0.57}$	535	R5	100	2

Note) Please refer to the S Type specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

TC Double Rod



*ϕ200 or greater are for special applications.

■C/A Rods

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:㎜

Symbol / Bore	C Rod							A Rod								
	ϕB	C	E	F	ϕQ	FT	FW	ϕB	C	E	F	ϕQ	FT	FW	QR	D
ϕ32	14	18	48	M12 P1.5	35	12	8	22.4	25	55	M16 P1.5	40	19	10	10	30
ϕ40	18	25	55	M16 P1.5	36	14	10	28	30	60	M20 P1.5	44	24	10	12	30
ϕ50	22.4	30	60	M20 P1.5	40	19	10	35.5	35	70	M24 P1.5	53	30	15	12	35
ϕ63	28	35	70	M24 P1.5	46	24	10	45	45	80	M30 P1.5	65	41	15	13	35
ϕ80	35.5	45	80	M30 P1.5	55	30	15	56	60	100	M39 P1.5	80	50	15	12	40
ϕ100	45	60	100	M39 P1.5	65	41	15	71	75	120	M48 P1.5	95	65	25	14	45
ϕ125	56	75	120	M48 P1.5	80	50	20	90	95	150	M64 P2	115	85	30	17	55
ϕ140	63	80	130	M56 P2	85	58	20	100	110	165	M72 P2	125	95	30	17	55
ϕ150	67	85	135	M60 P2	90	60	25	100	115	170	M76 P2	125	95	30	15	55
ϕ160	71	95	150	M64 P2	95	65	25	112	120	175	M80 P2	140	105	30	16	55
ϕ180	80	110	165	M72 P2	105	75	25	125	140	200	M95 P2	150	120	35	18	60
ϕ200	90	120	175	M80 P2	115	85	30	140	150	215	M100 P2	170	133	35	19	65
ϕ224	100	140	200	M95 P2	125	95	30	160	180	245	M120 P2	190	155	35	9	65
ϕ250	112	150	215	M100 P2	140	105	30	180	195	260	M130 P2	215	170	45	9	65

■Double Rod

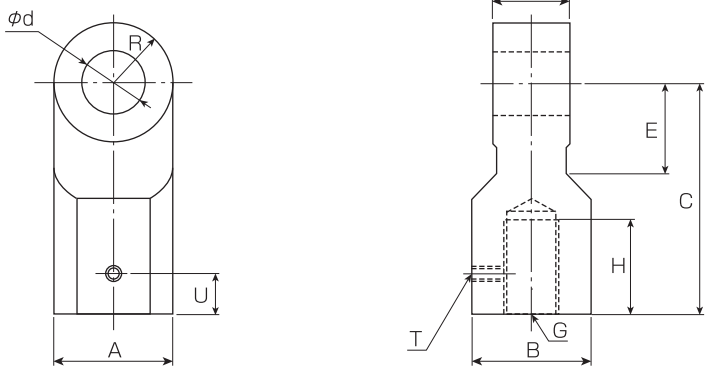
Units:㎜

Symbol / Bore	Double Rod	
	WTL	WJ
ϕ32	166	94
ϕ40	166	94
ϕ50	182	98
ϕ63	194	106
ϕ80	222	110
ϕ100	232	116
ϕ125	264	132
ϕ140	276	140
ϕ150	288	148
ϕ160	304	158
ϕ180	322	174
ϕ200	362	192
ϕ224	370	190
ϕ250	416	202

Note1) The cushion for the ϕ40 A Rod is a fixed cushion on the head-side.
Note2) The ϕ32 A Rod corresponds to the standard.There is no cushion on the head side.

■Single Protrusion End Joint : T type

Bore	Material
φ32 to φ125	Spheroidal Graphite Iron Casting



■Single Protrusion End Joint Dimension Table 〈B(A), C Rods〉

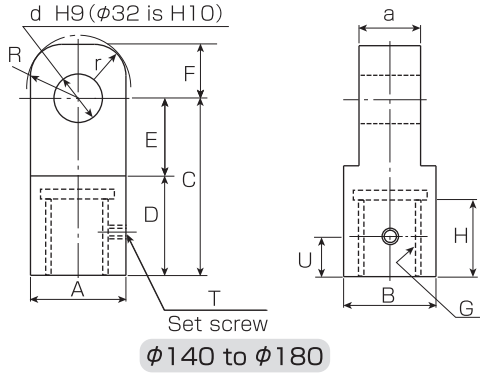
Units:㎜

Symbol / Bore	φd	a	A	B	C	E	G		H		R	T	U		Parts Code	
							B Rod	C Rod	B Rod	C Rod			B Rod	C Rod	B Rod	C Rod
φ32	16	25 $^{-0.1}_{-0.4}$	34	39	60	23	M16 P1.5	M12 P1.5	32	25	18	Note) M8	10	10	TJ-F32B	TJ-F32C
φ40	16	25 $^{-0.1}_{-0.4}$	34	39	60	23	M20 P1.5	M16 P1.5	35	32	18	M8	10	10	TJ-F40B	TJ-F40C
φ50	20	31.5 $^{-0.1}_{-0.4}$	42	47	70	28	M24 P1.5	M20 P1.5	38	35	22	M8	10	10	TJ-F50B	TJ-F50C
φ63	31.5	40 $^{-0.1}_{-0.4}$	62	62	115	43	M30 P1.5	M24 P1.5	47	38	33	M8	20	20	TJ-F63B	TJ-F63C
φ80	31.5	40 $^{-0.1}_{-0.4}$	62	62	115	43	M39 P1.5	M30 P1.5	62	47	33	M8	20	20	TJ-F80B	TJ-F80C
φ100	40	50 $^{-0.1}_{-0.4}$	82	82	145	55	M48 P1.5	M39 P1.5	77	62	43	M10	25	25	TJ-F100B	TJ-F100C
φ125	50	63 $^{-0.1}_{-0.4}$	102	102	180	65	M64 P2	M48 P1.5	97	77	53	M10	25	25	TJ-F125B	TJ-F125C

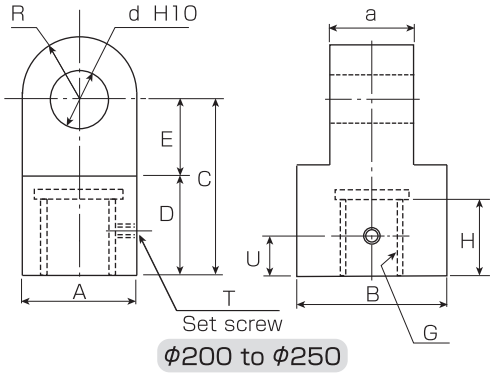
Note) The φ32 C rod of dimension "T" becomes M6.

■Single Protrusion End Joint : T type

Bore	Material
φ140 to φ250	Rolled Steels for General structure



φ140 to φ180



φ200 to φ250

■Single Protrusion End Joint Dimension Table 〈B(A), C Rods〉

Units:㎜

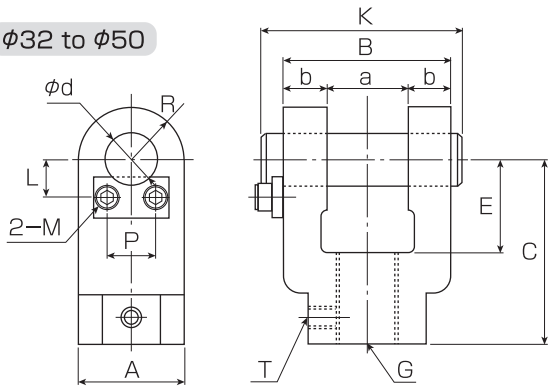
Symbol / Bore	φd	a	A	B	C	D	E	F	G		H		r	R	T	U		Parts Code	
									B Rod	C Rod	B Rod	C Rod				B Rod	C Rod	B Rod	C Rod
φ140	63	80 $^{-0.1}_{-0.6}$	120	120	225	140	85	65	M72 P2	M56 P2	112	82	42	71.5	M10	60	45	TJ-F140B	TJ-F140C
φ150	63	80 $^{-0.1}_{-0.6}$	120	120	225	140	85	65	M76 P2	M60 P2	117	87	42	71.5	M10	60	45	TJ-F150B	TJ-F150C
φ160	71	80 $^{-0.1}_{-0.6}$	140	140	240	150	90	70	M80 P2	M64 P2	122	97	54	76	M10	65	50	TJ-F160B	TJ-F160C
φ180	80	100 $^{-0.1}_{-0.6}$	160	160	270	170	100	80	M95 P2	M72 P2	142	112	62	87.5	M10	75	60	TJ-F180B	TJ-F180C

Symbol / Bore	φd	a	A	B	C	D	E	G		H		R	T	U		Parts Code	
								B Rod	C Rod	B Rod	C Rod			B Rod	C Rod	B Rod	C Rod
φ200	90	125 $^{-0.1}_{-0.6}$	180	180	310	180	130	M100 P2	M80 P2	155	125	90	M10	78	65	TJ-F200B	TJ-F200C
φ224	100	125 $^{-0.1}_{-0.6}$	200	200	370	230	140	M120 P2	M95 P2	185	145	100	M10	95	75	TJ-F224B	TJ-F224C
φ250	100	125 $^{-0.1}_{-0.6}$	200	200	370	230	140	M130 P2	M100 P2	200	155	100	M10	100	78	TJ-F250B	TJ-F250C

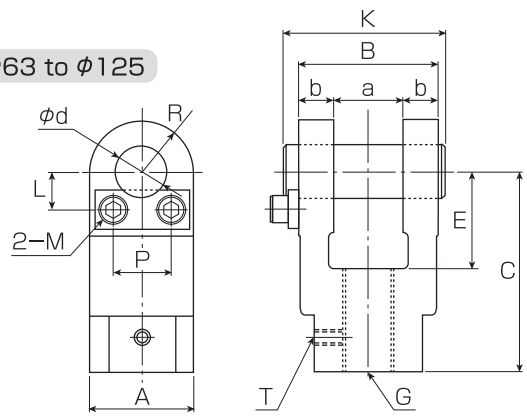
■Double Protrusion End Joint : Y type

Bore	Material
φ32 to φ125	Spheroidal Graphite Iron Casting

φ32 to φ50



φ63 to φ125



■Double Protrusion End Joint Dimension Table 〈B(A), C Rods〉

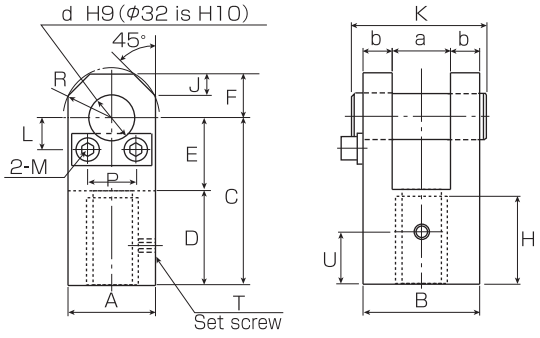
Units:㎜

Symbol / Bore	φd	a	b	A	B	C	E	G		R	K	T	M	L	P	Parts Code	
								B Rod	C Rod							B Rod	C Rod
φ32	16	25 $^{+0.4}_{+0.1}$	12.5	34	50	60	27	M16 P1.5	M12 P1.5	18	62	Note) M8	M6	12.5	18	YJ-F32B	YJ-F32C
φ40	16	25 $^{+0.4}_{+0.1}$	12.5	34	50	60	27	M20 P1.5	M16 P1.5	18	62	M8	M6	12.5	18	YJ-F40B	YJ-F40C
φ50	20	31.5 $^{+0.4}_{+0.1}$	16	42	63.5	70	32	M24 P1.5	M20 P1.5	22	76.5	M8	M6	14.5	18	YJ-F50B	YJ-F50C
φ63	31.5	40 $^{+0.4}_{+0.1}$	20	62	80	115	50	M30 P1.5	M24 P1.5	33	93	M8	M10	22	33	YJ-F63B	YJ-F63C
φ80	31.5	40 $^{+0.4}_{+0.1}$	20	62	80	115	50	M39 P1.5	M30 P1.5	33	93	M8	M10	22	33	YJ-F80B	YJ-F80C
φ100	40	50 $^{+0.4}_{+0.1}$	25	82	100	145	65	M48 P1.5	M39 P1.5	43	117	M10	M10	25	40	YJ-F100B	YJ-F100C
φ125	50	63 $^{+0.4}_{+0.1}$	31.5	102	126	180	75	M64 P2	M48 P1.5	53	143	M10	M10	29	50	YJ-F125B	YJ-F125C

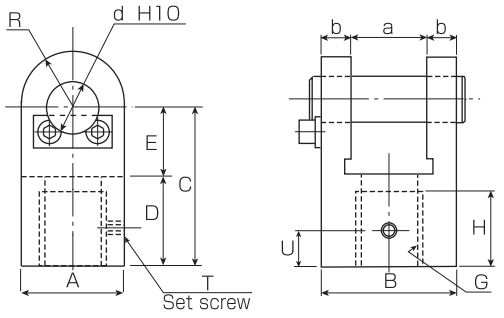
Note) The φ32 C rod of T becomes M6.

■Double Protrusion End Joint : Y type

Bore	Material
φ32 to φ250	Rolled Steels for General structure



φ140 to φ180



φ200 to φ250

■Double Protrusion End Joint Dimension Table 〈B(A), C Rods〉

Pins up to φ125 are standard. φ140 and above are options.

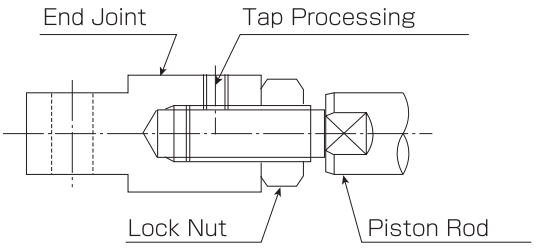
Units:㎜

Symbol / Bore	φd	a	b	A	B	C	D	E	F	G		H		J	R	K	T	U		M	L	P	Parts Code	
										B Rod	C Rod	B Rod	C Rod					B Rod	C Rod				B Rod	C Rod
φ140	63	80 $^{+0.6}_{+0.1}$	40	120	160	225	135	90	65	M72 P2	M56 P2	112	82	30	71.5	183	M10	60	45	M12	37	63	YJ-F140B	YJ-F140C
φ150	63	80 $^{+0.6}_{+0.1}$	40	120	160	225	135	90	65	M76 P2	M60 P2	117	87	30	71.5	183	M10	60	45	M12	37	63	YJ-F150B	YJ-F150C
φ160	71	80 $^{+0.6}_{+0.1}$	40	140	160	240	140	100	70	M80 P2	M64 P2	122	97	40	76	183	M10	65	50	M12	40	71	YJ-F160B	YJ-F160C
φ180	80	100 $^{+0.6}_{+0.1}$	50	160	200	270	160	110	80	M95 P2	M72 P2	142	112	45	87.5	225	M10	75	60	M14	45.5	80	YJ-F180B	YJ-F180C

Symbol / Bore	φd	a	b	A	B	C	D	E	G		H		R	T	U		M	L	P	Parts Code	
									B Rod	C Rod	B Rod	C Rod			B Rod	C Rod				B Rod	C Rod
φ200	90	125 $^{+0.6}_{+0.1}$	50	180	225	310	180	130	M100 P2	M80 P2	155	125	90	M10	78	65	M14	48	90	YJ-F200B	YJ-F200C
φ224	100	125 $^{+0.6}_{+0.1}$	63	200	251	370	230	140	M120 P2	M95 P2	185	145	100	M10	95	75	M16	54	100	YJ-F224B	YJ-F224C
φ250	100	125 $^{+0.6}_{+0.1}$	63	200	251	370	230	140	M130 P2	M100 P2	200	155	100	M10	100	78	M16	54	100	YJ-F250B	YJ-F250C

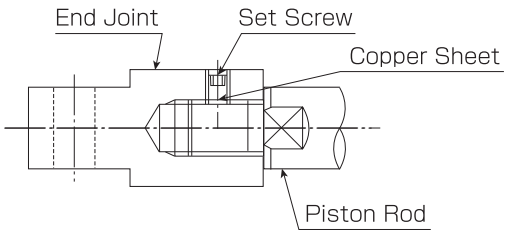
■Shipping Methods for Cylinders with End Joint

① When a cylinder with a lock nut and end joint is ordered



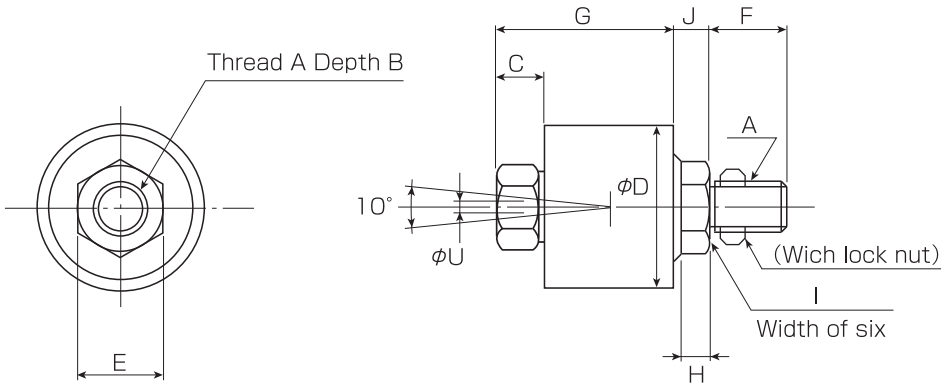
The end joint and lock nut are loosely assembled on the piston rod before shipping.
The lock nut is not tightened so it will have to be tightened after adjusting the position of the end joint.

② When a cylinder is ordered with the end joint only.



The end joint will be tightened onto the piston rod and fixed with a set screw before shipping.

■F Connector



※Cannot be used with full output norminal pressure. Confirm the usage load before use.

■Table of Dimensions

Units:㎜

Bore / Symbol		Parts Code	A	B	C	D	E	F	G	H	I	J	U	Usage loads (N)		Mass (kg)
B Rod	C Rod													Pull	Push	
φ32	φ40	F-16	M16P1.5	13	17 ±1.0	45	23	24	52 ±1.0	6	23	6	2	to 5290	to 19600	0.40
φ40	φ50	F-20	M20P1.5	20	24.5 ±1.0	61	32	32	68 ±1.0	6	29	11.5	3	to 7640	to 39200	1.10
φ50	φ63	F-24	M24P1.5	22	34.5 ±1.0	61	35	32	78 ±1.0	6	29	11.5	3	to 7640	to 39200	1.10
φ63	φ80	F-30	M30P1.5	22	36.5 ±1.0	69	41	42	88.5±1.0	8	35	15	3	to 13520	to 78400	1.80

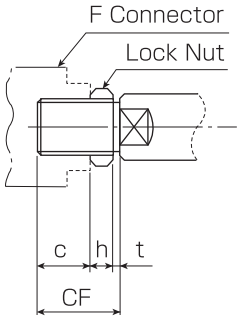
Note 1) It is possible to turn the thread section; however, it is not a joint for rotation so it cannot be used for turning.
Note 2) Supplying oil is unnecessary and grease lubricant is used to fill it.
Note 3) Cannot be reused after disassembly.
Note 4) The usage loads in the Table of Dimensions are values from static load tests.
Note 5) In the case of loads where there are repeated shocks, the usage load value will decrease, so this should be taken into consideration.
Note 6) The F connector cannot be used with the rotary bracket (mounting type: TC, CA and CB).

■The screw length with F Connector

Units:㎜

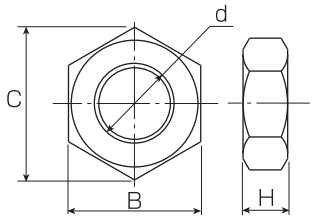
Bore / Symbol		Parts Code	A	B	c	h	t	Size CF (The screw length.)
B Rod	C Rod							
φ32	φ40	F-16	M16P1.5	13	12.5	10	2.5	25
φ40	φ50	F-20	M20P1.5	20	19.5	12	3.5	35
φ50	φ63	F-24	M24P1.5	22	21.5	14	4.5	40
φ63	φ80	F-30	M30P1.5	22	21.5	18	5.5	45

Note 1) The size CF (The screw length) is the one having calculated for the reference.
Note 2) Three types of lock nuts are available.

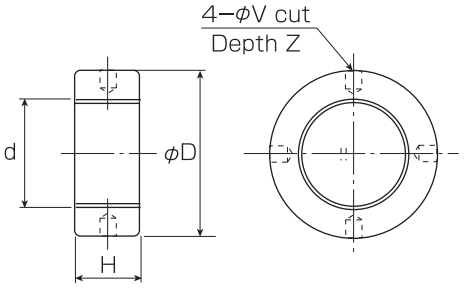


■Lock Nut

Bore	Material
φ32 to φ250	Rolled Steels for General structure



φ32 to φ180 ※φ200 to φ224 are only for the C Rod.



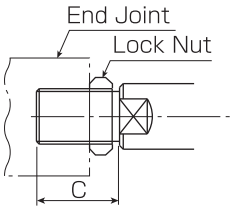
φ200 to φ250

■Table of Dimensions 〈B(A), C Rods〉

Units:㎜

Symbol / Bore	B(A) Rod				C Rod				Parts Code	
	d	H	B	C	d	H	B	C	B Rod	C Rod
φ32	M16 P1.5	10	24	27.7	M12 P1.5	7	19	21.9	LN-F32B	LN-F32C
φ40	M20 P1.5	12	30	34.6	M16 P1.5	10	24	27.7	LN-F40B	LN-F40C
φ50	M24 P1.5	14	36	41.6	M20 P1.5	12	30	34.6	LN-F50B	LN-F50C
φ63	M30 P1.5	18	46	53.1	M24 P1.5	14	36	41.6	LN-F63B	LN-F63C
φ80	M39 P1.5	23	60	69.3	M30 P1.5	18	46	53.1	LN-F80B	LN-F80C
φ100	M48 P1.5	29	75	86.5	M39 P1.5	23	60	69.3	LN-F100B	LN-F100C
φ125	M64 P2	38	95	110	M48 P1.5	29	75	86.5	LN-F125B	LN-F125C
φ140	M72 P2	42	105	121	M56 P2	34	85	98.1	LN-F140B	LN-F140C
φ150	M76 P2	46	110	127	M60 P2	36	90	104	LN-F150B	LN-F150C
φ160	M80 P2	48	115	133	M64 P2	38	95	110	LN-F160B	LN-F160C
φ180	M95 P2	57	135	156	M72 P2	42	105	121	LN-F180B	LN-F180C
φ200	—	—	—	—	M80 P2	48	115	133	—	LN-F200C
φ224	—	—	—	—	M95 P2	57	135	156	—	LN-F224C

Symbol / Bore	B(A) Rod					C Rod					Parts Code	
	d	H	φD	φV	Z	d	H	φD	φV	Z	B Rod	C Rod
φ200	M100 P2	45	155	15	18	—	—	—	—	—	LN-F200B	—
φ224	M120 P2	55	185	15	18	—	—	—	—	—	LN-F224B	—
φ250	M130 P2	60	205	15	18	M100 P2	45	155	15	18	LN-F250B	LN-F250C



※The length of the thread (C Dimension) of the piston rod with a lock nut is based on an insertion length of 80% of the thread diameter, so in cases where it is insufficient, use the dimensions in the illustration above.

■Recommended Thread Lengths with Lock Nuts

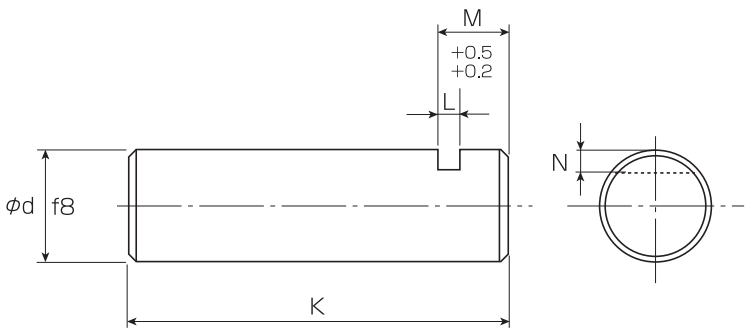
Units:㎜

Symbol / Bore	C Dimension (thread length)		
	A Rod	B Rod	C Rod
φ32	—	40	30
φ40	45	45	40
φ50	50	50	45
φ63	60	60	50
φ80	80	80	60
φ100	95	95	80
φ125	125	125	95
φ140	140	140	105
φ150	150	150	120
φ160	155	155	125
φ180	185	185	140
φ200	190	190	155
φ224	230	230	180
φ250	250	250	190

The recommended thread length with lock nut is adjusted in the case of equipped with the end joint and the lock nut.

■Pin

Bore	Material
φ32 to φ250	Carbon Steel for Machine Structual Use

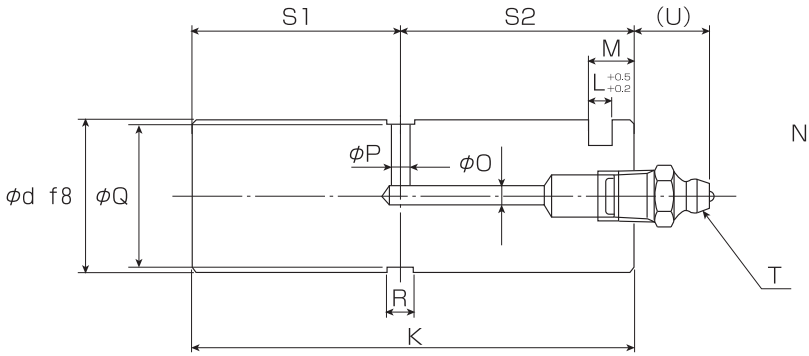


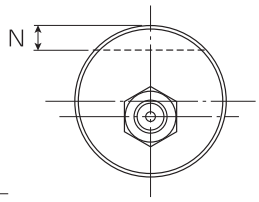
■Table of Dimensions

Units:㎜

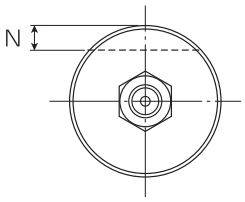
Symbol / Bore	φd	L	M	N	K
φ32	16	4.5	7.5	3.5	62
φ40	16	4.5	7.5	3.5	62
φ50	20	4.5	8.5	3.5	76.5
φ63	31.5	6	9	5.5	93
φ80	31.5	6	9	5.5	93
φ100	40	6	12	6.5	117
φ125	50	6	12	7.5	143
φ140	63	9	18	10	183
φ150	63	9	18	10	183
φ160	71	9	18	11	183
φ180	80	9	20	12	225
φ200	90	9	19	15	276 (For CB) 250 (For Y Joint)
φ224	100	12	24	15.5	280
φ250	100	12	24	15.5	280

■Pin with Grease Nipple





φ32 to φ40



φ50 to φ250

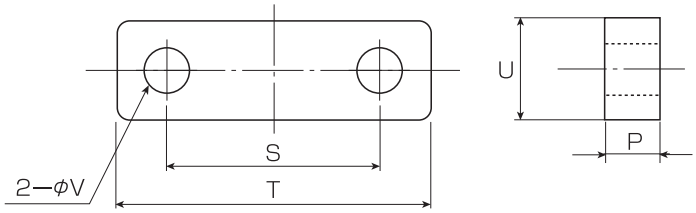
■Table of Dimensions

Units:mm

Symbol / Bore	φd	L	M	N	K	O	P	Q	R	S1	S2	T	(U)
φ32	16	4.5	8.5	3.5	62	3	3	15	5	29.5	32.5	A-R 1/8	(15)
φ40	16	4.5	8.5	3.5	62	3	3	15	5	29.5	32.5	A-R 1/8	(15)
φ50	20	4.5	8.5	3.5	76.5	3	3	19	5	36.5	40	A-R 1/8	(15)
φ63	31.5	6	9	5.5	93	3	3	30.5	5	44	49	A-R 1/8	(15)
φ80	31.5	6	9	5.5	93	3	3	30.5	5	44	49	A-R 1/8	(15)
φ100	40	6	12	6.5	117	5	5	39	7	55	62	A-R 1/4	(18)
φ125	50	6	12	7.5	143	5	5	49	7	68	75	A-R 1/4	(18)
φ140	63	9	18	10	183	5	5	62	7	85	98	A-R 1/4	(18)
φ150	63	9	18	10	183	5	5	62	7	85	98	A-R 1/4	(18)
φ160	71	9	18	11	183	5	5	70	7	85	98	A-R 1/4	(18)
φ180	80	9	20	12	225	5	5	79	7	105	120	A-R 1/4	(18)
φ200 For CB	90	9	19	15	276	11	8	88	10	131.5	144.5	A-R 1/4	(18)
φ200 For Y					250					118.5	131.5		
φ224	100	12	24	15.5	280	11	8	98	10	130.5	149.5	A-R 1/4	(18)
φ250	100	12	24	15.5	280	11	8	98	10	130.5	149.5	A-R 1/4	(18)

■Keeper Plate

Bore	Material
φ32 to φ250	Rolled Steels for General Structure



■Table of Dimensions

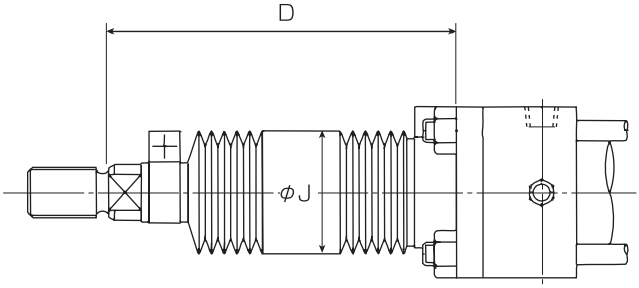
Units:mm

Symbol / Bore	φV	U	P	S	T	With Hex Hole Bolt
φ32	6.5	16	4.5	18	28	M6
φ40	6.5	16	4.5	18	28	M6
φ50	6.5	16	4.5	18	28	M6
φ63	11	22	6	33	55	M10
φ80	11	22	6	33	55	M10
φ100	11	22	6	40	62	M10
φ125	11	22	6	50	72	M10
φ140	14	30	9	63	93	M12
φ150	14	30	9	63	93	M12
φ160	14	30	9	71	101	M12
φ180	16	35	9	80	115	M14
φ200	16	35	9	90	125	M14
φ224	18	38	12	100	140	M16
φ250	18	38	12	100	140	M16

■Bellows

J : (Material: Neoprene, Heat Resistant : 100℃)
JC : (Material: Conex, Heat Resistant : 220℃)
JS : (Material: Silicon Glass Cloth, Heat Resistant : 220℃)
JA : (Material: Aluminum Leaf Glass Cloth, Heat Resistant : 350℃)

Note 1) The Heat Resistance indicates the maximum allowable temperature for Bellows.
Caution is advised because it differs from the heat resistant temperature of the cylinder body.
Note 2) Bellows is sent out after installing it on the cylinder.
Note 3) As for cylinders originally equipped with bellows, please specify the serial number or dimension D (in the illustration below) when ordering a replacement without the bellows.



■Table of Dimensions [Neoprene (J), Conex (JC)]

Units:㎜

Symbol / Bore	B・C Rod J 5 to 49	B・C Rod J from 50	B・C Rod D	A Rod J 5 to 49	A Rod J from 50	A Rod D
φ32	55	42	$\frac{ST}{3.5}$ +45	—	—	—
φ40	65	45	$\frac{ST}{3.5}$ +45	70	55	$\frac{ST}{3.5}$ +45
φ50	65	55	$\frac{ST}{3.5}$ +45	80	70	$\frac{ST}{3.5}$ +45
φ63	80	65	$\frac{ST}{4}$ +55	85	80	$\frac{ST}{4}$ +55
φ80	100	80	$\frac{ST}{4}$ +55	105	85	$\frac{ST}{4}$ +55
φ100	115	100	$\frac{ST}{4}$ +55	105	105	$\frac{ST}{4}$ +55
φ125	115	115	$\frac{ST}{5}$ +65	135	135	$\frac{ST}{5}$ +55
φ140	138	138	$\frac{ST}{5}$ +65	150	150	$\frac{ST}{5}$ +65
φ150	148	148	$\frac{ST}{5}$ +65	155	155	$\frac{ST}{5}$ +65
φ160	160	160	$\frac{ST}{5}$ +65	170	170	$\frac{ST}{5}$ +65
φ180	182	182	$\frac{ST}{5}$ +65	185	185	$\frac{ST}{5}$ +65
φ200	200	200	$\frac{ST}{5}$ +65	210	210	$\frac{ST}{5}$ +65
φ224	225	225	$\frac{ST}{6}$ +80	230	230	$\frac{ST}{5}$ +80
φ250	250	250	$\frac{ST}{6}$ +80	260	260	$\frac{ST}{6}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 5-strokes cannot be manufactured.

■Table of Dimensions [Silicon Glass Cloth(JS)]

Units:㎜

Symbol / Bore	B・C Rod J 6 to 59	B・C Rod J from 60	B・C Rod D	A Rod J 6 to 59	A Rod J from 60	A Rod D
φ32	55	45	$\frac{ST}{3}$ +45	—	—	—
φ40	55	45	$\frac{ST}{3}$ +45	65	55	$\frac{ST}{3}$ +45
φ50	65	55	$\frac{ST}{3}$ +45	80	65	$\frac{ST}{3}$ +45
φ63	80	65	$\frac{ST}{3}$ +55	85	80	$\frac{ST}{3}$ +55
φ80	100	80	$\frac{ST}{3}$ +55	105	85	$\frac{ST}{3}$ +55
φ100	115	100	$\frac{ST}{3.2}$ +55	105	105	$\frac{ST}{3.2}$ +55
φ125	115	115	$\frac{ST}{3.2}$ +65	135	135	$\frac{ST}{3.2}$ +55
φ140	138	138	$\frac{ST}{3.2}$ +65	150	150	$\frac{ST}{3.2}$ +65
φ150	148	148	$\frac{ST}{3.7}$ +65	150	150	$\frac{ST}{3.7}$ +65
φ160	160	160	$\frac{ST}{3.7}$ +65	165	165	$\frac{ST}{3.7}$ +65
φ180	182	182	$\frac{ST}{4}$ +65	175	175	$\frac{ST}{4}$ +65
φ200	200	200	$\frac{ST}{4.5}$ +65	200	200	$\frac{ST}{4.5}$ +65
φ224	225	225	$\frac{ST}{4.5}$ +80	225	225	$\frac{ST}{4.5}$ +80
φ250	250	250	$\frac{ST}{4.5}$ +80	250	250	$\frac{ST}{4.5}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 6-strokes cannot be manufactured.

■Table of Dimensions [Aluminum Foil Glass Cloth (JA)]

Units:㎜

Symbol / Bore	B・C Rod J 7 to 69	B・C Rod J from 70	B・C Rod D	A Rod J 7 to 69	A Rod J from 70	A Rod D
φ32	50	45	$\frac{ST}{2.5}$ +45	—	—	—
φ40	55	50	$\frac{ST}{2.5}$ +45	70	55	$\frac{ST}{2.5}$ +45
φ50	70	55	$\frac{ST}{2.5}$ +45	80	65	$\frac{ST}{2.5}$ +45
φ63	80	70	$\frac{ST}{2.5}$ +55	85	80	$\frac{ST}{3.5}$ +55
φ80	100	80	$\frac{ST}{3.5}$ +55	105	85	$\frac{ST}{3.5}$ +55
φ100	120	100	$\frac{ST}{3.5}$ +55	105	105	$\frac{ST}{3.5}$ +55
φ125	120	120	$\frac{ST}{3.5}$ +65	135	135	$\frac{ST}{4}$ +55
φ140	130	130	$\frac{ST}{4}$ +65	150	150	$\frac{ST}{4.5}$ +65
φ150	135	135	$\frac{ST}{4}$ +65	150	150	$\frac{ST}{4.5}$ +65
φ160	140	140	$\frac{ST}{4.5}$ +65	170	170	$\frac{ST}{4.5}$ +65
φ180	150	150	$\frac{ST}{4.5}$ +65	180	180	$\frac{ST}{4.5}$ +65
φ200	170	170	$\frac{ST}{4.5}$ +65	220	220	$\frac{ST}{5}$ +65
φ224	180	180	$\frac{ST}{5}$ +80	230	230	$\frac{ST}{5}$ +80
φ250	205	205	$\frac{ST}{5}$ +80	260	260	$\frac{ST}{5}$ +80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 7-strokes cannot be manufactured.

■Mass Table (B, C Rods)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)																						Stroke Mass per 100mm	
	S		LA・LB		LC		FA		FB		FC		FD		CF		CA・CB		TC		TA			
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	3.1	3.0	3.5	3.4	3.7	3.6	3.3	3.2	3.5	3.4	—	—	—	—	4.2	4.1	3.5	3.4	3.4	3.3	3.1	3.0	0.9	0.8
φ40	3.9	3.8	4.4	4.3	4.6	4.5	4.1	4.0	4.4	4.1	4.6	4.5	4.9	4.6	5.2	5.1	4.5	4.4	4.5	4.4	4.0	3.9	1.0	0.9
φ50	5.9	5.8	6.3	6.2	7.0	6.9	6.3	6.2	6.9	6.8	7.2	7.1	7.8	7.7	8.2	8.1	6.9	6.8	6.7	6.6	5.6	5.5	1.4	1.2
φ63	9.1	8.7	9.9	9.5	11.0	10.6	9.6	9.2	10.6	10.2	10.9	10.5	11.9	11.5	12.7	12.3	11.1	10.7	10.5	10.1	9.2	8.8	2.0	1.7
φ80	16.1	15.1	17.5	16.6	20.0	19.0	17.0	16.0	18.6	17.7	18.9	17.9	20.5	19.6	20.8	19.8	18.9	18.0	18.0	17.1	16.1	15.2	3.4	3.0
φ100	24.9	23.5	27.2	25.8	30.4	29.0	26.7	25.3	29.4	28.0	29.5	28.1	32.2	30.8	33.0	31.6	31.1	29.7	28.5	27.1	25.7	24.3	4.9	4.2
φ125	44.9	42.0	49.7	46.8	54.4	51.5	48.4	45.5	53.2	50.3	53.4	50.5	58.2	55.3	57.5	54.6	56.5	53.6	51.3	48.4	47.9	45.0	7.6	6.4
φ140	60.1	56.0	66.0	51.8	72.1	57.9	63.5	59.4	70.1	65.9	69.9	65.8	76.5	72.3	81.1	77.0	76.2	72.0	69.0	64.8	66.8	52.6	9.4	8.0
φ150	68.9	63.7	76.8	71.6	84.4	79.2	74.2	69.0	82.5	77.3	81.8	76.6	90.1	84.9	91.4	86.2	88.0	82.8	79.8	74.6	78.7	73.5	10.9	9.2
φ160	81.1	75.7	90.2	84.7	98.9	93.4	87.9	82.5	97.3	92.1	97.4	92.0	107.1	101.6	109.4	104.0	104.2	98.7	94.3	88.8	95.5	90.0	13.9	12.0
φ180	112.9	105.5	126.7	119.3	139.0	131.6	122.6	115.2	136.3	128.3	135.4	128.0	149.1	141.4	152.3	144.9	151.0	143.6	133.8	126.4	135.9	128.5	17.4	15.1
φ200	155.4	147.1	171.3	163.0	188.0	179.7	163.3	155.0	182.7	174.4	182.2	173.9	201.6	193.3	213.0	204.7	203.6	195.3	180.2	171.9	181.2	172.9	21.4	18.7
φ224	195.5	189.8	232.0	218.3	255.5	241.8	207.5	201.8	243.0	229.3	231.6	225.9	267.1	253.4	265.5	259.8	267.3	253.6	236.0	222.3	253.5	239.8	27.2	23.8
φ250	269.0	254.0	309.2	294.0	341.7	326.5	284.0	269.0	322.2	307.0	317.5	302.5	355.7	340.5	357.4	342.4	339.2	324.0	309.2	294.0	315.2	300.0	33.6	29.6

■Mass Table (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)											Stroke Mass per 100mm
	S	LA・LB	LC	FA	FB	FC	FD	CF	CA・CB	TC	TA	
	A Rod											
φ32	3.2	3.6	3.8	3.4	3.6	—	—	4.3	3.6	3.5	3.2	1.1
φ40	4.0	4.5	4.7	4.2	4.5	4.7	5.0	5.3	4.6	4.6	4.1	1.2
φ50	6.2	6.6	7.3	6.6	7.2	7.5	8.1	8.5	7.2	7.0	5.9	1.7
φ63	9.8	10.3	11.7	10.3	11.0	11.6	12.3	13.4	11.5	10.9	9.6	2.5
φ80	17.0	18.4	20.9	17.9	19.5	19.8	21.4	21.7	19.8	18.9	17.0	4.1
φ100	26.9	29.2	32.4	28.7	31.4	31.5	34.2	35.0	33.1	30.5	27.7	6.1
φ125	48.8	53.6	58.3	52.3	57.1	57.3	62.1	61.4	60.4	55.2	51.8	9.5
φ140	65.9	71.8	77.9	69.3	75.9	75.7	82.3	86.9	82.0	74.8	72.6	11.6
φ150	73.8	81.7	89.3	79.1	87.4	86.7	95.0	96.3	92.9	84.7	83.6	12.6
φ160	87.1	96.2	104.9	93.9	103.6	103.4	113.1	115.4	110.2	100.3	101.5	16.6
φ180	123.5	137.3	149.6	133.2	146.9	146.0	159.7	162.9	161.6	144.4	146.5	20.9
φ200	168.9	184.8	201.5	176.8	196.2	195.7	215.1	226.5	217.1	193.7	194.7	25.8
φ224	219.2	251.7	275.2	227.2	262.7	251.3	286.8	289.2	287.0	255.7	273.2	33.4
φ250	299.3	339.5	372.0	314.3	352.5	347.8	386.0	387.7	369.5	339.5	345.5	41.5

Calculation Formula :

With regard to Cylinder (kg) = Basic Mass + (Stroke 100mm), Added Mass $\times \frac{\text{Stroke}}{100}$)

Calculation Example:

Type FA100B140B1000··· 26.7 + (4.9 $\times \frac{1000}{100}$) = 75.7kg

■End Joint Mass Table

Units: kg

Symbol / Bore	Single Protrusion End Joint		Double Protrusion End Joint		Lock Nut	
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	0.57	0.59	0.59	0.61	0.05	0.02
φ40	0.53	0.57	0.56	0.59	0.05	0.02
φ50	0.89	0.95	1.23	1.27	0.08	0.05
φ63	2.91	3.04	3.83	3.99	0.16	0.08
φ80	2.59	2.91	3.62	3.83	0.32	0.16
φ100	5.51	6.02	7.77	8.17	0.64	0.32
φ125	10.44	11.79	14.80	16.01	1.34	0.64
φ140	20.80	22.90	29.60	31.30	1.70	1.00
φ150	20.20	22.50	29.10	30.90	1.80	1.30
φ160	29.00	31.50	36.30	38.30	2.20	1.34
φ180	44.50	49.00	49.60	53.40	3.20	1.70
φ200	45.20	47.90	45.60	47.70	4.10	2.20
φ224	56.10	61.80	66.10	69.70	6.50	3.20
φ250	56.40	69.80	67.30	72.40	8.30	4.10

Note) The A Rod End joint has characteristics common to Rod B.

■Double Rod Mass Table (B, C Rods)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)																Stroke Mass per 100mm	
	S		LA・LB		LC		FA		FC		CF		TC		TA			
	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod	B Rod	C Rod
φ32	3.7	3.6	4.1	4.0	4.1	4.0	3.9	3.8	——	——	4.8	4.7	4.0	3.9	3.7	3.6	1.22	0.98
φ40	4.8	4.7	5.3	5.2	5.3	5.2	5.0	4.9	5.5	5.4	6.1	6.0	5.4	5.3	4.9	4.8	1.49	1.20
φ50	7.3	7.1	7.7	7.5	8.0	7.8	7.7	7.5	8.6	8.4	9.6	9.4	8.1	7.9	7.0	6.8	2.18	1.67
φ63	11.5	10.8	12.3	11.6	12.8	12.1	12.0	11.3	13.3	12.6	15.1	14.4	12.9	12.2	11.6	10.9	3.32	2.46
φ80	20.6	19.1	22.0	20.6	23.0	21.5	21.5	20.0	23.4	21.9	25.3	23.8	22.5	21.1	20.6	19.2	5.53	4.30
φ100	32.3	30.2	34.6	32.5	35.8	33.7	34.1	32.0	36.9	34.8	40.4	38.3	35.9	33.8	33.1	31.0	8.38	6.51
φ125	57.8	53.1	62.6	57.9	63.2	58.5	61.3	56.6	66.3	61.6	70.4	65.7	64.2	59.5	60.8	56.1	13.51	10.27
φ140	77.6	70.8	83.5	66.6	85.2	78.4	81.0	74.2	87.4	80.6	98.6	91.8	86.5	79.6	84.3	67.4	17.29	12.54
φ150	89.3	81.1	97.2	89.0	98.2	90.0	94.6	86.4	102.2	94.0	111.8	103.6	100.2	92.0	99.1	90.9	19.81	14.73
φ160	108.0	97.0	117.1	106.0	118.5	107.5	114.8	103.8	124.3	113.3	136.3	125.3	121.2	110.1	122.4	111.3	24.39	18.53
φ180	143.9	131.0	157.7	144.8	158.2	145.3	153.6	140.7	166.4	153.5	183.3	170.4	164.8	151.9	166.9	154.0	30.35	23.39
φ200	199.0	185.1	215.3	201.0	220.2	206.3	207.3	193.0	226.2	211.9	256.6	242.7	224.2	209.9	225.2	210.9	37.64	29.19
φ224	250.3	234.4	286.8	262.9	283.4	267.5	262.3	264.4	286.4	270.5	320.3	304.4	290.8	266.9	308.3	284.4	48.39	37.36
φ250	353.7	324.8	393.9	364.8	399.0	370.1	368.7	339.8	402.2	373.3	442.1	413.2	393.9	364.8	399.9	370.8	61.39	47.39

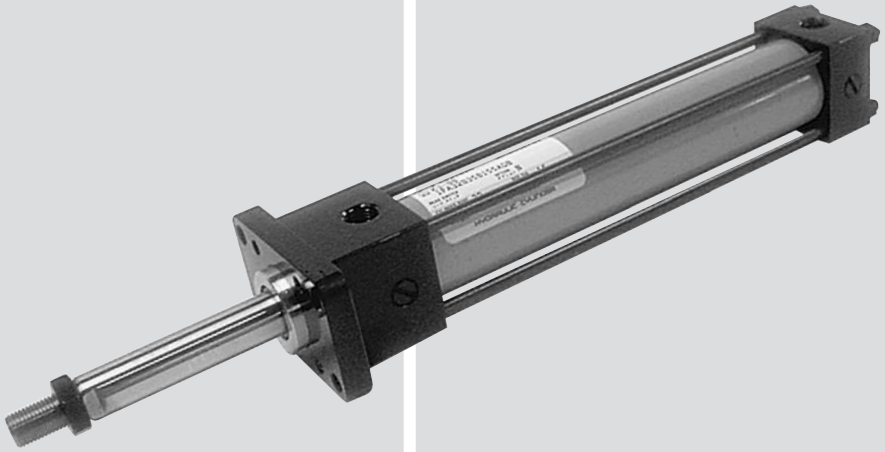
■Double Rod Mass Table (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)								Stroke Mass per 100mm
	S	LA・LB	LC	FA	FC	CF	TC	TA	
φ32	——	——	——	——	——	——	——	——	——
φ40	5.0	5.5	5.5	5.2	5.7	6.3	5.6	5.1	1.98
φ50	7.7	8.1	8.4	8.1	9.0	10.0	8.5	7.4	3.02
φ63	12.3	12.8	13.6	12.8	14.1	15.9	13.4	12.1	4.63
φ80	21.9	23.3	24.3	22.8	24.7	26.6	23.8	21.9	7.58
φ100	35.0	37.3	38.5	36.8	39.6	43.1	38.6	35.8	12.01
φ125	63.1	67.9	68.5	66.6	71.6	75.7	69.5	66.1	19.99
φ140	84.8	90.7	92.4	88.2	94.6	105.8	93.7	91.5	24.55
φ150	95.4	103.3	104.3	100.7	108.3	117.9	106.3	105.2	25.55
φ160	113.3	122.4	123.8	120.1	129.6	141.6	126.5	127.7	32.84
φ180	156.9	170.7	171.2	166.6	179.4	196.3	177.8	179.9	42.09
φ200	216.5	232.4	237.7	224.4	243.3	274.1	241.3	242.3	53.59
φ224	278.5	311.0	311.6	286.5	310.6	348.5	315.0	332.5	69.70
φ250	389.1	429.3	434.4	404.1	437.6	477.5	429.3	435.3	87.44

K Series

3.5MPa



Tie Rod Type Cylinder

K Series ■ 3.5MPa

■Features

Excellent Dependability

The rod is prevented being damaged by using a soft high-strength brass on the rod sliding surfaces for the chrome plating and rod bush of the high quality. An efficient U packing was adopted in Rod Packing. The gasket with the back pressure prevention ditch was adopted in piston packing. High reliability and durability to the oil leakage have been achieved.

Certain, steady operation

The piston uses a wear ring to prevent seizure, ensuring improved reliability. The cushion mechanism provides high accuracy, enabling reliable operation.Back-pressure preventive grooved packing is used for the piston packing.

Switch adjusted

As a standard feature, the KR series is equipped with the reliable high-performance switch (magnetic proximity switch), which provides excellent dust-proof structure. The compact, integrated structure enables efficient installation of the cylinder, without necessity of an external detector. With the LED indicator lamp, you can easily check operating status.

■Specifications

Series Name	K	
Nominal Pressure Note1)	3.5MPa	
Model	Standard : K	Switch adjusted : KR
Bore	φ32·φ40·φ50·φ63·φ80·φ100·φ125·φ160	φ32·φ40·φ50·φ63·φ80·φ100·φ125(Special size)
Maximum Allowable Pressure Note2)	4.4MPa	
Proof Pressure	5MPa	
Minimum Working Pressure Note3)	Less than 0.14MPa	
Thread Tolerance	JIS6g/6H (Corresponds to JIS Grade 2)	
Range of Operating Temperature Note4)	−10℃ to +80℃	−10℃ to +60℃
Hydraulic Oil Applied	General purpose mineral hydraulic oil (When using operating oils other than above, be sure to report the brand name(s) after referring to the Packing material.)	
Adjustment standard	Governed by Former JIS B 8354	

Note 1) The "Nominal Pressure" is the set pressure of the relief valve in the hydraulic circuit the cylinder uses.
Note 2) The Maximum Allowable Pressure is the tolerance value for pressures such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 3) The Minimum Working Pressure is the value when the pressure is supplied from the cap side.
Note 4) In switch adjusted specifications, the temperature limit for the switch body should be under 60℃. (Select a special high-temperature switch when temperatures will exceed 60℃)

■Ranges of Operating Speed

Bore	Range
φ32 to φ160	8 to 300㎜/s

Note 1) When operating at the maximum cylinder speed, keep the inertial load pressures generated within the cylinder chamber below the Nominal Pressure.
Note 2) The Minimum Cylinder Speed does not include cushion stroke operation.

■Maximum Stroke

Bore	Maximum Stroke
φ32 or φ40	1,000㎜
φ50 or φ63	1,200㎜
φ80 or φ100	1,600㎜
φ125 to φ160	1,800㎜

Note 1) This is the Maximum Stroke for the standard item produced.
Note 2) Please consider the rod buckling separately.

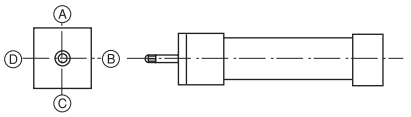
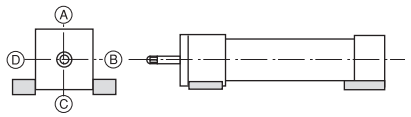
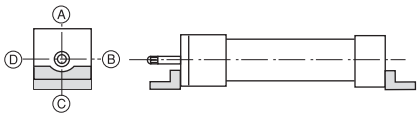
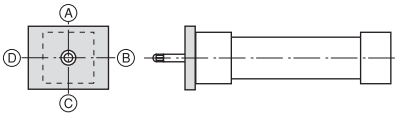
■Stroke Tolerance: Grade A

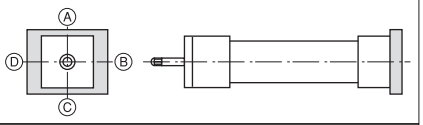
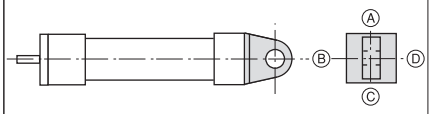
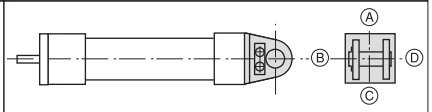
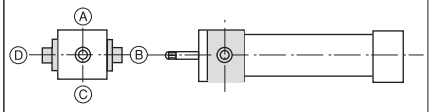
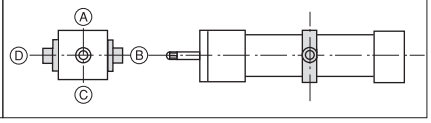
Units:㎜

Stroke	100 or less	101 to 250	251 to 630	631 to 1,000	1,001 to 1,600	1,601 to 2,000
Allowable Value	+0.8 0	+1.0 0	+1.25 0	+1.4 0	+1.6 0	+1.8 0

Note) The dimensions and precision of other parts conform to the former JIS B 8354 standard.

■Mounting Type

Format	Code	Appearance
Basic	S	
Axial Right Angle Direction Foot	LA	
Axis Direction Foot	LB	
Head Side: Rectangular Flange	FA	

Format	Code	Appearance
Cap Side Rectangular Flange	FB	
Single Protrusion Clevis	CA	
Double Protrusion Clevis	CB	
Head Side Integral Trunnion	TA	
Middle Trunnion	TC	

Note) ⒶⒷⒸⒹ are the positioning relationships for the port valve, etc.

■Cushion Symbols

Code	B	R	H	N
Attachment Section	Cushion on Both Sides	Head-side Cushion	Cap-side Cushion	No Cushion

■Cushion Ring Length

Units:㎜

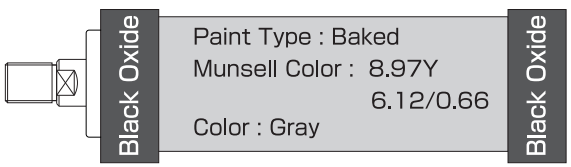
Code	φ32 to φ63	φ80 to φ125	φ160
Cushion Stroke	16	20	23

Note) Cushion ring is not tapered, but straight.

■Tube Coating Colors

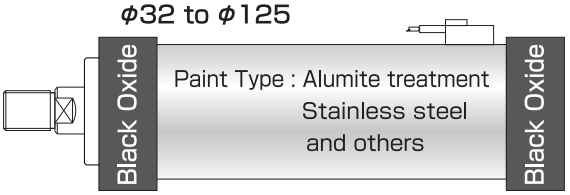
Standard

φ32 to φ160



Switch Adjusted Specifications

φ32 to φ125

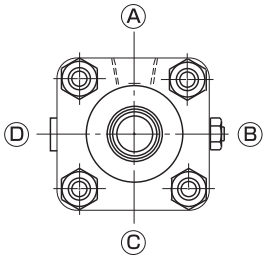


Note) If you have any questions with regard to the type of paint, please contact us.

■Port/Valve Locations

In each of the dimension diagrams for mounting, the base position is given as A as seen from the rod side with the following positions expressed as BCD continuing in a clockwise direction.

1) The standard positions are: A……Port B……Cushion Valve C……Check Valve D……Air Bleed



2) In the case where differences from the standard positions have been specified, these are indicated by Ⓐ, Ⓑ, Ⓒ, Ⓓ.
3) In the case of no cushion, the standard positions are indicated by ⒶⓄⒹ.
4) In the TA mounting format, the basic position for the head side is ⒶⒸⒸ or ⒶⓄⒸ.
5) In the case where there is no air bleed, this is indicated by ⊖.
6) In the case where the head side and the cap side positions are different, they are indicated as ⒶⒷⒹ and ⒷⒸⒹ with the former being the head side and the latter being the cap side. In the case where they are depicted on two levels, the upper level is the cap side and the lower level is the head side.

■Slide Section Processing

Piston Rod : Hard chrome plating processing
(more than 2/100mm)

■Packing Materials

Code	1
Material	Nitrile Rubber
Range of operating temperature	−10℃ to +80℃
General-purpose mineral hydraulic oil	○
Emulsions of water in mineral oil	○
Emulsions of mineral oil in water	○
Water + Glycol-type Operating Oil	○
Phosphate ester fluid	×
Fatty acid ester fluid	○

Note 1) The ○ mark indicates its use is possible. The X mark indicates it is not possible to use it.
Note 2) There are neither Urethane Rubber nor Fluoric Rubber.

■Theoretical Output Table

Bore	Rod Diameter (㎜)	Piston Area (㎠)		Theoretical Output (N)	
	S Rod	Push	Pull	Push	Pull
φ32	16	8.0	6.0	2,810	2,110
φ40	16	12.5	10.5	4,400	3,690
φ50	22.4	19.6	15.6	6,870	5,490
φ63	22.4	31.1	27.2	10,910	9,530
φ80	28	50.2	44.1	17,590	15,440
φ100	35.5	78.5	68.6	27,490	24,020
φ125	45	122.7	106.8	42,950	37,380
φ160	56	201.0	176.4	70,370	61,750

■Code

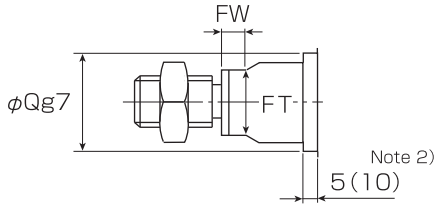
The switch codes are not necessary for the K.

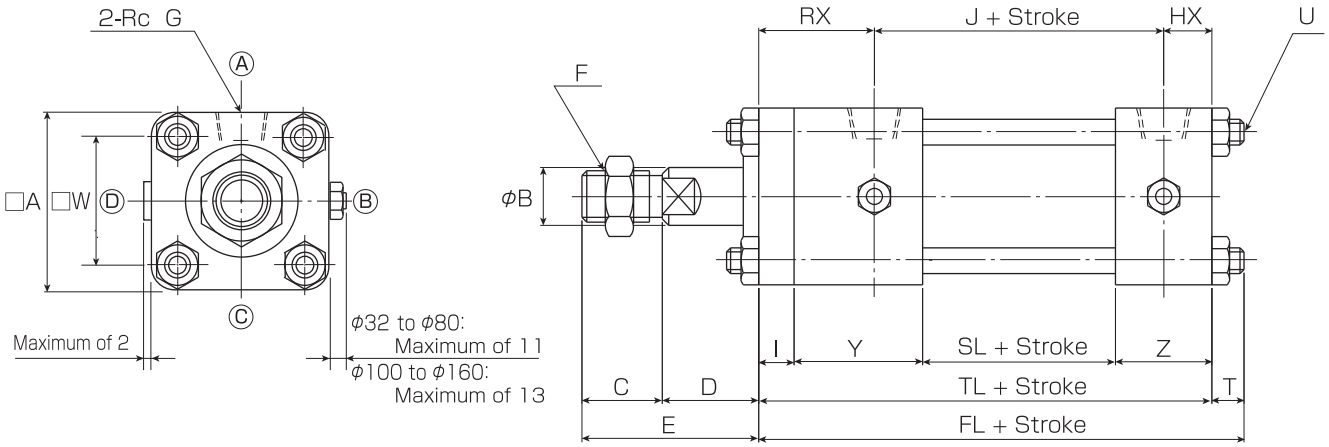
K		-S	A	1	TC	100	S	B	320	A	B	D	-		-	Y	P	N	J
KR		-S	A	1	TC	100	S	B	320	A	B	D	-	2	C	- Y	P	N	J
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬		⑭	⑮	⑯	⑰	⑱	⑲

① Series Name	K:3.5MPa
② Switch Adjusted Specifications	"R" is affixed in the case of cylinders with switch adjusted specifications. :KR
③ Single/Double Classification	S: Single Rod Type (Standard Type)　W: Double Rod Type
④ Standard Special Classification Note1)	A: Standard Dimensions
⑤ Packing Material	1. Nitrile Rubber (Standard)
⑥ Mounting	S·LA·LB·FA·FB·CA·CB·TA·TC
⑦ Bore (㎜)	32·40·50·63·80·100·125·160 (Specification for switch adjusted : φ32 to φ100, but φ125 is special.)
⑧ Type of Rod	S: S Rod
⑨ Cushion Format	B: Cushion on Both Sides　R: Head-side Cushion　H: Cap-side Cushion　N: No Cushion
⑩ Stroke Length (㎜)	Indicate the stroke.
⑪ Port Location	Refer to P.58 and then indicate A, B, C or D.
⑫ Cushion Valve Location	Refer to P.58 and then indicate A, B, C or D.　O: No Cushion or Fixed Cushion
⑬ Air Bleed Location	Refer to P.58 and then indicate A, B, C or D.　No notation : Not necessary (Semi standard)
⑭ Switch Quantity Note2)	Mentioned the quantity.　1A. When the switch is not needed in a switch-adjusted specifications.
⑮ Switch Type	C:TOV3　J:TOV5　CK:T5V3　CL:T5V5　DT:T2V3　DU:T2V5　CW:T2YV3　CH:T0H3 JH:T0H5　FJ: TOV-0.5 (For a DC connector system) FW: TOV-0.5 (For an AC connector system)　XX: Special Part Please refer to P.138 for more detailed information on switches.
⑯ End Joint	T: Single Protrusion End Joint　Y: Double Protrusion End Joint F: F Connector　No notation: None
⑰ Pin	P: CB When the Y joint has a pin attached　P2: CB and the Y joint have a pin attached No notation: None
⑱ Lock Nut	N: Available(Lock nut with standard external thread is available as standard equipment.) N2: Two lock nuts
⑲ Bellows	J: Neoprene No entry: None (In the case where there are any other material specifications, please specify them.)

Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) Switches are shipped unattached to prevent breakage.

S Single Rod





Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■S Type Basic Table of Dimensions

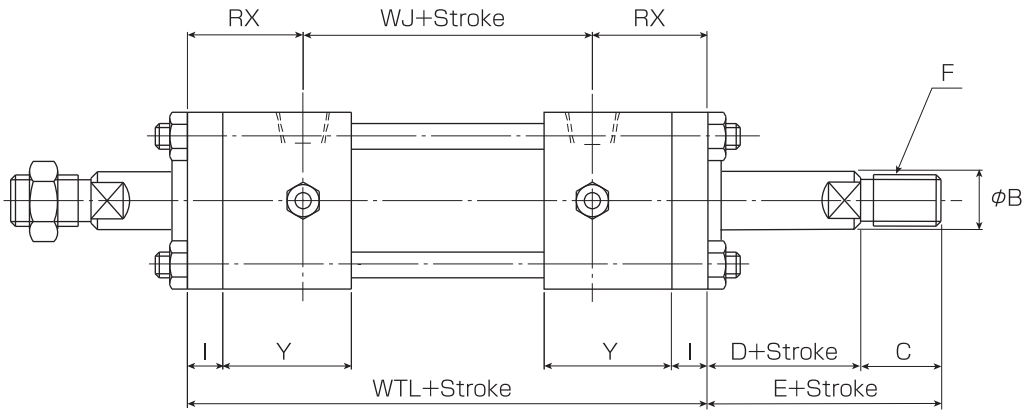
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:mm

Symbol / Bore	Rod							D	TL	J	FL	RX	HX	SL	I	Y	Z	T	U	□A	□W	Rc G
	φB	C	E	F	φQ	FT	FW															
φ32	16	24	39	M12 P1.25	30	12	5	15	103	58	110	34	11	30	10	38	25	7	M6 P1.0	44	33	1/4
φ40	16	24	39	M12 P1.25	30	12	5	15	103	58	110	34	11	30	10	38	25	7	M6 P1.0	50	37	3/8
φ50	22.4	36	51	M18 P1.5	34	19	5	15	103	58	110	34	11	30	10	38	25	7	M6 P1.0	62	47	3/8
φ63	22.4	36	51	M18 P1.5	34	19	5	15	106	61	115	34	11	33	10	38	25	9	M8 P1.0	75	56	3/8
φ80	28	48	67	M24 P2.0	42	24	8	19	124	67	134	43	14	31	16	45	32	10	M10 P1.25	94	70	1/2
φ100	35.5	60	83	M30 P2.0	50	30	10	23	124	75	136	35	14	39	16	37	32	12	M12 P1.25	114	89	1/2
φ125	45	84	109	M42 P2.0	60	41	15	25	134 (144)	75 (85)	150 (160)	45	14	39 (49)	20	43	32	16	M16 P1.5	138	110	1/2
φ160	56	96	125	M48 P2.0	72	50	15	29	155	88	174	50	17	46	25	46	38	19	M20 P1.5	178	142	3/4

Note) The dimensions in ( ) are special dimensions for switch adjusted specification.

S Double Rod



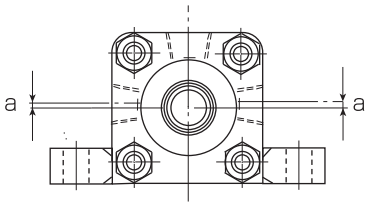
■Double Rod

Units:㎜

Symbol / Bore	WTL	WJ
φ32	132	64
φ40	136	68
φ50	136	68
φ63	136	68
φ80	162	76
φ100	151	81
φ125	165 (188)	75 (98)
φ160	188	88

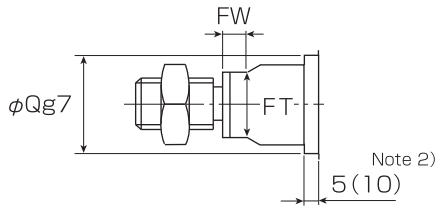
LA Single Rod

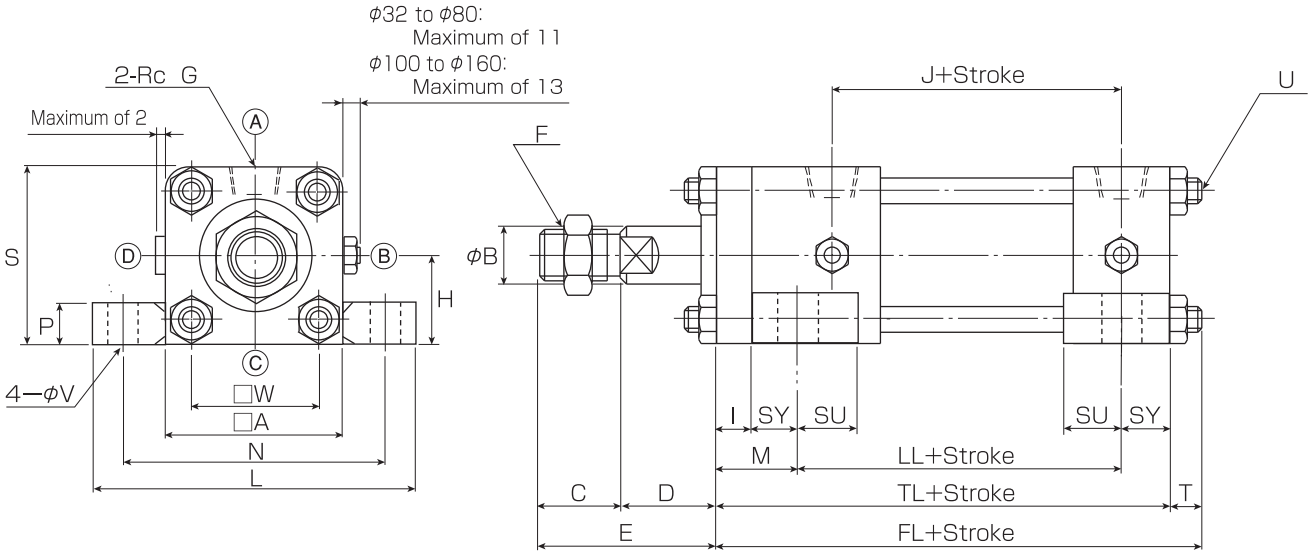
※ When the port position is Ⓑ or Ⓓ position



Units:㎜

Bore \ Symbol	a
φ32	4
φ40	5
φ50	6
More than φ63	0





Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■LA Type Basic Table of Dimensions

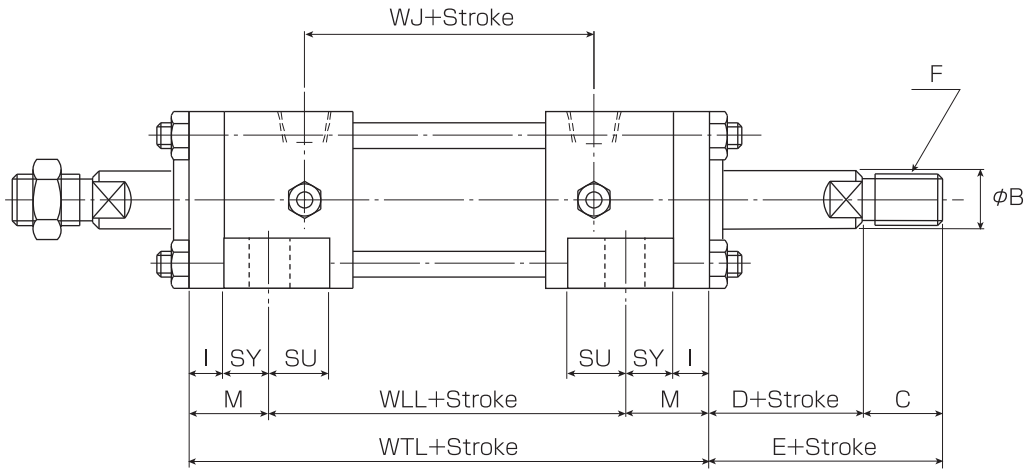
[▭ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:㎜

Bore \ Symbol	Rod φB	Rod C	Rod E	Rod F	D	TL	J	LL	FL	I	M	T	SU	SY	U	□A	□W	N	L	P	H	S	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	73	110	10	20	7	18	10	M6 P1.0	44	32	69	84	8	$22^{-0.300}_{-0.384}$	44	9	1/4
φ40	16	24	39	M12 P1.25	15	103	58	73	110	10	20	7	24	10	M6 P1.0	50	37	80	100	8	$25^{-0.300}_{-0.384}$	50	12	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	73	110	10	20	7	24	10	M6 P1.0	62	47	92	112	12	$31^{-0.310}_{-0.410}$	62	12	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	76	115	10	20	9	24	10	M8 P1.0	75	56	108	128	12	$38^{-0.310}_{-0.410}$	76	12	3/8
φ80	28	48	67	M24 P2.0	19	124	67	82	134	16	29	10	32	13	M10 P1.25	94	70	128	150	19	$47^{-0.320}_{-0.420}$	94	14	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	72	136	16	34	12	27	18	M12 P1.25	114	89	154	182	24	$57^{-0.340}_{-0.460}$	114	18	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	70 (80)	150 (160)	20	42	16	23	22	M16 P1.5	138	110	189	224	29	$69^{-0.360}_{-0.480}$	138	22	1/2
φ160	56	96	125	M48 P2.0	29	155	88	82	174	25	49	19	26	24	M20 P1.5	178	142	236	278	42	$89^{-0.380}_{-0.520}$	178	26	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifics on P.60 for the wrench-hold specifics (both sides).

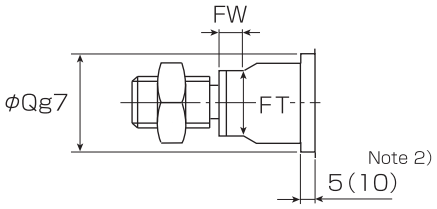
LA Double Rod

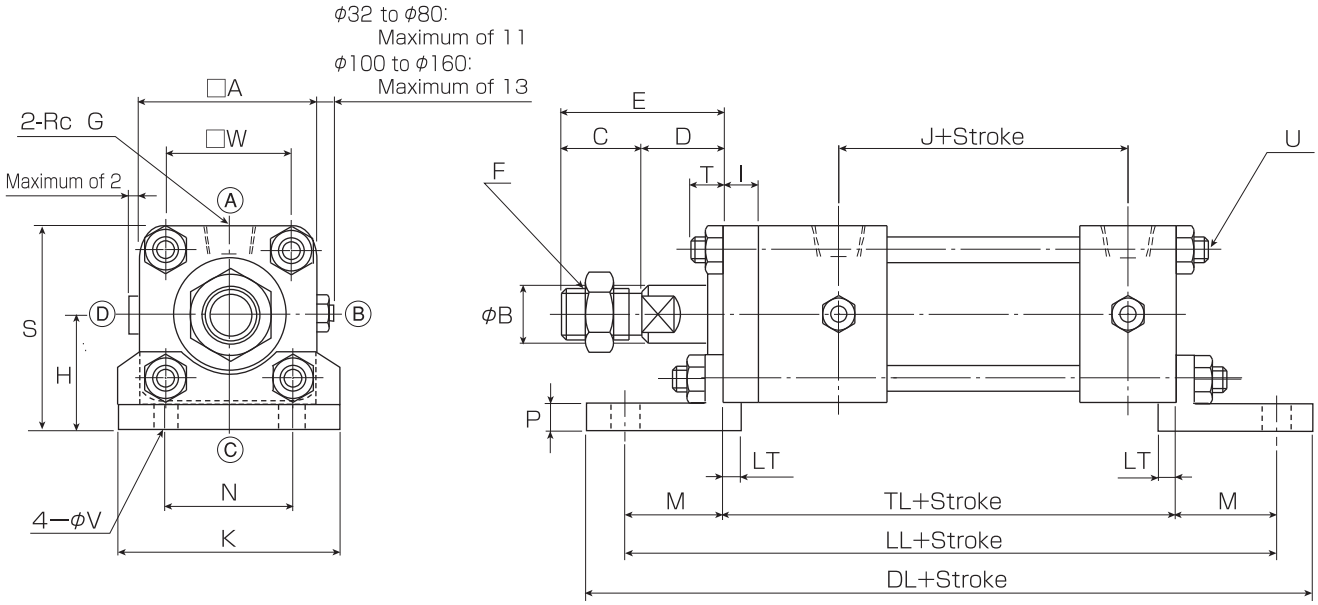


■Double Rod Units:㎜

Symbol / Bore	WTL	WJ	WLL
ϕ32	132	64	92
ϕ40	136	68	96
ϕ50	136	68	96
ϕ63	136	68	96
ϕ80	162	76	104
ϕ100	151	81	83
ϕ125	165 (188)	75 (98)	81 (104)
ϕ160	188	88	90

LB Single Rod





Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■LB Type Basic Table of Dimensions

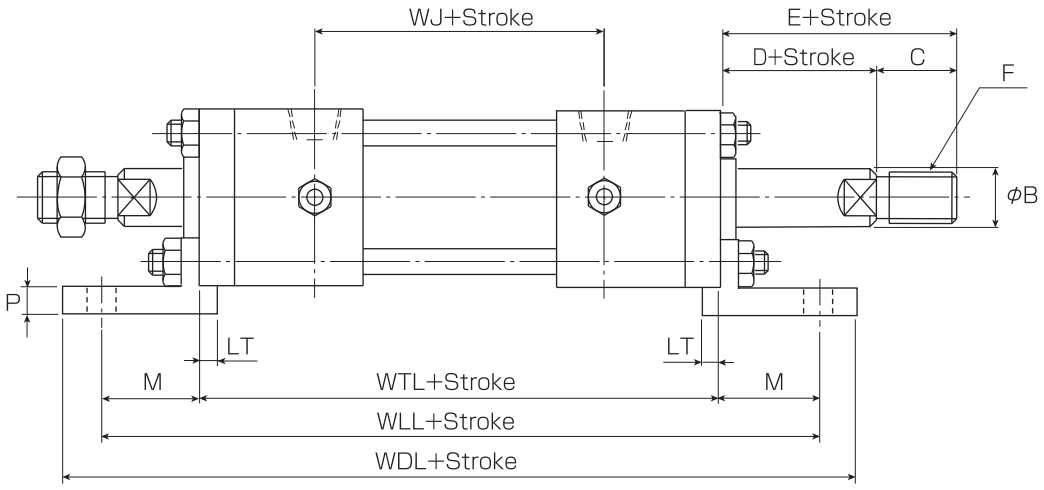
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:㎜

Symbol / Bore	Rod φB	C	E	F	D	TL	J	I	LL	DL	M	LT	P	T	U	□A	□W	N	K	H	S	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	10	149	169	23	(3)	5	7	M6 P1.0	44	33	33	54	33	55	9	1/4
φ40	16	24	39	M12 P1.25	15	103	58	10	153	177	25	(3)	5	7	M6 P1.0	50	37	37	60	35	60	12	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	10	155	179	26	(3)	6	7	M6 P1.0	62	47	47	70	41	72	12	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	10	162	186	28	(3)	6	9	M8 P1.0	75	56	56	80	48	85.5	12	3/8
φ80	28	48	67	M24 P2.0	19	124	67	16	192	220	34	(3)	8	10	M10 P1.25	94	70	70	97	59	106	14	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	16	204	240	40	(3)	9	12	M12 P1.25	114	89	89	120	70	127	18	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	20	228 (238)	272 (282)	47	0	10	16	M16 P1.5	138	110	95	138	86	155	22	1/2
φ160	56	96	125	M48 P2.0	29	155	88	25	271	323	58	0	15	19	M20 P1.5	178	142	128	178	111	200	26	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifications on P.60 for the wrench-hold specifics (both sides).

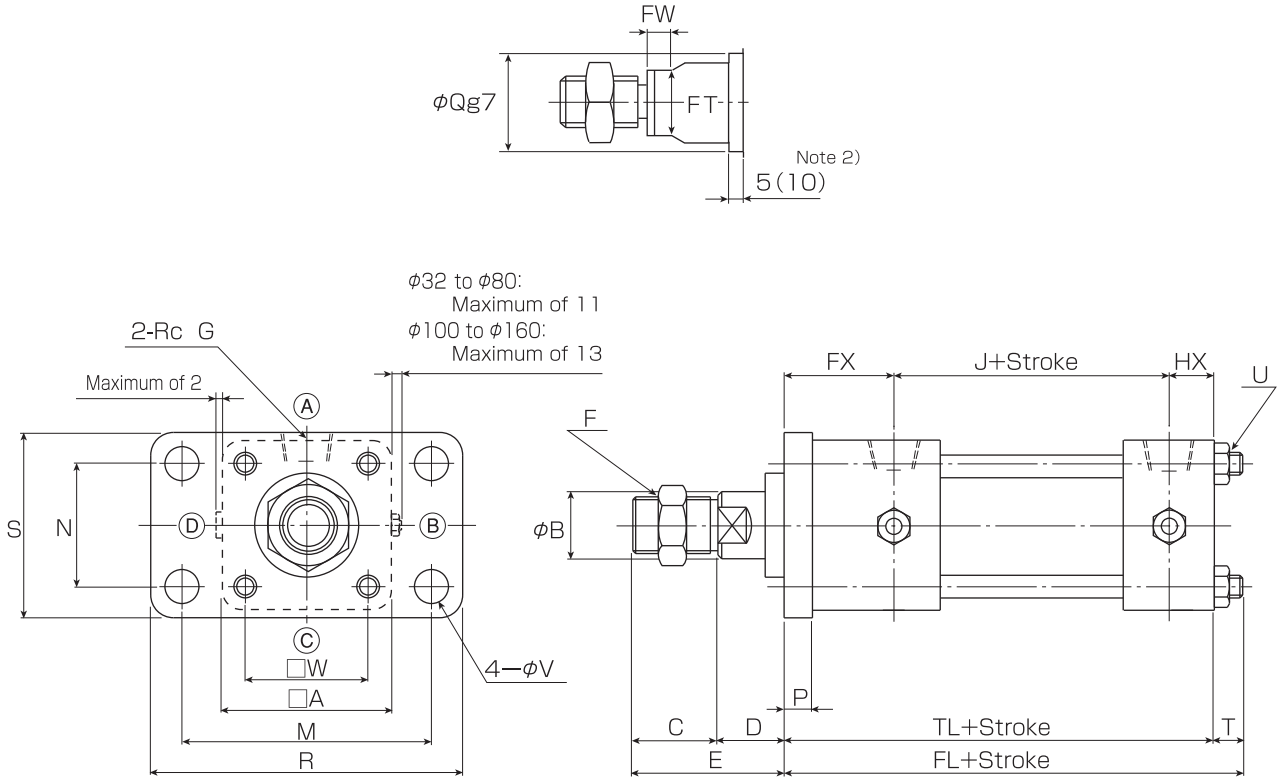
LB Double Rod



■Double Rod Units:㎜

Symbol / Bore	WTL	WJ	WLL	WDL
φ32	132	64	178	198
φ40	136	68	186	210
φ50	136	68	188	212
φ63	136	68	192	216
φ80	162	76	230	258
φ100	151	81	231	267
φ125	165 (188)	75 (98)	259 (282)	303 (326)
φ160	188	88	304	356

FA Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■FA Type Basic Table of Dimensions

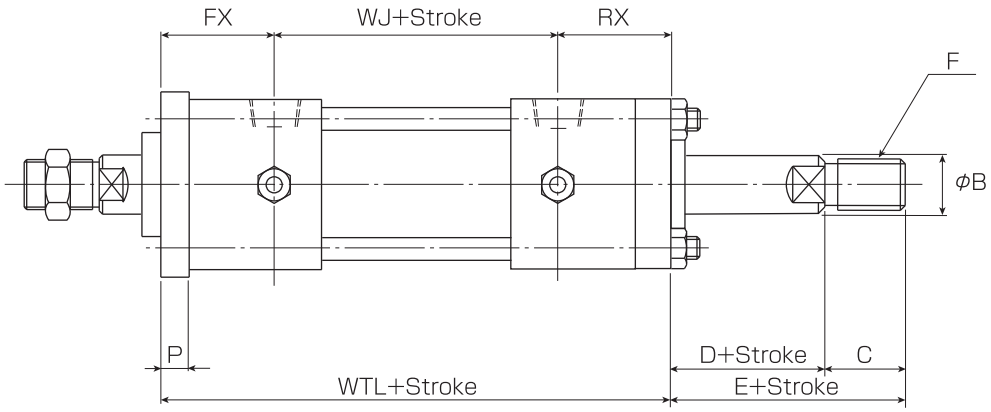
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:㎜

Symbol / Bore	ロッド φB	C	E	F	D	TL	J	FL	FX	HX	P	T	U	□A	□W	M	R	N	S	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	110	34	11	10	7	M6 P1.0	44	33	58	72	33	47	7	1/4
φ40	16	24	39	M12 P1.25	15	103	58	110	34	11	10	7	M6 P1.0	50	37	70	84	36	52	7	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	110	34	11	10	7	M6 P1.0	62	47	86	104	47	65	9	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	115	34	11	10	9	M8 P1.0	75	56	98	116	56	76	9	3/8
φ80	28	48	67	M24 P2.0	19	124	67	134	43	14	16	10	M10 P1.25	94	70	119	143	70	95	12	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	136	35	14	16	12	M12 P1.25	114	89	140	166	84	115	14	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	150 (160)	45	14	20	16	M16 P1.5	138	110	176	212	110	138	18	1/2
φ160	56	96	125	M48 P2.0	29	155	88	174	50	17	25	19	M20 P1.5	178	142	225	270	142	178	22	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifics on P.60 for the wrench-hold specifics (both sides).

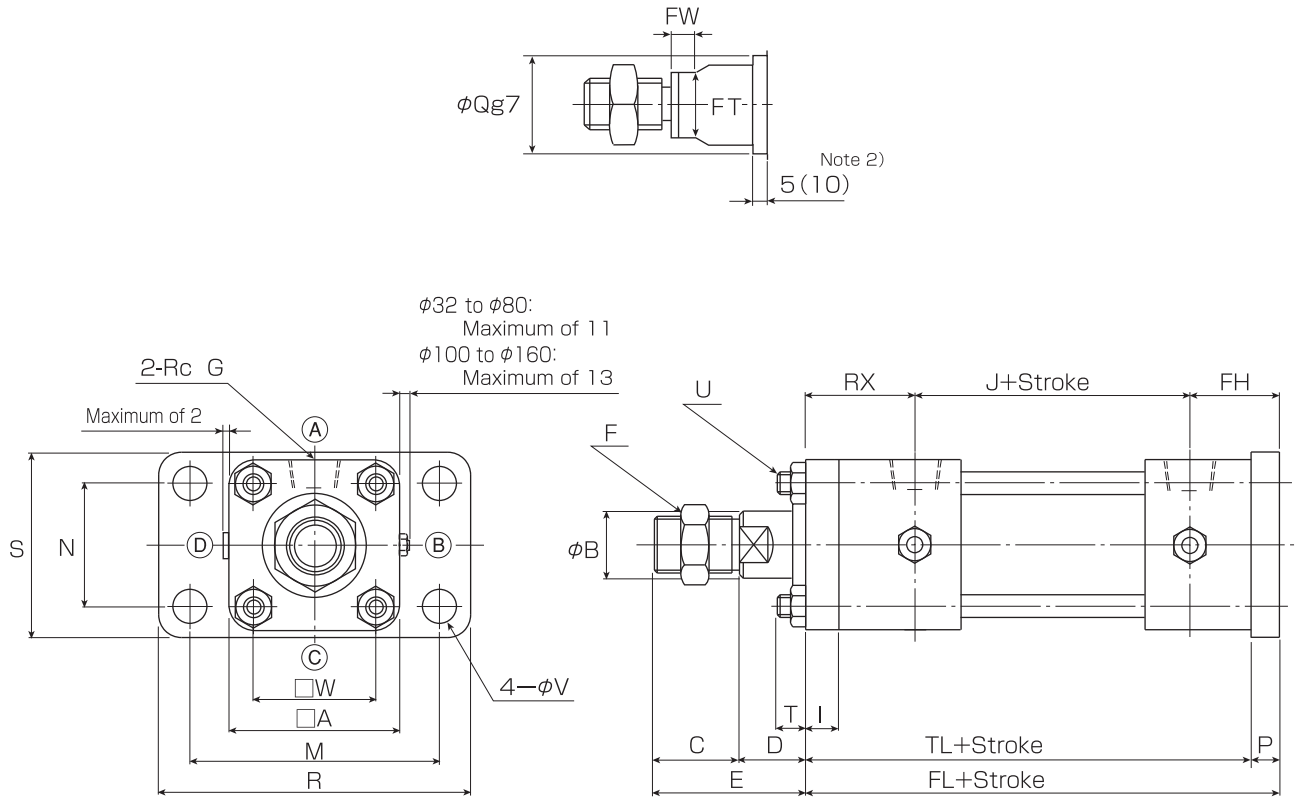
FA Double Rod



■Double Rod Units:mm

Symbol / Bore	WTL	WJ	RX
φ32	132	64	34
φ40	136	68	34
φ50	136	68	34
φ63	136	68	34
φ80	162	76	43
φ100	151	81	35
φ125	165 (188)	75 (98)	45
φ160	188	88	50

FB Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

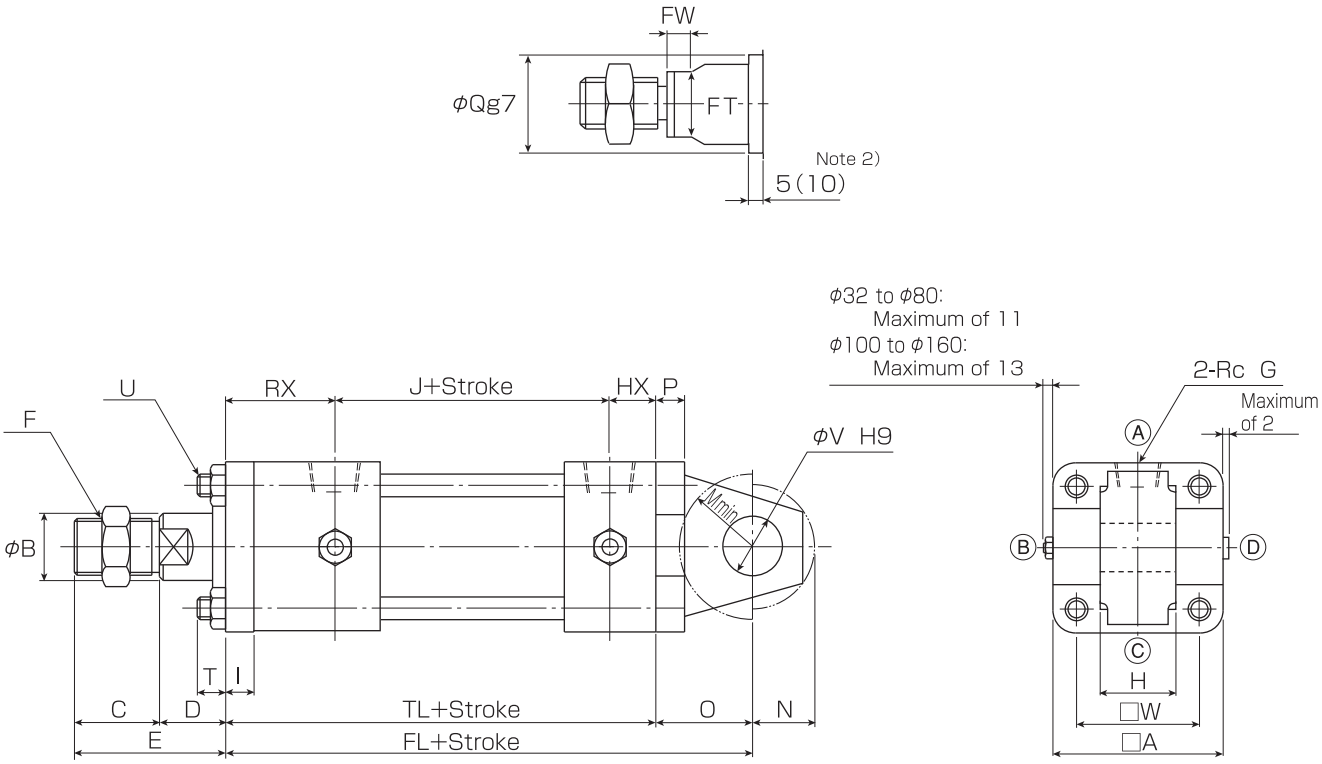
■FB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.] Units:㎜

Symbol / Bore	Rod φB	C	E	F	D	TL	J	FL	RX	FX	P	T	I	U	□A	□W	M	R	N	S	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	113	34	21	10	7	10	M6 P1.0	44	33	58	72	33	47	7	1/4
φ40	16	24	39	M12 P1.25	15	103	58	113	34	21	10	7	10	M6 P1.0	50	37	70	84	36	52	7	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	113	34	21	10	7	10	M6 P1.0	62	47	86	104	47	65	9	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	116	34	21	10	9	10	M8 P1.0	75	56	98	116	56	76	9	3/8
φ80	28	48	67	M24 P2.0	19	124	67	140	43	30	16	10	16	M10 P1.25	94	70	119	143	70	95	12	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	140	35	30	16	12	16	M12 P1.25	114	89	140	166	84	115	14	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	154 (164)	45	34	20	16	20	M16 P1.5	138	110	176	212	110	138	18	1/2
φ160	56	96	125	M48 P2.0	29	155	88	180	50	42	25	19	25	M20 P1.5	178	142	225	270	142	178	22	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifications on P.60 for the wrench-hold specifics (both sides).

CA Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■CA Type Basic Table of Dimensions

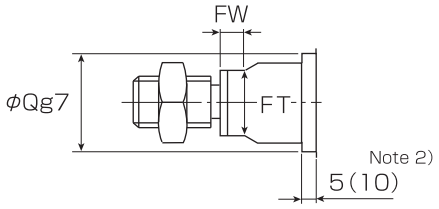
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:㎜

記号 / 内径	ロッド φB	C	E	F	D	TL	J	FL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	RcG
φ32	16	24	39	M12 P1.25	15	103	58	122	34	11	8	7	10	R17	R14	19	12	M6 P1.0	44	33	16 $^{0}_{-0.070}$	1/4
φ40	16	24	39	M12 P1.25	15	103	58	122	34	11	8	7	10	R17	R16	19	14	M6 P1.0	50	37	20 $^{0}_{-0.084}$	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	122	34	11	10	7	10	R19	R16	19	14	M6 P1.0	62	47	20 $^{0}_{-0.084}$	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	125	34	11	13	9	10	R19	R16	19	14	M8 P1.0	75	56	20 $^{0}_{-0.084}$	3/8
φ80	28	48	67	M24 P2.0	19	124	67	156	43	14	18	10	16	R26	R22	32	20	M10 P1.25	94	70	32 $^{0}_{-0.100}$	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	177	35	14	16	12	16	R32	R30	53	25	M12 P1.25	114	89	40 $^{0}_{-0.100}$	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	201 (211)	45	14	19	16	20	R42	R36	67	32	M16 P1.5	138	110	45 $^{0}_{-0.100}$	1/2
φ160	56	96	125	M48 P2.0	29	155	88	232	50	17	24	19	25	R45	R42	77	36	M20 P1.5	178	142	50 $^{0}_{-0.100}$	3/4

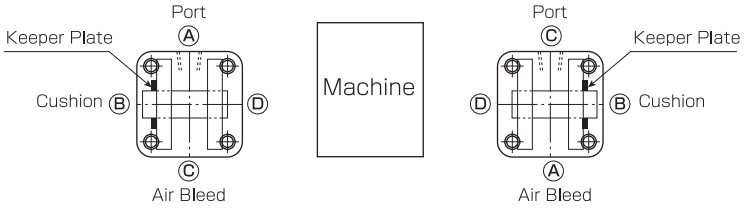
Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifications on P.60 for the wrench-hold specifics (both sides).

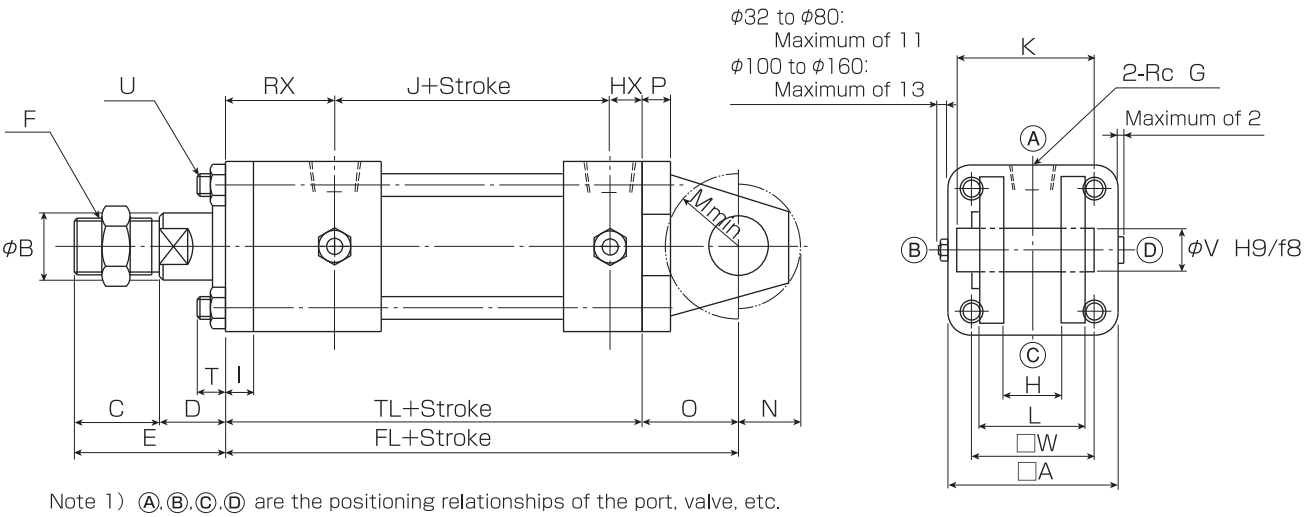
CB Single Rod



About opposite layout

The CB mounting is equipped with a keeper plate for fastening the pin. Normally, the keeper plate is located at the B position. If you order the opposite layout to use two cylinders, specify the model code that indicates the opposite layout: For example: "ABC" (as shown on the left), or "CBA" (as shown on the right). (φ125 to φ160)





Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) Pins are included as standard up to φ125. φ160 becomes optional.
Note 3) ( ) in figure is the dimension for the cylinder with additional bellows..
Note 4) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■CB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:㎜

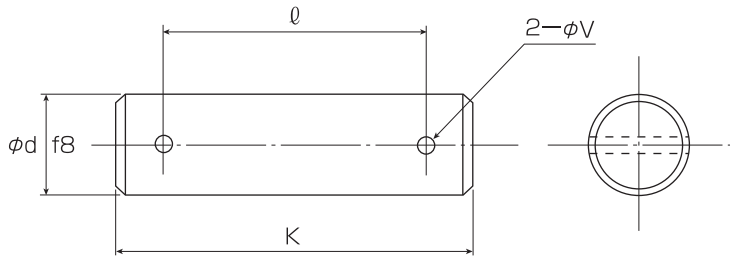
Symbol / Bore	Rod φB	C	E	F	D	TL	J	FL	RX	HX	P	T	I	M	N	O	φV	U	□A	□W	H	L	K	RcG
φ32	16	24	39	M12 P1.25	15	103	58	122	34	11	8	7	10	R18	R15	19	12	M6 P1.0	44	33	16 +0.7 +0.5	32	46	1/4
φ40	16	24	39	M12 P1.25	15	103	58	122	34	11	8	7	10	R18	R15	19	14	M6 P1.0	50	37	20 +0.7 +0.5	44	58	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	122	34	11	8	7	10	R19	R17	19	14	M6 P1.0	62	47	20 +0.7 +0.5	52	66	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	125	34	11	8	9	10	R19	R17	19	14	M8 P1.0	75	56	20 +0.7 +0.5	52	66	3/8
φ80	28	48	67	M24 P2.0	19	124	67	156	43	14	11	10	16	R32	R23	32	20	M10 P1.25	94	70	32 +0.7 +0.5	64	78	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	177	35	14	16	12	16	R32	R30	53	25	M12 P1.25	114	89	40 +0.7 +0.5	80	94	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	201 (211)	45	14	19	16	20	R42	R36	67	32	M16 P1.5	138	110	45 +0.7 +0.5	90	105	1/2
φ160	56	96	125	M48 P2.0	29	155	88	232	50	17	24	19	25	R45	R42	77	36	M20 P1.5	178	142	50 +0.7 +0.5	100	115	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifications on P.60 for the wrench-hold specifics (both sides).

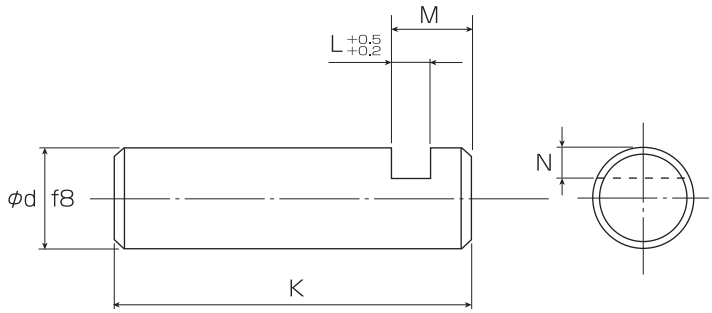
Table of Dimensions for CB

■Pin

Bore	Material
φ32 to φ160	Carbon Steel for Machine Structual Use



φ32 to φ100



φ125 to φ160

■Table of Dimensions

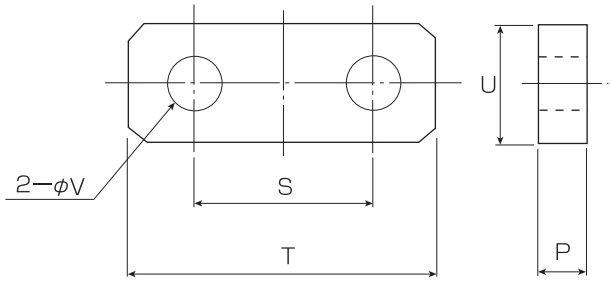
Units:㎜

Symbol / Bore	φd	L	M	N	K	V	ℓ
φ32	12	—	—	—	46	2.5	38
φ40	14	—	—	—	58	2.5	50
φ50	14	—	—	—	66	2.5	58
φ63	14	—	—	—	66	2.5	58
φ80	20	—	—	—	78	2.5	70
φ100	25	—	—	—	94	2.5	86
φ125	32	5	10	5.5	105	—	—
φ160	36	5	10	5.5	115	—	—

Note) For up to φ100, a split pin is used to fasten the pin.

■Keeper Plate

Bore	Material
φ125 to φ160	Rolled Steel for General Structure

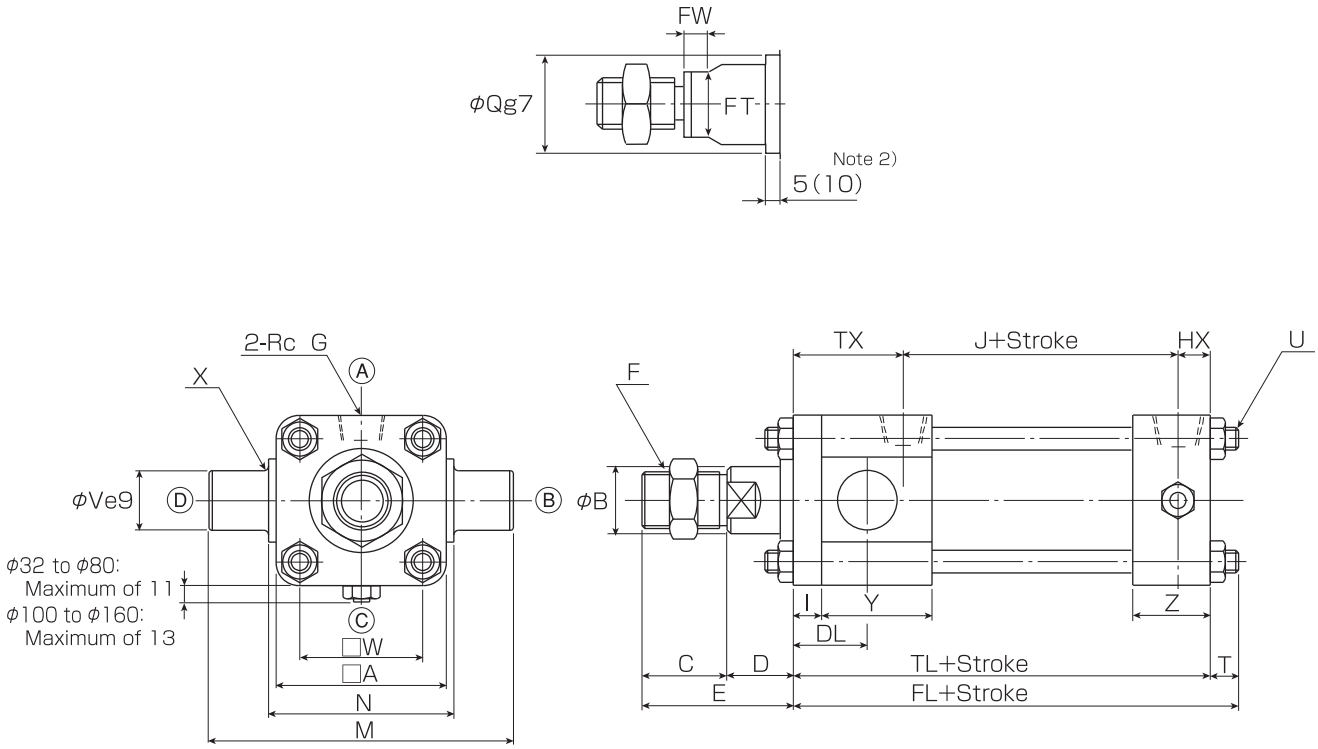


■Table of Dimensions

Units:㎜

Symbol / Bore	V	U	P	S	T	With Hex Hole Bolt
φ125	11	22	5	33	55	M10
φ160	11	22	5	40	62	M10

TA Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■TA Type Basic Table of Dimensions

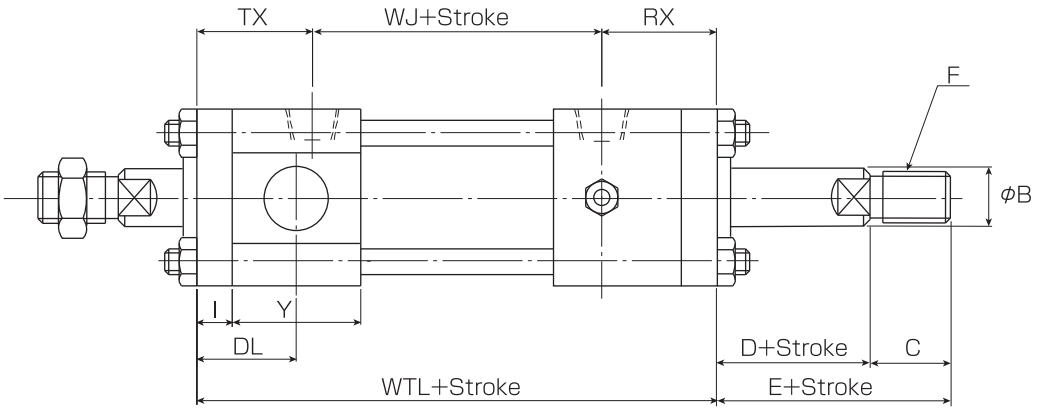
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:㎜

Symbol / Bore	Rod φB	C	E	F	D	TL	J	FL	TX	HX	I	Y	Z	DL	T	U	□A	□W	N	M	X	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	110	34	11	10	38	25	29	7	M6 P1.0	44	33	44	76	R1	16	1/4
φ40	16	24	39	M12 P1.25	15	103	58	110	34	11	10	38	25	29	7	M6 P1.0	50	37	50	100	R1.6	25	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	110	34	11	10	38	25	29	7	M6 P1.0	62	47	63	113	R1.6	25	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	115	34	11	10	38	25	29	9	M8 P1.0	75	56	76	126	R1.6	25	3/8
φ80	28	48	67	M24 P2.0	19	124	67	134	43	14	16	45	32	38	10	M10 P1.25	94	70	95	145	R1.6	25	1/2
φ100	35.5	60	83	M30 P2.0	23	132	75	144	43	14	16	45	32	38	12	M12 P1.25	114	89	114	178	R2.5	32	1/2
φ125	45	84	109	M42 P2.0	25	136 (146)	75 (85)	152 (162)	47	14	20	45	32	42	16	M16 P1.5	138	110	144	216	R2.5	36	1/2
φ160	56	96	125	M48 P2.0	29	159	88	178	54	17	25	50	38	50	19	M20 P1.5	178	142	184	274	R3	45	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifics on P.60 for the wrench-hold specifics (both sides).

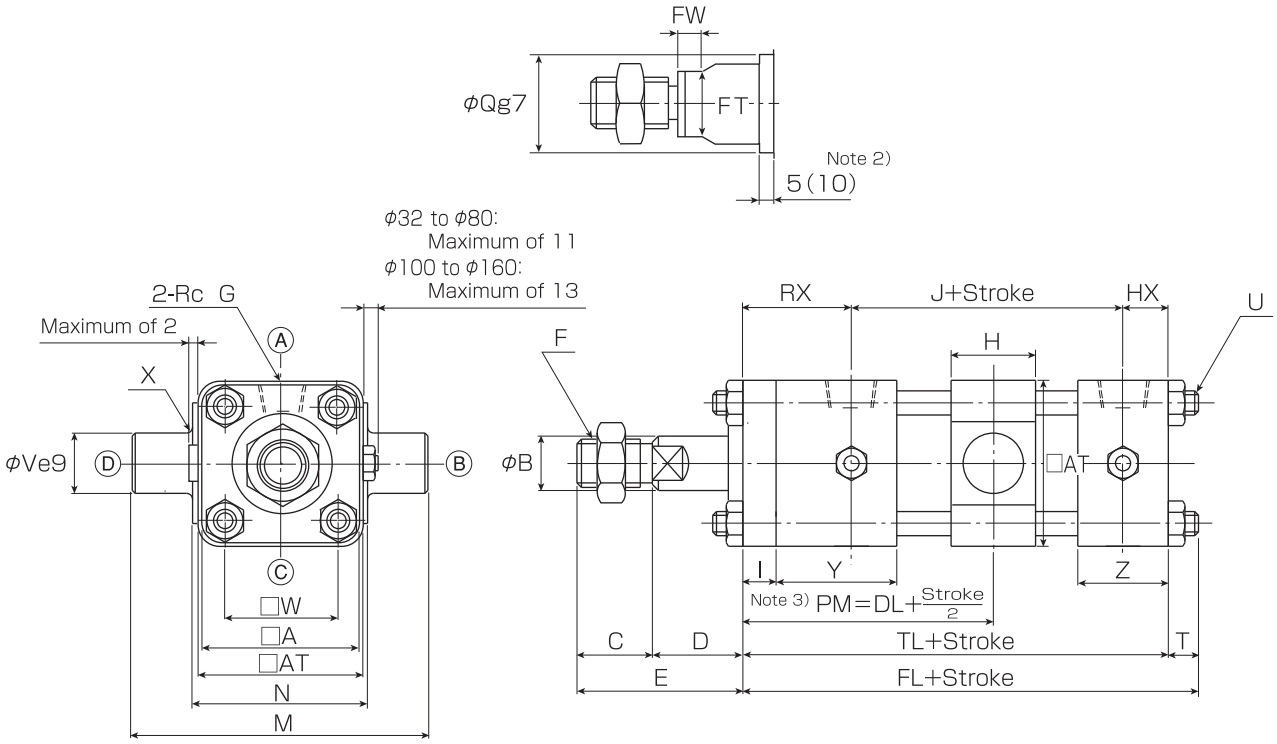
TA Double Rod



■Double Rod Units:mm

Symbol / Bore	WTL	WJ	RX
φ32	132	64	34
φ40	136	68	34
φ50	136	68	34
φ63	136	68	34
φ80	162	76	43
φ100	159	81	35
φ125	167 (190)	75 (98)	45
φ160	192	88	50

TC Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) ( ) in figure is the dimension for the cylinder with additional bellows.
Note 3) Please direct it separately when the size PM is different from the catalogue mark.
Decimal digits of the PM dimension are omitted.
Note 4) Please note that the cushion valve of φ100 to φ160 comes off when loosening it too much and drops.

■TC Type Basic Table of Dimensions

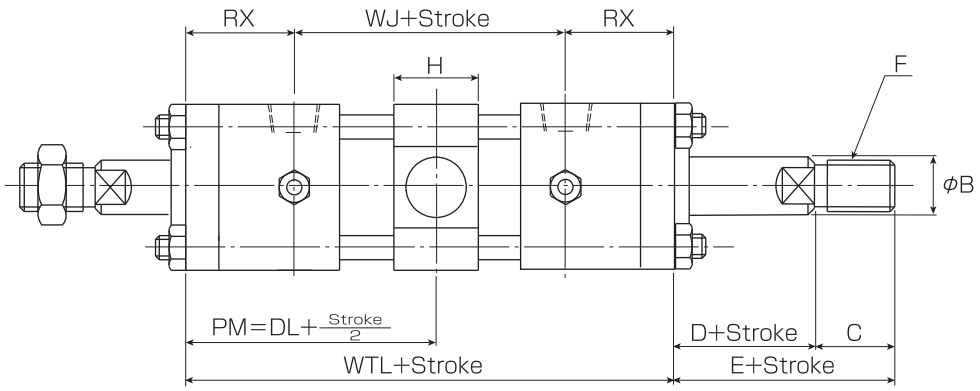
[ ] indicates no switch, switch adjusted specifications (up to φ100) are common ranges.]

Units:mm

Symbol / Bore	Rod φB	C	E	F	D	TL	J	FL	DL	RX	HX	I	Y	Z	T	H	□AT	U	□A	□W	N	M	X	φV	RcG
φ32	16	24	39	M12 P1.25	15	103	58	110	63	34	11	10	38	25	7	30	52	M6 P1.0	44	33	55	87	R1	16	1/4
φ40	16	24	39	M12 P1.25	15	103	58	110	63	34	11	10	38	25	7	30	59	M6 P1.0	50	37	63	113	R1.6	25	3/8
φ50	22.4	36	51	M18 P1.5	15	103	58	110	63	34	11	10	38	25	7	30	71	M6 P1.0	62	47	76	126	R1.6	25	3/8
φ63	22.4	36	51	M18 P1.5	15	106	61	115	64.5	34	11	10	38	25	9	30	86	M8 P1.0	75	56	88	138	R1.6	25	3/8
φ80	28	48	67	M24 P2.0	19	124	67	134	76.5	43	14	16	45	32	10	35	104	M10 P1.25	94	70	114	164	R1.6	25	1/2
φ100	35.5	60	83	M30 P2.0	23	124	75	136	76.5	35	14	16	37	32	12	40	132	M12 P1.25	114	89	140	204	R2.5	32	1/2
φ125	45	84	109	M42 P2.0	25	134 (144)	75 (85)	150 (160)	83.5	45	14	20	43	32	16	53	160	M16 P1.5	138	110	166	238	R2.5	36	1/2
φ160	56	96	125	M48 P2.0	29	155	88	174	96	50	17	25	46	38	19	58	208	M20 P1.5	178	142	214	304	R3	45	3/4

Note1) The dimensions in ( ) are special dimensions for switch adjusted specification.
Note2) Please refer to the S Type specifications on P.60 for the wrench-hold specifics (both sides).

TC Double Rod



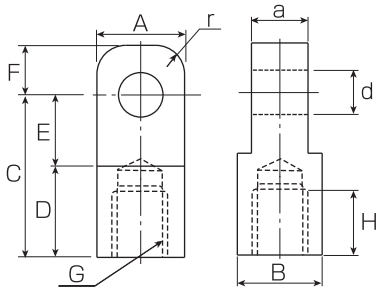
■Double Rod

Units:mm

Symbol / Bore	WTL	WJ
φ32	132	64
φ40	136	68
φ50	136	68
φ63	136	68
φ80	162	76
φ100	151	81
φ125	165 (188)	75 (98)
φ160	188	88

■Single Protrusion End Joint : T type

Bore	Material
φ32 to φ160	Spheroidal Graphite Iron Casting



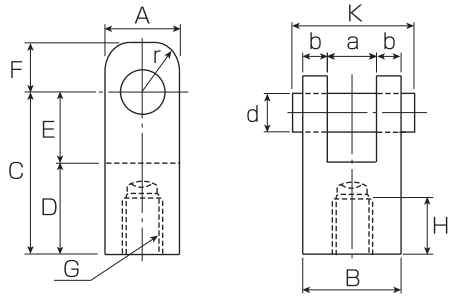
■Single Protrusion End Joint Dimension Table

Units:mm

Symbol / Bore	φd	C	a	A	B	D	E	F	r	H	G	Parts Code
φ32	12	55	$16^{0}_{-0.1}$	28	24	35	20	12	R8	25	M12 P1.25	TJ-K32
φ40	14	60	$20^{0}_{-0.1}$	28	24	40	20	12	R8	25	M12 P1.25	TJ-K40
φ50	14	64	$20^{0}_{-0.1}$	33	28	46	18	14	R10	37	M18 P1.5	TJ-K50
φ63	14	64	$20^{0}_{-0.1}$	33	28	46	18	14	R11	37	M18 P1.5	TJ-K63
φ80	20	100	$32^{0}_{-0.1}$	43	38	70	30	19	R12	49	M24 P2	TJ-K80
φ100	25	110	$40^{0}_{-0.1}$	53	48	73	37	24	R16	61	M30 P2	TJ-K100
φ125	32	132	$45^{0}_{-0.1}$	70	70	92	40	32	R20	67	M42 P2	TJ-K125
φ160	36	150	$50^{0}_{-0.1}$	79	79	105	45	36	R22	78	M48 P2	TJ-K160

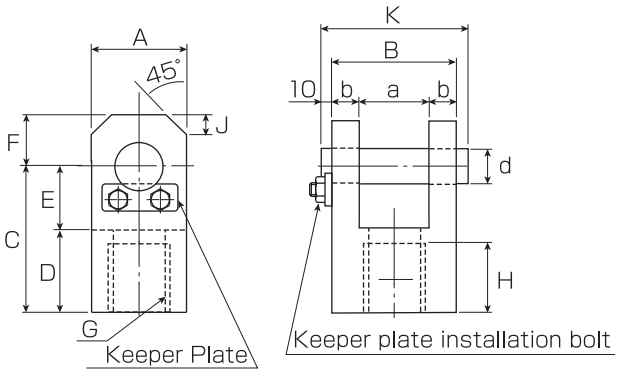
■Double Protrusion End Joint : Y type

Bore	Material
φ32 to φ100	Spheroidal Graphite Iron Casting
φ125 or φ160	Rolled Steels for General structure



φ32 to φ100

Note) For up to f100, a split pin is used to fasten the pin.



φ125 or φ160

Note) Pins are inserred with Y joint Up to φ125 to φ160.

■Double Protrusion End Joint Dimension Table

Units:mm

Symbol / Bore	φd	C	a	b	A	B	D	E	F	r	H	G	K	J	Parts Code
φ32	12	55	$16^{+1.5}_{+0.5}$	8	24	32	35	20	12	R 8	25	M12 P1.25	46	—	YJ-K32
φ40	14	60	$20^{+1.5}_{+0.5}$	12	24	44	40	20	12	R 8	25	M12 P1.25	58	—	YJ-K40
φ50	14	64	$20^{+1.5}_{+0.5}$	12	28	44	46	18	14	R10	37	M18 P1.5	58	—	YJ-K50
φ63	14	64	$20^{+1.5}_{+0.5}$	12	28	44	46	18	14	R10	37	M18 P1.5	58	—	YJ-K63
φ80	20	100	$32^{+1.5}_{+0.5}$	16	38	64	72	28	19	R12	49	M24 P2	78	—	YJ-K80
φ100	25	110	$40^{+1.5}_{+0.5}$	20	48	80	75	35	24	R16	61	M30 P2	94	—	YJ-K100
φ125	32	132	$45^{+1.5}_{+0.5}$	22.5	65	90	92	40	35	—	75	M42 P2	105	15	YJ-K125
φ160	36	150	$50^{+1.5}_{+0.5}$	25	70	100	105	45	40	—	86	M48 P2	115	15	YJ-K160

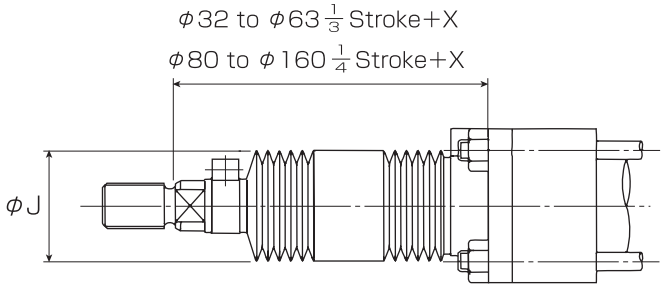
■Bellows

J : (Material: Neoprene, Heat Resistant : 100℃)
JC : (Material: Conex, Heat Resistant : 220℃)
JS : (Material: Silicon Glass Cloth, Heat Resistant : 220℃)
JA : (Material: Aluminum Leaf Glass Cloth, Heat Resistant : 350℃)

■Table of Dimensions

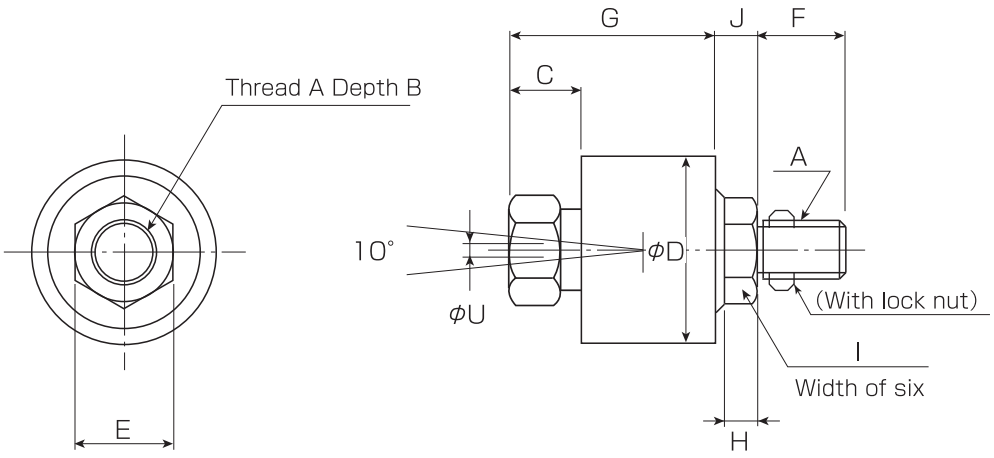
Units:mm

Symbol / Bore	J		X
	5 to 49	from 50	
φ32	45	36	50
φ40	45	40	50
φ50	55	45	55
φ63	55	45	55
φ80	65	60	65
φ100	80	71	65
φ125	80	80	65
φ160	100	100	70



Note 1) With the cylinder with bellows, the bush protrusion length is different from that of the standard cylinder.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Less than 5-strokes cannot be manufactured.
Note 4) Bellows is sent out after installing it on the cylinder.
Note 5) As for cylinders originally equipped with bellows, please specify the serial number or dimension D (in the illustration below) when ordering a replacement without the bellows.

■FK Connector



※The FK connector cannot be used for some types of cylinders at the full output under the nominal pressure. Please check the load being used in advance.

■Table of Dimensions

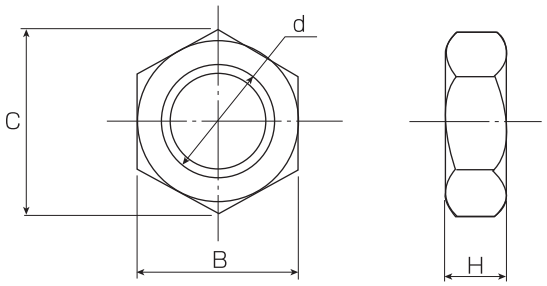
Units:㎜

Symbol / Bore	Parts Code	A	B	C	D	E	F	G	H	I	J	U	Usage loads (N) Pull	Usage loads (N) Push	Mass (kg)
φ32	FK-12	M12P1.25	13	17 ±1.0	45	23	24	52 ±1.0	6	23	6	2	up to 2110	up to 2810	0.40
φ40													up to 3690	up to 4400	
φ50	FK-18	M18P1.5	15	27 ±1.0	45	29	24	62 ±1.0	6	23	6	2	up to 5290	up to 6870	0.50
φ63													up to 5290	up to 10910	
φ80	FK-24	M24P2.0	22	34.5±1.0	61	35	32	78 ±1.0	6	29	11.5	3	up to 7640	up to 17590	1.10
φ100	FK-30	M30P2.0	22	36.5±1.0	69	41	42	88.5±1.0	8	35	15	3	up to 13520	up to 27490	1.80

Note 1) It is possible to turn the thread section; however, it is not a joint for rotation so it cannot be used for turning.
Note 2) Supplying oil is unnecessary and grease lubricant is used to fill it.
Note 3) Cannot be reused after disassembly.
Note 4) The usage loads in the Table of Dimensions are values from static load tests.
Note 5) In the case of loads where there are repeated shocks, the usage load value will decrease, so this should be taken into consideration.
Note 6) The one of inside diameter φ125 and φ160 cannot be produced.

■Lock Nut

Bore	Material
φ32 to φ160	Rolled Steels for General Structure



■Table of Dimensions

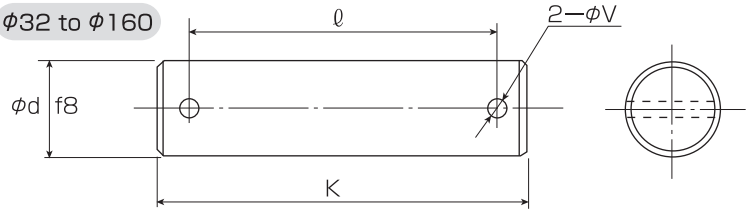
Units:mm

Bore \ Symbol	d	H	B	C	Parts Code
φ32	M12 P1.25	7	19	21.9	LN-K32
φ40	M12 P1.25	7	19	21.9	LN-K40
φ50	M18 P1.5	11	27	31.2	LN-K50
φ63	M18 P1.5	11	27	31.2	LN-K63
φ80	M24 P2	14	36	41.6	LN-K80
φ100	M30 P2	17	46	53.1	LN-K100
φ125	M42 P2	22	66	75	LN-K125
φ160	M48 P2	26	75	86.5	LN-K160

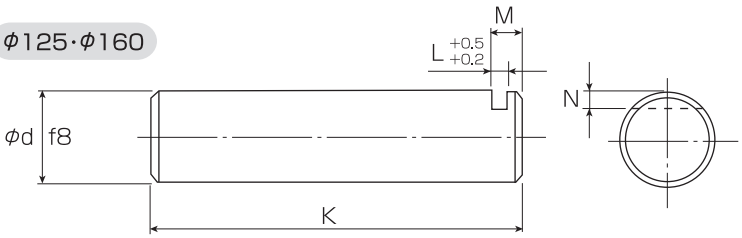
■Pin

Bore	Material
φ32 to φ250	Carbon Steels for Machine Structural Use

φ32 to φ160



φ125·φ160



■Table of Dimensions

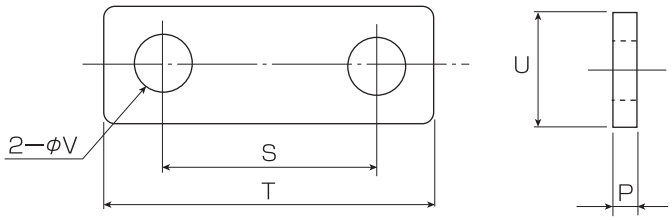
Units:mm

Bore \ Symbol	φd	L	M	N	K	V	ℓ
φ32	12	—	—	—	46	2.5	38
φ40	14	—	—	—	58	2.5	50
φ50	14	—	—	—	58(66)	2.5	50(58)
φ63	14	—	—	—	58(66)	2.5	50(58)
φ80	20	—	—	—	78	2.5	70
φ100	25	—	—	—	94	2.5	86
φ125	32	5	10	5.5	105	—	—
φ160	36	5	10	5.5	115	—	—

Note) The dimensions in ( ) apply to the CB series.

■Keeper Plate

Bore	Material
φ125 to φ160	Rolled Steels for General Structure



■Table of Dimensions

Units:mm

Bore \ Symbol	V	U	P	S	T	With Hex Hole Bolt
φ125	11	22	5	33	55	M10
φ160	11	22	5	40	62	M10

■Mass Table

Units: kg

Bore \ Symbol	Basic Mass (Stroke: 0mm)									Stroke Mass per 100mm
	S	LA	LB	FA	FB	CA	CB	TC	TA	
φ32	1.2	1.4	1.4	1.4	1.5	1.4	1.4	1.6	1.5	0.41
φ40	1.8	2.1	2.1	2.1	2.2	2.0	2.0	2.5	2.3	0.45
φ50	2.6	3.1	3.0	3.0	3.1	2.9	2.9	3.6	2.2	0.78
φ63	3.9	4.3	4.4	4.5	4.6	4.3	4.3	5.4	4.6	0.94
φ80	7.5	8.4	8.5	9.0	9.2	8.6	8.5	10.0	8.8	1.22
φ100	11.4	12.6	13.0	13.4	13.7	12.7	12.8	15.1	14.5	2.00
φ125	18.6	20.4	20.9	22.4	22.9	22.8	23.0	24.3	23.4	3.30
φ160	35.1	38.4	40.8	42.9	43.9	43.2	44.1	46.1	41.2	4.90

Calculation example Mounting:FB, Bore of cylinder:φ100, Stroke:350mm
13.7+2.00×3.5=20.7kg

■End Joint Mass Table

Units: kg

Bore	Single Protrusion End Joint	Double Protrusion End Joint	Lock Nut
φ32	0.26	0.27	0.01
φ40	0.31	0.43	0.01
φ50	0.40	0.51	0.03
φ63	0.40	0.51	0.03
φ80	1.17	1.57	0.07
φ100	1.74	2.66	0.16
φ125	5.29	6.57	0.44
φ160	6.15	8.82	0.67

T Series

21MPa

Tie Rod Type Cylinder

T Series ■ 21MPa

■Features

Excellent Dependability

To prevent damage to the rod, the rod sliding surface is plated with high-quality chromium, and soft high strength brass is used for the rod bush. Also, high-performance U-packing is used for the rod packing. Back-pressure preventive grooved packing is used for the piston packing. Thus, the T series provides high reliability against oil leak and durability.

Certain, steady operation

The piston uses a wear ring to prevent seizure, ensuring improved reliability.
The cushion mechanism provides high accuracy, enabling reliable operation.

■Specifications

Series Name	T	TR
Nominal Pressure Note1)	21MPa	
Model	Standard : T	Switch adjusted :TR
Bore Note2)	φ40·φ50·φ63·φ80·φ100·φ125·φ140 φ160·φ180·φ200·φ224·φ250	φ40·φ50·φ63·φ80
Maximum Allowable Pressure Note3)	Cap Side:26.5MPa Head Side:Rod Type A 26.5MPa,Rod Type B 24.5MPa	
Proof Pressure	31.5MPa	
Minimum Working Pressure Note4)	Less than 0.84MPa	
Thread Tolerance	JIS6g/6H (Corresponds to JIS Grade 2)	
Range of Operating Temperature Note5)	Standard Specifications: -10℃ to +80℃ High Temperature Specifications: -10℃ to +120℃	Standard Specifications: -10℃ to +60℃ High Temperature Specifications: -10℃ to +100℃
Hydraulic Oil Applied	General purpose mineral hydraulic oil (When using operating oils other than above, be sure to report the brand name(s) after referring to the Packing material.)	
Adjustment standard	Governed by Former JIS B 8354	

Note 1) The "Nominal Pressure" is the set pressure of the relief valve in the hydraulic circuit the cylinder uses.
Note 2) The φ180 to φ250 bore diameters of the standard type are special sizes.
Note 3) The Maximum Allowable Pressure is the tolerance value for pressures such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 4) The Minimum Working Pressure is the value when the pressure is supplied from the cap side.
Note 5) In switch adjusted specifications, the temperature limit for the switch body should be under 60℃.
(Select a special high-temperature switch when temperatures will exceed 60℃)

■Ranges of Operating Speed

Bore	Range
φ40 to φ63	8 to 400㎜/s
φ80 to φ125	8 to 300㎜/s
φ140 to φ250	8 to 200㎜/s

Note) When operating at the maximum cylinder speed, keep the inertial load pressures generated within the cylinder chamber below the Nominal Pressure.

■Maximum Stroke : Tie Rod Type

Bore	Maximum Stroke
φ40 or φ50	1,500㎜
φ63 or φ80	1,600㎜
φ100 to φ160	2,000㎜
φ180 to φ250	1,500㎜

Note 1) This is the Maximum Stroke for the standard item produced.
Note 2) Please consider the rod buckling separately.

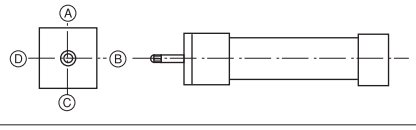
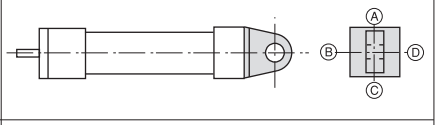
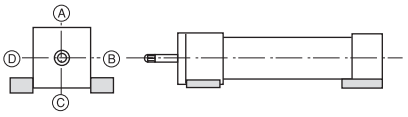
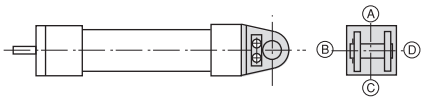
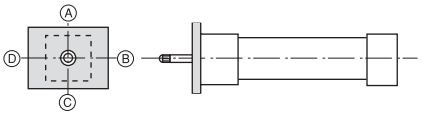
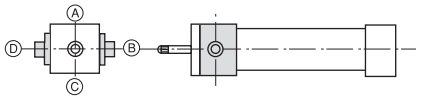
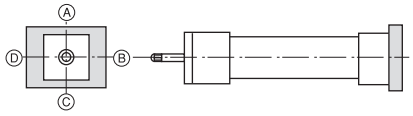
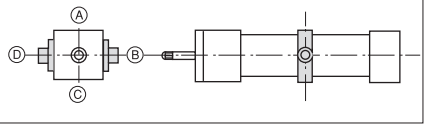
■Stroke Tolerance: Grade A

Units:㎜

Stroke	100 or less	101 to 250	251 to 630	631 to 1,000	1,001 to 1,600	1,601 to 2,000
Allowable Value	+0.8 0	+1.0 0	+1.25 0	+1.4 0	+1.6 0	+1.8 0

Note) The dimensions and precision of other parts conform to the former JIS B 8354 standard.

■Mounting Type

Format	Code	Appearance	Format	Code	Appearance
Basic	S φ40 to φ250		Single Protrusion Clevis	CA φ40 to φ250	
Axial Right Angle Direction Foot	LA φ40 to φ160		Double Protrusion Clevis	CB φ40 to φ160	
Head Side: Rectangular Flange	FA φ40 to φ250		Head Side Integral Trunnion	TA φ40 to φ250	
Cap Side Rectangular Flange	FB φ40 to φ250		Middle Trunnion	TC φ40 to φ250	

Note 2) ⒶⒷⒸⒹ are the positioning relationships for the port valve, etc.

■Cushion Symbols

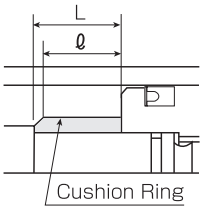
Code	B	R	H	N
Attachment Section	Cushion on Both Sides	Head-side Cushion	Cap-side Cushion	No Cushion

Note1) The cushion for the φ40 A rod is a fixed cushion on the head side.
Note2) For the φ40 A rod of the TR series (switch adjusted), the cushion on the rod side cannot be produced.

■Cushion Shape

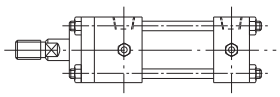
Units:㎜

Bore	Cushion Ring Length (L)	Cushion Ring Parallel Section Length (ℓ)
φ40 to φ63	20	16
φ80 to φ100	25	21
φ125 to φ160	25	21
φ180 to φ224	30	26
φ250	35	31



Note 1) When stoppage is not done at the end of the stroke at a distance of 3mm or more beforehand, the cushioning effect is weakened and this should be taken into consideration. (Note that this is from φ32 to φ100)
Note 2) When a cushion with a stroke shorter than the cushion ring length is used, the cushion will remain expanded, so this should also be taken into consideration.

■Cover Securing Formats

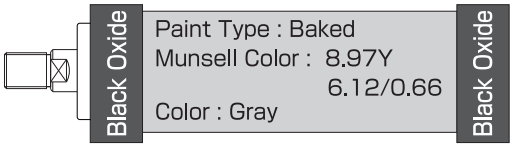
Securing Format	Appearance
Tie-rod System	

Note) The above specifications are the standard. The specifications may be changed depending on the mounting type.

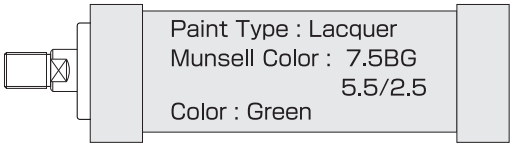
■Tube Coating Colors

Standard

φ40 to φ180

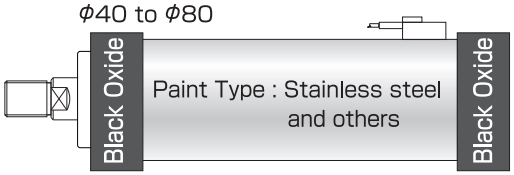


φ200 to φ250



Switch Adjusted Specifications

φ40 to φ80



Note) If you have any questions with regard to the type of paint, please contact us.

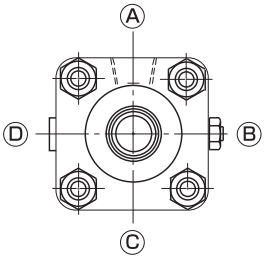
■Slide Section Processing

Piston Rod: Hard chrome plating processing (more than 2/100mm)

■Port/Valve Locations

In each of the dimension diagrams for mounting, the base position is given as A as seen from the rod side with the following positions expressed as BCD continuing in a clockwise direction.

1) The standard positions are: A……Port B……Cushion Valve C……Check Valve D……Air Bleed



2) In the case where differences from the standard positions have been specified, these are indicated by Ⓐ, Ⓑ, Ⓒ, Ⓓ.
3) In the case of no cushion, the standard positions are indicated by ⒶⓄⒹ.
4) In the TA attachment format, the basic position for the head side is ⒶⒸⒸ or ⒶⓄⒸ.
5) In the case of a fixed cushion, there is no cushion valve so this is annotated as Ⓞ.
6) In the case where there is no air bleed, this is indicated by ⊖.
The cylinder equipped with a cushion valve, no air bleed and two check valves is indicated as Ⓞ.
7) In the case where the head side and the cap side positions are different, they are indicated as ⒶⒷⒹ and ⒷⒸⒹ with the former being the head side and the latter being the cap side. In the case where they are depicted on two levels, the upper level is the cap side and the lower level is the head side.

■Packing Materials

Code	1	2	3	9
Material	Nitrile Rubber	Urethane Rubber	Fluoric Rubber	Hydrogenated Nitrile Rubber
Range of operating temperature	−10℃ to +80℃	−10℃ to +80℃	−10℃ to +120℃	−10℃ to +120℃
General-purpose mineral hydraulic oil	○	◎	○	○
Emulsions of water in mineral oil	○	△	○	◎
Emulsions of mineral oil in water	○	△	○	◎
Water + Glycol-type Operating Oil	○	×	×	◎
Phosphate Ester fluid	×	×	○	×
Fatty Acid Ester fluid	○	×	△	△

Note) The ◎ or ○ mark indicates its use is possible. The X mark indicates it is not possible to use it.
Regarding the △ mark, consult us for details. The ◎ mark indicates the packing material recommended for applications where wear resistance is important.

■Theoretical Output Table

Bore	Rod Diameter (㎜)		Piston Area (㎠)			Theoretical Output (N)		
	A Rod	B Rod	Push	Pull A Rod	Pull B Rod	Push	Pull A Rod	Pull B Rod
φ40	28	22.4	12.5	6.4	8.6	26,380	13,450	18,110
φ50	35.5	28	19.6	9.7	13.4	41,230	20,440	28,300
φ63	45	35.5	31.1	15.2	21.2	65,460	32,060	44,670
φ80	56	45	50.2	25.6	34.3	105,550	53,830	72,150
φ100	71	56	78.5	38.9	53.9	164,930	81,790	113,210
φ125	90	71	122.7	59.1	83.1	257,700	124,110	174,560
φ140	100	80	153.9	75.3	103.6	323,260	158,330	217,710
φ160	112	90	201.0	102.5	137.4	422,230	215,330	288,630
φ180	125	100	254.4	131.7	175.9	534,380	276,670	369,450
φ200	140	112	314.1	160.2	215.6	659,730	336,460	452,840
φ224	160	125	394.0	193.0	271.3	827,570	405,340	569,860
φ250	180	140	490.8	236.4	336.9	1,030,830	496,450	707,560

■Code

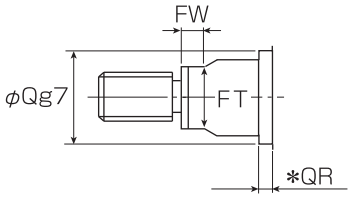
The switch codes are not necessary for the T.

T		-	S	A	2	TC	100	B	B	320	A	B	D	-		Y	P	N	J
T	R	-	S	A	2	TC	80	B	B	300	A	B	D	-	2	C	-	Y	P	N	J
①	②		③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬		⑭	⑮		⑯	⑰	⑱	⑲

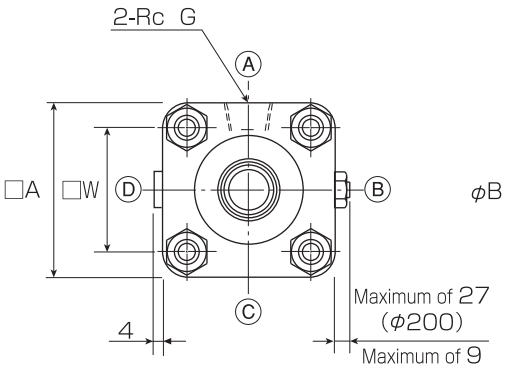
① Series Name	T: 21MPa
② Switch Adjusted Specifications	"R" is affixed in the case of cylinders with switch adjusted specifications. :TR
③ Single/Double Classification	S: Single Rod Type (Standard Type)　W: Double Rod Type (Standard Equivalent)
④ Standard Special Classification Note1)	A: Standard Dimensions
⑤ Packing Material	1. Nitrile Rubber (Standard Type:φ180 to φ250)　2. Urethane Rubber (Standard Type:φ40 to φ160) 3. Fluoric Rubber　9. Hydrogenated Nitrile Rubber
⑥ Mounting	S·LA·FA·FB·CA·CB·TA·TC (φ180 to φ250, there is no LA and CB.)
⑦ Bore (㎜)	40·50·63·80·100·125·140·160·180·200·224·250 (Specifications for switch adjusted φ40 to φ80 is standard Type.).
⑧ Type of Rod	A: A Rod　B: B Rod (Standard)
⑨ Cushion Format	B: Cushion on Both Sides　R: Head-side Cushion　H: Cap-side Cushion　N: No Cushion
⑩ Stroke Length (㎜)	Indicate the stroke.
⑪ Port Location	Refer to P.81 and then indicate A, B, C or D.
⑫ Cushion Valve Location	Refer to P.81 and then indicate A, B, C or D.　O: No Cushion or Fixed Cushion
⑬ Air Bleed Location	Refer to P.81 and then indicate A, B, C or D.　– No notation : None (Standard Equivalent)
⑭ Switch Quantity	Mentioned the quantity.　1A. When the switch is not needed in a switch-adjusted specifications.
⑮ Switch Type Note2)	C:TOV3　J:TOV5　CK:T5V3　CL:T5V5　DT:T2V3　DU:T2V5　CW:T2YV3　CH:T0H3 JH:T0H5　FJ: TOV-0.5 (For a DC connector system)　FW: TOV-0.5 (For an AC connector system) XX: Special Part Please refer to P.138 for more detailed information on switches.
⑯ End Joint	T: Single Protrusion End Joint　Y: Double Protrusion End Joint　No notation: None
⑰ Pin	P: CB or the Y joint has a pin attached P2: CB and the Y joint have a pin attached (at φ125 or less, the pin is attached as standard equipment)
⑱ Lock Nut	N: Available (3 types)　N2: Two lock nuts (3 types × 2 pieces)　No notation: None
⑲ Bellows	J: Neoprene　JS: Silicon Glass Cloth　JA: Aluminum Foil Glass Cloth No entry: None (In the case where there are any other material specifications, please specify them).

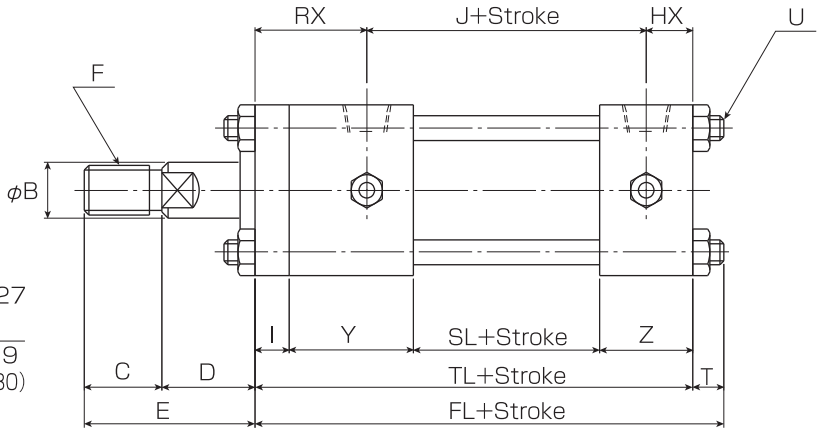
Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) Switches are shipped unattached to prevent breakage.
Note 3) To use the cylinder with lock nut, order a longer thread length by referring to the recommended thread length with lock nut given on p. 102.
Note 4) For the cylinder equipped with lock nut and end joint, the thread length conforms to the recommended thread length with lock nut given on p. 102.

S Single Rod

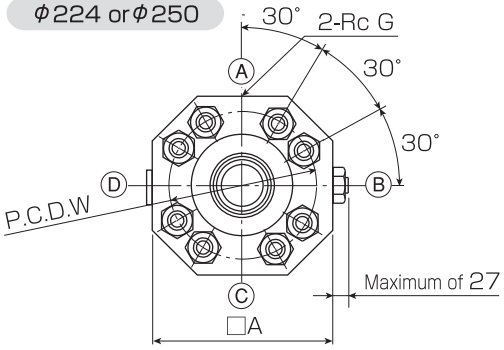


φ40 to φ200





φ224 or φ250



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P. 102.

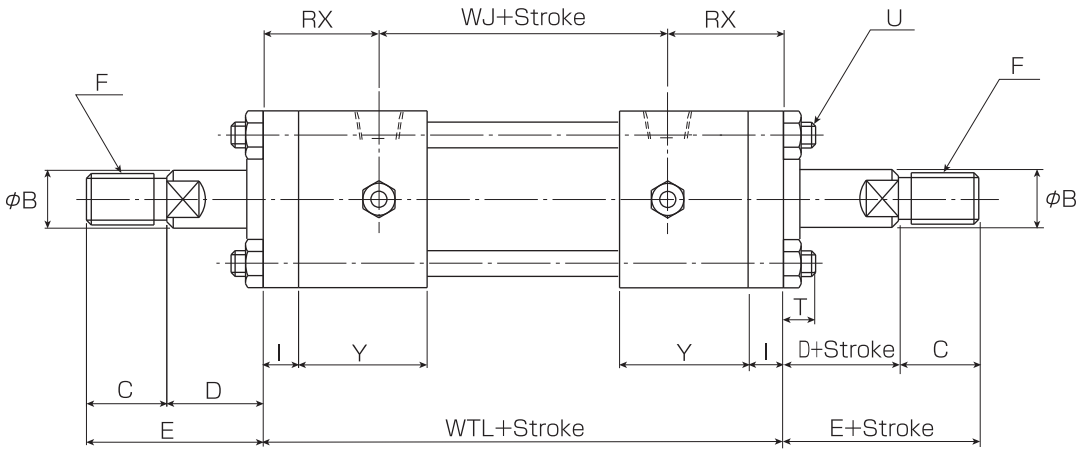
■S Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ80) are common ranges.] Units:㎜

Symbol / Bore	B Rod							QR	D	TL	J	FL	RX	HX	SL	I	Y	Z	T	U	□A	□W	RcG
	φB	C	E	F	φQ	FT	FW																
φ40	22.4	25	55	M20 P1.5	40	19	10	11	30	156	98	169	43	15	64	13	47	32	13	M12 P1.5	70	50	3/8
φ50	28	30	60	M24 P1.5	46	24	10	14	30	172	106	186	48	18	68	15	52	37	14	M14 P1.5	85	62	1/2
φ63	35.5	35	70	M30 P1.5	55	30	15	15	35	187	113	203	56	18	75	18	57	37	16	M16 P1.5	100	74	1/2
φ80	45	45	80	M39 P1.5	65	41	15	9	35	218	129	236	69	20	85	24	67	42	18	M18 P1.5	125	92	3/4
φ100	56	55	95	M48 P1.5	80	50	20	14	40	230	139	251	71	20	95	26	67	42	21	M22 P1.5	160	120	3/4
φ125	71	75	120	M64 P2	95	65	25	13	45	267	159	292	83	25	105	33	77	52	25	M27 P1.5	190	145	1
φ140	80	80	130	M72 P2	105	75	25	14	50	275	164	302	86	25	110	36	77	52	27	M30 P1.5	215	165	1
φ160	90	90	145	M80 P2	120	85	30	14	55	304	186	333	94	24	132	41	80	51	29	M33 P1.5	240	185	1
φ180	100	105	160	M95 P2.0	130	95	30	10	55	344	210	380	105	29	146	41	96	61	36	M39 P1.5	260	195	1 1/4
φ200	112	110	165	M100 P2.0	140	105	30	10	55	389	228	430	121	40	156	51	106	76	41	M45 P1.5	310	230	1 1/2
φ224	125	130	190	M120 P2.0	155	120	35	10	60	390	229	419	121	40	157	51	106	76	29	M33 P1.5	330	P.C.D φ317	1 1/2
φ250	140	140	205	M130 P2.0	170	133	45	10	65	444	262	480	134	48	166	56	126	96	36	M39 P1.5	375	P.C.D φ355	2

S Double Rod

[Standard Equivalent]



[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

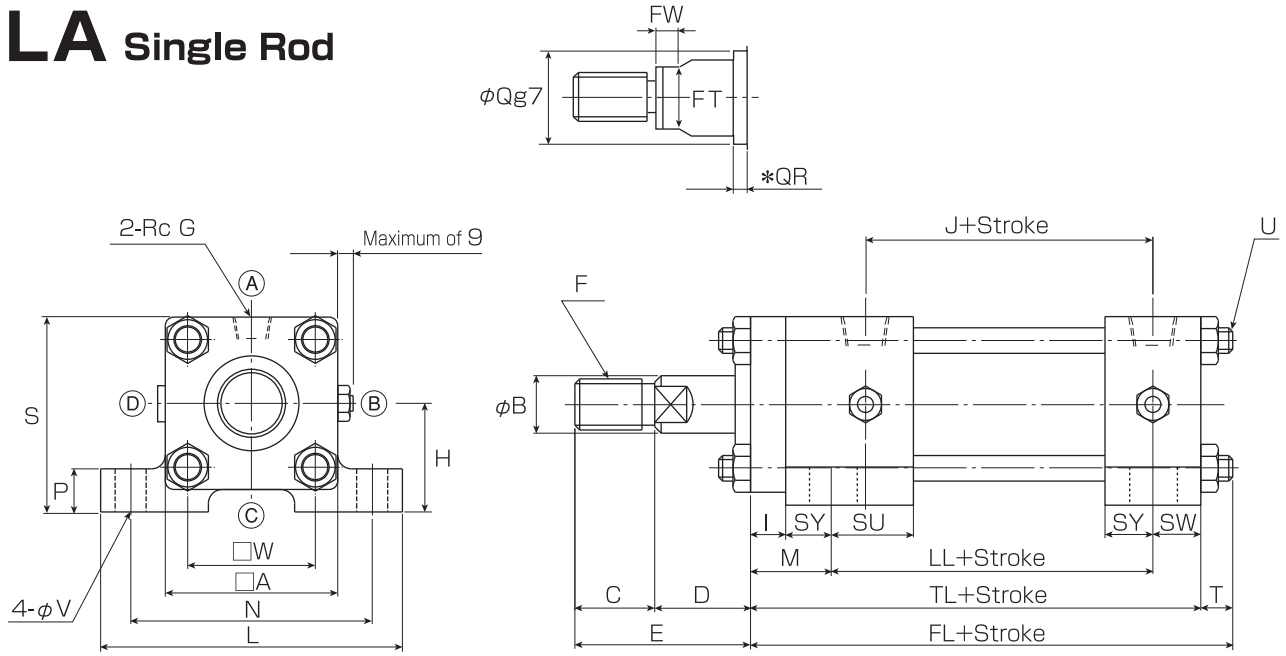
Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

■Double Rod

Units:mm

Symbol / Bore	WTL	WJ
φ40	184	98
φ50	202	106
φ63	225	113
φ80	267	129
φ100	281	139
φ125	325	159
φ140	336	164
φ160	374	186

LA Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.102.

■LA Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

Units:㎜

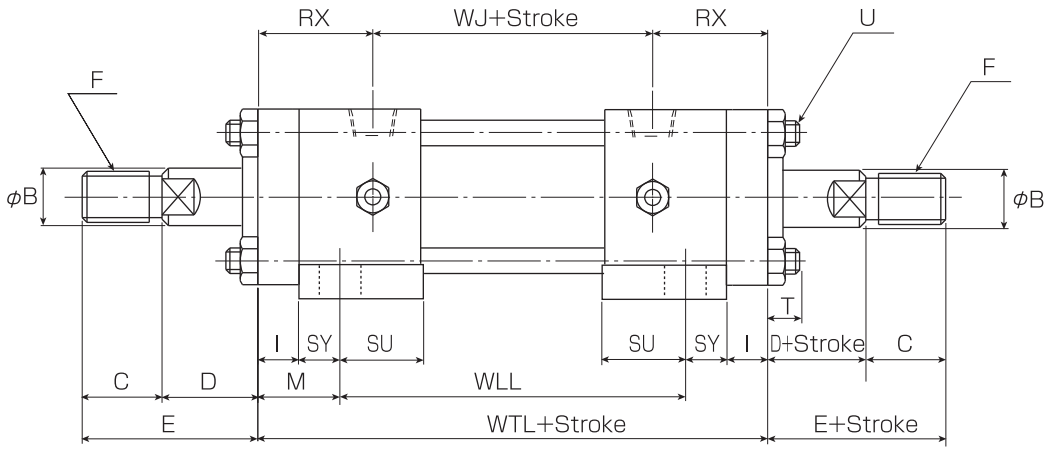
Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	LL	FL	I	M	SW	T	SU	SY	U	□A	□W	N	L	P	H	S	φV	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	111	169	13	29	16	13	31	16	M12 P1.5	70	50	98	122	15	42 ±0.15	77	11	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	120	186	15	33	19	14	34	18	M14 P1.5	85	62	118	145	20	55 ±0.15	97.5	14	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	132	203	18	36	19	16	39	18	M16 P1.5	100	74	140	175	25	63 ±0.15	113	18	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	152	236	24	45	21	18	46	21	M18 P1.5	125	92	175	210	30	75 ±0.25	137.5	22	3/4
φ100	56	55	95	M48 P1.5	14	40	235	139	162	251	26	49	24	21	44	23	M22 P1.5	160	120	215	260	35	85 ±0.25	165	26	3/4
φ125	71	75	120	M64 P2	13	45	272	159	182	292	33	61	29	25	49	28	M27 P1.5	190	145	270	330	45	105 ±0.25	200	33	1
φ140	80	80	130	M72 P2	14	50	280	164	187	302	36	64	29	27	49	28	M30 P1.5	215	165	280	335	45	112 ±0.25	219.5	33	1
φ160	90	90	145	M80 P2	14	55	315	186	212	333	41	72	31	29	49	31	M33 P1.5	240	185	315	375	50	125 ±0.25	245	36	1

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Symbol / Bore	A Rod φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

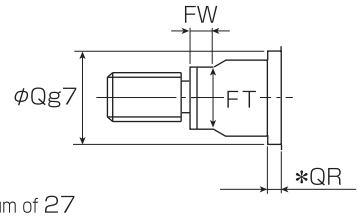
LA Double Rod
[Standard Equivalent]



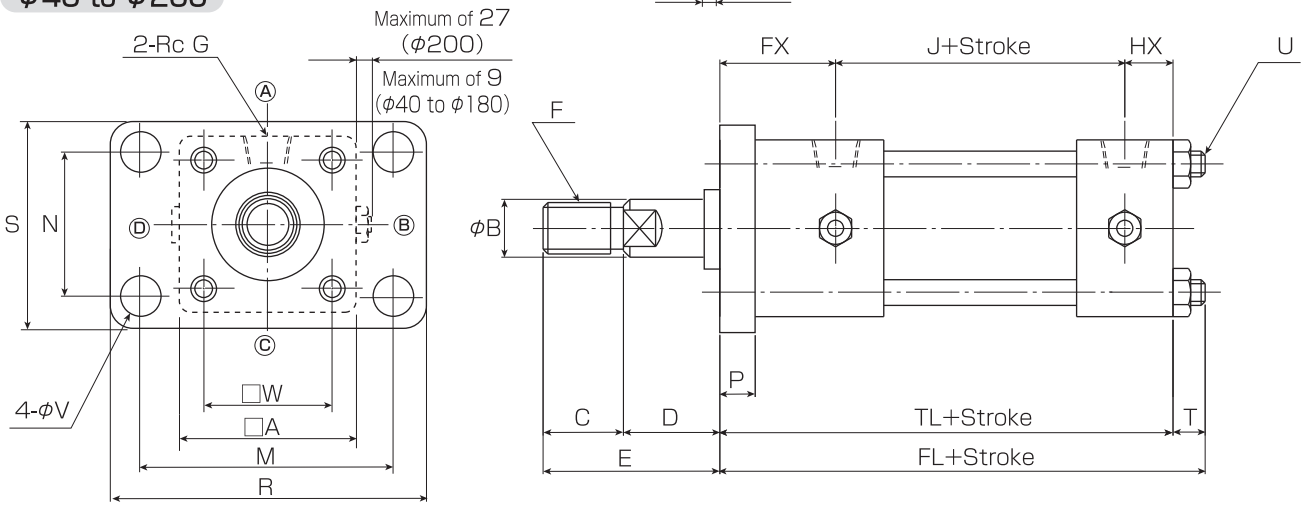
■Double Rod Units:mm

Symbol / Bore	WLL	WTL	WJ
φ40	126	184	98
φ50	136	202	106
φ63	153	225	113
φ80	177	267	129
φ100	183	281	139
φ125	203	325	159
φ140	208	336	164
φ160	230	374	186

FA Single Rod

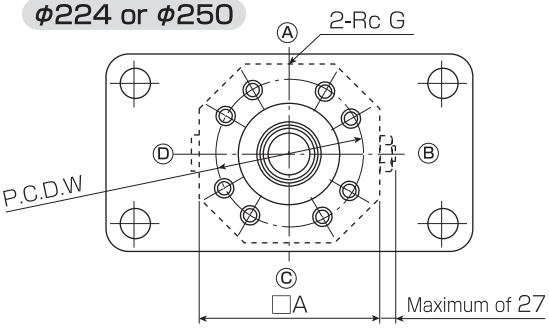


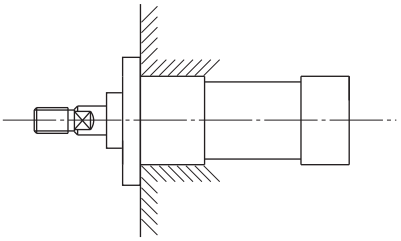
φ40 to φ200



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.

φ224 or φ250





Note 2) When the 21 MPa FA series hydraulic cylinder shown in this figure is used for press applications, mount the cylinder in the above condition.

Note 3) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.102.

■FA Type Basic Table of Dimensions

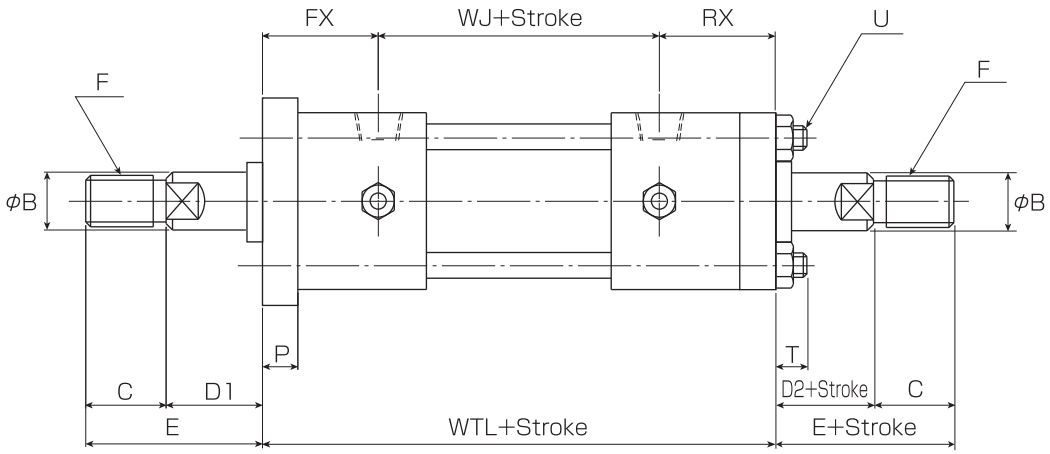
[ ] indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	φQ	QR	D	TL	J	FL	FX	HX	P	T	U	□A	□W	M	R	N	S	φV	RcG
φ40	22.4	25	53	M20 P1.5	40	9	28	158	98	171	45	15	15	13	M12 P1.5	70	50	98	122	50	73	11	3/8
φ50	28	30	55	M24 P1.5	46	9	25	177	106	191	53	18	20	14	M14 P1.5	85	62	118	145	60	88	14	1/2
φ63	35.5	35	64	M30 P1.5	55	9	29	193	113	209	62	18	24	16	M16 P1.5	100	74	140	175	73	106	18	1/2
φ80	45	45	80	M39 P1.5	65	9	35	218	129	236	69	20	24	18	M18 P1.5	125	92	175	210	90	130	22	3/4
φ100	56	55	90	M48 P1.5	80	9	35	235	139	256	76	20	31	21	M22 P1.5	160	120	215	260	115	165	26	3/4
φ125	71	75	116	M64 P2	95	9	41	271	159	296	87	25	37	25	M27 P1.5	190	145	270	330	145	205	33	1
φ140	80	80	125	M72 P2	105	9	45	280	164	307	91	25	41	27	M30 P1.5	215	165	280	335	160	218	33	1
φ160	90	90	140	M80 P2	120	9	50	309	186	338	99	24	46	29	M33 P1.5	240	185	315	375	180	243	36	1
φ180	100	105	160	M95 P2.0	130	10	55	359	210	395	120	29	56	36	M39 P1.5	260	195	345	412	200	265	39	1 1/4
φ200	112	110	165	M100 P2.0	140	10	55	404	228	445	136	40	66	41	M45 P1.5	310	230	412	500	230	315	48	1 1/2
φ224	125	130	190	M120 P2.0	155	10	60	410	229	439	141	40	71	29	M33 P1.5	330	P.C.D φ317	425	515	250	335	48	1 1/2
φ250	140	140	205	M130 P2.0	170	10	65	469	262	505	159	48	81	36	M39 P1.5	375	P.C.D φ355	490	590	285	385	56	2

Note) Please refer to S type basic size table of P.84 for B rod FT·FW.

FA Double Rod
[Standard Equivalent]



[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	58	M20 P1.5	46	24	10	14	33
φ50	35.5	30	60	M24 P1.5	55	30	13	13	30
φ63	45	35	64	M30 P1.5	65	41	15	9	29
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	96	M48 P1.5	95	65	20	15	41
φ125	90	75	125	M64 P2	120	85	30	9	50
φ140	100	80	126	M72 P2	130	95	30	10	46
φ160	112	90	146	M80 P2	140	105	30	9	56
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

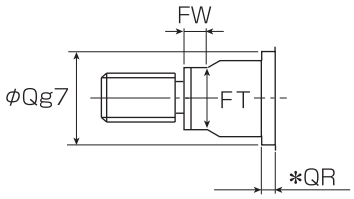
■Double Rod

Units:mm

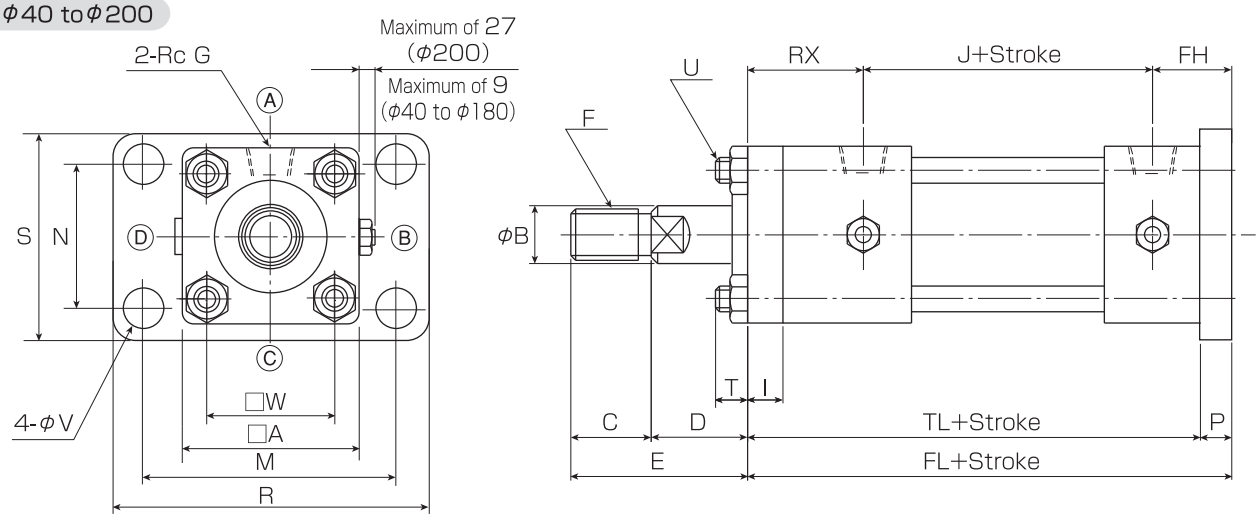
Symbol / Bore	WTL	WJ	RX	D_1	D_2
φ40	186	98	43	28	30
φ50	207	106	48	25	30
φ63	231	113	56	29	35
φ80	267	129	69	35	35
φ100	286	139	71	35	40
φ125	329	159	83	41	45
φ140	341	164	86	45	50
φ160	379	186	94	50	55

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

FB Single Rod

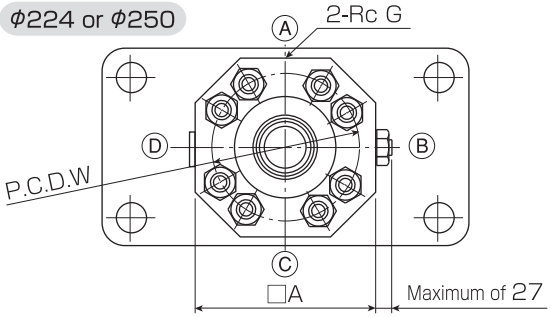


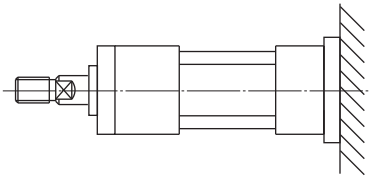
φ40 to φ200



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.

φ224 or φ250





Note 2) When the 21 MPa FA series hydraulic cylinder shown in this figure is used for press applications, mount the cylinder in the above condition.

Note 3) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.102.

■FB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ80) are common ranges.] Units:㎜

Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	FL	RX	FH	P	T	I	U	□A	□W	M	R	N	S	φV	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	171	43	30	15	13	13	M12 P1.5	70	50	98	122	50	73	11	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	192	48	38	20	14	15	M14 P1.5	85	62	118	145	60	88	14	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	211	56	42	24	16	18	M16 P1.5	100	74	140	175	73	106	18	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	242	69	44	24	18	24	M18 P1.5	125	92	175	210	90	130	22	3/4
φ100	56	55	95	M48 P1.5	14	40	230	139	261	71	51	31	21	26	M22 P1.5	160	120	215	260	115	165	26	3/4
φ125	71	75	120	M64 P2	13	45	267	159	304	83	62	37	25	33	M27 P1.5	190	145	270	330	145	205	33	1
φ140	80	80	130	M72 P2	14	50	275	164	316	86	66	41	27	36	M30 P1.5	215	165	280	335	160	218	33	1
φ160	90	90	145	M80 P2	14	55	304	186	350	94	70	46	29	41	M33 P1.5	240	185	315	375	180	243	36	1
φ180	100	105	160	M95 P2.0	10	55	344	210	400	105	85	56	36	41	M39 P1.5	260	195	345	412	200	265	39	1 1/4
φ200	112	110	165	M100 P2.0	10	55	389	228	455	121	106	66	41	51	M45 P1.5	310	230	412	500	230	315	48	1 1/2
φ224	125	130	190	M120 P2.0	10	60	390	229	461	121	111	71	29	51	M33 P1.5	330	P.C.D φ317	425	515	250	335	48	1 1/2
φ250	140	140	205	M130 P2.0	10	65	444	262	525	134	129	81	36	56	M39 P1.5	375	P.C.D φ355	490	590	285	385	56	2

Note 2) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

FB

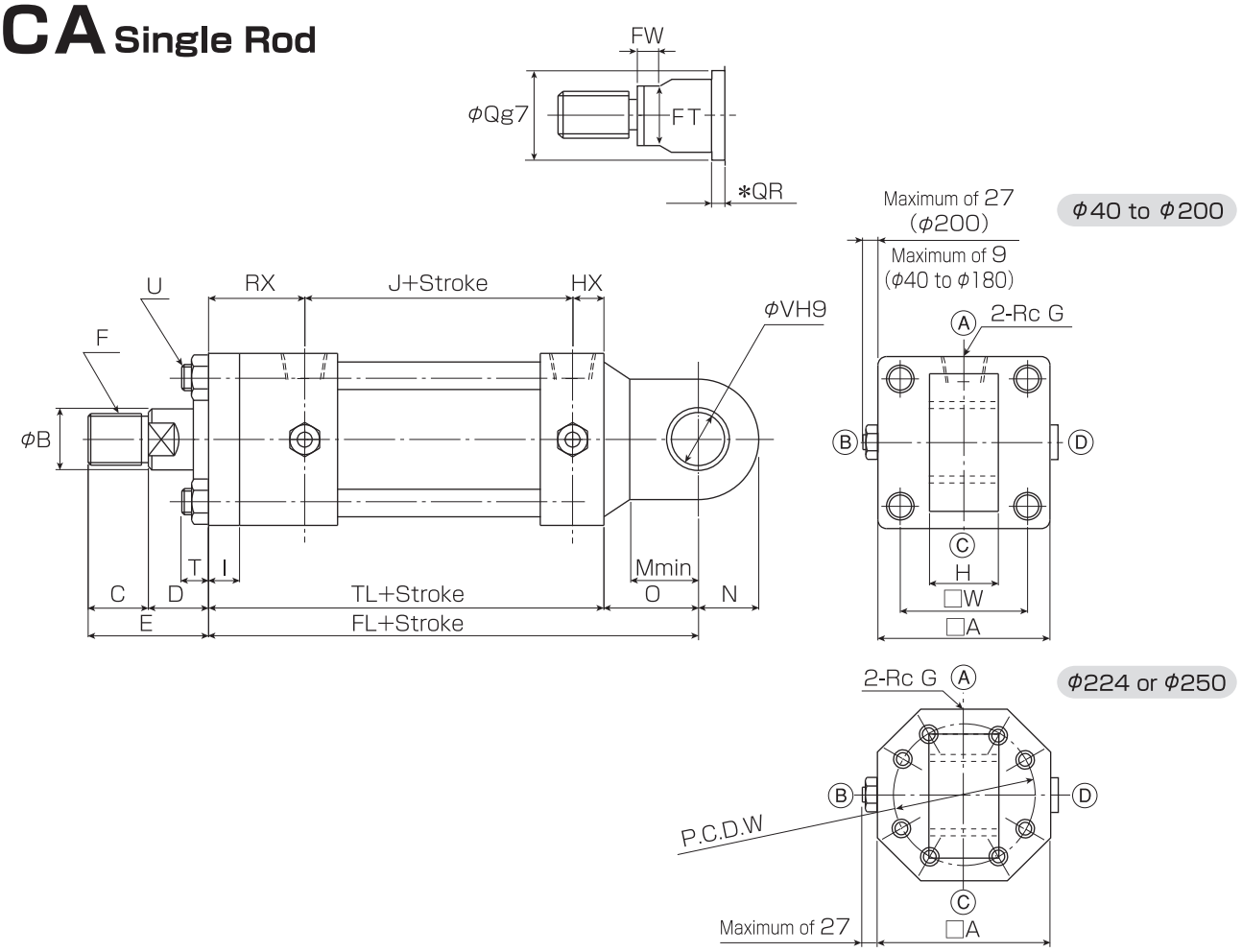
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

CA Single Rod



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.102.

■CA Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

Units:㎜

Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	FL	RX	HX	T	I	M	N	O	φV	U	□A	□W	H	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	191	43	15	13	13	25	25	35	20	M12 P1.5	70	50	32 $^{-0.1}_{-0.4}$	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	217	48	18	14	15	32	30	45	25	M14 P1.5	85	62	36 $^{-0.1}_{-0.4}$	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	242	56	18	16	18	40	35	55	31.5	M16 P1.5	100	74	40 $^{-0.1}_{-0.4}$	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	288	69	20	18	24	50	40	70	40	M18 P1.5	125	92	50 $^{-0.1}_{-0.4}$	3/4
φ100	56	55	95	M48 P1.5	14	40	230	139	310	71	20	21	26	63	50	80	50	M22 P1.5	160	120	63 $^{-0.1}_{-0.4}$	3/4
φ125	71	75	120	M64 P2	13	45	267	159	372	83	25	25	33	79	63	105	63	M27 P1.5	190	145	80 $^{-0.1}_{-0.6}$	1
φ140	80	80	130	M72 P2	14	50	275	164	390	86	25	27	36	89	71	115	71	M30 P1.5	215	165	80 $^{-0.1}_{-0.6}$	1
φ160	90	90	145	M80 P2	14	55	304	186	429	94	24	29	41	100	80	125	80	M33 P1.5	240	185	100 $^{-0.1}_{-0.6}$	1
φ180	100	105	160	M95 P2.0	10	55	344	210	489	105	29	36	41	120	108	145	90	M39 P1.5	260	195	125 $^{-0.1}_{-0.6}$	1 1/4
φ200	112	110	165	M100 P2.0	10	55	389	228	544	121	40	41	51	130	120	155	100	M45 P1.5	310	230	125 $^{-0.1}_{-0.6}$	1 1/2
φ224	125	130	190	M120 P2.0	10	60	390	229	565	121	40	29	51	150	135	175	112	M33 P1.5	330	P.C.D φ317	140 $^{-0.1}_{-0.6}$	1 1/2
φ250	140	140	205	M130 P2.0	10	65	444	262	639	134	48	36	56	165	150	195	125	M39 P1.5	375	P.C.D φ355	160 $^{-0.1}_{-0.6}$	2

Note) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

CA

[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

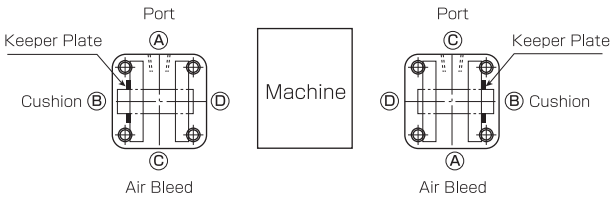
Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

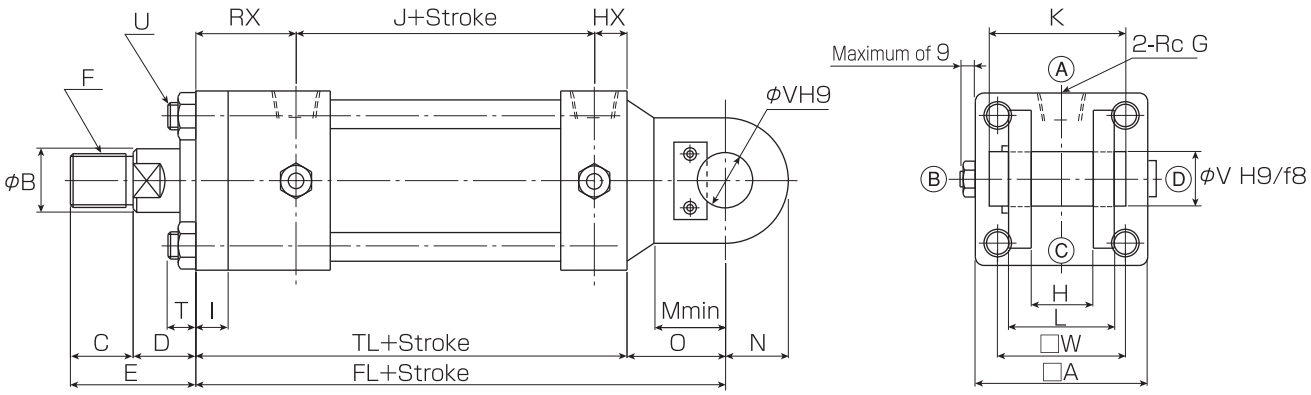
Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

CB Single Rod

About opposite layout



The CB mounting is equipped with a keeper plate for fastening the pin. Normally, the keeper plate is located at the B position. If you order the opposite layout to use two cylinders, specify the model code that indicates the opposite layout: For example: "ABC" (as shown on the left), or "CBA" (as shown on the right).



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.
Note 2) Pins are included as standard up to φ125. They are offered as options above φ140.
Note 3) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P.102.

■CB Type Basic Table of Dimensions

[ ] indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

Units:㎜

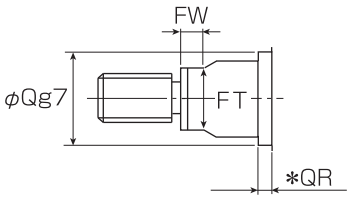
Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	FL	RX	HX	T	I	M	N	O	φV	U	□A	□W	H	L	K	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	191	43	15	13	13	25	25	35	20	M12 P1.5	70	50	$32^{+0.4}_{+0.1}$	64	76.5	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	217	48	18	14	15	32	30	45	25	M14 P1.5	85	62	$36^{+0.4}_{+0.1}$	72	85	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	242	56	18	16	18	40	35	55	31.5	M16 P1.5	100	74	$40^{+0.4}_{+0.1}$	80	93	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	288	69	20	18	24	50	40	70	40	M18 P1.5	125	92	$50^{+0.4}_{+0.1}$	100	117	3/4
φ100	56	55	95	M48 P1.5	14	40	230	139	310	71	20	21	26	63	50	80	50	M22 P1.5	160	120	$63^{+0.4}_{+0.1}$	126	143	3/4
φ125	71	75	120	M64 P2	13	45	267	159	372	83	25	25	33	79	63	105	63	M27 P1.5	190	145	$80^{+0.6}_{+0.1}$	160	183	1
φ140	80	80	130	M72 P2	14	50	275	164	390	86	25	27	36	89	71	115	71	M30 P1.5	215	165	$80^{+0.6}_{+0.1}$	160	183	1
φ160	90	90	145	M80 P2	14	55	304	186	429	94	24	29	41	100	80	125	80	M33 P1.5	240	185	$100^{+0.6}_{+0.1}$	200	225	1

[The A Rod thread diameter conforms to our company's standards and corresponds to theB Rod's.]

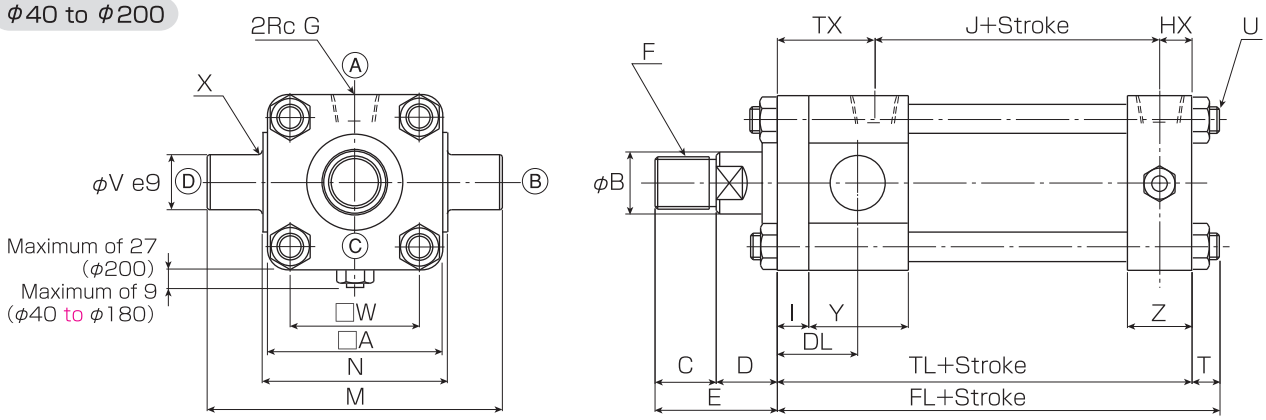
Symbol / Bore	A Rod φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61

Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.
Note2) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

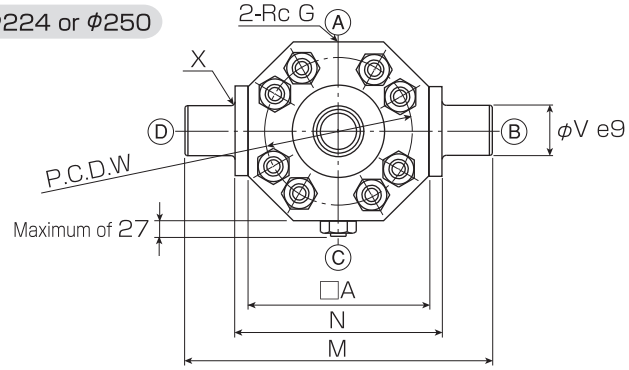
TA Single Rod



φ40 to φ200



φ224 or φ250



Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.

Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P. 102.

■TA Type Basic Table of Dimensions

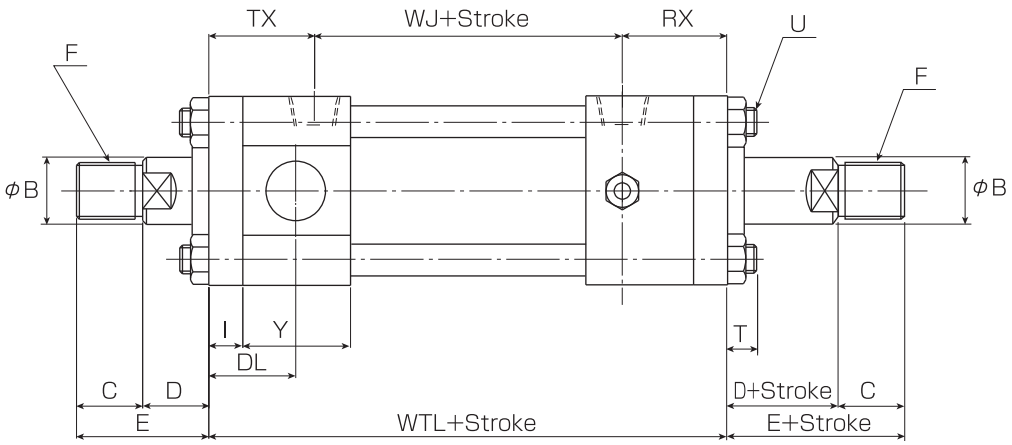
[ ] indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

Units:mm

Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	FL	TX	HX	I	Y	Z	DL	T	U	□A	□W	N	M	X	φV	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	169	43	15	13	47	32	36	13	M12 P1.5	70	50	$73_{-0.30}^{0}$	123	R2.5	25	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	186	48	18	15	52	37	41	14	M14 P1.5	85	62	$88_{-0.35}^{0}$	138	R2.5	25	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	203	56	18	18	57	37	46	16	M16 P1.5	100	74	$106_{-0.35}^{0}$	169	R2.5	31.5	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	236	69	20	24	67	42	57	18	M18 P1.5	125	92	$128_{-.040}^{0}$	208	R3	40	3/4
φ100	56	55	95	M48 P1.5	14	40	230	139	251	71	20	26	67	42	59	21	M22 P1.5	160	120	$170_{-0.40}^{0}$	270	R3	50	3/4
φ125	71	75	120	M64 P2	13	45	267	159	292	83	25	33	77	52	71	25	M27 P1.5	190	145	$205_{-0.46}^{0}$	331	R4	63	1
φ140	80	80	130	M72 P2	14	50	288	164	315	99	25	36	90	52	81	27	M30 P1.5	215	165	$225_{-0.46}^{0}$	367	R4	71	1
φ160	90	90	145	M80 P2	14	55	324	186	353	114	24	41	100	51	91	29	M33 P1.5	240	185	$255_{-0.52}^{0}$	415	R4	80	1
φ180	100	105	160	M95 P2.0	10	55	354	210	390	115	29	41	106	61	94	36	M39 P1.5	260	195	$280_{-0.8}^{0}$	460	R5	90	1 1/4
φ200	112	110	165	M100 P2.0	10	55	399	228	440	131	40	51	116	76	109	41	M45 P1.5	310	230	$320_{-0.8}^{0}$	520	R5	100	1 1/2
φ224	125	130	190	M120 P2.0	10	60	420	229	449	151	40	51	136	76	119	29	M33 P1.5	330	P.C.D φ317	$355_{-0.8}^{0}$	579	R5	112	1 1/2
φ250	140	140	205	M130 P2.0	10	65	464	262	500	154	48	56	146	96	129	36	M39 P1.5	375	P.C.D φ355	$400_{-0.8}^{0}$	650	R5	125	2

Note) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

TA Double Rod
[Standard Equivalent]



[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

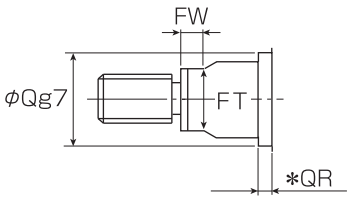
■Double Rod

Units:mm

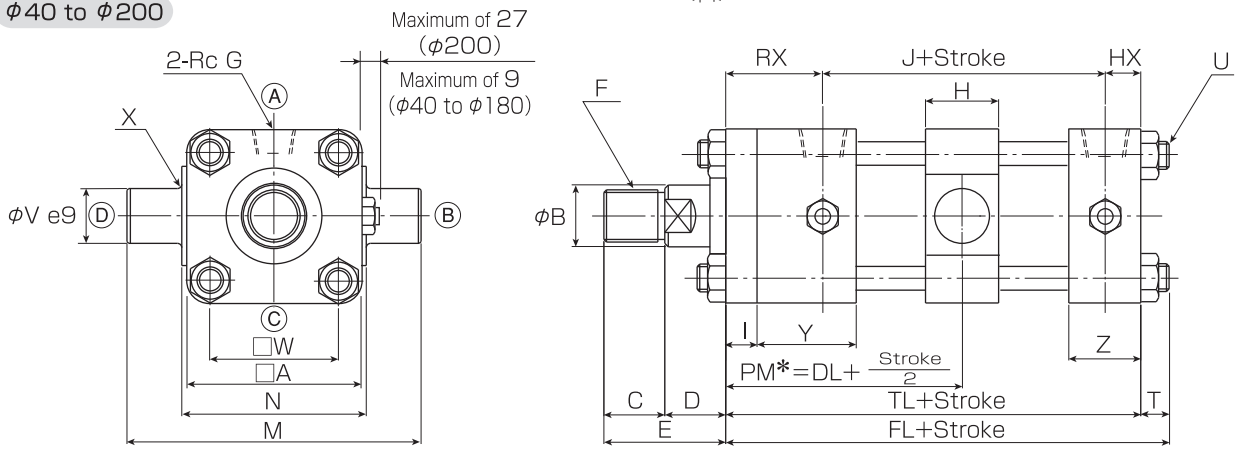
Symbol / Bore	WTL	WJ	RX
φ40	184	98	43
φ50	202	106	48
φ63	225	113	56
φ80	267	129	69
φ100	281	139	71
φ125	325	159	83
φ140	349	164	86
φ160	394	186	94

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

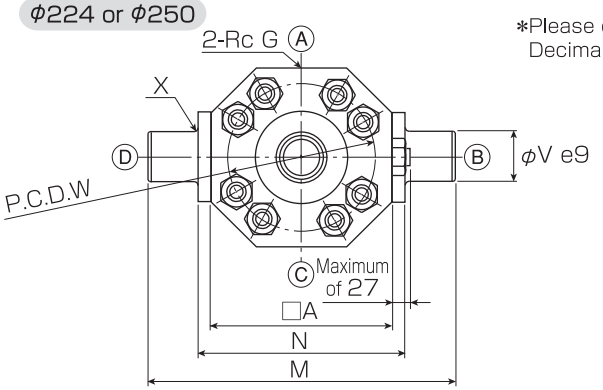
TC Single Rod



φ40 to φ200



φ224 or φ250



*Please direct it separately when the size PM is different from the catalogue mark.
Decimal digits of the PM dimension are omitted.

Note 1) Ⓐ,Ⓑ,Ⓒ,Ⓓ are the positioning relationships of the port, valve, etc.

Note 2) The length of the thread (C dimension) of the lock nut-end fitting will be the recommended thread length for the lock nut assembly given on P. 102.

■TC Type Basic Table of Dimensions

[▭ indicates no switch, switch adjusted specifications (up to φ80) are common ranges.]

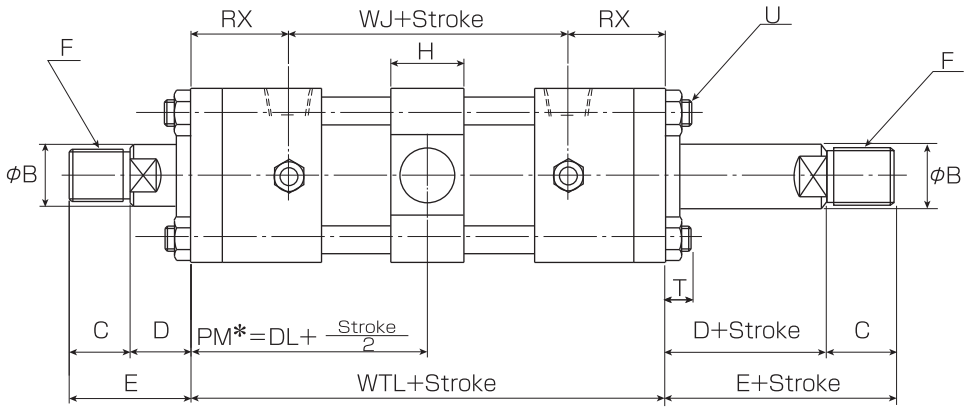
Units:㎜

Symbol / Bore	B Rod φB	C	E	F	QR	D	TL	J	FL	DL	RX	HX	I	Y	Z	T	H	U	□A	□W	N	M	X	φV	RcG
φ40	22.4	25	55	M20 P1.5	11	30	156	98	169	92	43	15	13	47	32	13	33	M12 P1.5	70	50	73 $^{0}_{-0.30}$	123	R2.5	25	3/8
φ50	28	30	60	M24 P1.5	14	30	172	106	186	101	48	18	15	52	37	14	33	M14 P1.5	85	62	88 $^{0}_{-0.35}$	138	R2.5	25	1/2
φ63	35.5	35	70	M30 P1.5	15	35	187	113	203	113	56	18	18	57	37	16	42	M16 P1.5	100	74	106 $^{0}_{-0.35}$	169	R2.5	31.5	1/2
φ80	45	45	80	M39 P1.5	9	35	218	129	236	134	69	20	24	67	42	18	52	M18 P1.5	125	92	128 $^{0}_{-0.40}$	208	R3	40	3/4
φ100	56	55	95	M48 P1.5	14	40	230	139	251	141	71	20	26	67	42	21	62	M22 P1.5	160	120	170 $^{0}_{-0.40}$	270	R3	50	3/4
φ125	71	75	120	M64 P2	13	45	267	159	292	163	83	25	33	77	52	25	77	M27 P1.5	190	145	205 $^{0}_{-0.46}$	331	R4	63	1
φ140	80	80	130	M72 P2	14	50	275	164	302	168	86	25	36	77	52	27	87	M30 P1.5	215	165	225 $^{0}_{-0.46}$	367	R4	71	1
φ160	90	90	145	M80 P2	14	55	304	186	333	187	94	24	41	80	51	29	97	M33 P1.5	240	185	255 $^{0}_{-0.52}$	415	R4	80	1
φ180	100	105	160	M95 P2.0	10	55	344	210	380	207	105	29	41	96	61	36	107	M39 P1.5	260	195	280 $^{0}_{-0.8}$	460	R5	90	1 1/4
φ200	112	110	165	M100 P2.0	10	55	389	228	430	234	121	40	51	106	76	41	117	M45 P1.5	310	230	320 $^{0}_{-0.8}$	520	R5	100	1 1/2
φ224	125	130	190	M120 P2.0	10	60	390	229	419	234	121	40	51	106	76	29	137	M33 P1.5	330	P.C.D φ317	355 $^{0}_{-0.8}$	579	R5	112	1 1/2
φ250	140	140	205	M130 P2.0	10	65	444	262	480	264	134	48	56	126	96	36	147	M39 P1.5	375	P.C.D φ355	400 $^{0}_{-0.8}$	650	R5	125	2

Note) Please refer to S type basic size table of P.84 for B rod φQ·FT·FW.

TC Double Rod

[Standard Equivalent]



[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod's.]

Units:mm

Symbol / Bore	A Rod								
	φB	C	E	F	φQ	FT	FW	QR	D
φ40	28	25	60	M20 P1.5	46	24	10	16	35
φ50	35.5	30	65	M24 P1.5	55	30	13	18	35
φ63	45	35	70	M30 P1.5	65	41	15	15	35
φ80	56	45	87	M39 P1.5	80	50	20	16	42
φ100	71	55	101	M48 P1.5	95	65	20	20	46
φ125	90	75	129	M64 P2	120	85	30	13	54
φ140	100	80	131	M72 P2	130	95	30	15	51
φ160	112	90	151	M80 P2	140	105	30	14	61
φ180	125	105	165	M95 P2.0	155	120	35	10	60
φ200	140	110	175	M100 P2.0	170	133	45	10	65
φ224	160	130	195	M120 P2.0	190	155	45	10	65
φ250	180	140	205	M130 P2.0	215	170	45	10	65

■Double Rod

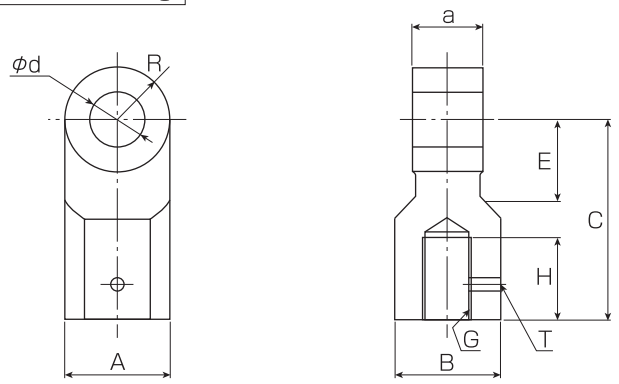
Units:mm

Symbol / Bore	WTL	WJ
φ40	184	98
φ50	202	106
φ63	225	113
φ80	267	129
φ100	281	139
φ125	325	159
φ140	336	164
φ160	374	186

Note) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

■Single Protrusion End Joint : T type

Bore	Material
φ40 to φ100	Spheroidal Graphite Iron Casting



■Single Protrusion End Joint Dimension Table〈B(A) Rods〉

Units:㎜

Symbol / Bore	φd	a	A	B	C	E	G	H	R	T
φ40	20	31.5 $^{-0.1}_{-0.4}$	42	47	70	28	M20 P1.5	35	22	M8
φ50	25	35.5 $^{-0.1}_{-0.4}$	52	52	85	35	M24 P1.5	38	27	M8
φ63	31.5	40 $^{-0.1}_{-0.4}$	62	62	115	43	M30 P1.5	47	33	M8
φ80	40	50 $^{-0.1}_{-0.4}$	82	82	145	55	M39 P1.5	62	43	M10
φ100	50	63 $^{-0.1}_{-0.4}$	102	102	180	65	M48 P1.5	77	53	M10

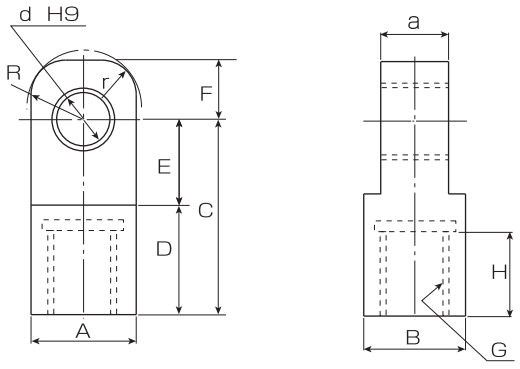
■Mass Table of Single Protrusion End Joint

Units:kg

内径	Single Protrusion End Joint
φ40	0.70
φ50	1.21
φ63	2.29
φ80	5.33
φ100	10.00

■Single Protrusion End Joint : T type

Bore	Material
φ125 to φ250	Rolled Steel for General Structure (With Bush)



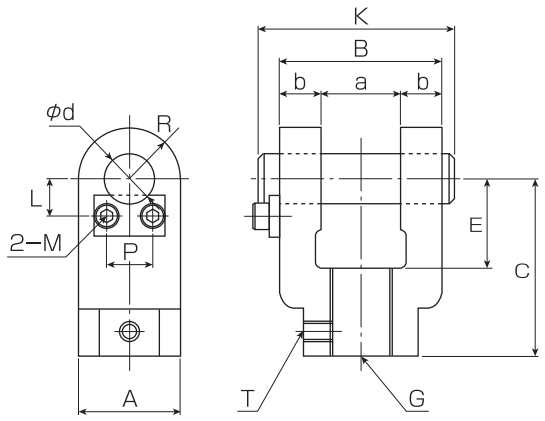
■Single Protrusion End Joint Dimension Table

Units:㎜

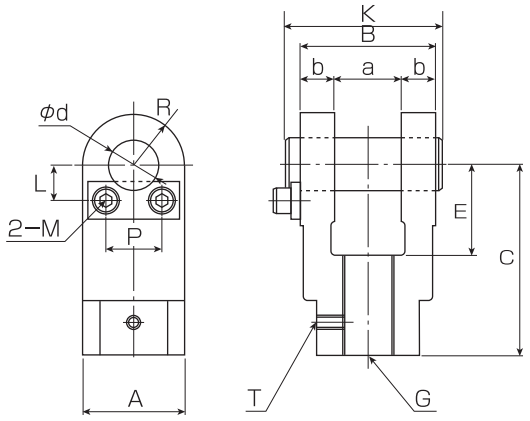
Symbol / Bore	φd	a	A	B	C	D	E	F	G	H	r	R	Parts Code
φ125	63	80 $^{-0.1}_{-0.6}$	120	120	225	140	85	65	M64 P2.0	82	42	71.5	TJ-T125B
φ140	71	80 $^{-0.1}_{-0.6}$	140	140	240	150	90	70	M72 P2.0	97	54	76	TJ-T140B
φ160	80	100 $^{-0.1}_{-0.6}$	160	160	270	170	100	80	M80 P2.0	112	62	87.5	TJ-T160B
φ180	90	125 $^{-0.1}_{-0.6}$	180	180	280	170	110	90	M95 P2.0	135	69	99	TJ-T180B
φ200	100	125 $^{-0.1}_{-0.6}$	200	200	300	180	120	100	M100 P2.0	120	72	112	TJ-T200B
φ224	112	140 $^{-0.1}_{-0.6}$	230	230	332	200	132	112	M120 P2.0	145	82	124.5	TJ-T224B
φ250	125	160 $^{-0.1}_{-0.6}$	250	250	355	210	145	125	M130 P2.0	155	87	141	TJ-T250B

■Double Protrusion End Joint : Y type

Bore	Material
φ40 to φ100	Spheroidal Graphite Iron Casting



φ40 to φ50



φ63 to φ100

■Double Protrusion End Joint Dimension Table 〈B(A) Rods〉

Units:㎜

Symbol / Bore	φd	a	b	A	B	C	E	G	R	K	T	M	L	P
φ40	20	31.5 +0.4 +0.1	16	42	63.5	70	32	M20 P1.5	22	76.5	M8	M6	14.5	18
φ50	25	35.5 +0.4 +0.1	18	52	71.5	85	45	M24 P1.5	27	85	M8	M10	18.5	25
φ63	31.5	40 +0.4 +0.1	20	62	80	115	50	M30 P1.5	33	93	M8	M10	22	33
φ80	40	50 +0.4 +0.1	25	82	100	145	65	M39 P1.5	43	117	M10	M10	25	40
φ100	50	63 +0.4 +0.1	31.5	102	126	180	75	M48 P1.5	53	143	M10	M10	29	50

■Mass Table of Double Protrusion End Joint

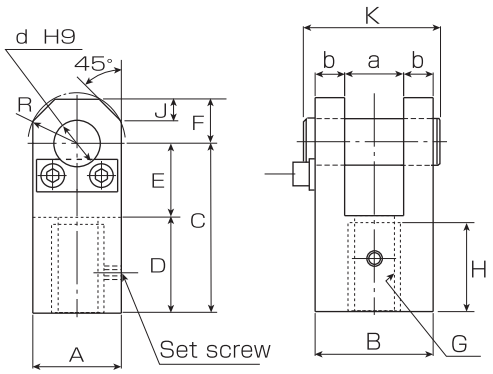
Units:kg

内径	Double Protrusion End Joint
φ40	0.77
φ50	1.29
φ63	2.33
φ80	5.01
φ100	10.01

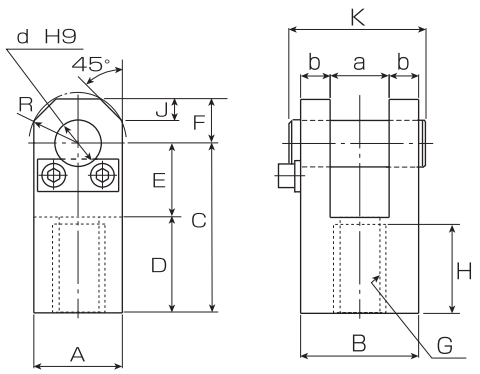
■Double Protrusion End Joint : Y type

Bore	Material
φ125 to φ250	Rolled Steel for General Structure

φ125 to φ160



φ180 to φ250



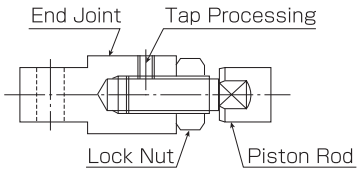
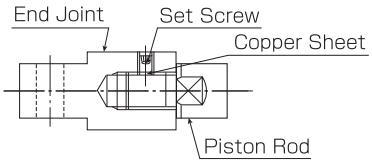
Note) Pins are included as standard up to φ125. They are offered as options above φ140.

■Double Protrusion End Joint Dimension Table

Units:㎜

Bore / Symbol	φd	a	b	A	B	C	D	E	F	G	H	J	R	K	Parts Code
φ125	63	80 +0.6 +0.1	40	120	160	225	135	90	65	M64 P2.0	92	30	71.5	183	YJ-T125B
φ140	71	80 +0.6 +0.1	40	140	160	240	140	100	70	M72 P2.0	103	40	76	183	YJ-T140B
φ160	80	100 +0.6 +0.1	50	160	200	270	160	110	80	M80 P2.0	112	45	87.5	225	YJ-T160B
φ180	90	125 +0.6 +0.1	62.5	180	250	280	170	110	90	M95 P2.0	135	50	98.5	276	YJ-T180B
φ200	100	125 +0.6 +0.1	62.5	200	250	300	180	120	100	M100 P2.0	120	55	110	276	YJ-T200B
φ224	112	140 +0.6 +0.1	70	220	280	332	200	132	110	M120 P2.0	145	65	121.5	310	YJ-T224B
φ250	125	160 +0.6 +0.1	80	250	320	355	210	145	125	M130 P2.0	155	70	136.5	350	YJ-T250B

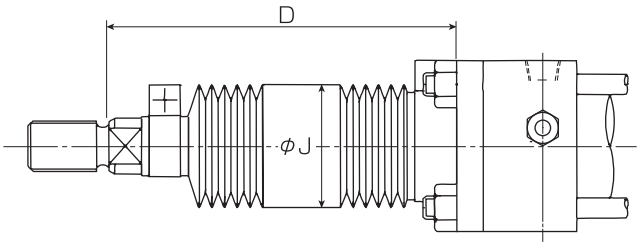
■Shipping Methods for Cylinders with End Joint

① When a cylinder with a lock nut and end joint is ordered	② When a cylinder is ordered with the end joint alone.
The end joint and lock nut are loosely assembled on the piston rod before shipping. The lock nut is not tightened so it will have to be tightened after adjusting the position of the end joint. 	The end joint will be tightened onto the piston rod and fixed with a set screw before shipping. 

■Bellows

J : (Material : Neoprene, Heat Resistant : 100℃)
JC : (Material : Conex, Heat Resistant : 220℃)
JS : (Material : Silicon Glass Cloth, Heat Resistant : 220℃)
JA : (Material : Aluminum Leaf Glass Cloth, Heat Resistant : 350 ℃)

Note 1) The Heat Resistance indicates the maximum allowable temperature for bellows.
Caution is advised because it differs from the heat resistant temperature of the cylinder body.
Note 2) Bellows is sent out after installing it on the cylinder.
Note 3) As for cylinders originally equipped with bellows, please specify the serial number or dimension D (in the illustration below) when ordering a replacement without the bellows.



■Table of Dimensions [Neoprene (J), Conex (JC)]

Units:㎜

Symbol / Bore	B Rod J 5 to 49	B Rod J from 50	B Rod D	A Rod J 5 to 49	A Rod J from 50	A Rod D
φ40	65	45	$\frac{ST}{3.5}$+45	70	55	$\frac{ST}{3.5}$+45
φ50	65	55	$\frac{ST}{3.5}$+45	80	70	$\frac{ST}{3.5}$+45
φ63	80	65	$\frac{ST}{4}$+55	85	80	$\frac{ST}{4}$+55
φ80	100	80	$\frac{ST}{4}$+55	105	85	$\frac{ST}{4}$+55
φ100	115	100	$\frac{ST}{4}$+55	105	105	$\frac{ST}{4}$+55
φ125	115	115	$\frac{ST}{5}$+65	135	135	$\frac{ST}{5}$+55
φ140	138	138	$\frac{ST}{5}$+65	150	150	$\frac{ST}{5}$+65
φ160	160	160	$\frac{ST}{5}$+65	170	170	$\frac{ST}{5}$+65
φ180	182	182	$\frac{ST}{5}$+65	185	185	$\frac{ST}{5}$+65
φ200	200	200	$\frac{ST}{5}$+65	210	210	$\frac{ST}{5}$+65
φ224	225	225	$\frac{ST}{6}$+80	230	230	$\frac{ST}{5}$+80
φ250	250	250	$\frac{ST}{6}$+80	260	260	$\frac{ST}{6}$+80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 5-strokes cannot be manufactured.

■Table of Dimensions [Silicon Glass Cloth(JS)]

Units:㎜

Symbol / Bore	B Rod J 6 to 59	B Rod J from 60	B Rod D	A Rod J 6 to 59	A Rod J from 60	A Rod D
φ40	55	45	$\frac{ST}{3}$+45	65	55	$\frac{ST}{3}$+45
φ50	65	55	$\frac{ST}{3}$+45	80	65	$\frac{ST}{3}$+45
φ63	80	65	$\frac{ST}{3}$+55	85	80	$\frac{ST}{3}$+55
φ80	100	80	$\frac{ST}{3}$+55	105	85	$\frac{ST}{3}$+55
φ100	115	100	$\frac{ST}{3.2}$+55	105	105	$\frac{ST}{3.2}$+55
φ125	115	115	$\frac{ST}{3.2}$+65	135	135	$\frac{ST}{3.2}$+55
φ140	138	138	$\frac{ST}{3.2}$+65	150	150	$\frac{ST}{3.2}$+65
φ160	160	160	$\frac{ST}{3.7}$+65	165	165	$\frac{ST}{3.7}$+65
φ180	182	182	$\frac{ST}{4}$+65	175	175	$\frac{ST}{4}$+65
φ200	200	200	$\frac{ST}{4.5}$+65	200	200	$\frac{ST}{4.5}$+65
φ224	225	225	$\frac{ST}{4.5}$+80	225	225	$\frac{ST}{4.5}$+80
φ250	250	250	$\frac{ST}{4.5}$+80	250	250	$\frac{ST}{4.5}$+80

Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 6-strokes cannot be manufactured.

■Table of Dimensions [Aluminum Foil Glass Cloth (JA)]

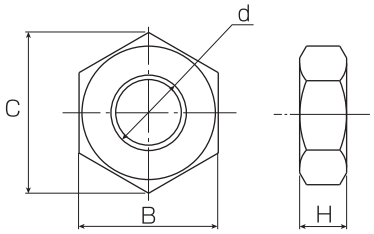
Units:㎜

Symbol / Bore	B Rod J 7 to 69	B Rod J from 70	B Rod D	A Rod J 7 to 69	A Rod J from 70	A Rod D
φ40	55	50	$\frac{ST}{2.5}$+45	65	55	$\frac{ST}{2.5}$+45
φ50	70	55	$\frac{ST}{2.5}$+45	80	65	$\frac{ST}{2.5}$+45
φ63	80	70	$\frac{ST}{2.5}$+55	85	80	$\frac{ST}{3.5}$+55
φ80	100	80	$\frac{ST}{3.5}$+55	105	85	$\frac{ST}{3.5}$+55
φ100	120	100	$\frac{ST}{3.5}$+55	105	105	$\frac{ST}{3.5}$+55
φ125	120	120	$\frac{ST}{3.5}$+65	135	135	$\frac{ST}{4}$+55
φ140	130	130	$\frac{ST}{4}$+65	150	150	$\frac{ST}{4.5}$+65
φ160	140	140	$\frac{ST}{4.5}$+65	170	170	$\frac{ST}{4.5}$+65
φ180	150	150	$\frac{ST}{4.5}$+65	180	180	$\frac{ST}{5}$+65
φ200	170	170	$\frac{ST}{4.5}$+65	220	220	$\frac{ST}{5}$+65
φ224	180	180	$\frac{ST}{5}$+80	230	230	$\frac{ST}{5}$+80
φ250	205	205	$\frac{ST}{5}$+80	260	260	$\frac{ST}{5}$+80

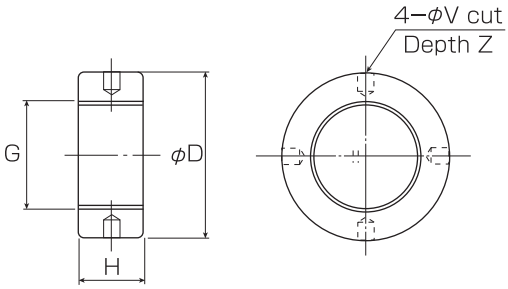
Note 1) In cases where the calculations resulted in decimal values, the values were rounded.
Note 2) The numbers under "J" indicate the Stroke.
Note 3) Bellows for less than 7-strokes cannot be manufactured.

■Lock Nut

Bore	Material
φ40 to φ250	Rolled Steel for General Structure



φ40 to φ180



φ200 to φ250

■Table of Dimensions

Units:㎜

Symbol / Bore	B Rod				
	d	H	B	C	Parts Code
φ40	M20 P1.5	12	30	34.6	LN-T40B
φ50	M24 P1.5	14	36	41.6	LN-T50B
φ63	M30 P1.5	18	46	53.1	LN-T63B
φ80	M39 P1.5	23	60	69.3	LN-T80B
φ100	M48 P1.5	29	75	86.5	LN-T100B
φ125	M64 P2	38	95	110	LN-T125B
φ140	M72 P2	42	105	121	LN-T140B
φ160	M80 P2	48	115	133	LN-T160B
φ180	M95 P2	57	135	156	LN-T180B

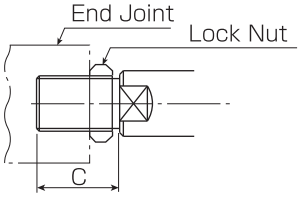
Symbol / Bore	G	H	φD	φd	Z	Parts Code
φ200	M100 P2	45	155	15	18	LN-T200B
φ224	M120 P2	55	185	15	18	LN-T224B
φ250	M130 P2	60	205	15	18	LN-T250B

■Recommended Thread Lengths with Lock Nuts

Units:㎜

Symbol / Bore	C Dimension (thread length)
	A Rod・B Rod
φ40	45
φ50	50
φ63	60
φ80	80
φ100	95
φ125	125
φ140	140
φ160	155
φ180	185

Symbol / Bore	G	C Dimension
φ200	M100 P2	165
φ224	M120 P2	200
φ250	M130 P2	215

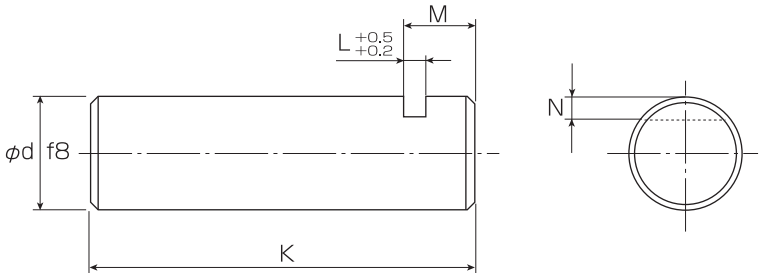


※The length of the thread (C Dimension) of the piston rod with a lock nut is based on an insertion length of 80% of the thread diameter, so in cases where it is insufficient, use the dimensions in the illustration above.

The recommended thread length with lock nut is adjusted in the case of equipped with the end joint and the lock nut.

■Pin

Bore	Material
φ32 to φ250	Carbon Steel for Machine Structural Use



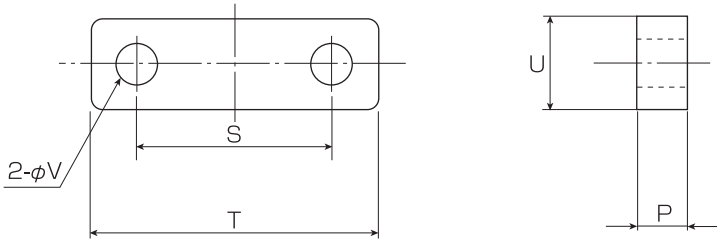
■Table of Dimensions

Units:㎜

Symbol / Bore	φd	L	M	N	K
φ40	20	4.5	8.5	3.5	76.5
φ50	25	6	9	5.5	85
φ63	31.5	6	9	5.5	93
φ80	40	6	12	6.5	117
φ100	50	6	12	7.5	143
φ125	63	8	18	10	183
φ140	71	9	19	11	183
φ160	80	9	20	12	225
φ180	90	12	22	14	276
φ200	100	12	22	14	276
φ224	112	12	25	15	310
φ250	125	12	25	15	350

■Keeper Plate

Bore	Material
φ40 to φ250	Rolled Steel for General Structure



■Table of Dimensions

Units:㎜

Symbol / Bore	V	U	P	S	T	With Hex Hole Bolt
φ40	6.5	16	4.5	18	28	M6
φ50	11	22	6	25	47	M10
φ63	11	22	6	33	55	M10
φ80	11	22	6	40	62	M10
φ100	11	22	6	50	72	M10
φ125	14	30	8	63	93	M12
φ140	14	30	9	71	101	M12
φ160	16	35	9	80	115	M14
φ180	16	38	2	90	125	M14
φ200	18	38	12	100	140	M16
φ224	18	38	12	115	155	M16
φ250	18	38	12	125	165	M16

■Mass Table (B Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)							Stroke Mass per 100mm
	S	FA	FB	LA	CA·CB	TA	TC	
φ40	4.4	5.1	5.4	5.4	5.1	4.6	5.4	1.2
φ50	8.1	9.3	10.0	9.2	9.4	8.3	9.6	2.0
φ63	13.2	15.1	16.9	14.5	15.2	13.6	15.2	2.9
φ80	23.6	25.6	28.3	25.5	27.0	24.4	26.5	4.5
φ100	39.6	44.0	49.3	44.7	46.0	41.3	47.2	7.4
φ125	68.5	78.5	87.1	77.0	81.7	71.9	81.5	12.1
φ140	92.4	101.0	114.2	97.6	108.9	97.1	107.5	16.4
φ160	126.0	139.7	156.0	130.7	151.6	132.9	149.7	19.2
φ180	155.6	177.9	199.4	—	198.1	171.3	188.5	18.7
φ200	244.9	282.1	319.5	—	295.9	265.0	298.9	23.9
φ224	290.7	335.6	378.8	—	363.3	331.9	359.6	29.3
φ250	393.3	470.1	525.4	—	495.8	434.5	493.0	35.4

■Mass Table (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)							Stroke Mass per 100mm
	S	FA	FB	LA	CA·CB	TA	TC	
φ40	4.6	5.3	5.6	5.6	5.3	4.8	5.6	1.4
φ50	8.4	9.6	10.3	9.5	9.7	8.6	9.9	2.3
φ63	13.8	15.7	17.5	15.1	15.8	14.2	15.8	3.4
φ80	24.6	26.6	29.3	26.5	28.0	25.4	27.5	5.2
φ100	41.4	45.8	51.1	46.5	47.8	43.1	49.0	8.6
φ125	71.8	81.8	90.4	80.3	85.0	75.2	84.8	14.0
φ140	96.3	95	118.1	101.5	112.8	101.0	111.4	14.5
φ160	131.4	145.1	161.4	136.1	157.0	138.3	155.1	21.9
φ180	158.2	179.8	202.0	—	200.6	173.7	191.0	22.2
φ200	249.7	286.0	324.3	—	300.7	269.1	303.7	28.2
φ224	294.8	338.2	382.9	—	367.4	334.5	363.7	35.5
φ250	398.1	472.3	530.2	—	500.6	438.3	497.8	43.3

■Mass Table of Double Rod (B Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)							Stroke Mass per 100mm
	S	FA	FB	LA	CA·CB	TA	TC	
φ40	5.1	5.8	6.1	6.1	5.8	5.3	6.1	1.4
φ50	9.3	10.5	11.2	10.4	10.6	9.5	10.8	2.3
φ63	15.3	17.2	19.0	16.6	17.3	15.7	17.3	3.4
φ80	27.6	29.6	32.3	29.5	31.0	28.4	30.5	5.4
φ100	46.7	51.1	56.4	51.8	53.1	48.4	54.3	9.0
φ125	81.5	91.5	100.1	90.0	94.7	84.9	94.5	15.4
φ140	110.5	119.1	132.3	115.7	127.0	115.2	125.6	20.9
φ160	151.5	165.2	181.5	156.2	177.1	158.4	175.2	25.5
φ180	187.2	209.5	231.0	—	229.7	202.9	220.1	28.0
φ200	295.0	332.2	369.6	—	346.0	315.1	349.0	35.0
φ224	350.7	395.6	438.8	—	423.3	391.9	419.6	46.7
φ250	475.4	552.2	607.5	—	577.9	516.6	575.1	57.9

■Mass Table of Double Rod (A Rod)

Units: kg

Symbol / Bore	Basic Mass (Stroke: 0mm)							Stroke Mass per 100mm
	S	FA	FB	LA	CA·CB	TA	TC	
φ40	5.5	6.2	6.5	6.5	6.2	5.7	6.5	1.6
φ50	9.9	11.1	11.8	11.0	11.2	10.1	11.4	2.7
φ63	16.1	18.0	19.8	17.4	18.1	16.5	18.1	4.0
φ80	29.2	31.2	33.9	31.1	32.6	30.0	32.1	6.4
φ100	46.4	53.8	59.1	54.5	55.8	51.1	57.0	10.8
φ125	86.4	96.4	105.0	94.9	99.6	89.8	99.4	18.6
φ140	115.8	124.4	137.6	121.0	132.3	120.5	130.9	24.3
φ160	159.0	172.7	189.0	163.7	184.6	165.9	182.7	30.2
φ180	192.3	213.9	236.1	—	234.7	207.8	225.1	33.9
φ200	303.6	339.9	378.2	—	354.6	323.0	357.6	42.9
φ224	359.4	402.8	447.5	—	432.0	399.1	428.3	57.4
φ250	485.6	559.8	617.7	—	588.1	525.8	585.3	70.9

■Mass Table (End Joint, Lock Nut)

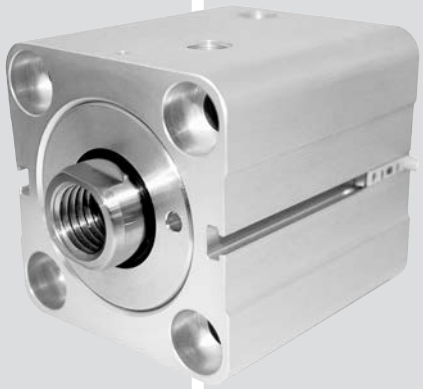
Units: kg

Symbol / Bore	Single Protrusion End Joint	Double Protrusion End Joint	Lock Nut
φ40	1.1	1.1	0.1
φ50	1.9	1.8	0.1
φ63	3.1	3.4	0.2
φ80	6.4	7.2	0.3
φ100	12.6	14.2	0.6
φ125	22.9	27.2	1.3
φ140	31.3	32.7	1.7
φ160	48.1	53.8	2.2
φ180	65.5	63.0	3.2
φ200	84.1	81.1	3.9
φ224	120.3	115.7	6.7
φ250	155.4	149.3	9.3

The A rod end joint is also applicable to the B rod.

C Series

10・14・16・21MPa



Compact Type Cylinder

Compact Design. A host of variations.

Our compact hydraulic cylinders use a unified tube and cover construction to provide a size that is approximately only a third (in-house comparison) of that of tie rod type cylinders. This enables them to be installed in spaces that would be impossible for conventional cylinders, making them perfect for variable applications.

■Features

Easy Maintenance

The packing can be changed by simply loosening the rod bushing without having to remove the main unit or disconnecting lines – the ultimate in easy maintenance!

Innovations that make installation a breeze

The attachment holes have been recessed to hide the cap bolts in the cylinder main unit. They can be attached from either the front or the rear. A parallel key has been attached in the Foot type, thereby eliminating the need for positioning

■Specifications

Series Name	CS	
Model	Standard Type	Foot Type
Mounting	SA·FA·FB	LD
Bore	φ32·φ40·φ50·φ63·φ80·φ100·φ125·φ140·φ150·φ160	φ32·φ40·φ50·φ63
Nominal Pressure Note 1)	16MPa	
Maximum Allowable Pressure Note 2)	16MPa	
Proof Pressure	21MPa	
Minimum Working Pressure Note 3)	0.64MPa or less	
Range of Operating Speed Note 4)	8 to 100㎜/s	
Range of Operating Temperature	φ32 to φ125:−10℃ to +120℃ (H-NBR) φ140 to φ160:−10℃ to +80℃ (NBR)	−10℃ to +120℃ (H-NBR)
Cushion	None	
Hydraulic Oil Applied	General Purpose Mineral Hydraulic Oil (Please specify when a different type of working oil is to be used)	
Thread Tolerance Note 5)	JIS 6g/6H (corresponds to JIS Grade 2)	
Stroke Tolerance	100㎜ or less $^{+0.8}_{0}$: 101㎜ to 250㎜ $^{+1.0}_{0}$	
Rod End Type	Female Thread or Male Thread	

Note 1) The "Nominal Pressure" is the set pressure of the relief valve in the hydraulic circuit the cylinder uses.
Note 2) The Maximum Allowable Pressure is the tolerance value for pressures, such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 3) When operating at the maximum operating speed, keep the inertial load pressures generated within the cylinder chamber below the Maximum Allowable Pressure.
Note 4) The Minimum Operating Pressure is the value when the pressure is supplied from the cap side.
Note 5) The female thread is a metric coarse thread.
Note 6) None of these cylinders have air bleeds.
Note 7) Radial loads cannot be applied to the piston rod, so care is necessary when adjusting them during installation.
Note 8) The range of operating temperature will vary with the packing material used.
Note 9) In the case where the piston strikes the cylinder end surface at the end of the stroke, reduce the speed to below the minimum speed.
Note 10) When tightening a double rod piston rod, always use on the width across flats side of the rod for tightening. The double rod type of piston rod ends with a thread, so make sure that the torque does not affect the ends of the piston rods.

■Mass Table

Units: kg

Symbol / Bore	CS							
	Standard Type				Foot Type			
	Single Rod		Double Rod		Single Rod		Double Rod	
	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass
φ32	1.36	0.25	2.21	0.25	1.39	0.26	2.01	0.26
φ40	1.67	0.30	2.83	0.30	1.76	0.32	2.56	0.32
φ50	2.32	0.37	3.87	0.37	2.58	0.41	3.62	0.41
φ63	3.57	0.47	5.89	0.47	4.26	0.57	5.90	0.57
φ80	6.35	0.67	9.94	0.67	—	—	—	—
φ100	15.4	1.22	20.6	1.22	—	—	—	—
φ125	27.8	2.02	36.8	2.02	—	—	—	—
φ140	58.3	2.26	—	—	—	—	—	—
φ150	72.4	2.59	—	—	—	—	—	—
φ160	96.4	3.31	—	—	—	—	—	—

Note) The stroke mass is the mass per 10mm of stroke.

■Stroke Table: Single Rod

Units:㎜

Type	Mounting	Bore (㎜)	Stroke																			Male Thread Specifications	Maximum Stroke
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CS Standard Type	SA FA FB	φ32	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	200
		φ40	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ50	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ63	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ80	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ100	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	250
		φ125	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	250
		φ140	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	250
		φ150	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	250
		φ160	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	250

Units:㎜

Type	Mounting	Bore (㎜)	Stroke																			Male Thread Specifications	Maximum Stroke
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CS Foot Type	LD	φ32	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	200
		φ40	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	250
		φ50	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	250
		φ63	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	250

■Stroke Table: Double Rod

Units:㎜

Type	Mounting	Bore (㎜)	Stroke																			Male Thread Specifications	Maximum Stroke
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CS Standard Type	SA FA FB	φ32	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	100
		φ40	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	110
		φ50	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	140
		φ63	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	170
		φ80	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	200
		φ100	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	200
		φ125	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	200

Units:㎜

Type	Mounting	Bore (㎜)	Stroke																			Male Thread Specifications	Maximum Stroke
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CS Foot Type	LD	φ32	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	100
		φ40	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	110
		φ50	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	140
		φ63	○	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	170

Note 1) Standard ◎,Standard Equivalent ○, Special Order△
Note 2) The interval stroke of the multiples of 5 indicated by the O mark have external dimensions 5mm longer than the standard stroke. Example: The 15 stroke would have the external dimensions of the 20 stroke.
Note 3) As for the size that exceeds 100 strokes (the standardized form and the fundamental form), the installation hole changes into the tap.
The overall length will also differ for the up to dimentions the 100 stroke sizes so please refer to the Table of Dimensions.

■Packing Material

Code	1 (Standard)	3	9 (Standard)
Material	Nitrile Rubber	Fluoric Rubber	Hydrogenated Nitrile Rubber
Range of Operating Temperature	−10℃ to +80℃	−10℃ to +120℃	−10℃ to +120℃
General-purpose Mineral Hydraulic Oil	○	○	○
Emulsions of Water in Mineral Oil	○	○	◎
Emulsions of Mineral Hydraulic Oil in Water	○	○	◎
Water + Glycol-type Operating Oil	○	×	◎
Phosphate Ester Fluid	×	○	×
Fatty Acid Ester Fluid	○	○	○

Note) The ○ mark indicates its use is possible.
The X mark indicates it is not possible to use it.
Regarding the △ mark, consult us for details.
The ◎ mark indicates the packing material recommended for applications where wear resistance is important.

■Piston Area

Bore (mm)	Rod Diameter (mm)	Piston Area (㎠)	
		Push	Pull
φ32	φ18	8.0	5.5
φ40	φ22.4	12.6	8.6
φ50	φ28	19.6	13.5
φ63	φ35.5	31.2	21.3
φ80	φ45	50.2	34.3
φ100	φ56	78.5	53.9
φ125	φ71	122.7	83.1
φ140	φ80	153.9	103.6
φ150	φ85	176.7	119.9
φ160	φ90	201.0	137.4

■Code

CS - S A 9 SA 32 B 10 - M N YP

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

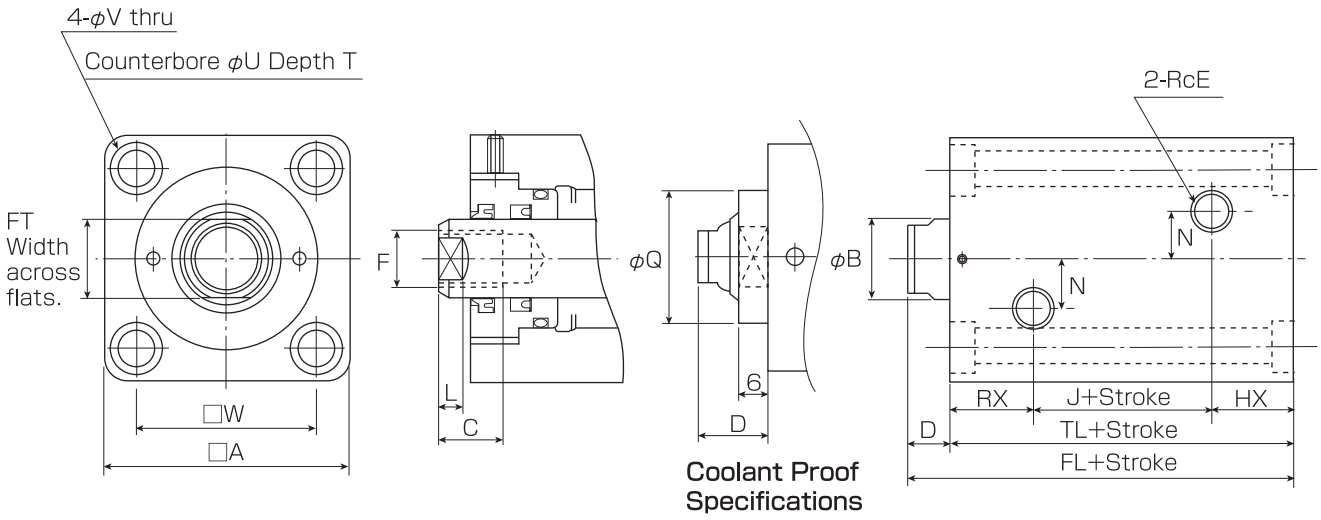
① Series Name	Standard: CS
② Single/Double Classification	S: Single Rod Type W: Double Rod Type (Special Order)
③ Standard Special Classification	A: Standard Dimensions
④ Packing Material	1. Nitrile Rubber (Standard:φ140 to φ160) 3. Fluoric Rubber 6. Coolant Proof Nitrile Rubber 7. Coolant Proof Fluoric Rubber 9. Hydrogenated Nitrile Rubber (Standard:φ32 to φ125)
⑤ Mounting	SA·FA·FB·LD (The key places to the accessory.)
⑥ Bore (mm)	φ32·φ40·φ50·φ63·φ80·φ100·φ125·φ140·φ150·φ160 (LD Foot type is up to 63.)
⑦ Type of Rod	B:B Rod
⑧ Stroke Length (mm)	5·10·15·20·25·30·35·40·45·50·60·70·80·90·100
⑨ Thread Specifications	M: Male Thread Specifications , No Notation; Female Thread Specifications(Standard) *In the case of double rods: male thread M , Female thread L : notated as MM, LL, ML, etc.Male / Female threads are standard for double rods , and so thread specifications are not described here.
⑩ Lock Nut	N: With Lock Nut; No Notation: None (this is an option of male thread specifications)
⑪ Rod End Joint	YP: Double Protrusion End Joint with Pin (Refer to P47.) T: Single Protrusion End Joint (Refer to P46.) (this is an option of male thread specifications)

Note 1) The Special Standard Classification will be selected at our company. Indicated in the product label.
Note 2) The standard of the packing material is hydrogenated nitrile for φ32 to φ125 and nitrile for φ140 to φ160.

Please refer to P.132 for information regarding male thread dimensions.

Basic Type [CS-SA]

Single Rod(up to 100 strokes)



Coolant Proof Specifications

The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:mm

Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX
φ32	62	18	15	10 (20)	1/4	M12XP1.75	64 (74)	14	12	14	7	10	28
φ40	70	22.4	20	10 (20)	1/4	M16XP2.0	65 (75)	19	12	16	7	10	27
φ50	80	28	24	11 (21)	1/4	M20XP2.5	71 (81)	24	13	19	8	10	28
φ63	94	35.5	33	13 (23)	1/4	M27XP3.0	80 (90)	30	13	24	9	10	30
φ80	114	45	33	17 (27)	3/8	M30XP3.5	95 (105)	41	18	25	14	15	35
φ100	145	56	45	26 (36)	3/8	M39XP4.0	121 (131)	50	21	39	20	0	35
φ125	185	71	50	31	1/2	M42XP4.5	136	65	26	44	25	0	35
φ140	205	80	55	35	1/2	M42XP4.5	220	75	66	53	25	0	66
φ150	220	85	60	40	1/2	M45XP4.5	240	80	71	58	30	0	71
φ160	245	90	65	40	1/2	M48XP5.0	255	85	76	63	30	0	76

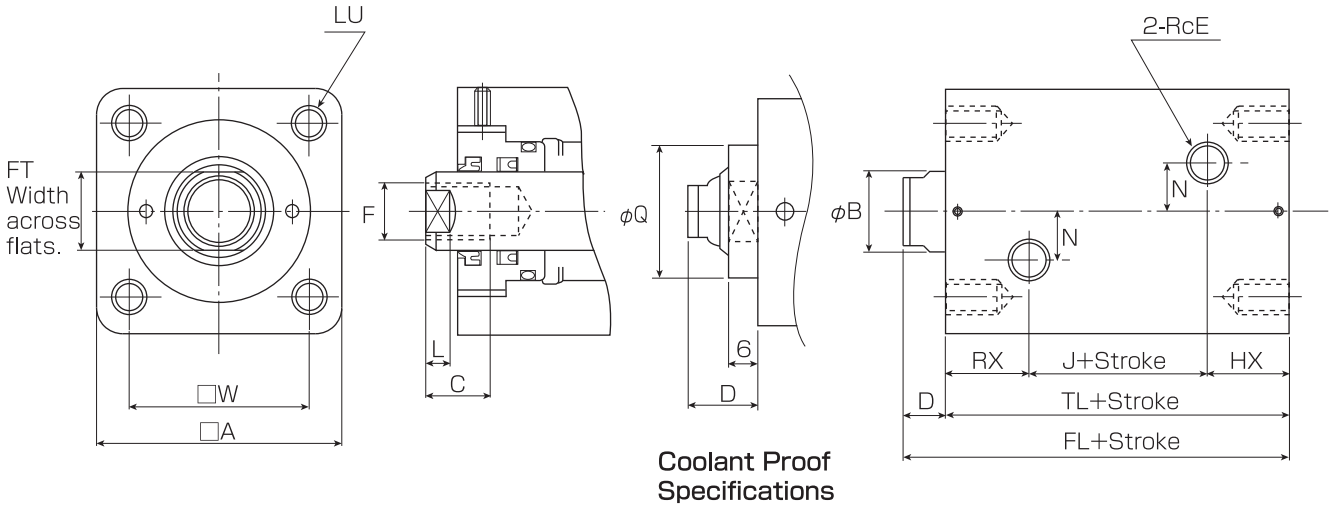
Units:mm

Bore \ Symbol	T	TL	φU	φQ	φV	□W
φ32	6.5	54	11	(37)	6.6	47
φ40	8.6	55	14	(45)	9	52
φ50	10.8	60	17.5	(53)	11	58
φ63	13	67	20	(63)	14	69
φ80	15.2	78	23	(80)	16	86
φ100	21.5	95	32	(105)	22	105
φ125	25.5	105	39	—	26	140
φ140	29	185	43	—	30	150
φ150	32	200	48	—	33	160
φ160	35	215	54	—	36	175

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

Basic Type [CS-SA]

Single Rod [Above 100 strokes, up to Maximum Stroke for Each Bore]



■Table of Dimensions (Above 100 strokes, up to maximum stroke)

Units: mm

Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N
φ32	62	18	15	10 (20)	1/4	M12×P1.75	82 (92)	14	28	16	7	10
φ40	70	22.4	20	10 (20)	1/4	M16×P2.0	82 (92)	19	27	18	7	10
φ50	80	28	24	11 (21)	1/4	M20×P2.5	86 (96)	24	28	19	8	10
φ63	94	35.5	33	13 (23)	1/4	M27×P3.0	95 (105)	30	30	22	9	10
φ80	114	45	33	17 (27)	3/8	M30×P3.5	112 (122)	41	35	25	14	15
φ100	145	56	45	26 (36)	3/8	M39×P4.0	138 (148)	50	35	42	20	0
φ125	185	71	50	31	1/2	M42×P4.5	148	65	35	47	25	0
φ140	205	80	55	35	1/2	M42XP4.5	220	75	66	53	25	0
φ150	220	85	60	40	1/2	M45XP4.5	240	80	71	58	30	0
φ160	245	90	65	40	1/2	M48XP5.0	255	85	76	63	30	0

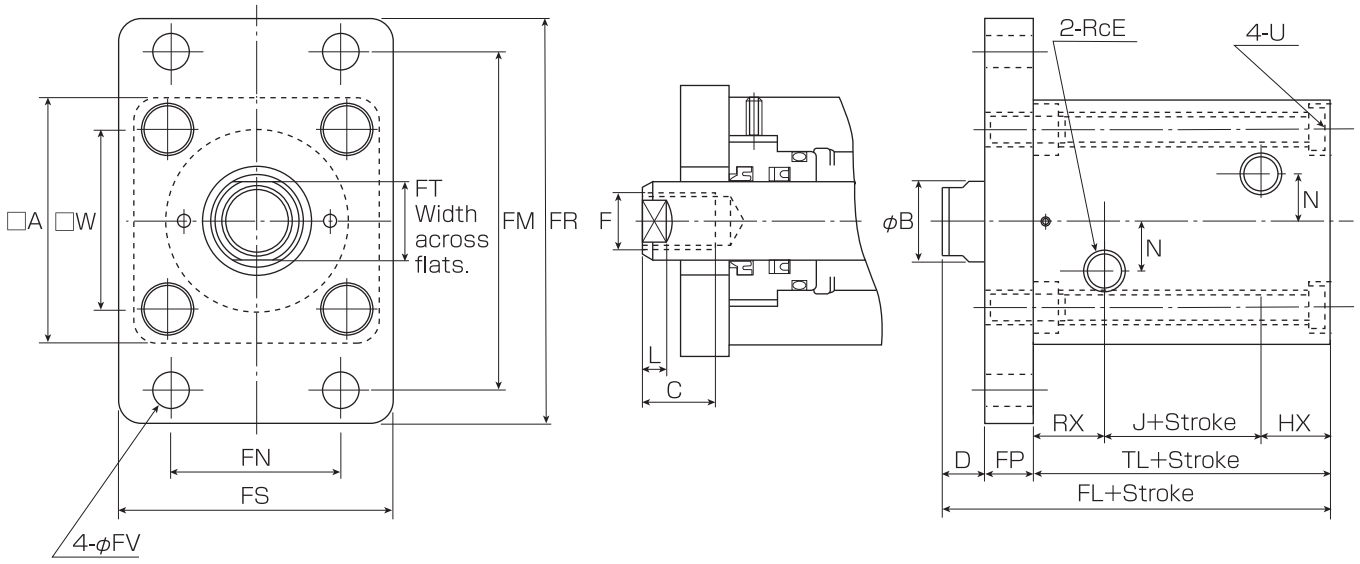
Units: mm

Bore \ Symbol	RX	TL	φQ	□W	LU
φ32	28	72	(37)	47	M6×P1.0 Depth 12
φ40	27	72	(45)	52	M8×P1.25 Depth 116
φ50	28	75	(53)	58	M10×P1.5 Depth 120
φ63	30	82	(63)	69	M12×P1.75 Depth 124
φ80	35	95	(80)	86	M14×P2.0 Depth 128
φ100	35	112	(105)	105	M18×P2.5 Depth 136
φ125	35	117	—	140	M22×P2.5 Depth 144
φ140	66	185	—	150	M27×P3.0 Depth 154
φ150	71	200	—	160	M30×P3.5 Depth 160
φ160	76	215	—	175	M33×P3.5 Depth 166

Note1) The stroke is given in units of 10mm.
Note2) The information contained between the parentheses ( ) is the coolant proof specifications.

Flange Type (CS-FA)

With FA Flange



Note) The standard stroke is up to100mm.

The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:㎜

Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	79 (97)	14	12 (28)	14	7	10	28	54 (72)	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	85 (102)	19	12 (27)	16	7	10	27	55 (72)	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	91 (106)	24	13 (28)	19	8	10	28	60 (75)	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	100 (119)	30	13 (30)	24	9	10	30	67 (82)	69	M12×P1.75
φ80	114	45	33	17	3/8	M30×P3.5	120 (140)	41	18 (35)	25	14	15	35	78 (95)	86	M14×P2.0
φ100	145	56	45	26	3/8	M39×P4.0	158 (175)	50	21 (35)	39	20	0	35	95 (112)	105	M20×P2.5
φ125	185	71	50	31	1/2	M42×P4.5	182 (194)	65	26 (35)	44	25	0	35	105 (117)	140	M24×P3.0
φ140	205	80	55	35	1/2	M42XP4.5	271	75	66	53	25	0	66	185	150	M27×P3.0
φ150	220	85	60	40	1/2	M45XP4.5	296	80	71	58	30	0	71	200	160	M30×P3.5
φ160	245	90	65	40	1/2	M48XP5.0	316	85	76	63	30	0	76	215	175	M33×P3.5

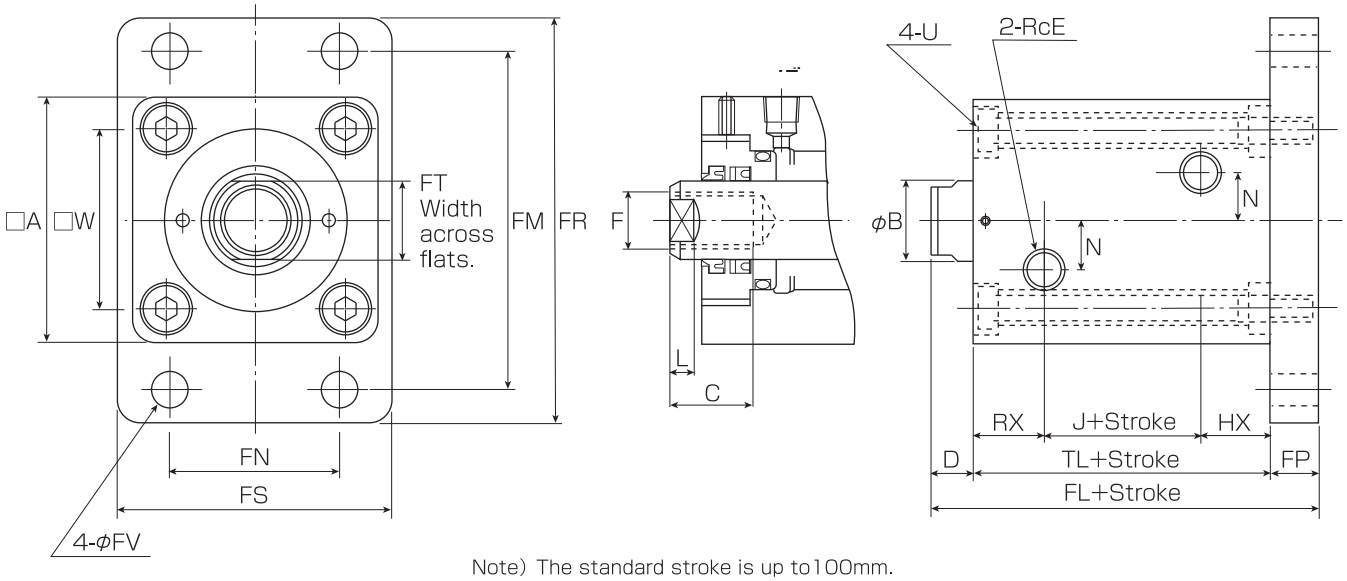
Units:㎜

Bore \ Symbol	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20 (24)	124	150	65	98	14
φ80	25 (28)	154	185	87	118	18
φ100	37	195	235	110	150	22
φ125	46	245	295	140	190	26
φ140	51	270	325	155	210	30
φ150	56	295	355	165	225	33
φ160	61	325	390	185	250	36

Note) The size when 100 strokes are exceeded is ( ).

Flange Type (CS-FB)

With FB Flange



Note) The standard stroke is up to100mm.

The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:㎜

Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	79 (97)	14	12 (28)	14	7	10	28	54 (72)	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	85 (102)	19	12 (27)	16	7	10	27	55 (72)	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	91 (106)	24	13 (28)	19	8	10	28	60 (75)	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	100 (119)	30	13 (30)	24	9	10	30	67 (82)	69	M12×P1.75
φ80	114	45	33	17	3/8	M30×P3.5	120 (140)	41	18 (35)	25	14	15	35	78 (95)	86	M14×P2.0
φ100	145	56	45	26	3/8	M39×P4.0	158 (175)	50	21 (35)	39	20	0	35	95 (112)	105	M20×P2.5
φ125	185	71	50	31	1/2	M42×P4.5	182 (194)	65	26 (35)	44	25	0	35	105 (117)	140	M24×P3.0
φ140	205	80	55	35	1/2	M42XP4.5	271	75	66	53	25	0	66	185	150	M27×P3.0
φ150	220	85	60	40	1/2	M45XP4.5	296	80	71	58	30	0	71	200	160	M30×P3.5
φ160	245	90	65	40	1/2	M48XP5.0	316	85	76	63	30	0	76	215	175	M33×P3.5

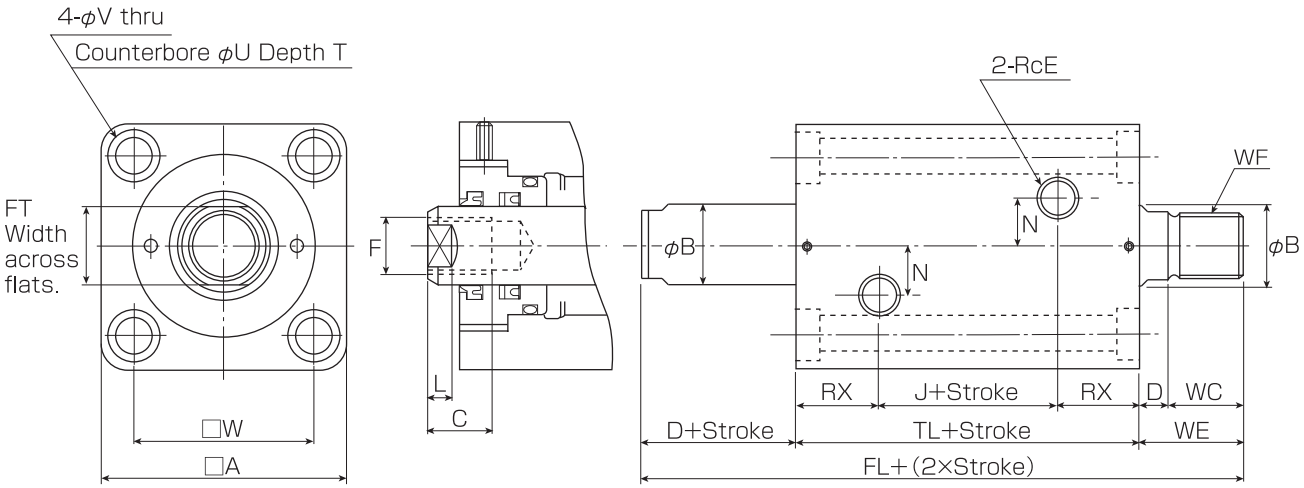
Units:㎜

Bore \ Symbol	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20 (24)	124	150	65	98	14
φ80	25 (28)	154	185	87	118	18
φ100	37	195	235	110	150	22
φ125	46	245	295	140	190	26
φ140	51	270	325	155	210	30
φ150	56	295	355	165	225	33
φ160	61	325	390	185	250	36

Note) The size when 100 strokes are exceeded is ( ).

Basic Type

Double Rod [Special Order]



Note 1) Right side of the double rods has standard male thread specifications.
Note 2) In cases of over 50 strokes, they are special specifications.

The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

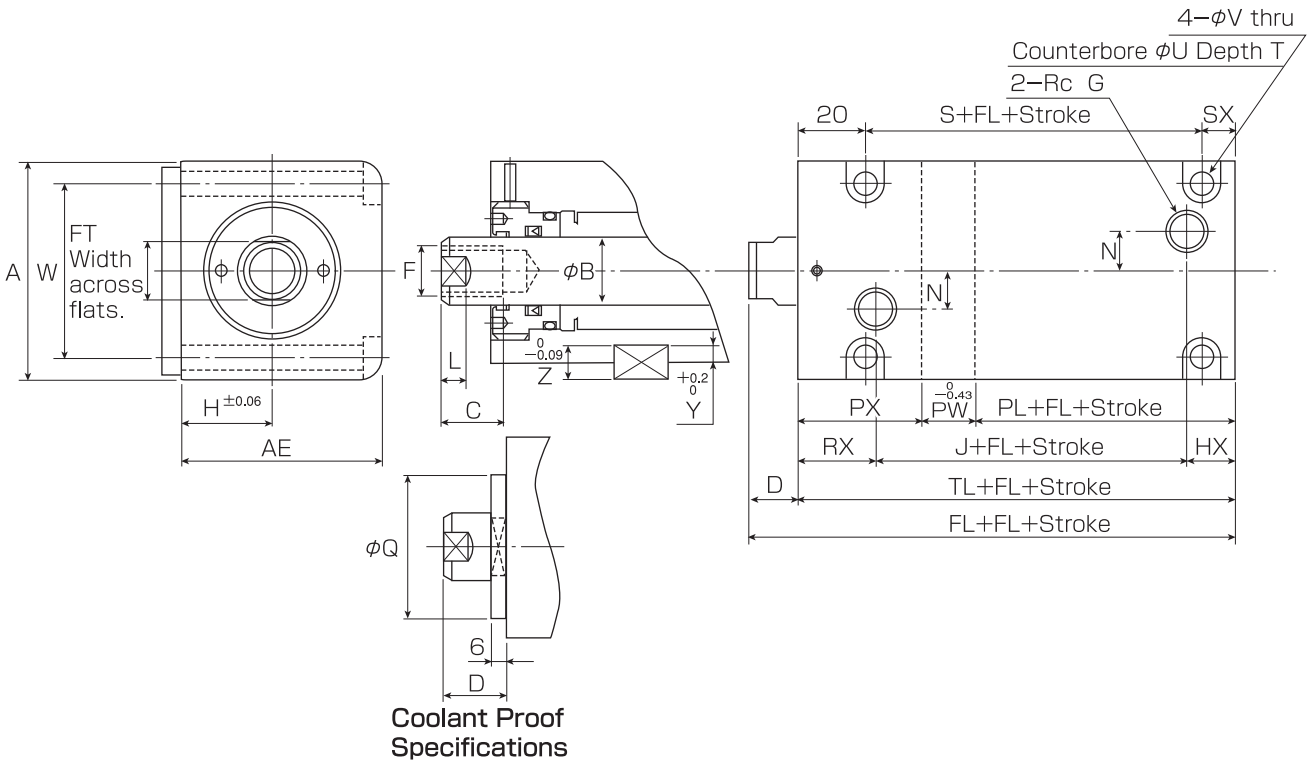
Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	J	L	N	RX	T	TL	φU
φ32	62	18	15	10	1/4	M12XP1.75	117	14	16	7	10	28	6.5	72	11
φ40	70	22.4	20	10	1/4	M16XP2.0	122	19	18	7	10	27	8.6	72	14
φ50	80	28	24	11	1/4	M20XP2.5	132	24	19	8	10	28	10.8	75	17.5
φ63	94	35.5	33	13	1/4	M27XP3.0	153	30	22	9	10	30	13	82	20
φ80	114	45	33	17	3/8	M30XP3.5	189	41	25	14	15	35	15.2	95	23
φ100	145	56	45	26	3/8	M39XP4.0	239	50	42	20	0	35	21.5	112	32
φ125	185	71	50	31	1/2	M42XP4.5	274	65	47	25	0	35	25.5	117	39

Units: mm

Bore \ Symbol	φV	□W	WF	WC	WE
φ32	6.6	47	M16×P1.5	25	35
φ40	9	52	M20×P1.5	30	40
φ50	11	58	M24×P1.5	35	46
φ63	14	69	M30×P1.5	45	58
φ80	16	86	M39×P1.5	60	77
φ100	22	105	M48×P1.5	75	101
φ125	26	140	M64×P2	95	126

Foot Type [CS-LD]

Single Rod(up to 100 strokes)



The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:mm

Bore \ Symbol	A	AE	φB	C	D	F	G	H	RX	HX	J	L	N	S	SX	PL	PX	PW	Y	Z
φ32	70	56	18	15	10 (20)	M12×P1.75	1/4	25	28	12	14	7	10	24	10	14	28	12	3.3	8
φ40	80	64	22.4	20	10 (20)	M16×P2.0	1/4	29	27	12	16	7	10	23	12	15	28	12	3.3	8
φ50	94	74	28	24	11 (21)	M20×P2.5	1/4	34	28	13	19	8	10	27	13	17	29	14	3.8	9
φ63	114	89	35.5	33	13 (23)	M27×P3.0	1/4	42	30	13	24	9	10	32	15	20	31	16	4.3	10

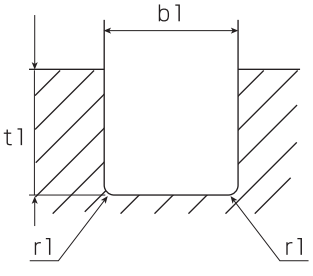
Bore \ Symbol	FT	TL	FL	φV	φU	φQ	T	W
φ32	14	54	64 (74)	9	14	(37)	8.6	56
φ40	19	55	65 (75)	11	17.5	(45)	10.8	62
φ50	24	60	71 (81)	14	20	(53)	13	74
φ63	30	67	80 (90)	16	23	(63)	15.2	90

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

■Recommended key slot size (Only the Foot type)

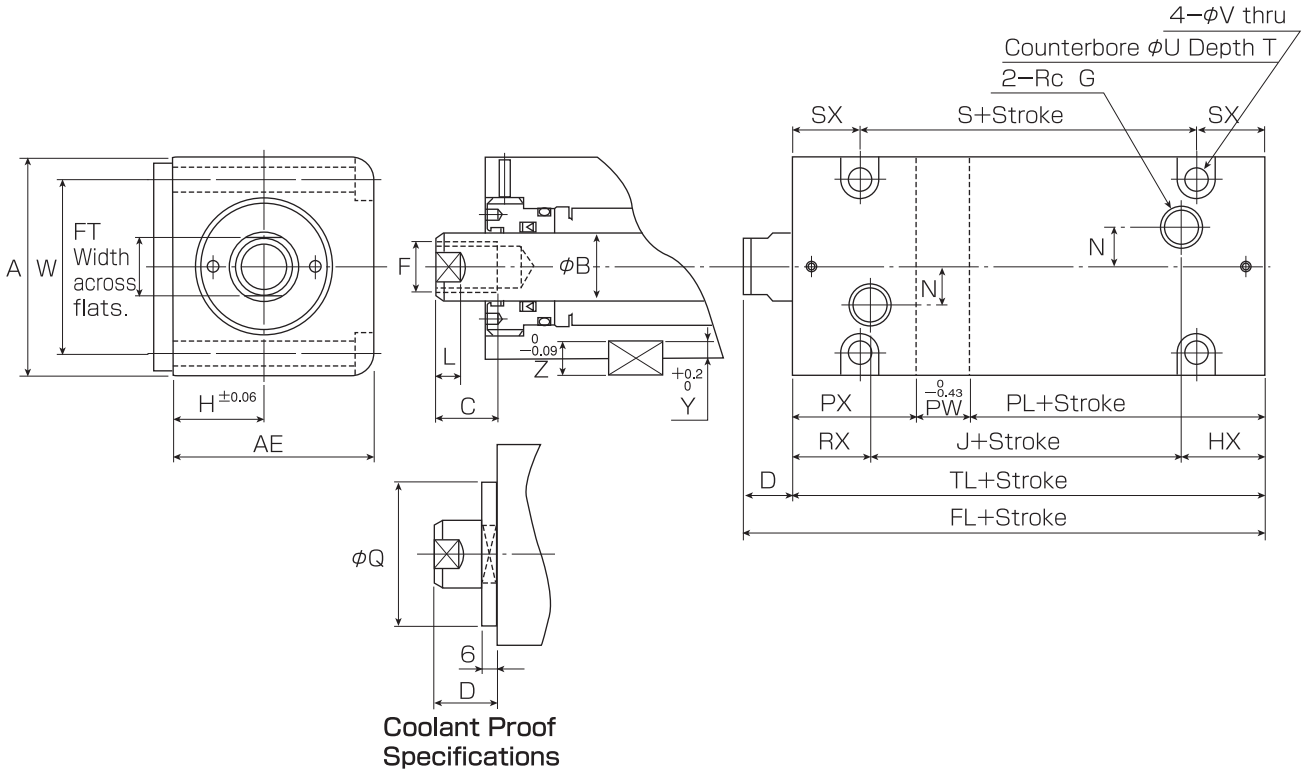
Units:mm

Bore	Key Size	Key Slot Dimension		
	b×h×t (Both are round.)	b1	t1	r1
φ32	12×8×63	$12\ ^{0}_{-0.043}$	$5.0\ ^{+0.2}_{0}$	0.3
φ40	12×8×70	$12\ ^{0}_{-0.043}$	$5.0\ ^{+0.2}_{0}$	0.3
φ50	14×9×90	$14\ ^{0}_{-0.043}$	$5.5\ ^{+0.2}_{0}$	0.3
φ63	16×10×100	$16\ ^{0}_{-0.043}$	$6.0\ ^{+0.2}_{0}$	0.3



Foot Type [CS-LD]

Single Rod [Above 100 strokes, Maximum Stroke for Each Bore]



The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:mm

Symbol / Bore	A	AE	φB	C	D	F	G	H	RX	HX	J	L	N	S	SX	PL	PX	PW	Y	Z
φ32	70	56	18	15	10 (20)	M12×P1.75	1/4	25	28	28	16	7	10	32	20	32	28	12	3.3	8
φ40	80	64	22.4	20	10 (20)	M16×P2.0	1/4	29	27	27	18	7	10	32	20	32	28	12	3.3	8
φ50	94	74	28	24	11 (21)	M20×P2.5	1/4	34	28	28	19	8	10	35	20	32	29	14	3.8	9
φ63	114	89	35.5	33	13 (23)	M27×P3.0	1/4	42	30	30	22	9	10	42	20	35	31	16	4.3	10

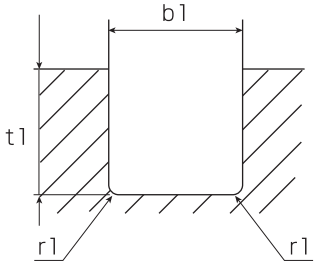
Symbol / Bore	FT	TL	FL	φV	φU	φQ	T	W
φ32	14	72	82 (92)	9	14	(37)	8.6	56
φ40	19	72	82 (92)	11	17.5	(45)	10.8	62
φ50	24	75	86 (96)	14	20	(53)	13	74
φ63	30	82	95 (105)	16	23	(63)	15.2	90

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

■Recommended key slot size (Only the Foot type)

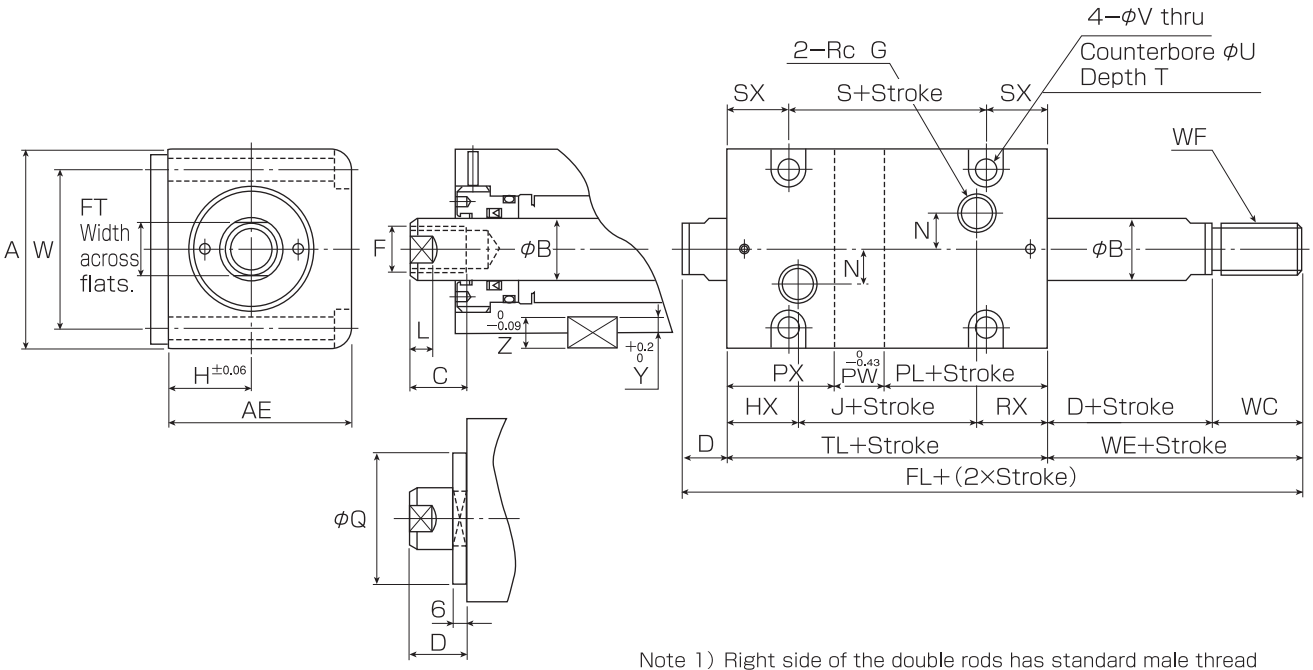
Units:mm

Bore	Key Size	Key Slot Dimension		
	b×h×t (Both are round.)	b1	t1	r1
φ32	12×8×63	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ40	12×8×70	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ50	14×9×90	$14^{\ 0}_{-0.043}$	$5.5^{+0.2}_{\ 0}$	0.3
φ63	16×10×100	$16^{\ 0}_{-0.043}$	$6.0^{+0.2}_{\ 0}$	0.3



Foot Type [CS-LD]

Double Rod



Coolant Proof Specifications

Note 1) Right side of the double rods has standard male thread specifications.
Note 2) In cases of over 50 strokes, they are special specifications.

The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:mm

Bore \ Symbol	A	AE	φB	C	D	F	G	H	RX	HX	J	L	N	S	SX	PL	PX	PW	Y	Z
φ32	70	56	18	15	10 (20)	M12×P1.75	1/4	25	28	28	16	7	10	32	20	32	28	12	3.3	8
φ40	80	64	22.4	20	10 (20)	M16×P2.0	1/4	29	27	27	18	7	10	32	20	32	28	12	3.3	8
φ50	94	74	28	24	11 (21)	M20×P2.5	1/4	34	28	28	19	8	10	35	20	32	29	14	3.8	9
φ63	114	89	35.5	33	13 (23)	M27×P3.0	1/4	42	30	30	22	9	10	42	20	35	31	16	4.3	10

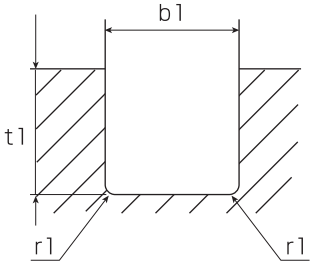
Bore \ Symbol	FT	TL	FL	φV	φU	φQ	T	W	WC	WE	WF
φ32	14	72	117 (127)	9	14	(37)	8.6	56	25	35	M16×P1.5
φ40	19	72	122 (132)	11	17.5	(45)	10.8	62	30	40	M20×P1.5
φ50	24	75	132 (142)	14	20	(53)	13	74	35	46	M24×P1.5
φ63	30	82	153 (163)	16	23	(63)	15.2	90	45	58	M30×P1.5

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

■Recommended key slot size (Only the Foot type)

Units:mm

Bore	Key Size	Key Slot Dimension		
	b×h×t (Both are round.)	b1	t1	r1
φ32	12×8×63	$12\ ^{0}_{-0.043}$	$5.0\ ^{+0.2}_{0}$	0.3
φ40	12×8×70	$12\ ^{0}_{-0.043}$	$5.0\ ^{+0.2}_{0}$	0.3
φ50	14×9×90	$14\ ^{0}_{-0.043}$	$5.5\ ^{+0.2}_{0}$	0.3
φ63	16×10×100	$16\ ^{0}_{-0.043}$	$6.0\ ^{+0.2}_{0}$	0.3



CSR Series ■16MPa

■Specifications

Series Name	CSR	
Mounting	SA·FA·FB	LD
Bore	φ32·φ40·φ50·φ63·φ80	φ32·φ40·φ50·φ63
Nominal Pressure Note 1)	16MPa	
Maximum Allowable Pressure Note 2)	16MPa	
Proof Pressure	21MPa	
Minimum Operating Pressure Note 3)	0.64MPa or less	
Range of Operating Speed Note 4)	8 to 100mm/sec	
Range of Operating Temperature Note 5)	Standard Specifications : -10℃ to +80℃ High Temperature Specifications : -10℃ to +100℃	
Cushion	None	
Hydraulic Oil Applied	General Purpose Mineral Hydraulic Oil (Please specify when a different type of operating oil is to be used)	
Thread Tolerance Note 6)	JIS 6g/6H	
Stroke Tolerance	100st or less : 0 to +0.8㎜ 101st to 250st : 0 to +1.0㎜	
Rod End Type	Female Thread or Male Thread	

Note 1) Dimensions of the special model are different from those of the standard model.
Note 2) The Maximum Allowable Pressure is the tolerance valu for pressures, such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 3) When operating at the maximum cylinder speed, keep the inertial load pressures generated within the cylinder chamber below Maximum Allowable Pressure.
Note 4) The Minimum Operating Pressure is the value when the pressure is supplied from the cap side.
Note 5) In the switch adjusted type, the temperature limit for the switch body should be under 60℃. (Select a special high-temperature switch in the case where temperatures will exceed 60℃) The high temperature specifications for the switch adjusted type vary with the packing/switch specifications so please contact us for usage details.
Note 6) The female thread is a metric coarse thread.
Note 7) None of these cylinders have air bleeds.
Note 8) Radial loads cannot be applied to the piston rod, so care is necessary when adjusting them during installation.
Note 9) In the case where the piston strikes the cylinder end surface at the end of the stroke, reduce the speed to below the minimum speed.
Note 10) When tightening a double rod piston rod, always use the double surface width side of the rod for tightening. The double rod type of piston rod ends with a thread, so make sure that the torque does not affect the ends of the piston rods.

■Stroke Table: Single Rod

Units:㎜

Type	Mounting	Bore	Stroke																			Male Thread Specifications	Maximum Stroke
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CSR	SA FA FB	φ32	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	200
		φ40	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ50	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ63	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
		φ80	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎	○	◎	○	◎	○	250
	LD	φ32	◎	○	◎	○	◎	○	◎	○	◎	△	○	△	○	△	○	△	○	△	○	○	200
		φ40	◎	○	◎	○	◎	○	◎	○	◎	△	○	△	○	△	○	△	○	△	○	○	250
		φ50	◎	○	◎	○	◎	○	◎	○	◎	△	○	△	○	△	○	△	○	△	○	○	250
		φ63	◎	○	◎	○	◎	○	◎	○	◎	△	○	△	○	△	○	△	○	△	○	○	250

■Stroke Table: Double Rod

Units:㎜

Type	Mounting	Bore	Stroke																			Male Thread Specifications	Maximum Stroke
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CSR	SA	φ32	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	100
		φ40	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	110
		φ50	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	140
		φ63	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	170
		φ80	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	200
	LD	φ32	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	100
		φ40	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	110
		φ50	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	140
		φ63	◎	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	170

Note 1) Standard ◎,Standard Equivalent ○, Special Order△
Note 2) The interval stroke of the multiples of 5 indicated by the O mark have external dimensions 5mm longer than the standard stroke.
Example: The 15 stroke would have the external dimensions of the 20 stroke.
Note 3) Please contact us for more information.

■Packing Material

Code	8 (Standard)	6 (Coolant Proof Specifications)	9 (Standard)
Material	Nitrile Rubber + Urethane rubber	Nitrile Rubber + Urethane rubber	Hydrogenated Nitrile Rubber
Range of Operating Temperature	−10℃ to +80℃	−10℃ to +80℃	−10℃ to +120℃
General-purpose Mineral Hydraulic Oil	◎	◎	○
Emulsions of Water in Mineral Oil	△	△	◎
Emulsions of Mineral Hydraulic Oil in Water	△	△	◎
Water + Glycol-type Operating Oil	×	×	◎
Phosphate Ester Fluid	×	×	×
Fatty Acid Ester Fluid	×	×	△

■Piston Area

Bore (mm)	Rod Diameter (mm)	Piston Area (㎠)			
		Single Rod		Double Rod	
		Push	Pull	Push	Pull
φ32	φ18	8.04	5.50	5.50	
φ40	φ22.4	12.57	8.63	8.63	
φ50	φ28	19.63	13.48	13.48	
φ63	φ35.5	31.17	21.27	21.27	
φ80	φ45	50.27	34.36	34.36	

Note 1) ○ -◎ mark can be used. x mark cannot be used. Please consult about △ mark separately.
Note 2) Urethane is contained in the piston packing of 8 (standard) and 6 (coolant-proof specification).
Note 3) Packing quality of the material 9: In selection of hydrogenated nitrile rubber, packing exchange cannot be performed of a visitor. Please return to our company.

■Code

CSR - S B 8 SA 32 B 10 - 2 C - M N YP
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Series Name	CSR : Switch adjusted type
② Single/Double Classification	S: Single Rod Type W: Double Rod Type (Special Order)
③ Standard Special Classification	A:Standard Dimensions B:In the cases of form with the length of a screw, size, and a special tip, etc. E:When attachment lug, tip metal fittings, etc. are special (a part of B-E -- when special, it writes in our company.)
④ Packing Material	8. Nitrile Rubber (Standard) 6. Coolant Proof Nitrile Rubber + Urethane rubber 9. Hydrogenated Nitrile Rubber (Standard)
⑤ Mounting	SA·FA·FB·LD (A key is included as an attachment)
⑥ Bore (mm)	φ32·φ40·φ50·φ63·φ80 (There is no φ80 Foot Type)
⑦ Type of Rod	B: B Rod
⑧ Stroke Length (mm)	10·15·20·25·30·35·40·45·50·60·70·80·90·100
⑨ Switch Quantity	Mention the quantity. 1A: In cases where a switch is not required. 1A2: For cylinder using CW or CX or WH or XH, No switch required. 1A3: For cylinder using SV or SH, No switch required.
⑩ Switch	C:T0V3 J:T0V5 CK:T5V3 CL:T5V5 DT:T2V3 DU:T2V5 CW:T2YV3 CH:T0H3 JH:T0H5 FJ: T0V-0.5 (For a DC connector system) FW: T0V-0.5 (For an AC connector system)XX: Special Part Please refer to P.138 for more detailed information on switches.
⑪ Thread Specifications	M: Male Thread Specifications, No Notation: Female Thread Specifications (Standard) *In the case of double rods: male threads M, Male Thread: L, is notated as MM, LL, ML, etc.
⑫ Lock Nut	N: With Lock Nut; No Notation: None (this is an option of male thread specifications are used)
⑬ Rod End Joint	YP: Double Protrusion End Joint with Pin (Refer to P47.) T: Single Protrusion End Joint (Refer to P46.) (this is an option of male thread specifications)

Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) When Switch the CX,CW,WH,XH,SH and SV is used, additional processing will be necessary.

Please refer to P.132 for more detailed information on male thread dimensions.

■Mass Table

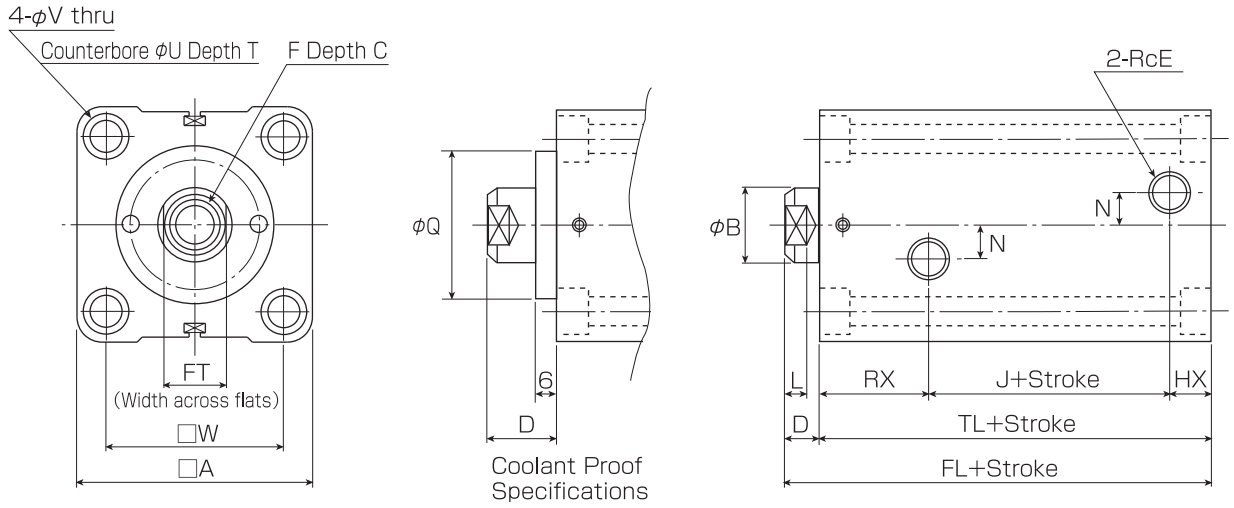
Units: kg

Symbol / Bore	CSR							
	SA				LD			
	Single Rod		Double Rod		Single Rod		Double Rod	
	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass
φ32	0.77	0.10	1.09	0.11	0.90	0.11	1.38	0.13
φ40	1.03	0.12	1.48	0.15	1.30	0.15	2.00	0.18
φ50	1.50	0.15	2.11	0.20	1.91	0.19	2.91	0.24
φ63	2.32	0.21	3.28	0.29	3.03	0.27	4.66	0.35
φ80	4.57	0.31	6.51	0.44	—	—	—	—

Note) The stroke mass is the mass per 10mm of stroke.

Basic Type [CSR-SA]

Single Stroke (Up to 100 strokes)



The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

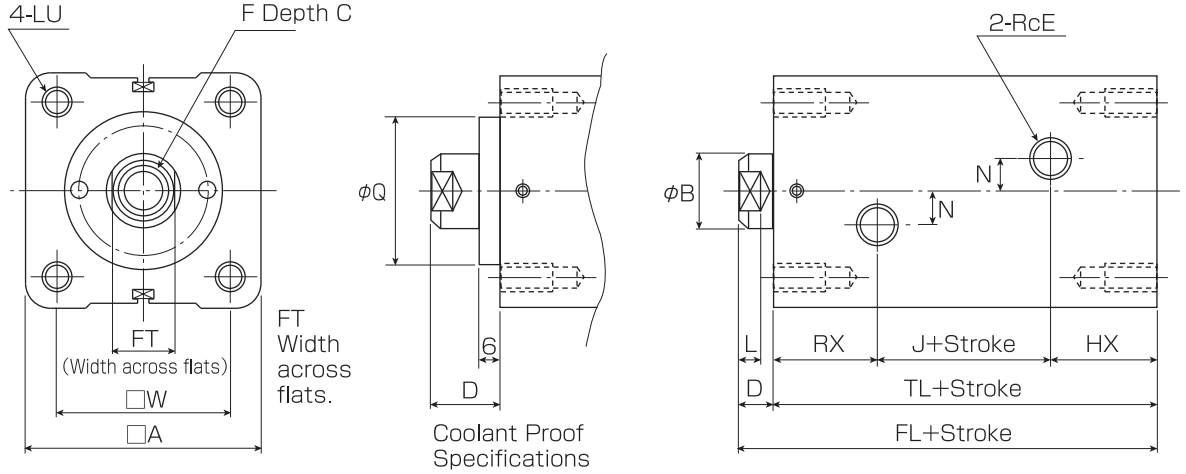
■Table of Dimensions (Up to 100 strokes)

Units: mm

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	T	TL	φU	φQ	φV	□W
φ32	62	18	15	10 (20)	1/4	M12XP1.75	69 (79)	14	13.5	18.5	7	10	27	6.5	59	11	(37)	6.6	47
φ40	70	22.4	20	10 (20)	1/4	M16XP2.0	73 (83)	19	16	21	7	10	26	8.6	63	14	(45)	9	52
φ50	80	28	24	11 (21)	1/4	M20XP2.5	77 (87)	24	19.5	19.5	8	10	27	10.8	66	17.5	(53)	11	58
φ63	94	35.5	33	13 (23)	1/4	M27XP3.0	87 (97)	30	22.5	22.5	9	10	29	13	74	20	(63)	14	69
φ80	114	45	33	17 (27)	3/8	M30XP3.5	107 (117)	41	30	26	14	15	34	15.2	90	23	(80)	16	86

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

Single Rod (Above 100 strokes, Maximum Stroke for Each Bore)



■Table of Dimensions (Above 100 strokes, Maximum Stroke for Each Bore)

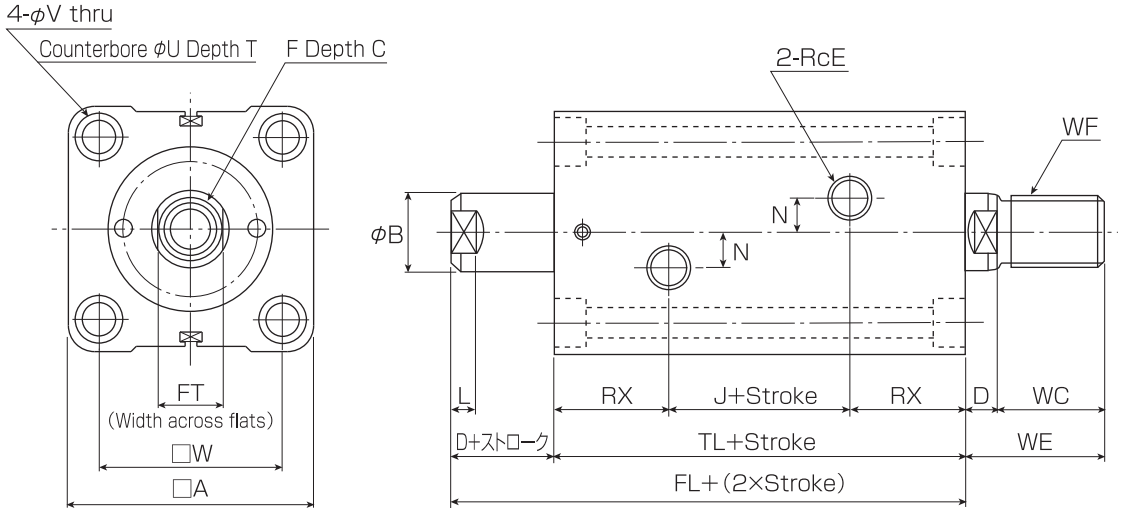
Units: mm

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	φQ	□W	LU
φ32	62	18	15	10 (20)	1/4	M12XP1.75	86 (96)	14	27	22	7	10	27	76	(37)	47	M 6XP1.0 Depth 12
φ40	70	22.4	20	10 (20)	1/4	M16XP2.0	87 (97)	19	26	25	7	10	26	77	(45)	52	M 8XP1.25 Depth 16
φ50	80	28	24	11 (21)	1/4	M20XP2.5	89 (99)	24	27	24	8	10	27	78	(53)	58	M10XP1.5 Depth 20
φ63	94	35.5	33	13 (23)	1/4	M27XP3.0	98 (108)	30	29	27	9	10	29	85	(63)	69	M12XP1.75 Depth 24
φ80	114	45	33	17 (27)	3/8	M30XP3.5	116 (126)	41	34	31	14	15	34	99	(80)	86	M14XP2.0 Depth 28

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

Basic Type [CSR-SA]

Double Rod



Note 1) Right side of the double rods has standard male thread specifications.
Note 2) In cases of over 50 strokes, They are special specifications.
Note 3) It becomes tap attachment when a stroke exceeds 100 mm.

■Table of Dimensions

Units: mm

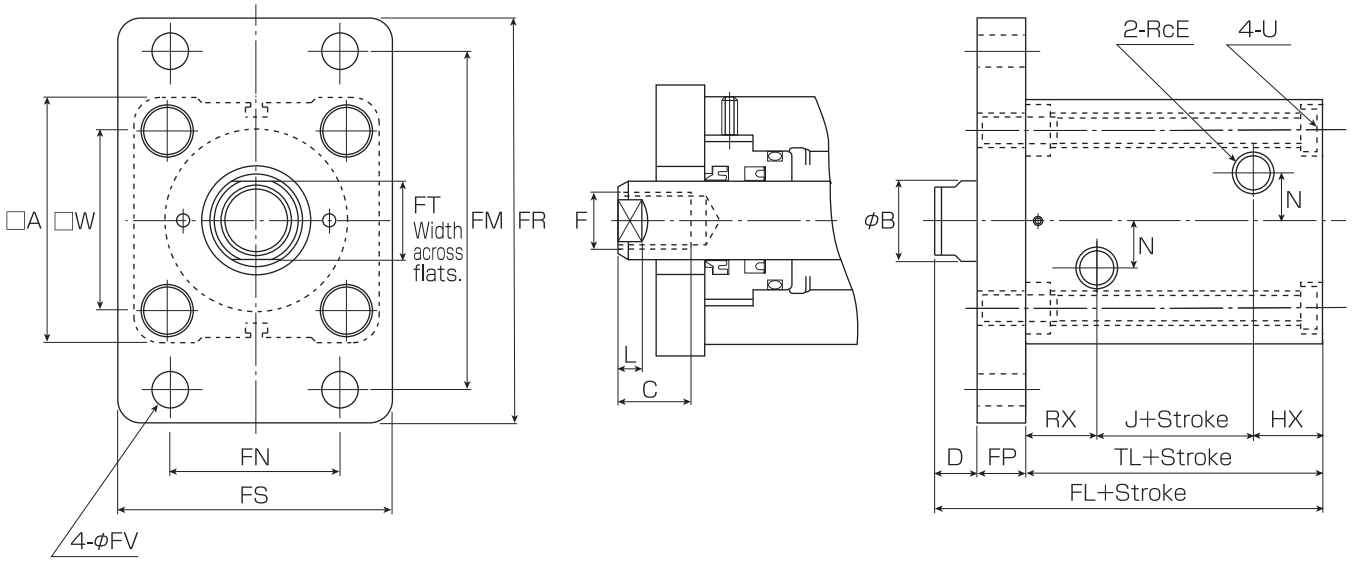
Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	J	L	N	RX	T	TL	φU
φ32	62	18	15	10	1/4	M12XP1.75	119	14	20	7	10	27	6.5	74	11
φ40	70	22.4	20	10	1/4	M16XP2.0	127	19	25	7	10	26	8.6	77	14
φ50	80	28	24	11	1/4	M20XP2.5	133	24	22	8	10	27	10.8	76	17.5
φ63	94	35.5	33	13	1/4	M27XP3.0	153	30	24	9	10	29	13	82	20
φ80	114	45	33	17	3/8	M30XP3.5	193	41	31	14	15	34	15.2	99	23

Units: mm

Symbol / Bore	φV	□W	WF	WC	WE
φ32	6.6	47	M16XP1.5	25	35
φ40	9	52	M20XP1.5	30	40
φ50	11	58	M24XP1.5	35	46
φ63	14	69	M30XP1.5	45	58
φ80	16	86	M39XP1.5	60	77

Basic Type [CSR-FA]

With FA Flange



Note) The standard stroke is up to100mm. Please contact us for stroke lengths above 100mm.

The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	84 (101)	14	13.5 (27)	18.5 (22)	7	10	27	59 (76)	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	93 (107)	19	16 (26)	21 (25)	7	10	26	63 (77)	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	97 (109)	24	19.5 (27)	19.5 (24)	8	10	27	66 (78)	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	107 (122)	30	22.5 (29)	22.5 (27)	9	10	29	74 (85)	69	M12×P1.75
φ80	114	45	33	17	3/8	M30×P3.5	132 (144)	41	30 (34)	26 (31)	14	15	34	90 (99)	86	M14×P2.0

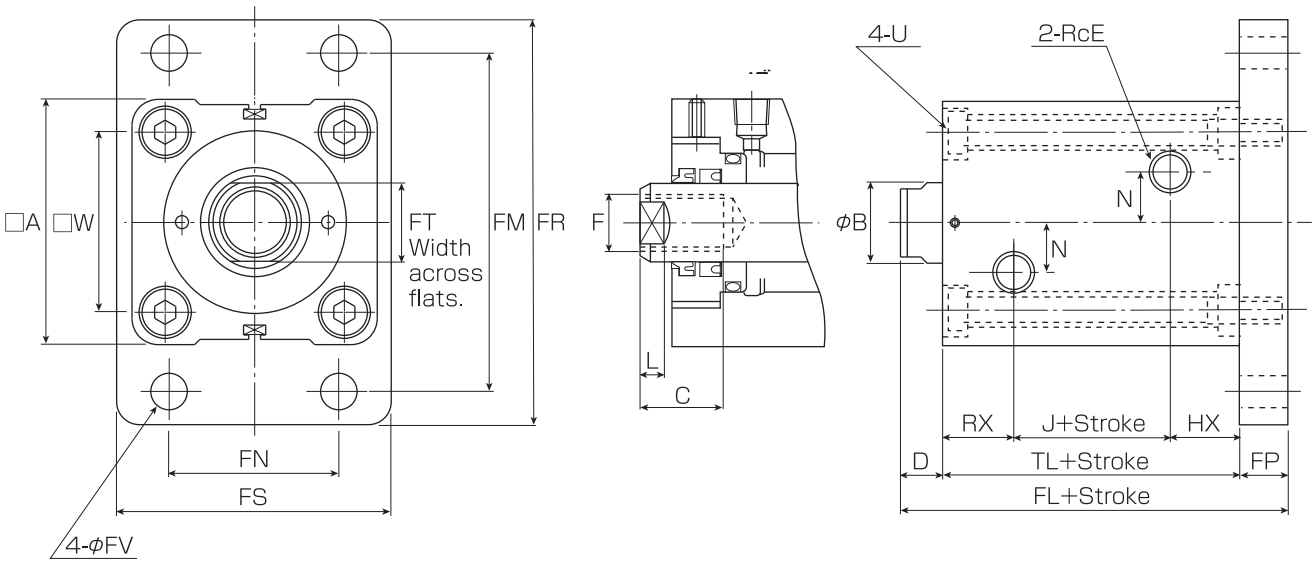
Units: mm

Symbol / Bore	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20 (24)	124	150	65	98	14
φ80	25 (28)	154	185	87	118	18

Note) The size when 100 strokes are exceeded is ( ).

Basic Type [CSR-FB]

With FB Flange



Note) The standard stroke is up to100mm. Please contact us for stroke lengths above 100mm.

The interval stroke of the multiples of 5 for 50 strokes or more has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	84 (101)	14	13.5 (27)	18.5 (22)	7	10	27	59 (76)	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	93 (107)	19	16 (26)	21 (25)	7	10	26	63 (77)	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	97 (109)	24	19.5 (27)	19.5 (24)	8	10	27	66 (78)	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	107 (122)	30	22.5 (29)	22.5 (27)	9	10	29	74 (85)	69	M12×P1.75
φ80	114	45	33	17	3/8	M30×P3.5	132 (144)	41	30 (34)	26 (31)	14	15	34	90 (99)	86	M14×P2.0

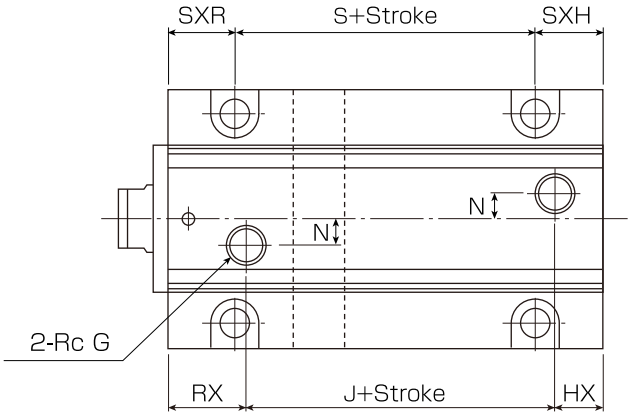
Units: mm

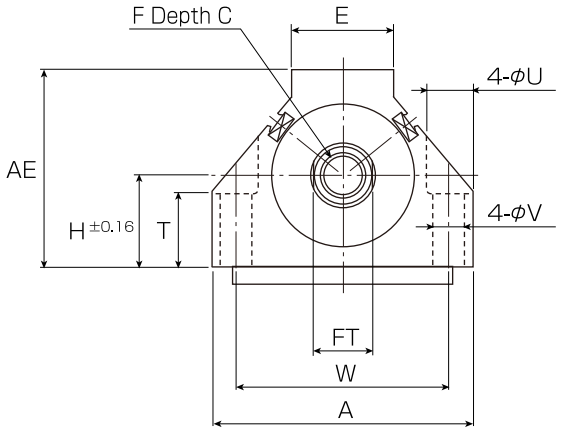
Symbol / Bore	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20 (24)	124	150	65	98	14
φ80	25 (28)	154	185	87	118	18

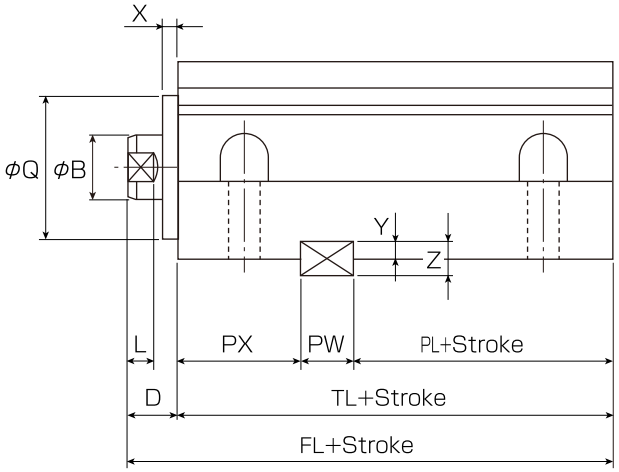
Note 1) The size when 100 strokes are exceeded is ( ).
Note 2) Refer to CSR-SA for the dimensional drawing relation of Coolant Proof Specifications.

Foot Type [CSR-LD]

Single Rod







The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions (Up to 100 strokes)

Units:mm

Symbol / Bore	A	AE	φB	C	D	E	F	Rc G	H	RX	HX	J	L	S	SXR	SXH
φ32	84	62	18	15	10 (20)	38	M12XP1.75	1/4	28	27	13.5	18.5	7	29	15	15
φ40	98	70	22.4	20	10 (20)	44	M16XP2.0	1/4	32	30	15	21	7	33	15	18
φ50	110	81	28	24	11 (21)	50	M20XP2.5	1/4	38	30	19.5	19.5	8	39	15	15
φ63	132	96	35.5	33	13 (23)	50	M27XP3.0	1/4	46	32	22.5	22.5	9	37	20	20

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

Units:mm

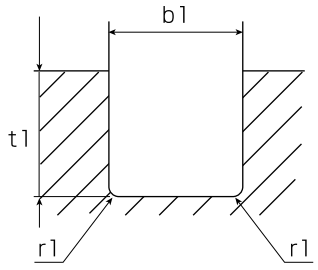
Symbol / Bore	PL	PX	PW	Y	Z	FT	TL	FL	φV	φU	φQ	X	T	W	N
φ32	19	28	12	3.3	8	14	59	69 (79)	9	14	50	5(6)	23	70	6
φ40	26	28	12	3.3	8	19	66	76 (86)	11	17.5	58	5(6)	25	80	8
φ50	25	30	14	3.8	9	24	69	80 (90)	14	20	68	6(6)	32	90	10
φ63	30	31	16	4.3	10	30	77	90 (100)	16	23	82	7(7)	37	108	10

Note) The information contained between the parentheses ( ) is the coolant proof specifications.

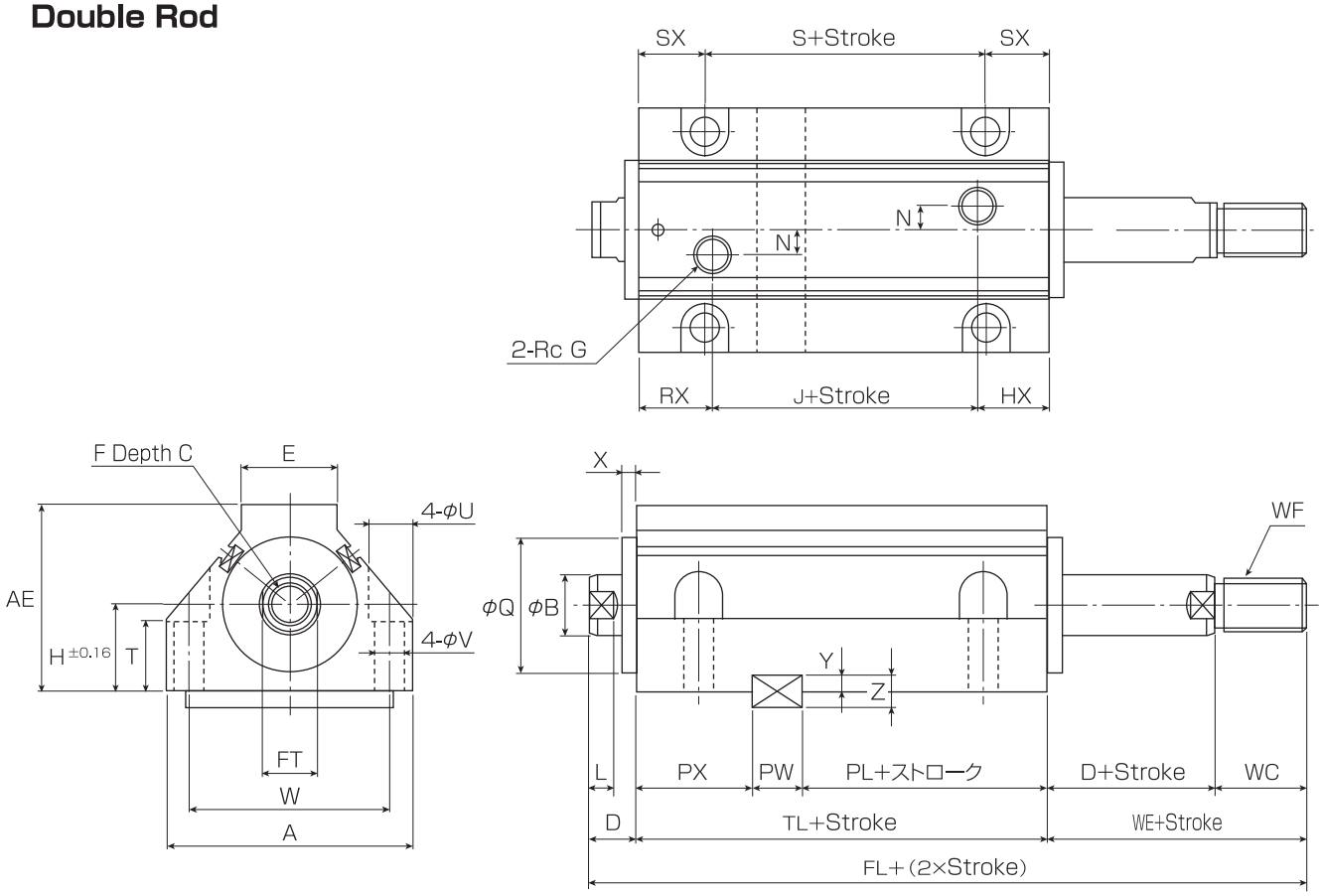
■Recommended key slot size

Units:mm

Bore (mm)	Key Size b×h×t (Both are round.)	Key Slot Dimension b1	t1	r1
φ32	$12^{\ 0}_{-0.043} \times 8^{\ 0}_{-0.09} \times 70$	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ40	$12^{\ 0}_{-0.043} \times 8^{\ 0}_{-0.09} \times 80$	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ50	$14^{\ 0}_{-0.043} \times 9^{\ 0}_{-0.09} \times 100$	$14^{\ 0}_{-0.043}$	$5.5^{+0.2}_{\ 0}$	0.3
φ63	$16^{\ 0}_{-0.043} \times 10^{\ 0}_{-0.09} \times 100$	$16^{\ 0}_{-0.043}$	$6.0^{+0.2}_{\ 0}$	0.3



Foot Type [CSR-LD]
Double Rod



Note 1) Right side of the double rods has standard male thread specifications.
Note 2) In cases of over 50 strokes, They are special specifications.

The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units:㎜

Symbol / Bore	A	AE	φB	C	D	E	F	RcE	H	RX	HX	J	L	S	SX	PL	PX
φ32	84	62	18	15	10	38	M12XP1.75	1/4	28	27	27	20	7	44	15	34	28
φ40	98	70	22.4	20	10	44	M16XP2.0	1/4	32	30	30	25	7	55	15	45	28
φ50	110	81	28	24	11	50	M20XP2.5	1/4	38	30	30	22	8	52	15	38	30
φ63	132	96	35.5	33	13	50	M27XP3.0	1/4	46	32	32	24	9	48	20	41	31

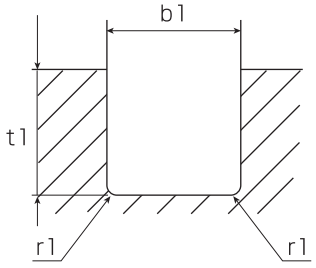
Units:㎜

Symbol / Bore	PW	Y	Z	FT	TL	FL	φV	φU	φQ	X	T	W	N	WF	WC	WE
φ32	12	3.3	8	14	74	119	9	14	50	5	23	70	6	M16XP1.5	25	35
φ40	12	3.3	8	19	85	135	11	17.5	58	5	25	80	8	M20XP1.5	30	40
φ50	14	3.8	9	24	82	139	14	20	68	6	32	90	10	M24XP1.5	35	46
φ63	16	4.3	10	30	88	159	16	23	82	7	37	108	10	M30XP1.5	45	58

■Recommended key slot size

Units:㎜

Bore (mm)	Key Size	Key Slot Dimension		
	b×h×t (Both are round.)	b1	t1	r1
φ32	$12^{\ 0}_{-0.043}$×8 $^{\ 0}_{-0.09}$×70	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ40	$12^{\ 0}_{-0.043}$×8 $^{\ 0}_{-0.09}$×80	$12^{\ 0}_{-0.043}$	$5.0^{+0.2}_{\ 0}$	0.3
φ50	$14^{\ 0}_{-0.043}$×9 $^{\ 0}_{-0.09}$×100	$14^{\ 0}_{-0.043}$	$5.5^{+0.2}_{\ 0}$	0.3
φ63	$16^{\ 0}_{-0.043}$×10 $^{\ 0}_{-0.09}$×100	$16^{\ 0}_{-0.043}$	$6.0^{+0.2}_{\ 0}$	0.3



CHR Series ■10MPa

■Specifications

Series Name	CHR
Model	Switch adjusted type
Mounting	Basic Type: SA
Bore	φ32·φ40·φ50·φ63·φ80·φ100
Nominal Pressure Note 1)	10MPa
Maximum Allowable Pressure Note 2)	12.8MPa
Proof Pressure	15MPa
Minimum Operating Pressure Note 4)	0.4MPa or less
Range of Operating Speed Note 3)	8 to 100mm/sec
Range of Operating Temperature	Standard Specifications: -10℃ to + 60℃ Note 5) High Temperature Specifications: -10℃ to +100℃
Cushion	None
Hydraulic Oil Applied	General Purpose Mineral Hydraulic Oil (Please specify when a different type of operating oil is to be used)
Thread Tolerance Note 6)	JIS 6g/6H (corresponds to JIS Grade 2)
Stroke Tolerance	100㎜ or less $^{+0.8}_{0}$: 101㎜ to 200㎜ $^{+1.0}_{0}$
Rod End Type	Female Thread or Male Thread

Note 1) Dimensions of the special model are different from those of the standard model.
Note 2) The Maximum Allowable Pressure is the tolerance valu for pressures, such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 3) When operating at the maximum cylinder speed, keep the inertial load pressures generated within the cylinder chamber below Maximum Allowable Pressure.
Note 4) The Minimum Operating Pressure is the value when the pressure is supplied from the cap side.
Note 5) In the switch adjusted type, the temperature limit for the switch body should be under 60℃. (Select a special high-temperature switch in the case where temperatures will exceed 60℃) The high temperature specifications for the switch adjusted type vary with the packing/switch specifications so please contact us for usage details.
Note 6) The female thread is a metric coarse thread.
Note 7) None of these cylinders have air bleeds.
Note 8) Radial loads cannot be applied to the piston rod, so care is necessary when adjusting them during installation.
Note 9) In the case where the piston strikes the cylinder end surface at the end of the stroke, reduce the speed to below the minimum speed.
Note 10) When tightening a double rod piston rod, always use the double surface width side of the rod for tightening. The double rod type of piston rod ends with a thread, so make sure that the torque does not affect the ends of the piston rods.

■Stroke Table: Single Rod

Units:㎜

Type	Mounting	Bore	Stroke																			Male Thread Specifications	Maximum Stroke
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CR Switch-adjusted	SA	φ32	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	100
		φ40	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	110
		φ50	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	140
		φ63	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	170
		φ80	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	200
		φ100	◎	○	◎	○	◎	○	◎	○	◎	○	○	○	○	○	○	○	○	○	○	○	200

■Stroke Table: Double Rod

Units:㎜

Type	Mounting	Bore	Stroke																			Male Thread Specifications	Maximum Stroke
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
CR Switch-adjusted	SA	φ32	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	100
		φ40	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	110
		φ50	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	140
		φ63	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	170
		φ80	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	200
		φ100	○	◎	○	◎	○	◎	○	◎	△	△	△	△	△	△	△	△	△	△	○	○	200

Note 1) Standard ◎ Standard Equivalent ○ Special Order △
Note 2) The interval stroke of the multiples of 5 indicated by the O mark have external dimensions 5mm longer than the standard stroke.
Example: The 15 stroke would have the external dimensions of the 20 stroke.
Note 3) Tapped mounting of special order items above 100 strokes is used, and the overall length will differ from the standard demention up to 100 strokes so please refer to the Table of Dimensions for details.

■Packing Material

Code	1 (Standard)	3	9
Material	Nitrile Rubber	Fluoric Rubber	Hydrogenated Nitrile Rubber
Range of Operating Temperature	−10 to +80℃	−10 to +120℃	−10 to +120℃
General-purpose Mineral Hydraulic Oil	○	○	○
Emulsions of Water in Mineral Oil	○	○	◎
Emulsions of Mineral Hydraulic Oil in Water	○	○	◎
Water + Glycol-type Operating Oil	○	×	◎
Phosphate Ester Fluid	×	○	×
Fatty Acid Ester Fluid	○	△	△

■Piston Area

Bore (mm)	Rod Diameter (mm)	Piston Area (㎠)	
		Push	Pull
φ32	φ18	8.0	5.5
φ40	φ22.4	12.6	8.6
φ50	φ28	19.6	13.5
φ63	φ35.5	31.2	21.2
φ80	φ45	50.2	34.3
φ100	φ56	78.5	53.9

Note) The ○ mark indicates its use is possible.The X mark indicates it is not possible to use it.
Regarding the △ mark, consult us for details. The ◎ mark indicates the packing material recommended for applications where wear resistance is important.

■Code

CHR - S A 1 SA 32 B 10 - 2 C - M N YP
① ②③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪⑫ ⑬

① Series Name	CHR: Switch adjusted type
② Single/Double Classification	S: Single Rod Type W: Double Rod Type (Special Order)
③ Standard Special Classification	A: Standard Dimensions; B, E, F: some of special specifications
④ Packing Material	1. Nitrile Rubber (Standard) 3. Fluoric Rubber 6. Coolant Proof Nitrile Rubber 7. Coolant Proof Fluoric Rubber 9. Hydrogenated Nitrile Rubber
⑤ Mounting	SA: Standard FA: FA Type
⑥ Bore (mm)	φ32·φ40·φ50·φ63·φ80·φ100
⑦ Type of Rod	B: B Rod
⑧ Stroke Length (mm)	10·15·20·25·30·35·40·45·50
⑨ Switch Quantity	Mention the quantity. 1A: In cases where a switch is not required. 1A2: For cylinder using CW or CX or WH or XH, No switch required. 1A3: For cylinder using SV or SH, No switch required.
⑩ Switch	C:TOV3 J:TOV5 CK:T5V3 CL:T5V5 DT:T2V3 DU:T2V5 CW:T2YV3 CH:TOH3 JH:TOH5 FJ:TOV-0.5 (For a DC connector system) FJ: TOV-0.5 (For an AC connector system) XX: Special Part Please refer to P.138 for more detailed information on switches.
⑪ Thread Specifications	M: Male Thread Specifications , No Notation: Female Thread Specifications (Standard) *In the case of double rods: male threads M , Male Thread: L , is notated as MM, LL, ML, etc. Standard male threads - female thread specifications are not described here.
⑫ Lock Nut	N:With Lock Nut No Notation:None (This is an option of male thread specifications.)
⑬ End Joint	YP: Double Protrusion End Joint with Pin (Refer to P47.) T: Single Protrusion End Joint (Refer to P46.) (This is an option of male thread specifications.)

Note 1) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.
Note 2) When Switch the CX,CW,WH,XH,SH and SV is used, additional processing will be necessary.

Please refer to P.132 for more detailed information on male thread dimensions.

■Mass Table

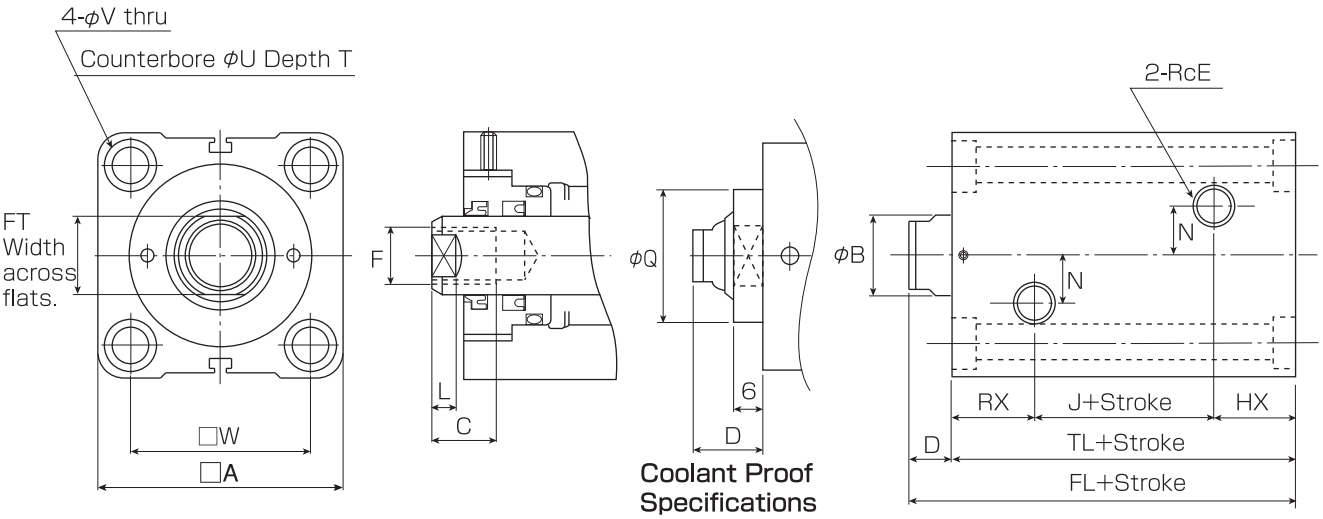
Units: kg

Symbol / Bore	CHR			
	Single Rod		Double Rod	
	Basic Mass	Stroke Mass	Basic Mass	Stroke Mass
φ32	0.79	0.097	1.03	0.118
φ40	1.10	0.118	1.62	0.143
φ50	1.61	0.161	2.34	0.209
φ63	2.59	0.226	3.64	0.306
φ80	4.59	0.328	6.33	0.454
φ100	9.03	0.508	12.09	0.701

Note) The stroke mass is the added mass per 10mm of stroke.

[CHR-SA]

Single Rod [up to 100 strokes]



Note) The information contained between the parentheses ( ) is the coolant proof specifications.

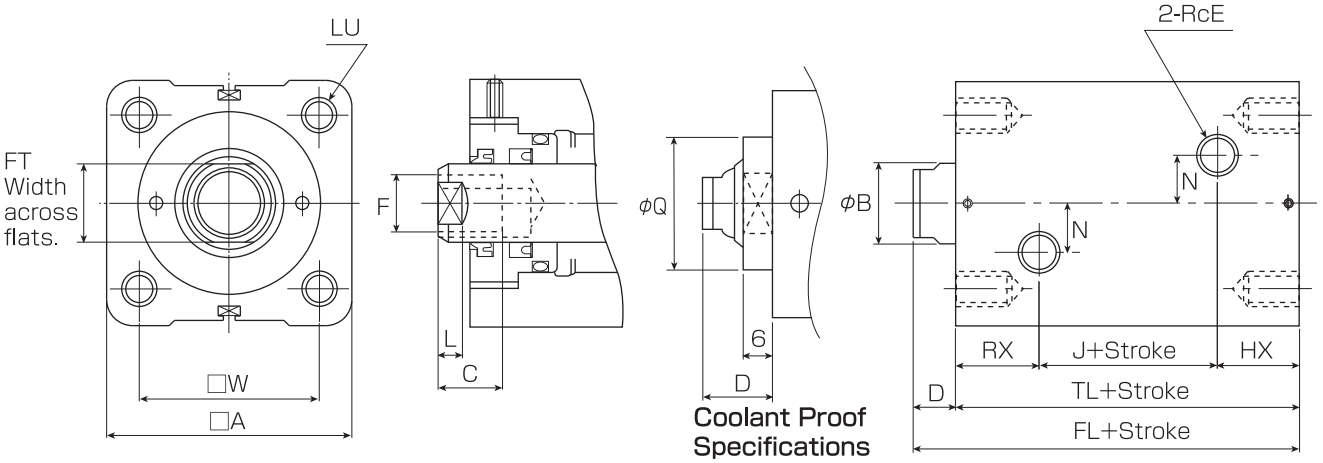
The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions(up to 100 strokes)

Units:㎜

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	T	TL	φU	φQ	φV	□W
φ32	62	18	15	10 (20)	1/4	M12×P1.75	64 (74)	14	12	14	7	10	28	6.5	54	11	(37)	6.6	47
φ40	70	22.4	20	10 (20)	1/4	M16×P2.0	65 (75)	19	12	16	7	10	27	8.6	55	14	(45)	9	52
φ50	80	28	24	11 (21)	1/4	M20×P2.5	71 (81)	24	13	19	8	10	28	10.8	60	17.5	(53)	11	58
φ63	94	35.5	33	13 (23)	1/4	M27×P3.0	80 (90)	30	13	24	9	10	30	13	67	20	(63)	14	69
φ80	114	45	36	17 (27)	3/8	M30×P3.5	95 (105)	41	18	25	14	15	35	15.2	78	23	(80)	16	86
φ100	142	56	45	26 (36)	3/8	M39×P4.0	122 (132)	50	26	34	20	15	36	17.5	96	26	(100)	18	106

Single Rod [Above 100 strokes, Maximum Stroke for Each Bore]



Note) The information contained between the parentheses ( ) is the coolant proof specifications.

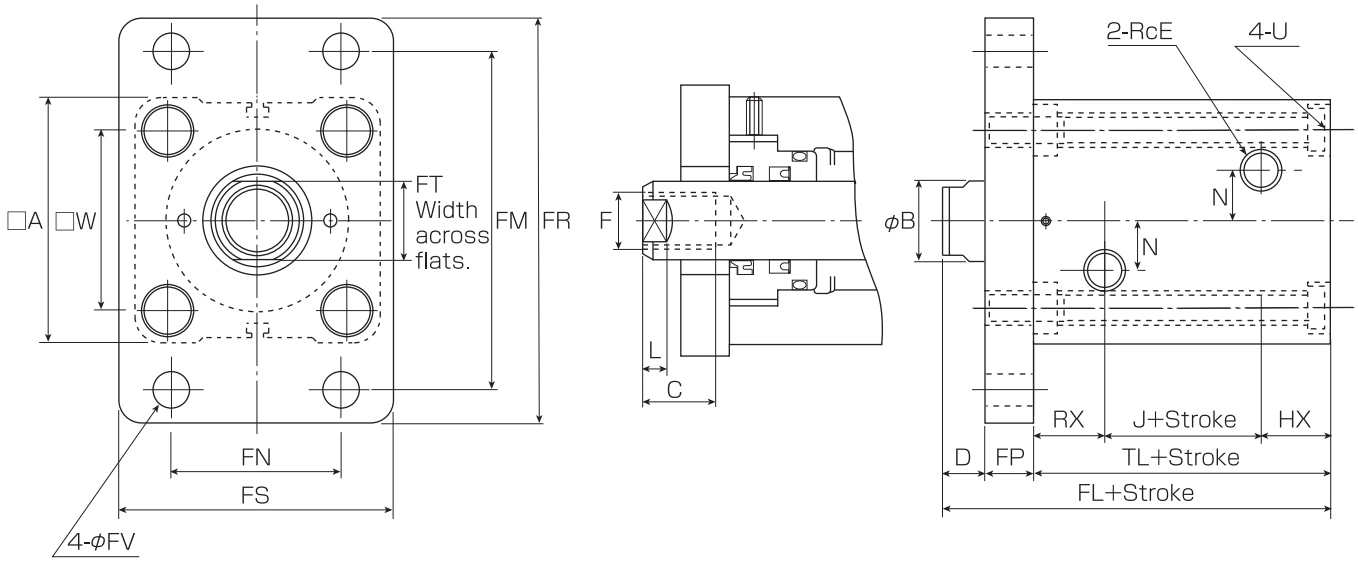
■Table of Dimensions(Above 100 strokes, Maximum Stroke for Each Bore)

Units:㎜

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	φQ	□W	LU
φ40	70	22.4	20	10 (20)	1/4	M16×P2.0	84 (94)	19	27	20	7	10	27	74	(45)	52	M 8×P1.25 Depth 16
φ50	80	28	24	11 (21)	1/4	M20×P2.5	89 (99)	24	28	22	8	10	28	78	(53)	58	M10×P1.5 Depth 20
φ63	94	35.5	33	13 (23)	1/4	M27×P3.0	96 (119)	30	30	23	9	10	30	83	(63)	69	M12×P1.75 Depth 24
φ80	114	45	36	17 (27)	3/8	M30×P3.5	111 (121)	41	35	24	14	15	35	94	(80)	86	M14×P2.0 Depth 28
φ100	142	56	45	26 (36)	3/8	M39×P4.0	135 (145)	50	36	37	20	15	36	109	(100)	106	M16×P2.0 Depth 32

Basic Type [CHR-FA]

With FA Flange [up to 100 strokes]



Note) The standard stroke is up to100mm. Please contact us for stroke lengths above 100mm.

The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	79	14	12	14	7	10	28	54	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	85	19	12	16	7	10	27	55	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	91	24	13	19	8	10	28	60	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	100 (104)	30	13	24	9	10	30	67	69	M12×P1.75
φ80	114	45	36	17	3/8	M30×P3.5	120 (123)	41	18	25	14	15	35	78	86	M14×P2.0
φ100	142	56	45	26	3/8	M39×P4.0	152 (154)	50	26	34	20	15	36	96	106	M16×P2.0

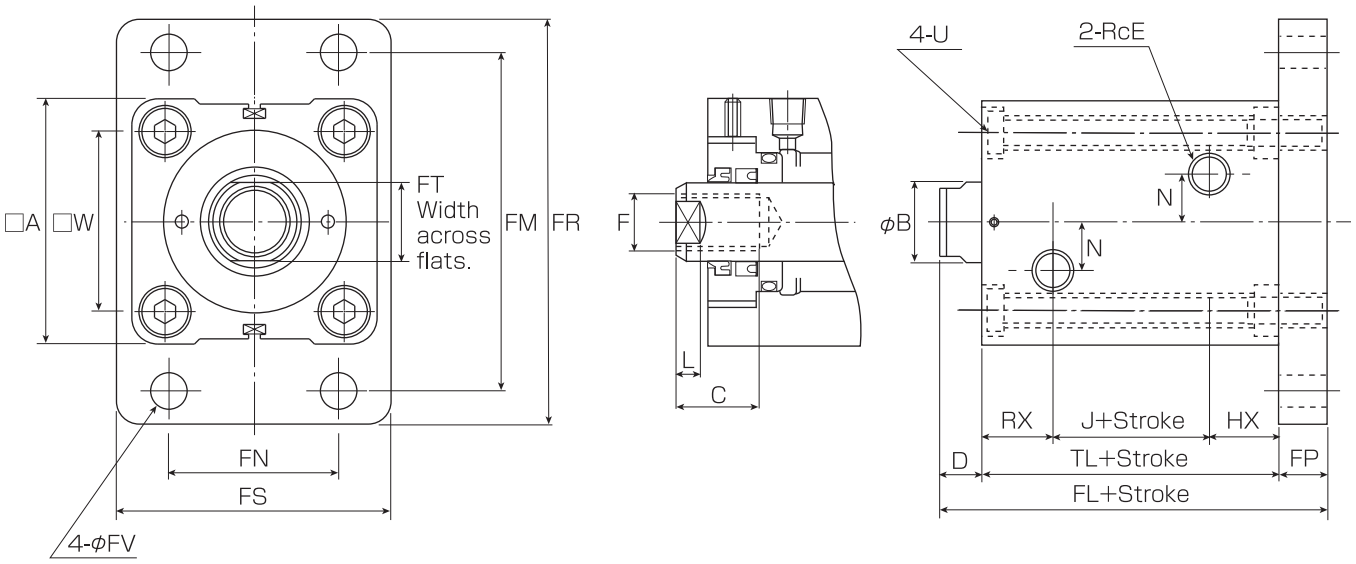
Units: mm

Bore \ Symbol	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20 (24)	124	150	65	98	14
φ80	25 (28)	154	185	87	118	18
φ100	30 (32)	190	230	109	150	22

Note) The size when 100 strokes are exceeded is ( ).

Basic Type [CHR-FB]

With FB Flange



The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

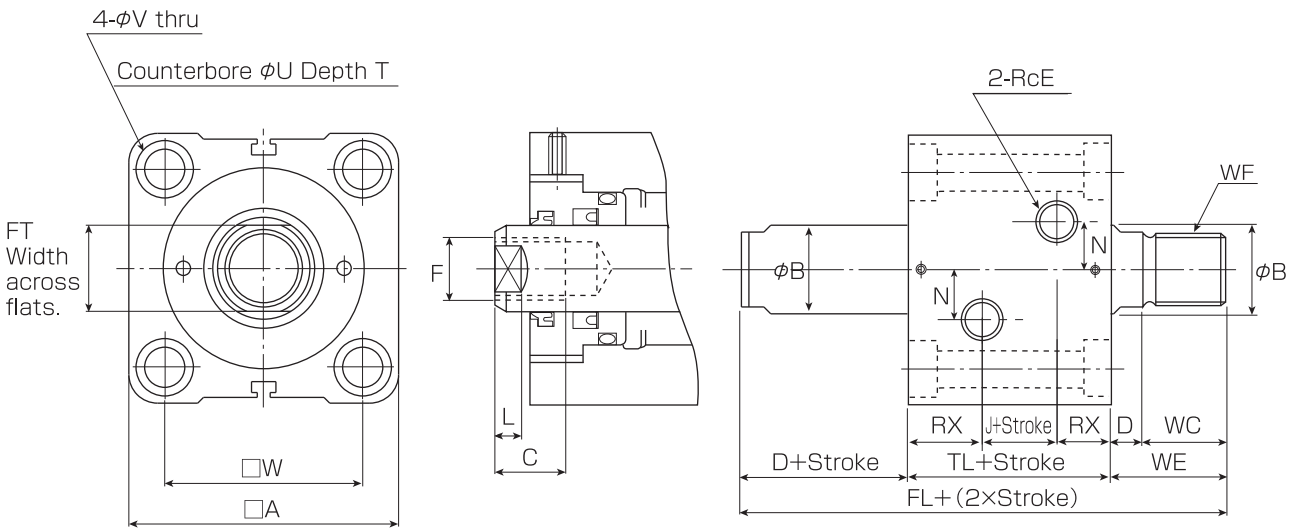
Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	TL	□W	U
φ32	62	18	15	10	1/4	M12×P1.75	79	14	12	14	7	10	28	54	47	M6×P1.0
φ40	70	22.4	20	10	1/4	M16×P2.0	85	19	12	16	7	10	27	55	52	M8×P1.25
φ50	80	28	24	11	1/4	M20×P2.5	91	24	13	19	8	10	28	60	58	M10×P1.5
φ63	94	35.5	33	13	1/4	M27×P3.0	100	30	13	24	9	10	30	67	69	M12×P1.75
φ80	114	45	36	17	3/8	M30×P3.5	120	41	18	25	14	15	35	78	86	M14×P2.0
φ100	142	56	45	26	3/8	M39×P4.0	152	50	26	34	20	15	36	96	106	M16×P2.0

Units: mm

Symbol / Bore	FP	FM	FR	FN	FS	φFV
φ32	15	80	95	40	62	6.6
φ40	20	96	118	46	70	11
φ50	20	108	135	58	85	14
φ63	20(24)	124	150	65	98	14
φ80	25(28)	154	185	87	118	18
φ100	30(32)	190	230	109	150	22

Note) The size when 100 strokes are exceeded is ( ).

Basic Type
Double Rod [Special Order]



Note) Right side of the double rods has standard male thread specifications.

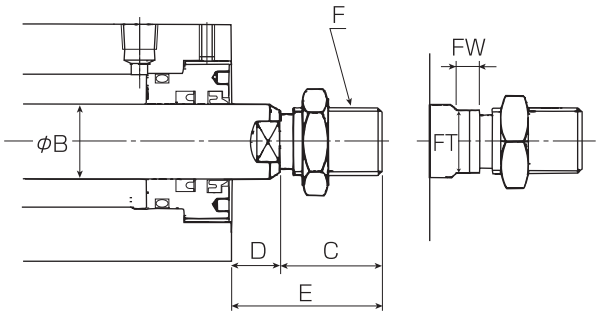
The interval stroke of the multiples of 5 has external dimensions 5mm longer than the standard stroke.

■Table of Dimensions

Units: mm

Symbol / Bore	□A	φB	C	D	RcE	F	FL	FT	J	L	N	RX	T	TL	φU	φV	□W	WF	WC	WE
φ32	62	18	15	10	1/4	M12×P1.75	116	14	15	7	10	28	6.5	71	11	6.6	47	M16×P1.5	25	35
φ40	70	22.4	20	10	1/4	M16×P2.0	124	19	20	7	10	27	8.6	74	14	9	52	M20×P1.5	30	40
φ50	80	28	24	11	1/4	M20×P2.5	135	24	22	8	10	28	10.8	78	17.5	11	58	M24×P1.5	35	46
φ63	94	35.5	33	13	1/4	M27×P3.0	154	30	23	9	10	30	13	83	20	14	69	M30×P1.5	45	58
φ80	114	45	36	17	3/8	M30×P3.5	188	41	24	14	15	35	15.2	94	23	16	86	M39×P1.5	60	77
φ100	142	56	45	26	3/8	M39×P4.0	236	50	37	20	15	36	17.5	109	26	18	106	M48×P1.5	75	101

■Rod End Male Thread Type



■Table of Dimensions

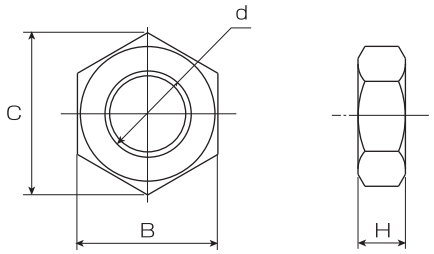
Units: mm

Symbol / Bore	φB	F	C	D	E	FT	FW
φ32	18	M16XP1.5	25	10	35	14	7
φ40	22.4	M20XP1.5	30	10	40	19	7
φ50	28	M24XP1.5	35	11	46	24	8
φ63	35.5	M30XP1.5	45	13	58	30	9
φ80	45	M39XP1.5	60	17	77	41	14
φ100	56	M48XP1.5	75	26	101	50	20
φ125	71	M64XP2	95	31	126	65	25
φ140	80	M72XP2	110	35	145	75	25
φ150	85	M76XP2	115	40	155	80	30
φ160	90	M80XP2	120	40	160	85	30

Note) The lock nut is an option.

■Lock Nut

Bore	Material
φ32 to φ100	Rolled Steel for General Structure



■Table of Dimensions

Units:mm

Symbol / Bore	B Rod				Parts Code
	d	H	B	C	
φ32	M16XP1.5	10	24	27.7	LN-F32B
φ40	M20XP1.5	12	30	34.6	LN-F40B
φ50	M24XP1.5	14	36	41.6	LN-F50B
φ63	M30XP1.5	18	46	53.1	LN-F63B
φ80	M39XP1.5	23	60	69.3	LN-F80B
φ100	M48XP1.5	29	75	86.5	LN-F100B
φ125	M64XP2	38	95	110	LN-F125B
φ140	M72XP2	42	105	121	LN-F140B
φ150	M76XP2	46	110	127	LN-F150B
φ160	M80XP2	48	115	133	LN-F160B

■Specifications

Series Name	CT
Type	Standard Type
Mounting	Basic Type: SA
Bore	φ40·φ50·φ63
Nominal Pressure	21MPa
Maximum Allowable Pressure Note 1)	Cap Side: 27MPa Head Side: 25MPa (Column B)
Proof Pressure	31.5MPa
Minimum Working Pressure Note 3)	0.84MPa or less
Range of Operating Speed Note 2)	8 to 100mm/sec
Range of Operating Temperature	−10℃ to +80℃
Cushion	None
Hydraulic Oil Applied	General Purpose Mineral Hydraulic Oil
Thread Tolerance	JIS 6g/6H (corresponds to JIS Grade 2)
Stroke Tolerance	0 to +0.8㎜
Rod End Type	Male Thread

Note 1) Dimensions of the special model are different from those of the standard model.
Note 2) The Maximum Allowable Pressure is the tolerance valu for pressures, such as surge pressures and increased pressures, in the hydraulic cylinder circuit that exceed the pressure set for operation.
Note 3) When operating at the maximum cylinder speed, keep the inertial load pressures generated within the cylinder chamber below Maximum Allowable Pressure.
Note 4) The Minimum Operating Pressure is the value when the pressure is supplied from the cap side.
Note 5) None of these cylinders have air bleeds.
Note 6) Radial loads cannot be applied to the piston rod, so care is necessary when adjusting them during installation.
Note 7) In the case where the piston strikes the cylinder end surface at the end of the stroke, reduce the speed to below the minimum speed.
Note 8) When tightening a double rod piston rod, always use the double surface width side of the rod for tightening. The double rod type of piston rod ends with a thread, so make sure that the torque does not affect the ends of the piston rods.

■Packing Material

Code	1	3
Material	Nitrile Rubber	Fluoric Rubber
Range of Operating Temperature	−10℃ to +80℃	−10℃ to +120℃
General-purpose Mineral Hydraulic Oil	○	○
Water + Glycol-type Operating Oil	○	×
Fatty Acid Ester Fluids	○	△

Note) The ○ mark indicates its use is possible.The X mark indicates it is not possible to use it.
Regarding the △ mark, consult us for details.

■Standard Stroke Table

Mounting	Bore (mm)	Stroke (mm)				
		10	20	30	40	50
SA	φ40	○	○	○	○	○
	φ50	○	○	○	○	○
	φ63	○	○	○	○	○

■Piston Area

Bore (mm)	Rod Diameter (mm)	Piston Area (㎠)	
		Push	Pull
φ40	φ22.4	12.6	8.6
φ50	φ28	19.6	13.5
φ63	φ35.5	31.2	21.3

■Mass Table

Units: kg

Item / Bore (mm)	CT	
	SA	
	Basic Mass	Stroke Mass
φ40	6.21	0.33
φ50	9.21	0.55
φ63	15.2	0.78

Note) The stroke mass is the mass per 10mm of stroke.

■Code

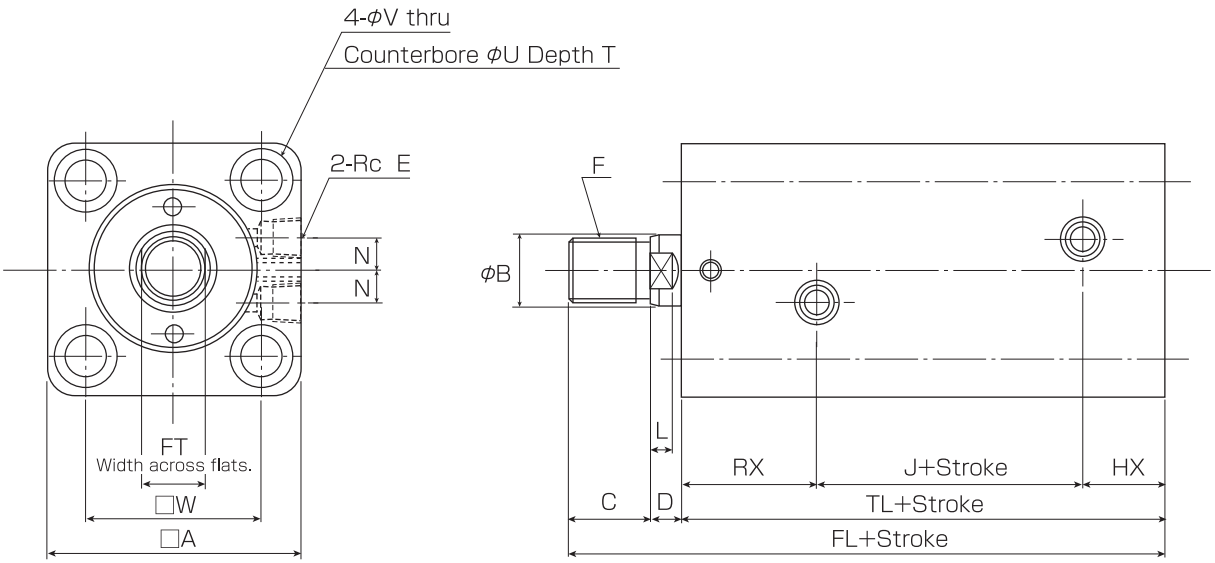
CT - S A 1 SA 40B 50 M N
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	Standard: CT
② Single/Double Classification	S: Single Rod Type W: Double Rod Type (Special Order)
③ Standard Special Classification	A: Standard Dimensions B, E: Some of special specifications, devided by our company
④ Packing Material	1. Nitrile Rubber (Standard) 3. Fluoric Rubber
⑤ Mounting	SA: Basic Type
⑥ Bore	φ40·φ50·φ63
⑦ Type of Rod	B:B Rod
⑧ Stroke Length (mm)	10·20·30·40·50
⑨ Thread Specifications	M: Male Thread Specifications
⑩ Lock Nut	N:With Lock Nut No Notation: None

Note) The Special Standard Classification will be selected and mentioned at our company. Indicated in the product label.

Basic Type [CT-SA]

Single Rod(up to 50 strokes)



■Table of Dimensions

Units:㎜

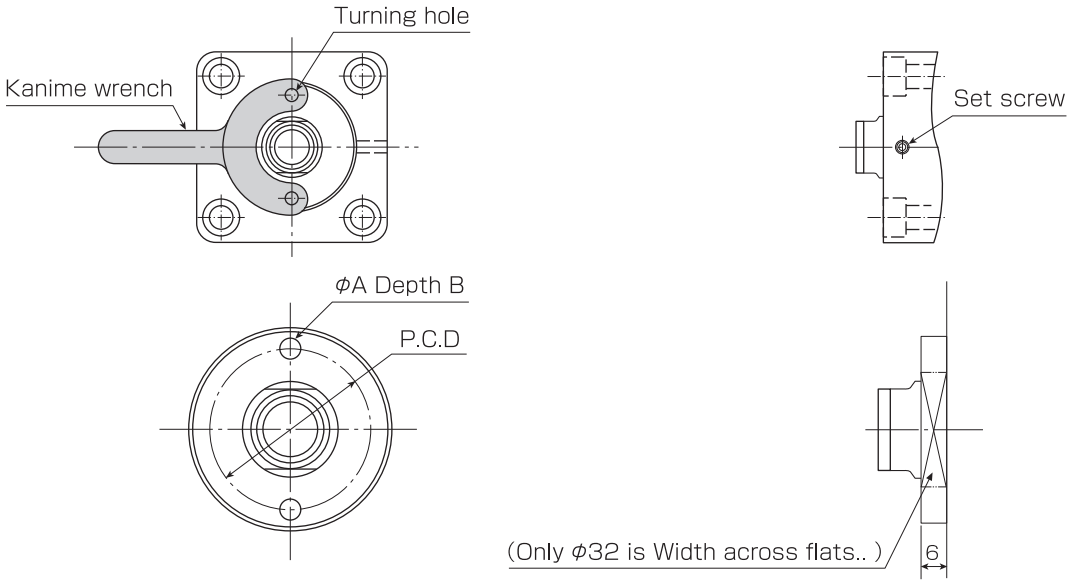
Bore \ Symbol	□A	φB	C	D	RcE	F	FL	FT	HX	J	L	N	RX	T	TL	φU	φV	□W
φ40	80	22.4	25	10	1/4	M20XP1.5	134	19	26	31	7	10	42	15.5	99	20	14	56
φ50	94	28	30	11	1/4	M24XP1.5	149	24	31	35	8	10	42	17.5	108	23	16	67
φ63	114	35.5	35	13	3/8	M30XP1.5	168	30	37	38	9	15	45	19.5	120	26	18	82

■Notes When Using It

- ●Please use the bolt (JIS B 1176 strength division 10.9 or more) with the hexagon socket for the installation of the cylinder.
- ●The material of the mounting part should be SS400 or equivalent.
- ●To screw-mount the cylinder into the mounting part with a bolt, the bolt insertion depth should be 100% of the thread diameter or more.
- ●To mount the cylinder with bolts and nuts, the nut strength should be Class 6 or higher level.
  ※Do not use Class 3 nut.
- ●Please do the air bleed when you drive the cylinder for the first time.
  ※The compact cylinder body has no air bleeder. Bleed air through the piping.
- ●After air bleeding, start the cylinder operation at a low speed, and gradually increase the pressure to the operating pressure.
- ●Consider the load mounting structure so that eccentric load is not applied to the piston rod.
- ●To connect the end screws of the double rods to a load, use the width across flats of the rod on the connection side, and make sure that twisting force will not be applied to the piston rod.

■Notes When Resolving and Assembling It

- ●After removing the set screw, remove the rod bush from the cylinder body through the turning hole.
  ※You can easily remove the rod bush by using a special tool (we call it "Kanime wrench").
  When you place an order, confirm the series name and bore diameter which you need.



Standard Specifications	φ32 to φ160

Coolant Proof Specifications	φ40 to φ100

Bore	Standard Specifications			Coolant Proof Specifications		
	P.C.D	A	B	P.C.D	A	B
φ32	32	3	4	Width across flats 35		
φ40	38	5	5	40	3	4
φ50	45	5	5	47	3	4
φ63	56	5	5	57	3	4
φ80	71	5	5	71	5	5
φ100	85	11	10	85	7	7
φ125	100	11	10			
φ140	125	11	15			
φ150	130	11	15			
φ160	140	11	15			

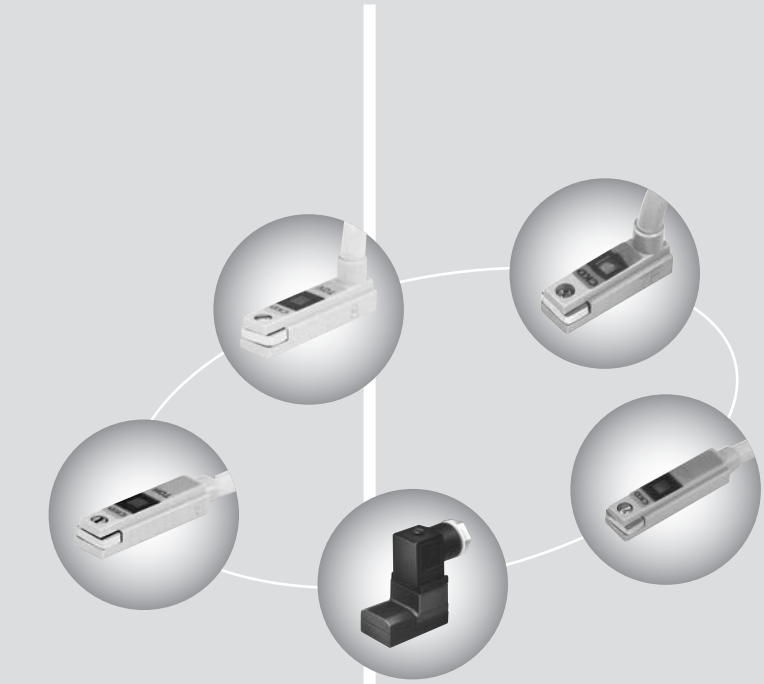
CSR-SA	Standard Specifications			Coolant Proof Specifications		
Bore	P.C.D	A	B	P.C.D	A	B
φ32	32	3	4	Width across flats 35		
φ40	38	5	5	40	3	4
φ50	45	5	5	47	3	4
φ63	56	5	5	57	3	4
φ80	71	5	5	71	5	5

CSR-LD	Standard Specifications			Coolant Proof Specifications		
Bore	P.C.D	A	B	P.C.D	A	B
φ32	32	3	4	36	3	4
φ40	38	5	5	40	3	4
φ50	45	5	5	47	3	4
φ63	56	5	5	57	3	4

*When you re-assemble the cylinder after replacing the packing, be careful that dust or other foreign object will not enter the cylinder.

Switch Specifications

F•K•T•C Series



Switch Specifications
F•K•T•C Series

■Switch Selection List

Code	Stock	Power	Contact Type	SW Type	Connection	Reference	Protective Construction	Rated Voltage	Rated Current	Surrounding Temperature	Indicator Lamp	Adaptive Control Device
C	Standard	AC/DC	Contact	T0V−3	Right angle direction with 3m cord	Standard	IP67	DC12/24V AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA	−10 to +60℃	Lit when ON	Relay Sequencer
J	Standard	AC/DC	Contact	T0V−5	Right angle direction with 5m cord	Standard	IP67					
W	Standard	AC/DC	Contact	R0B	Connector Type	Standard	None	DC12/24 AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA			
CK	Standard	AC/DC	Contact	T5V−3	Right angle direction with 3m cord	For high-temperature use, Series connection	IP67	DC12/24V AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA	−10 to +100℃	None	
CL	Standard	AC/DC	Contact	T5V−5	Right angle direction with 5m cord	For high-temperature use, Series connection	IP67					
DT	Standard	DC	Non-contact	T2V−3	Right angle direction with 3m cord	Standard	IP67	DC10 to 30V	5 to 20mA	−10 to +60℃	Lit when ON	Sequencer
DU	Semi-Standard	DC	Non-contact	T2V−5	Right angle direction with 5m cord	Standard	IP67					
CW	Standard	DC	Non-contact	T2YV−3	Right angle direction with 3m cord	2-color lamp	IP67				Red/Green 2-color Lamp	
CX	Special	DC	Non-contact	T2YV−5	Right angle direction with 5m cord	2-color lamp	IP67					
SH	Semi-Standard	DC	Non-contact	D-M9BWZ	Horizontal direction 5 meter cord	2-color lamp	IP67	DC12/24V	2.5 to 40mA			Relay Sequencer
SV	Semi-Standard	DC	Non-contact	D-M9BWVZ	Right angle direction with 5m cord	2-color lamp	IP67					
CH	Standard	AC/DC	Contact	T0H−3	Horizontal direction 3 meter cord	Standard	IP67	DC12/24V AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA		Lit when ON	
JH	Semi-Standard	AC/DC	Contact	T0H−5	Horizontal direction 5 meter cord	Standard	IP67					
CC	Special	DC	Non-contact	T2YLV−3	Right angle direction with 3m cord	Coolant Proof	IP67	Less than 30V	5 to 20mA		Red/Green 2-color Lamp	
CF	Special	DC	Non-contact	T2YLV−5	Right angle direction with 5m cord	Coolant Proof	IP67					
CG	Special	DC	Non-contact	T2YLH−3	Horizontal direction 3 meter cord	Coolant Proof	IP67					
CJ	Special	DC	Non-contact	T2YLH−5	Horizontal direction 5 meter cord	Coolant Proof	IP67					
KH	Special	AC/DC	Contact	T5H−3	Horizontal direction 3 meter cord	For high-temperature use, Series connection	IP67	DC12/24V AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA	−10 to +100℃	None	
LH	Special	AC/DC	Contact	T5H−5	Horizontal direction 5 meter cord	For high-temperature use, Series connection	IP67					
WH	Special	DC	Non-contact	T2YH−3	Horizontal direction 3 meter cord	2-color lamp	IP67	DC10~30V	5 to 50mA	−10 to +60℃	Red/Green 2-color Lamp	
XH	Semi-Standard	DC	Non-contact	T2YH−5	Horizontal direction 5 meter cord	2-color lamp	IP67					
TH	Special	DC	Non-contact	T2H−3	Horizontal direction 3 meter cord	Standard	IP67				Lit when ON	
UH	Special	DC	Non-contact	T2H−5	Horizontal direction 5 meter cord	Standard	IP67					
FG	Semi-Standard	AC/DC	Contact	T5V−3	Connector + 3m cord	NCS-302	None (SW-IP67)	DC12/24V AC110V AC220V	5 to 50mA 7 to 20mA 7 to 10mA	−10 to +100℃	None	
	Semi-Standard	AC/DC	Contact	T5V−3	Connector + 3m cord	NCS-252	None (SW-IP67)					
FH	Semi-Standard	AC/DC	Contact	T5V−5	Connector + 5m cord	NCS-302	None (SW-IP67)					
	Semi-Standard	AC/DC	Contact	T5V−5	Connector + 5m cord	NCS-252	None (SW-IP67)					
FJ	Semi-Standard	For DC use	Contact	T0V−0.5	Connector + 0.5m cord	XS2G-D4C5	IP67			−10 to +60℃	Lit when ON	
FW	Semi-Standard	For AC use	Contact	T0V-0.5	Connector + 0.5m cord	XS2G-D4C5	IP67					

Note) All of the switches are in compliance with CE mark. In principle, the non-contact switches (T2∗ and D-M∗) comply with the CE marking. If you need a contact switch (T0∗, T5∗ and R0∗) complying with the CE marking, please contact us for order.
(The T0∗ and T5∗ switches can be used at up to 110 VAC.)

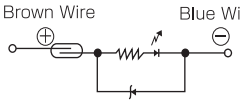
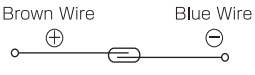
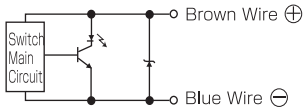
SP	Contact Protection Circuit	XEB1K
SA	Serge measures circuit	SW-SKAC
SD		SW-SKDC

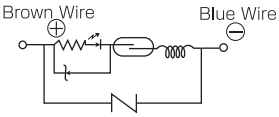
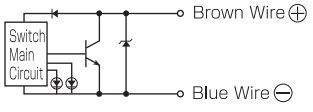
Cautions

※To connect an inductive load (relay or solenoid valve), be sure to provide a protection circuit, because a surge voltage is generated when the switch is turned OFF.To connect a capacitance load (capacitor), be sure to provide a protection circuit, because an inrush current is generated when the switch is turned ON.Extension of the cable length may result in damage to the switch or shortened service life depending on the wiring capacity. In this case, provide a contact protection circuit.
To use an inductive load at 100 V/200 V AC, be sure to provide contact protection measures as described above.
(Surge protection circuit to be connected within 1 m from the inductive load protection circuit SP = XEB1K1, and the switch: SW-SKAC·SW-SKDC)

Please tell us separately when the contact protection circuit of the read switch is necessary. Please refer to Figure 1 of P146.

■Switch Specifications

Switch Type	T0V/T0H		T5V/T5H		T2V/T2H		T2YV/T2YH	
Appearance								
Symbol	T0V	T0H	T5V	T5H	T2V	T2H	T2YV	T2YH
	C (with 3m cord) /J (with 5m cord)	CH (with 3m cord) /JH (with 5m cord)	CK (with 3m cord) /CL (with 5m cord)	KH (with 3m cord) /LH (with 5m cord)	DT (with 3m cord) /DU (with 5m cord)	TH (with 3m cord) /UH (with 5m cord)	CW (with 3m cord) /CX (with 5m cord)	WH (with 3m cord) /XH (with 5m cord)
Contact Type	Contact Type				Non-contact Type			
Adaptive Control Device	Relay, Programmable Controller (Sequencer)				Programmable Controller (Sequencer)			
Operating Voltage /Current	DC12/24V, 5 to 50mA AC110V, 7 to 20mA AC220V, 7 to 10mA				Note 2) DC10 to 30V, 5 to 25mA		DC10 to 30V, 5 to 20mA	
An internal voltage drop	Less than 2.4V		0V		Less than 4V			
Operating Lamp	LED lit when ON		None		LED lit when ON		Red/Green LED lit when ON (The best operation position Green lighting)	
Operating Temperature Range	−10℃ to +60℃		−10℃ to +100℃		−10℃ to +60℃			
Lead Length	Standard: 3m (Oil-resistance Vinyl Cabtyre Cable Cord 2-wire 0.2mm²)						Standard: 3m (Oil-Resistance Vinyl Cabtyre Cable Cord 2-wire 0.3mm²)	
Maximum Impact	30G (294m/s²)				100G (980m/s²)			
Leakage Current	0				Less than 1mA			
Insulation Resistance	Greater than 20 MΩ at 500VDC megger							
Insulation Pressure Resistance	Assuming no problems after the application of 1000VAC over 1 minute							
Protective Construction	IEC Standard: IP67, JIS-C0920 (water proof type), oil proof							
Internal Circuit								

Switch Type	R0B	D-M9BWVZ	D-M9BWZ
Appearance			
Symbol	W	SV	SH
Contact Type	Contact Type	Non - Contact 2-color lamp	
Adaptive Control Device	Programmable Controller (Sequencer)	Relay, Programmable Controller (Sequencer)	
Operating Voltage /Current	DC12/24V, 5 to 50mA AC110V, 7 to 20mA AC220V, 7 to 10mA	DC10 to 28V, 2.5 to 40mA	
An internal voltage drop	Less than 2.4V	Less than 4V	
Operating Lamp	LED lit when ON	Red/Green LED lit when ON (The best operation position Green lighting)	
Operating Temperature Range	−10℃ to +60℃		
Lead Length	Connector Type	Oil-resistance Vinyl Cabtyre Cable Cord 2-wire 0.15mm²	
Maximum Impact	30G (294m/s²)	1000m/s²	
Leakage Current	0	Less than 0.8mA	
Insulation Resistance	Greater than 20 MΩ at 500VDC megger	Greater than 50 MΩ at 500VDC megger	
Insulation Pressure Resistance	1 minute at 1500 VAC	Assuming no problems after the application of 1000VAC over 1 minute	
Protective Construction	Not water proof	IEC60529 Standard: IP67, JIS-C0920 (water proof type)	
Internal Circuit			

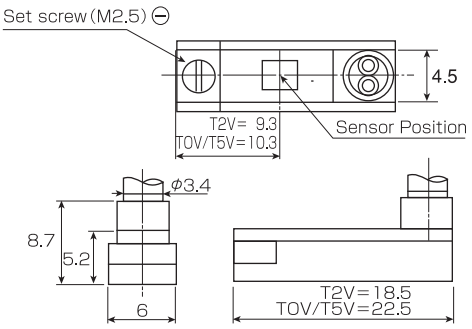
Note 1) The maximum value of 25mA for the operating voltage/current listed above is at +25 . The current will drop below 25mA when the surrounding temperature exceeds 25 . (at 60 , it will be in the range of 5 to 10mA)
Note 2) Make sure that the curve radius of the cord is longer than 10mm.
Note 3) The above switches have no protection circuit.
Note 4) The above switches do not contain harmful substances under control of the RoHs Directive (six substances in total).

Switch Specifications
F•K•T•C Series

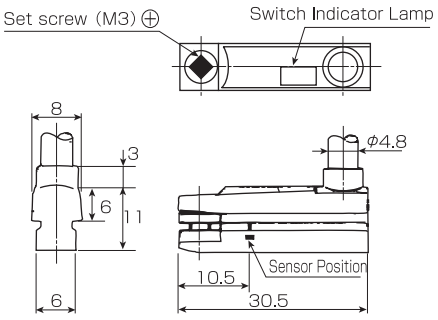
■Switch External Dimensions (Standard Switches: T/R Types)

Units:mm

T0V/T5V/T2V

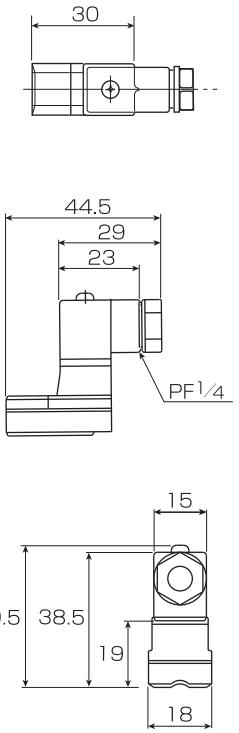


T2YV

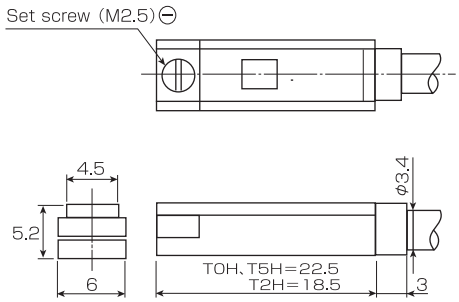


Additional procedure is required when this is to be used with the Compact cylinder type.

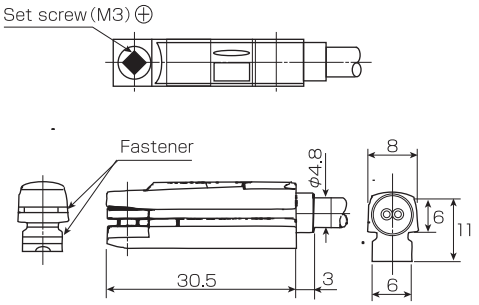
R0B



T0H/T5H/T2H



T2YH

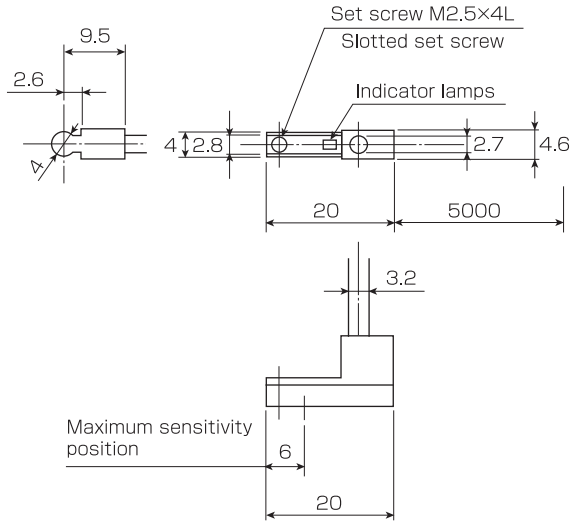


Additional procedure is required when this is to be used with the Compact cylinder type.

■Switch External Dimensions (Standard Equivalent Switches: D/M Types)

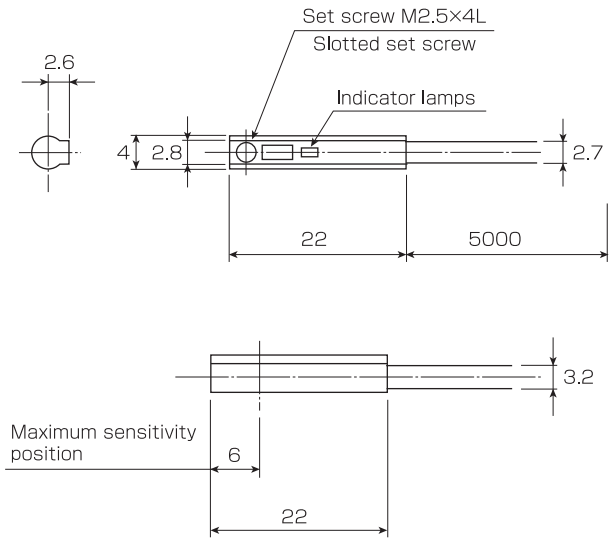
Units:mm

D-M9BWVZ



Additional procedure is required when this is to be used for the Compact cylinder type.

D-M9BWZ



Additional procedure is required when this is to be used for the Compact cylinder type.

Note 1) The lead wire becomes the oval of 2.7×3.2.
Note 2) A special adaptor is mounted on D-M※.

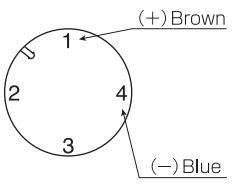
Switch with Connector Specifications

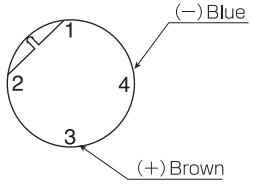
Read Switch with Connector	
Connector	Omron XS2G
Protective Constrution	IP67
Cable Length	0.5m

Companion connectors
(conforming to the IEC-947-5-2 standard)
that can be used with XS2G

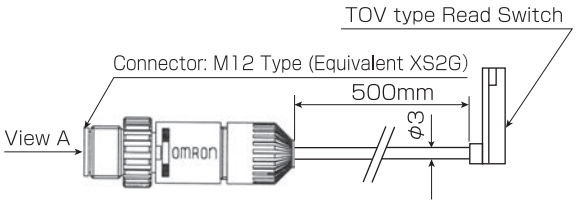
Japanese Manufacturers	Hirose Electric Co., Ltd. HR24 Series
	Yamatake Corporation PA5 Series
Overseas Manufacturers	Hirschmann E Series M12 Type

Specifications	DC Specifications	AC Specifications
Code	FJ type	FW type
Switch Type	TOV	TOV
Connector	M12 Type (Equivalent XS2G)	XS2G-A4C5
Pin Position	Pin positions as seen from View A	





FJ Model/FW Model



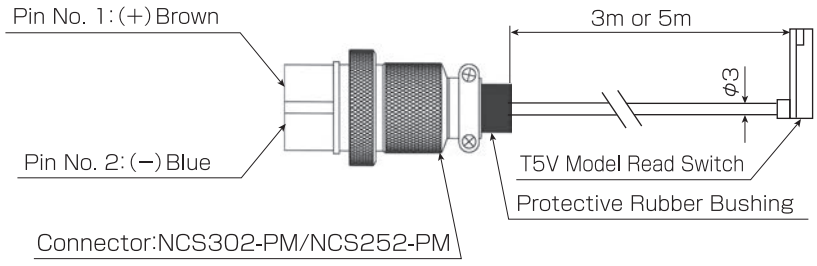
※Please consult us when you wish to change the type of switch to be used.

M12 Type (Equivalent XS2G)

M12 Type (Equivalent XS2G)

■With Nanaboshi Electric Metal Connector

Special Order Support Part	Nanaboshi Electric Mfg. Co. Metal Connector, NCS Read Switch with Connector
Connector	Nanaboshi Electric Mfg. Co. NCS252-PM or NCS302-PM
Cable Length	3m or 5m
Read Switch Model	T5V



※Please consult us when you wish to change the type of switch to be used.

■Code

Code	Switch Specifications	Note
FG	T5V3+Connector	2FE, FF, FG and FH are NCS302 + 252 1FE comes with NCS302. When ordering only the NCS252, please indicate it as "NCS252".
FH	T5V5+Connector	

※As for the connector and the metal outlet, the combination with other switches (Refer to P139) is possible. Please consult separately.

Switch Specifications
F•K•T•C Series

■F Series Switch Mounting Minimum Cylinder Stroke

Units:㎜

Bore \ Mounting Type / Type of Switch / Switch Qty.	Except for TC/CF						TC/CF			
	With Cord (T※)			Connector (ROB)			With Cord (T※)		Connector (ROB)	
	With 1 Switch	With 2 Switches (mounted on the same surface)	With 2 Switches (mounted on different surfaces)	With 1 Switch	With 2 Switches (mounted on the same surface)	With 2 Switches (mounted on different surfaces)	With 1 Switch	With 2 Switch	With 1 Switch	With 2 Switch
φ32	25	50	25	45	70	45	75	75	75	75
φ40	25	50	25	45	70	45	75	75	75	75
φ50	25	50	25	25	50	25	80	80	80	80
φ63	25	50	25	25	50	25	90	90	90	90
φ80	25	50	25	25	50	25	90	90	90	90
φ100	25	50	25	25	50	25	100	100	100	100
φ125	25	50	25	25	50	25	100	100	100	100
φ140	25	50	25	25	50	25	100	100	100	100

Note 1) In the case of the TC, the trunnion position is the catalogue standard.
Note 2) There may be variations in dimensions due to the surrounding environment or other factors, so please use these values only as a guide.

■K Series Switch Mounting Minimum Cylinder Stroke

Units:㎜

Bore \ Mounting Type / Type of Switch / Switch Qty.	Except for TC/CF			TC/CF	
	With Cord (TO※ T2Y※ D-M※)			With Cord (TO※ T2Y※ D-M※)	
	With 1 Switch	With 2 Switches (mounted on the same surface)	With 2 Switches (mounted on different surfaces)	With 1 Switch	With 2 Switch
φ32	20	30	20	60	60
φ40	20	30	20	60	60
φ50	20	30	20	60	60
φ63	20	30	20	60	60
φ80	20	30	20	60	60
φ100	20	30	20	60	60
φ125	20	30	20	60	60

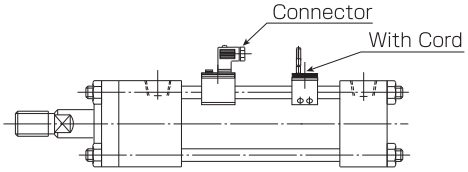
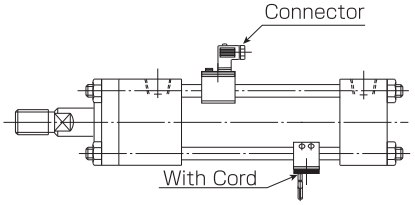
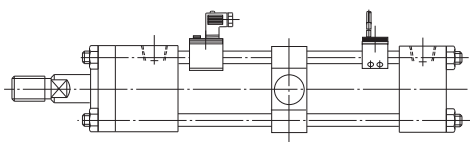
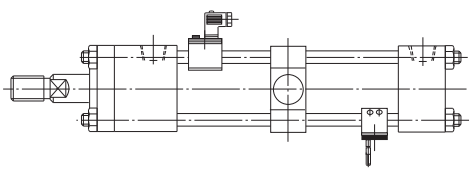
Note 1) In the case of the TC, the trunnion position is the catalogue standard.
Note 2) There may be variations in dimensions due to the surrounding environment or other factors, so please use these values only as a guide.

■T Series Switch Mounting Minimum Cylinder Stroke

Units:㎜

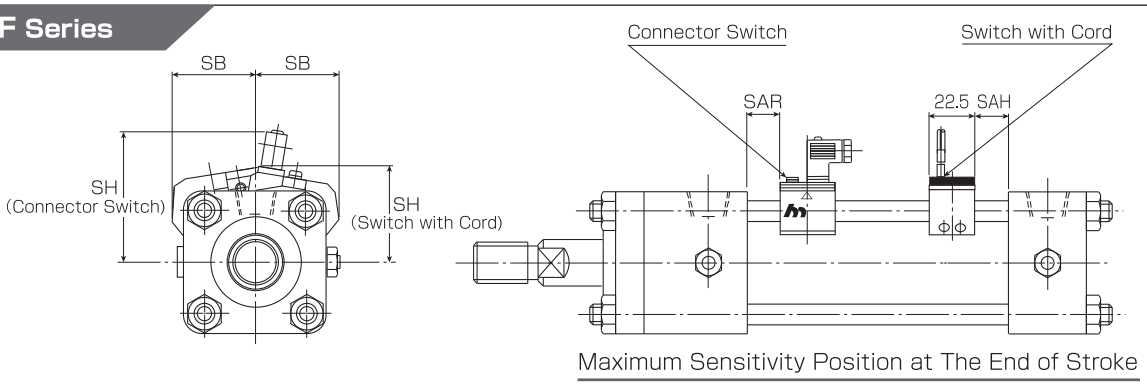
Bore \ Mounting Type / Type of Switch / Switch Qty.	Except for TC/CF			TC/CF	
	With Cord (T※ D-M※)			With Cord (T※ D-M※)	
	With 1 Switch	With 2 Switches (mounted on the same surface)	With 2 Switches (mounted on different surfaces)	With 1 Switch	With 2 Switch
φ40	25	50	25	85	85
φ50	25	50	25	85	85
φ63	25	50	25	95	95
φ80	25	50	25	100	100

Note 1) In the case of the TC, the trunnion position is the catalogue standard.
Note 2) The above data are for your reference. Numerical error may occur with influence of surrounding environment and variations in switch sensitivity.

Except for Trunnion (switch on the same surface)	Except for Trunnion (switches on different surfaces)
	
Trunnion (switch on the same surface)	**Trunnion (switches on different surfaces)**
	

Standard Switch Mounting External Dimensions/Maximum Sensitivity Positions

F Series



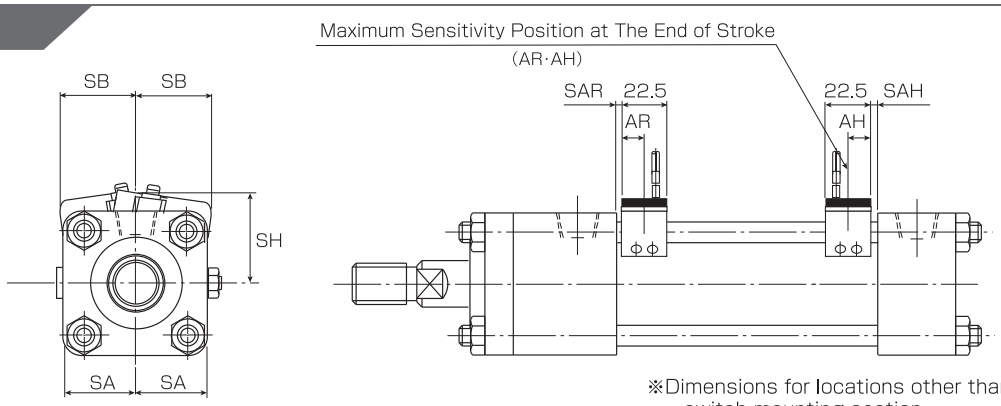
■Table of Dimensions (Standard Switch : T0※・T5※・ROB Types) Units:㎜

Symbol / Bore	With Cord								Connector			
	SB	SH	T0※		T2※		D-M※		SB	SH	RO	
			SAR	SAH	SAR	SAH	SAR	SAH			SAR	SAH
φ32	24	32	18	18	18	18	21.5	21	28.5	70	15	15
φ40	33	36	20	22	20	22	23	24	40	64	18	19
φ50	36	39	21	22	21	23	23.5	26	43	70	18	19
φ63	44	46	25	26	24	25	26.5	28.5	45	85	20	24
φ80	54	56	27	29	28	30	26.5	28.5	58	94	23	25
φ100	65	66	30	30	33	33	29.5	31.5	68	104	25	25
φ125	79	80	28	30	28	30	32	33	87	120	23	25
φ140	88	88	32	32	36	36	35	37	98	130	33	33

※Dimensions for locations other than the switch mounting section are the same as for the Switch-Adjusted Specifications/No Switch.

Note 1) The mounting direction for the switch are both towards the inside of the wiring entrance for the head and cap sides.
Note 2) The switch mount differs for each size.
Note 3) There may be variations in dimensions due to the surrounding environment or other factors, so these values should only be used as guides.
Note 4) The matching of the actual part in switch mounting is recommended.

K Series



■Table of Dimensions (Standard Switch : T0※・T5※・D-M※) Units:㎜

Symbol / Bore	SA	SB	SH	T0※・T5※				D-M※			
				SAR	SAH	AR	AH	SAR	SAH	AR	AH
φ32	22	24	27	1.5	2	17	16	8	7.5	7	7
φ40	25	26	32	1.5	2	17	16	7.5	7.5	7	7
φ50	31	31	37	1.5	2	17	16	7	7	7	7
φ63	38	37	43	2	2	17	18	8	8	7	7
φ80	47	47	51	0	0	16	16	7	6.5	7	7
φ100	57	59	66	3	4	19	20	11.5	11.5	7	7
φ125	69	67	69	15	17	24	26	17.5	17.5	7	7

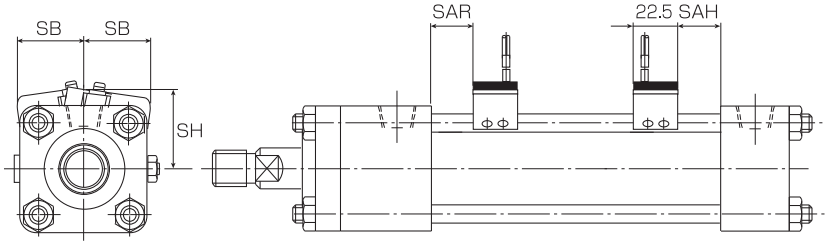
※Dimensions for locations other than the switch mounting section are the same as for the Switch-Adjusted Specifications/No Switch.

Note 1) The mounting direction for the switch are both towards the inside of the wiring entrance for the head and cap sides.
Note 2) The switch mount differs for each size.
Note 3) There may be variations in dimensions due to the surrounding environment or other factors, so these values should only be used as guides.
Note 4) The matching of the actual part in switch mounting is recommended.

T Series

■Table of Dimensions
(Standard Switch : T0※・T5※・D-M※) Units:㎜

Symbol / Bore	SB	SH	T0※・T5※		D-M※	
			SAR	SAH	SAR	SAH
φ40	40	39	20	20	24	24
φ50	48	48	23	23	26	25.5
φ63	52	55	26	26	28	29
φ80	64	66	30	30	35	35



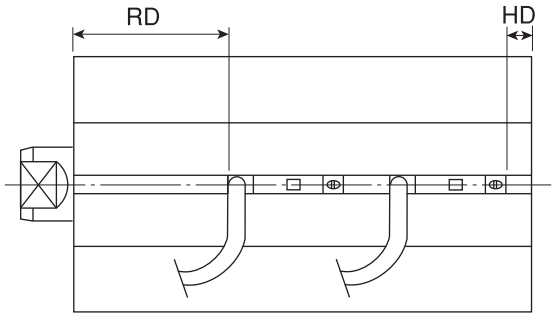
Note 1) The mounting direction for the switch are both towards the inside of the wiring entrance for the head and cap sides.
Note 2) The above data are for your reference. Numerical error may occur with influence of surrounding environment and variations in switch sensitivity.
(The matching of the actual part in switch mounting is recommended.)

Switch Specifications
C Series

■Switch Mounting Position

〈Stroke End Mounting〉
Attach the head side of the switch to the RD and the cap side to the HD dimensions in the Maximum Sensitivity Positioning Table for maximum switch sensitivity in operation.

〈Middle position Mounting〉
In cases where the piston is to be stopped mid-stroke, stop the piston at the stoppage position and move the switches to a position before or after the top of the piston and determine where each switch will change to the ON state. The location between the two points is the position of maximum sensitivity and is where the switch should be mounted.



■Response Speed (Cylinder Speed)

In the case where the switch is mounted at a position mid-stroke in the cylinder and the piston's passing time is to be used to drive a load, if the cylinder speed is too fast, the switch output will become too slow and there will be no response to the load so caution should be exercised in mounting position.

Reference : Switch Output Time Formula

$$\text{Switch Output Time (s)} = \frac{\text{Switch Operating Range (mm)}}{\text{Cylinder Speed (mm/s)}}$$

■Table of Dimensions

Units:㎜

Symbol / Bore	TOV・TOH・T5V・T5H					
	CSR-SA		CSR - LD		CHR	
	RD	HD	RD	HD	RD	HD
φ32	30	5	24	9	30	1
φ40	30	7	27	10	30	2
φ50	33	11	31	11	30	8
φ63	39	13	35	13	35	9
φ80	47	20			43	12
φ100					51	22

■Table of Dimensions

Units:㎜

	T2YV・T2YH						D-M※					
	CSR-SA		CSR - LD		CHR		CSR-SA		CSR - LD		CHR	
	RD	HD	RD	HD	RD	HD	RD	HD	RD	HD	RD	HD
φ32	23	6	16	9	21	2	26	8	20	12.5	25.5	5.5
φ40	21	7	19	9	20	3	25	11	21.5	13.5	24.5	6.5
φ50	24	11	23	11	21	8	28	14	24.5	17.5	26.5	9.5
φ63	31	13	28	12	26	9	32.5	15.5	30.5	19.5	31	12
φ80	38	21			36	11	41	24			38	15
φ100					44	22					51.5	24.5

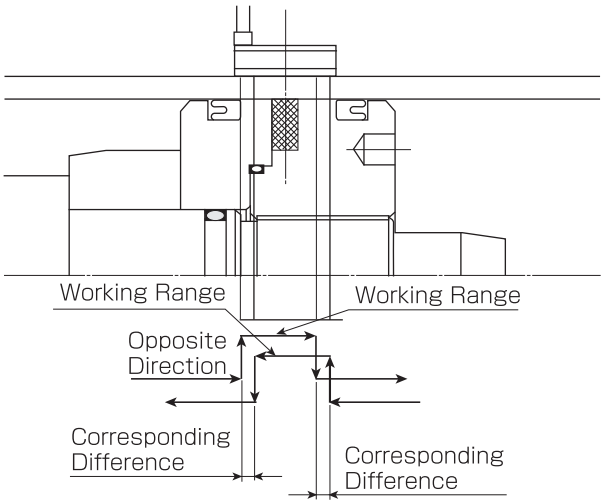
Note 1) The switch mounting direction is both towards cap side of the wiring exit for both the head and cap sides.
Note 2) There may be variations in dimensions due to the surrounding environment or other factors, so these values should only be used as guides. The matching of the actual part in switch mounting is recommended.

■Working Range

The Working Range is the range from where the piston moves and the switch goes ON to the point where it moves in the same direction causing the switch to change to the OFF state.
The point in the middle of the Working Range is the position of maximum sensitivity.
Setting the switch at this point will result in the least disturbance from external forces and ensure stable switch operation.

■Corresponding Difference

The Corresponding Difference is the difference in the range of movement from where the piston is moved in direction A shown in the diagram on the right towards direction B. If the piston is stopped within this region, the switch is easily influenced by outside factors and a non-contact switch may change from the ON to the OFF state or the OFF to the ON state due to electrical noise. A contact switch may exhibit the same behavior due to vibration and both types of switches may possibly react with the same ON-OFF fluctuations due to magnetic disturbances so caution should be exercised.



〈Operation/Tolerance Range List〉

■Tie Rod System Cylinder (TO※)

Units:㎜

FFR・FSR					KR					TR				
Bore	Working Range		Corresponding Difference		Bore	Working Range		Corresponding Difference		Bore	Working Range		Corresponding Difference	
	TO※	D-M※	TO※	D-M※		TO※	D-M※	TO※	D-M※		TO※	D-M※	TO※	D-M※
φ32	11.5	2.5	2	0.5	φ32	9.5	2.5	2	0.5	—	—	—	—	—
φ40	12	2.5	2	0.5	φ40	10.5	2.5	2	0.5	φ40	8.5	3	2	0.5
φ50	12.5	3.5	2	0.5	φ50	12.5	3.5	2	0.5	φ50	10	3.5	2	0.5
φ63	15	4	2	0.5	φ63	14.5	3.5	2	0.5	φ63	12	4	2	0.5
φ80	14	5	2	0.5	φ80	19	4	2	0.5	φ80	12	4	2	0.5
φ100	16	5	2	0.5	φ100	20	5	2	0.5	—	—	—	—	—
φ125	20	6	2	0.5	φ125	22	5	2	0.5	—	—	—	—	—
φ140	16	6	3	0.5	—	—	—	—	—	—	—	—	—	—

Note) There may be tolerance differences due to the surrounding environment, switch sensitivity tolerances, etc., so these values are only intended as guides.

■Compact Cylinder Type

Units:㎜

Bore	T0V・T0H・T5V・T5H						T2YV・T2YH						D-M※					
	CSR-SA mounting		CSR-LD mounting		CHR		CSR-SA mounting		CSR-LD mounting		CHR		CSR-SA mounting		CSR-LD mounting		CHR	
	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference	Working Range	Corresponding Difference
φ32	17	2	17	2	12	2	10	2	10	1	9	1.5	7	2	7	1	5	0.5
φ40	18	2	19	2	12	2	10	3	10	1	9	1.5	8	2	8	1	5	0.5
φ50	18	3	19	2	12	2	10	2	10	1	10	1.5	8	2	8	1	5	0.5
φ63	19	3	21	2	15	2	11	2	12	1	11	1.5	9	2	9	1	6	0.5
φ80	23	3			16	2	12	2			13	1.5	10	2			6	0.5
φ100					21	2					15	1.5					7	0.5

■Surrounding Magnetic Environment

① The presence of strong magnetic fields or devices that generate high currents (large magnets, solenoids, spot welders, etc.) may cause the switch to malfunction, so care should be exercised to avoid such surroundings.
② Devices that generate large surge currents (magnetic lifters, high frequency induction furnaces, motors, etc) located near non-contact switches may degrade the switch's internal circuit components or lead to the switch's failure so surge protection should be considered in such environments.
③ In the case where there are large amounts of steel particles near a hydraulic cylinder Switch adjusted, such as those resulting from cutting or spatter from welding operations, the magnetic strength within the cylinder may be decreased or changed, influencing its detection sensitivity or even causing the switch to stop operating, so appropriate measures should be taken to guard against this.

■General Environment

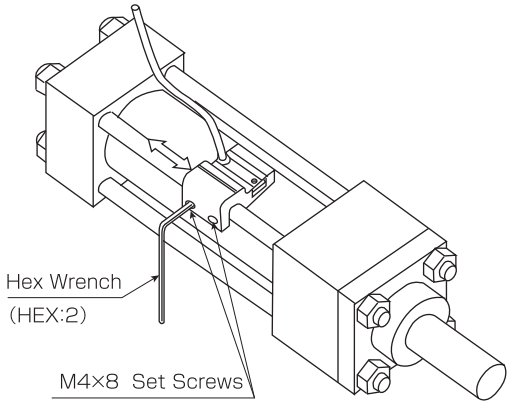
① Avoid operation in wet environments. Water can cause malfunctions and insulation failure.
② Avoid operation in environments where pharmaceuticals or petroleum-based chemicals are used. Avoid usage in environments where oils of any kind, coolant fluids, pharmaceuticals and such are present. Doing so may have a detrimental effect on the switch and the lead wires (leading to failure of the insulation, faulty operation due to the imbibition of resin fillings, hardening of the lead wire insulation, etc.). Note that we also offer switches with coolant resistant specifications. Please feel free to contact us for further details.
③ Do not use in locations where the switch will be jolted heavily. In the case of the contact switch, if a strong shock (greater than 294m/sec^2) is applied during operation, there is the possibility that momentary contact or opening will occur resulting in its malfunction. If the environment in which the switch is to be used requires a shock resistant (shock resistance:980m/s2) non-contact switch, please contact us for further details.

Switch Specifications
F•K•T•C Series

■F Series

Moving the Switch

Unscrew the set screws (2 screws) 1/2 to 3/4 turn to allow easy movement in the axis direction.
After adjusting the position, apply gentle pressure to make sure the bottom of the tube is firm against the holder and tighten the set screws to lock the position.

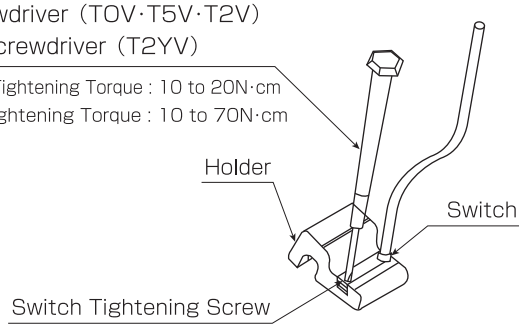


Tie Rod Size	φ6㎜	φ8 to φ12㎜	φ16,φ18㎜	φ22,φ24㎜
Applicable Cylinder Size	KR:φ32 to φ50	KR:φ63 to φ100 F※R:φ32 to φ63	KR:φ125 F※R:φ80, φ100	F※R:φ125, φ140
Torque Value Range	55 to 65N·cm	60 to 80N·cm	80 to 100N·cm	100 to 120N·cm

Mounting the Switch

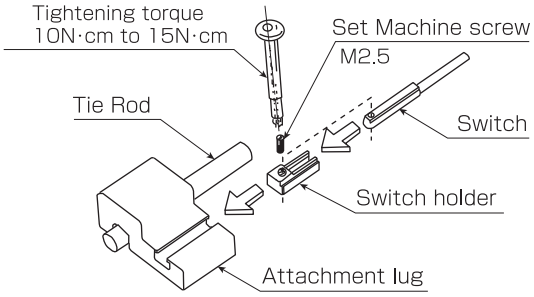
① Insert the switch into the groove in the holder, and tighten the switch fastening screws to 10 to 20N·cm.

⊖ Flat Screwdriver (TOV·T5V·T2V)
⊕ Phillips Screwdriver (T2YV)
TOV/T5V/T2V=Tightening Torque : 10 to 20N·cm
T2YV/T2YH=Tightening Torque : 10 to 70N·cm

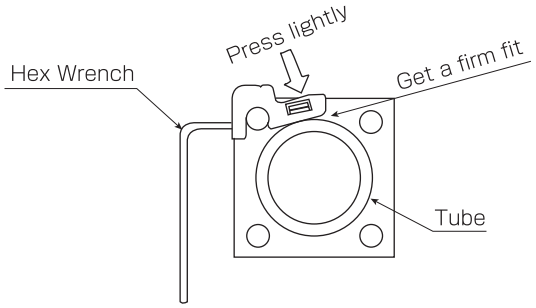


M2.5 (TOV·T5V·T2V)
M3 (T2YV)

⊖ Turnscrew (D-M※)
Tightening torque
10N·cm to 15N·cm



② The fixation of a holder should bind a set screw(M4hollow point) tight, pushing a switch against a tube lightly.
Please make a torque value table into near aim.



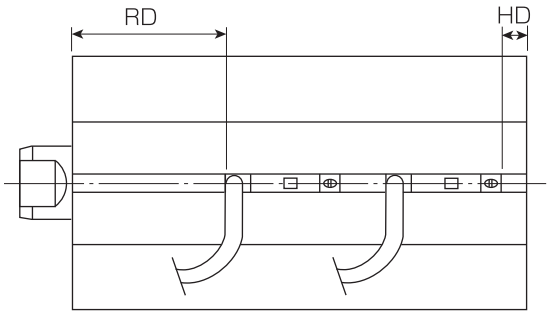
■C Series

Moving the Switch

Loosen the tightening screws (fastening screws) and move the switch along the cylinder tube.
Tighten it at the prescribed position.

Mounting/Replacing Read Switches

Loosen the tightening screws, and remove the switch from the groove. Align the replacement switch with the prescribed position in the groove and tighten the screws to fasten the switch in place.
(The torque ranges for the tightening screws are: TOV/TOH = 10 to 20N·cm T2YV/T2YH = 50 to 70N·cm Note that the tightening screws for the TOV/TOH require a flat screwdriver. The T2YV/T2YH screws require a Phillips screwdriver.)



■Attaching the Connectors (W Type Switch: ROB)

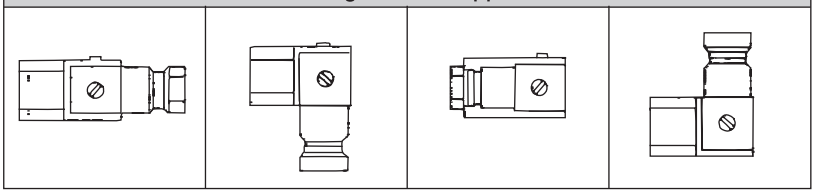
Use the diagrams as a reference and follow the procedure outlined below to attach the W Type terminal box.

① Remove all of the fastening screws and pull the switch out of the terminal box.
② From the top of the case, push on the pin support to separate it from the case.
③ Remove the cap, washer, and gasket.
④ Determine the direction you are going to bring the lead wires out of the terminal box.
⑤ Use the case attachment directions shown in the diagram above and cut the lead wires in accordance with the direction you will be using. Peel off the seal and strip the insulation.
⑥ Firmly crimp the included solderless terminals.
⑦ Carefully pass the lead wires through the cap, washer, gasket and case in the selected direction.
Pass the lead wire through the case and use a pair of long nose pliers to bring the wire out.
⑧ Insert the terminal into the pin support and press it towards the case, taking care to maintain the proper direction. Push it in until the top edge rib of the pin support is slightly above the case's upper surface.
⑨ Insert the fastening screws into the case pin support.
⑩ Put the gasket and washer on the case and then tighten the cap.
⑪ Insert the case into the switch terminal and tighten the fastening screws.

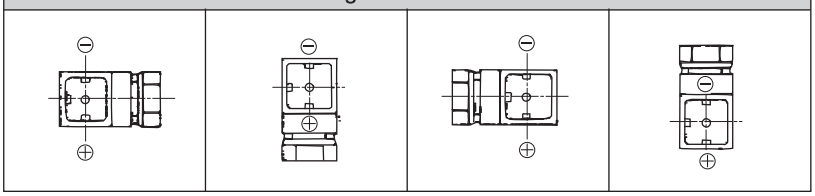
●Length to Cut Lead Wires

The length to which lead wires should be cut will vary with the direction the case is mounted. Please refer to the table below for specifics.

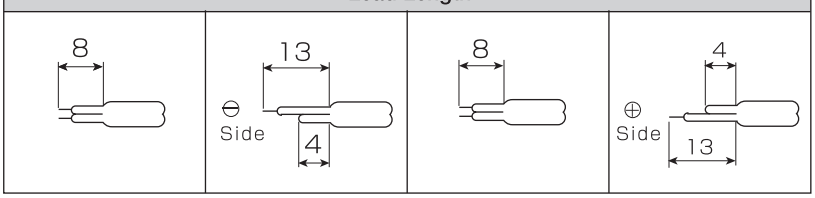
Case Mounting Direction Upperside View



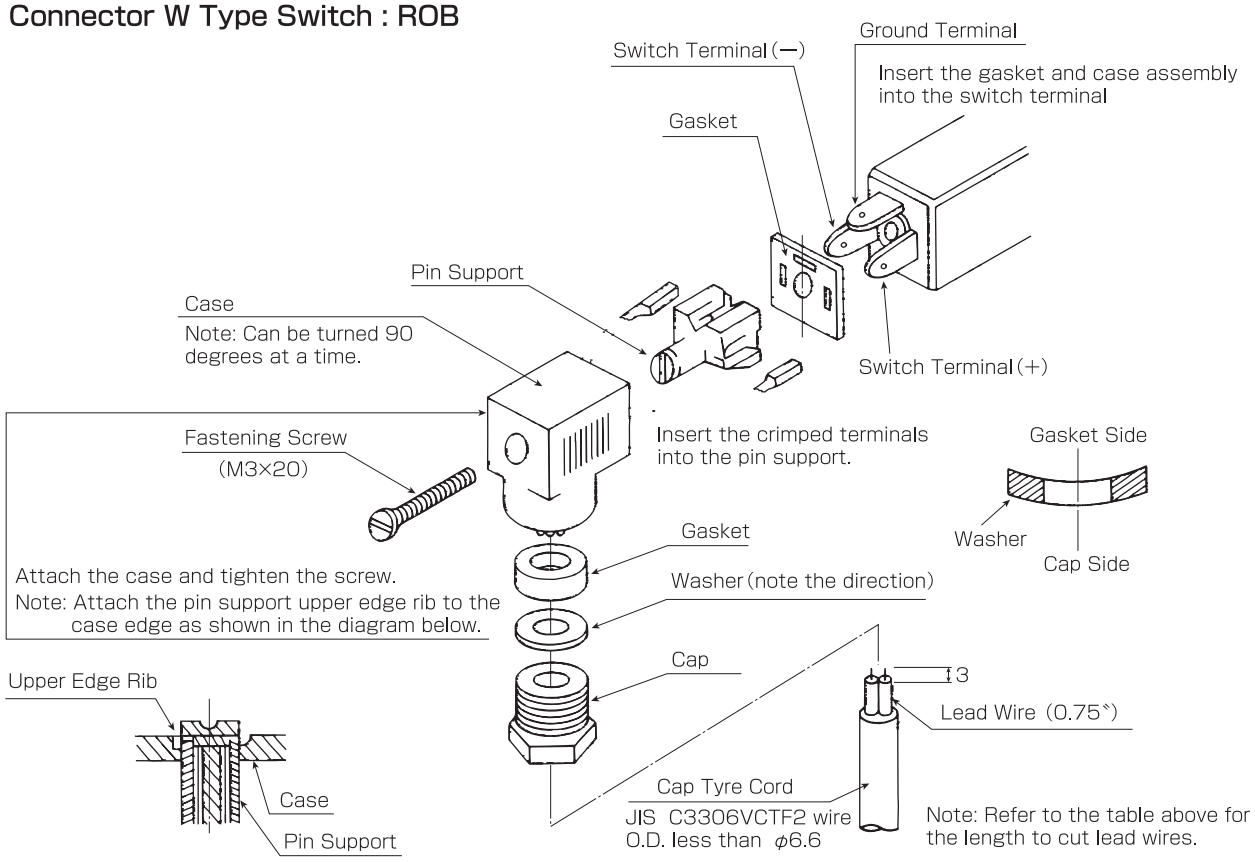
Case Mounting Direction Underside View



Lead Length



Connector W Type Switch : ROB



Attach the gasket and washer and tighten the cap.

Switch Specifications
F•K•T•C Series

■Lead Wire Protection

Run the wiring so that it does not subject the lead wires to repeated bending, pulling or stress. Use anti-bending support such as that used for robot wiring in sections that are movable.

■Lead Wire Connection

Do not connect the switch lead wires directly to the power source. Always check to make sure the load is connected in series. In addition, in the case of TO※, refer to Ⓐ, Ⓑ below.

Ⓐ When used for DC, the brown wire should be connected to the positive ⊕ side and the blue wire should be connected to the negative ⊖ side. If the connections are reversed, the switch will operate; however, the lamp will fail to light up.

Ⓑ When the relay for AC is connected to the programmable controller's input side going through a half-wave rectifier, there may be cases in which the lamp does not light; however, the lamp will light when the switch's lead wires are reconnected with the polarities reversed.

■Contact Capacity

Avoid loads that will exceed the maximum contact capacity of the switch. Note also that if the current drops below the rated value, the lamp may not light in the case of the TO※.

■Series Connection

When multiple TO※s are connected and used in series, the voltage at the switch drops and is the sum of all of the drops in voltages of the switches connected. In order to confirm operation, a TO※ can be used as a single unit (approx. 2.4V). The lamp will light only when all of the switches are in an ON state.

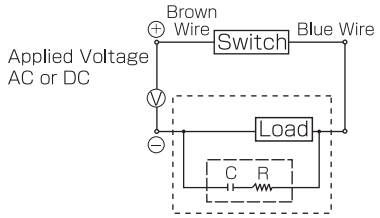
■Parallel Connection

When multiple switches are connected and used in parallel, there is no limit to the number of units that can be connected; however, in the case of the TO※, the lamp may dim or fail to light up.

■Contact Protection

When the switch is to be used with inductive loads such as relays, etc. the contact protection circuit shown in Figures 1 and 2 must be set up. Note also that the contact protection circuit shown in Figures 3 and 4 must be set up when wiring lengths exceed 50 meters for DC and 10 meters for AC.

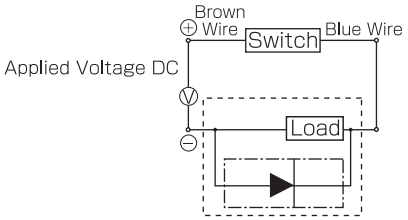
Fig. 1 Cases where a condenser or resistance is used



User Wiring
Protective Circuit

Condenser C= .033 to .1μF
Resistance R= 1 to 3KΩ
Okaya Electric XEB1K1 or equivalent

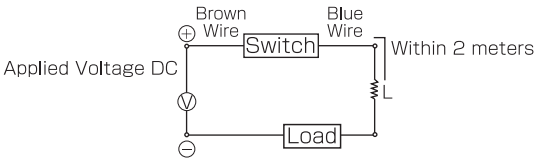
Fig. 2 Cases where a diode is used



User Wiring
Protective Circuit

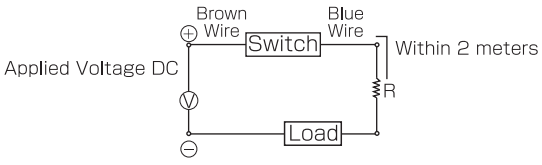
General Use Rectifier Diode
Hitachi Seisakusho V06C or equivalent

Fig. 3 Cases where standard wiring lengths are exceeded



·Chalk Coil
L=several hundred μH to several mH
Superior High Frequency Performance
·Wiring near the switch
(Within 2 meters)

Fig. 4 Cases where standard wiring lengths are exceeded



·Surge current limiter resistance
R=The maximum resistance allowed by the load circuit side
·Wiring near the switch
(Within 2 meters)

■Relays

Use only those relays that correspond to those listed below

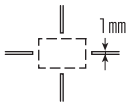
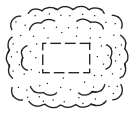
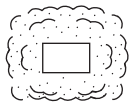
·Omron ——— MY Type
·Fuji Electric ——— HH5 Type
·Tokyo Electric ——— MPM Type
·Panasonic ——— HC Type

■Switch Protective Construction

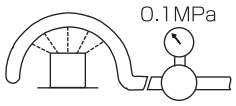
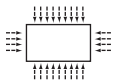
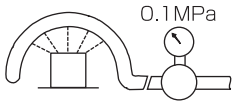
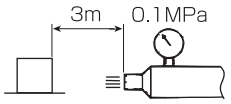
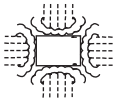
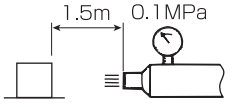
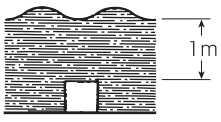
■IEC (International Electrotechnical Commission (IEC529)

IP— A B IP:International Protection

A Grades and Protection with regard to People and Fixed Foreign Objects

Grade	Degree of Protection	
4		The infiltration of the tips of fixed objects such as wire and steel belts exceeding a thickness or diameter or 1mm is not possible.
5		Fine particles that can influence operations cannot infiltrate into the interior.
6	Dust bears Type 	Fine particles cannot infiltrate the interior.

B Protection and Grades regarding Water Infiltration

Grade	JIS	Degree of Protection		Test Methods
0	——	No special protection	No special protection against water infiltration.	No test.
3	Rainproof Type	Protection against rain 	Not influenced or harmed by rainfall falling anywhere from vertically to 60 degrees.	The testing device illustrated on the right sprays water vertically to 60 degrees for a 10 minute period. 
4	Mist-resistant Type	Protection against mist 	Not influenced or harmed by mist coming from any direction.	The testing device illustrated on the right sends out a mist from every direction possible for a 10 minute period. 
5	Stream jet Resistant Type	Protection against streams of water 	Not influenced or harmed by stream jets of water coming from any direction.	The testing device illustrated on the right shoots out water from every direction possible for a 15 minute period.  Spray section nozzle diameter: φ12.5
6	Water Resistant Type	Protection against waves 	No infiltration occurs even when strong jets of water are sprayed from all directions.	The testing device illustrated on the right shoots out water from every direction possible for a 15 minute period.  Spray section nozzle diameter: φ12.5
7	Infiltration Resistant Type	Water Submersible Protection 	Water will not infiltrate at the prescribed pressure over a set period of time.	Submerging for 30 minutes at 1 meter. 
8	Submersible Type	Submergence Protection 	Can be used while continuously immersed in water.	Determined Separately

MINI Series

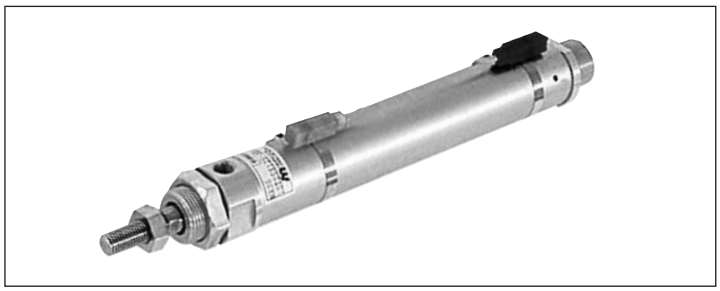
3.5・7・14・16・21・35MPa

MINI Cylinder

Selection and standard table

Series Name		MR35	MRK35	M70	MR70	MRK70	M140	M210
Bore (mm)	φ15						●	●
	φ20	●	●	●	●	●	●	●
	φ25	●	●	●	●	●	●	●
	φ30	●	●	●	●	●	●	●
Nominal Pressure MPa	3.5	●	●					
	7			●	●	●		
	14						●	
	21							●
Mounting	ST	●	●	●	●	●	●	●
	LB	●	●	●	●	●	●	●
	FA (FB)	●	●	●	●	●	●	●
	CA	●	●	●	●	●	●	●
	TA (TB)	●	Only TA ●	●	●	Only TA ●	●	Only TA ●
Port	E (Side access)	●		●	●		●	●
Double Rod				●			●	
End Joint		●	●	●	●	●	●	●
Cushion Format			●			●	●	
Switch Adjusted		●	●		●	●		
Maximum Stroke		300	300	300	300	300	300	300
Feature		Round shape	Round shape	Round shape	Round shape	Round shape	Round shape	Round shape

Note) In the case of M140 and M210, when the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.



Specifications

Series Name	MR35		
Bore	φ20·φ25·φ30		
Nominal Pressure	3.5MPa		
Proof Pressure	5.3MPa		
Minimum Working Pressure	0.3MPa		
Range of Operating Speed	10 to 300㎜/s		
Range of Operating Temperature	−10℃ to +60℃		
Hydraulic Oil Applied	General purpose mineral hydraulic oil		
Thread Tolerance	JIS6g/6H		
Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) The phosphoric acid ester cannot be used for the hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	150	200	Maximum
Bore	φ20	○	○	○	○	○	○	300
	φ25	○	○	○	○	○	○	300
	φ30	○	○	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

Switch Specifications

Type	10
Rated Voltage	AC/DC5 to 100V
Rated Current	5 to 50mA (Indicator Lamp is red 3 to 50mA)
Maximum Contact Capacity	AC/DC 10VA
Closed Circuit Voltage Drops	2.5V or less
Impact Resistance	30G
Lead Length	Side access
	Standard length : 1 m (Special order : 5 m)
Indicator Lamp	LED lights at all aspects ON.
Leak Current at OFF	0
Contact Dielectric Strength	200 VDC for one minute, Leak current: 1 mA or less
Protective construction	IP67

Note 1) To select a switch, check the current rating of the small relay coil, and the input current of PLC (programmable controller), and use the switch within the above operating current range.
Note 2) "Type 10" provides IP68 enclosure rating. It shall be tested depending on submersion depth.
Note 3) Red and green switches are available. There is no difference in performance.

Minimum stroke that can install switch ▶ In case of one switch : 10㎜ / In case of two switches : 25㎜

■Code

MR35 - 1 LB 25×25 E - SB 101 - T- J

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	MR35
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA) / Cap Side Trunnion (TB)
④ Bore (㎜)	20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Port Location Note)	No notation : Standard E: Cap-side port, side access (ST, FA and TA only)
⑦ Switch Quantity	SO: No switch SR: Head-side switch (1 piece) SH: Cap-side switch (1 piece) SB: Two switches SC: Three switches
⑧ Switch Type	101:10 type, 1m cord (Standard) 105:10 type, 5m cord (Standard Equivalent)
⑨ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint
⑩ Bellows	No notation : None J:With Bellows

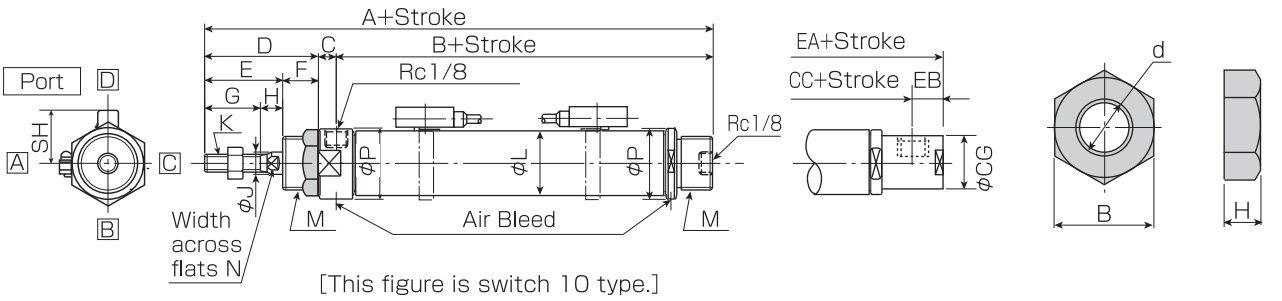
Note) Please refer to the dimensional outline drawing for the port position.

Basic Type [ST]

■With Mounting Nut

Mounting nut
(Shaded area)

●Port side access type



[This figure is switch 10 type.]

Units:㎜

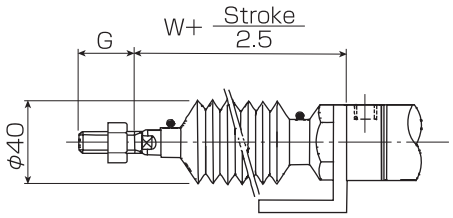
Symbol / Bore	A	B	C	D	E	F	G	H	ϕJ	K	L	M	N	P	Port side access type				Switch
															EA	EB	CC	ϕCG	SH
ϕ20	150	91	8	51	35	16	25	10	10	M8 P1.0	26	M24 P1.5	8	29	155	11	85	18	22
ϕ25	150	91	8	51	35	16	25	10	12	M10 P1.25	31	M24 P1.5	10	34	155	11	85	22	24.5
ϕ30	160	94	8	58	40	18	30	10	14	M12 P1.25	36	M26 P1.5	12	39	166	12	88	26	27

Units:㎜

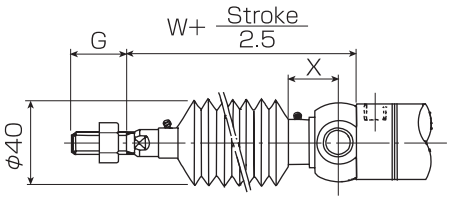
Symbol / Bore	d	H	B
ϕ20	M24 P1.5	8	30
ϕ25	M24 P1.5	8	30
ϕ30	M26 P1.5	8	32

■With Bellows (Material: Nylon tarporin, Heat resistance: 80℃)

Example 1: Foot (LB)



Example 2 : Trunnion (TA)



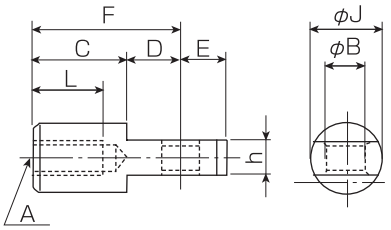
Units:㎜

Symbol / Bore	W	G	X
ϕ20	55	25	23
ϕ25	55	25	23
ϕ30	59	30	25

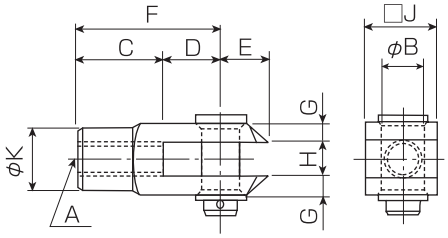
Note) For a cylinder with 37.5 mm or shorter stroke (with dust cover), calculate "W + 15".

■End Joint

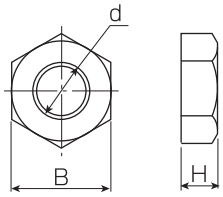
Single Protrusion End Joint : T type



Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Lock Nut



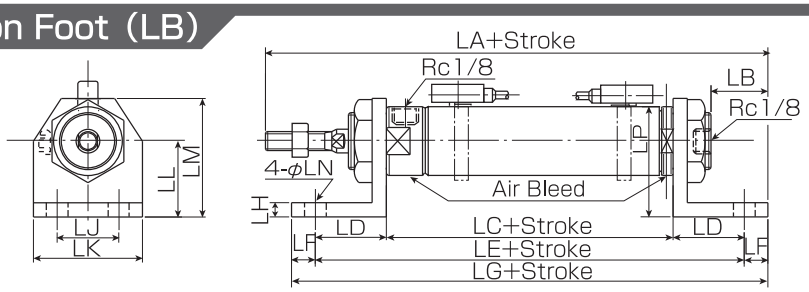
Units:㎜

Symbol / Bore	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J/ ϕJ	ϕK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
ϕ20	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14
ϕ25	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
ϕ30	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21

Units:㎜

Symbol / Bore	d	H	B
ϕ20	M8 P1.0	6.5	13
ϕ25	M10 P1.25	8	17
ϕ30	M12 P1.25	10	19

Axis Direction Foot (LB)

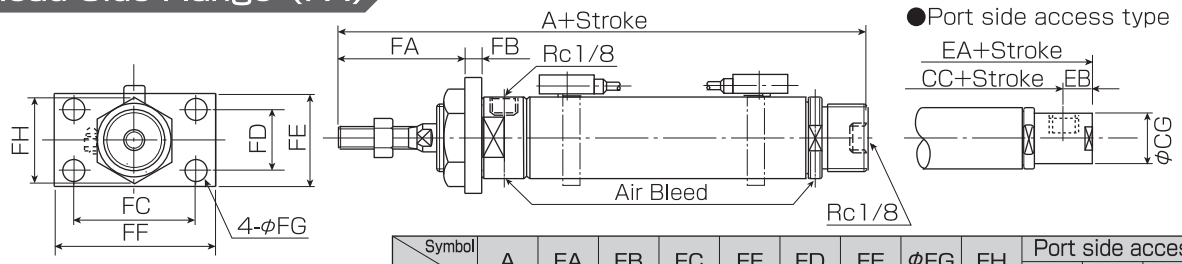


Units:mm

Symbol / Bore	LA	LB	LC	LD	LE	LF	LG	LH	φLN	LP	LJ	LK	LL	LM
φ20	174	24	83	30	143	10	163	6	9	46.5	26	46	32	50
φ25	174	24	83	30	143	10	163	6	9	49.0	26	46	32	50
φ30	184	24	86	30	146	10	166	6	9	51.5	26	46	32	50

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)

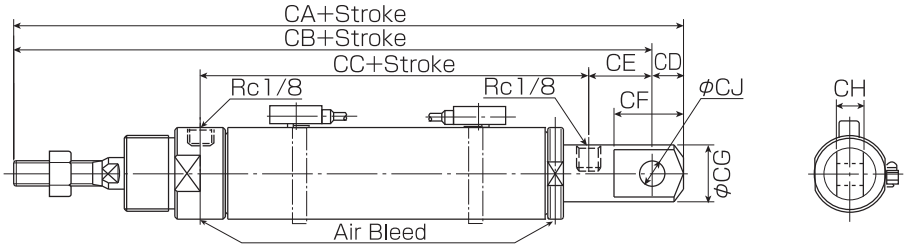


Units:mm

Symbol / Bore	A	FA	FB	FC	FF	FD	FE	φFG	FH	Port side access type			
										EA	EB	CC	φCG
φ20	150	45	6	50	66	25	38	9	35	155	11	85	18
φ25	150	45	6	50	66	25	38	9	35	155	11	85	22
φ30	160	49	9	55	71	25	38	9	38	166	12	88	26

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA) 〈Port side access type only〉

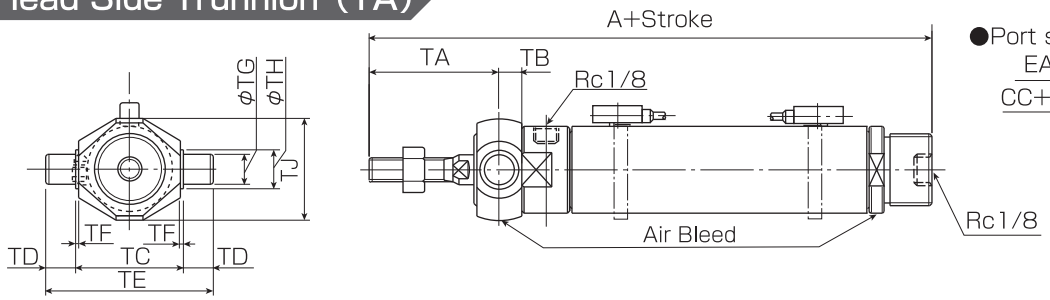


Units:mm

Symbol / Bore	CA	CB	CC	CE	CD	CF	φCG	φCJ	CH
φ20	174	164	85	20	10	22	18	$8^{+0.02}_{0}$	$10^{0}_{-0.2}$
φ25	182	169	85	25	13	30	22	$10^{+0.02}_{0}$	$12^{0}_{-0.2}$
φ30	196	181	88	27	15	33	26	$12^{+0.02}_{0}$	$14^{0}_{-0.2}$

Note) Please refer to the ST type for other dimensions.

Head Side Trunnion (TA)

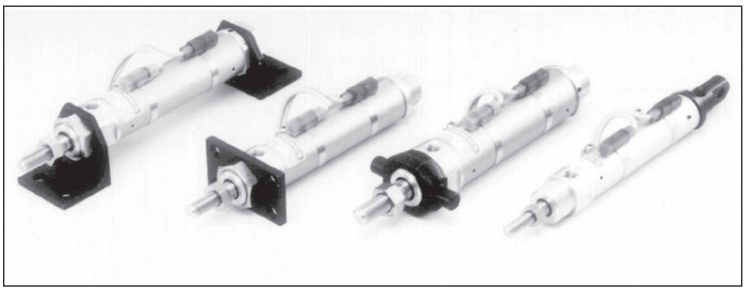


Units:mm

Symbol / Bore	A	TA	TB	TC	TD	φTE	TF	φTG	φTH	TJ	Port side access type			
											EA	EB	CC	φCG
φ20	150	$43.5^{0}_{-0.8}$	$7.5^{+0.8}_{0}$	36±0.1	10	56±0.2	1	$10^{0}_{-0.02}$	13	34	155	11	85	18
φ25	150	$43.5^{0}_{-0.8}$	$7.5^{+0.8}_{0}$	36±0.1	10	56±0.2	1	$10^{0}_{-0.02}$	13	34	155	11	85	22
φ30	160	$50.0^{0}_{-0.8}$	$8.0^{+0.8}_{0}$	42±0.1	12	66±0.2	1	$12^{0}_{-0.02}$	14	39	166	12	88	26

Note) Please refer to the ST type for other dimensions.

MINI Series
MRK35 Series ■ 3.5MPa



Specifications

Series Name	MR35		
Bore	φ20·φ25·φ30		
Nominal Pressure	3.5MPa		
Proof Pressure	5.3MPa		
Minimum Working Pressure	0.3MPa		
Range of Operating Speed	10 to 300㎜/s		
Range of Operating Temperature	−10℃ to +60℃		
Hydraulic Oil Applied	General purpose mineral hydraulic oil		
Thread Tolerance	JIS6g/6H		
Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) The phosphoric acid ester cannot be used for the hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	150	200	Maximum
Bore	φ20	○	○	○	○	○	○	300
	φ25	○	○	○	○	○	○	300
	φ30	○	○	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

Switch Specifications

Type	10
Rated Voltage	AC/DC5 to 100V
Rated Current	5 to 50mA (Indicator Lamp is red 3 to 50mA)
Maximum Contact Capacity	AC/DC 10VA
Closed Circuit Voltage Drops	2.5V or less
Impact Resistance	30G
Lead Length	Side access
	Standard length : 1 m (Special order : 5 m)
Indicator Lamp	LED lights at all aspects ON.
Leak Current at OFF	0
Contact Dielectric Strength	200 VDC for one minute, Leak current: 1 mA or less
Protective construction	IP67

Note 1) To select a switch, check the current rating of the small relay coil, and the input current of PLC (programmable controller), and use the switch within the above operating current range.
Note 2) "Type 10" provides IP68 enclosure rating. It shall be tested depending on submersion depth.
Note 3) Red and green switches are available. There is no difference in performance.

Minimum stroke that can install switch ▶ In case of one switch : 10㎜ / In case of two switches : 25㎜

■Code

MRK35 - 1 LB 25×25 B A - SB 101 - T

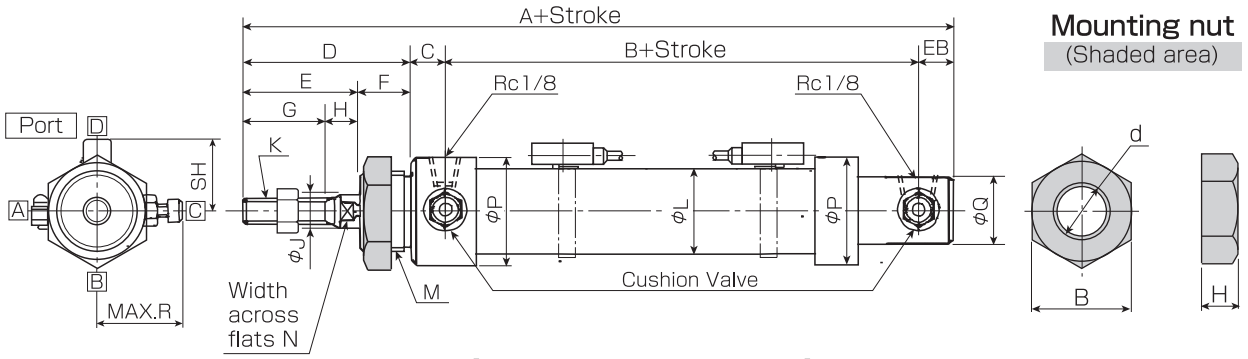
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	MRK35
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA)
④ Bore (㎜)	20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Cushion Format	R:Cushion on Head side H:Cushion on Cap side B:Cushion on both sides (Standard) N:None
⑦ Cushion valve location Note)	No notation : Standard (C position) A:A position B:B position
⑧ Switch Quantity	SO: No switch SR: Head-side switch (1 piece) SH: Cap-side switch (1 piece) SB: Two switches SC: Three switches
⑨ Switch Type	101:10 type, 1m cord (Standard) 105:10 type, 5m cord (Standard Equivalent)
⑩ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint

Note) The standard cushion valve position is shown in the outer dimension drawing. If the cushion valve position is different from the standard position, specify the "A", "B" or "C" symbol shown in the figure.

Basic Type [ST]

■With Mounting Nut



[This figure is switch 10 type.]

Units:mm

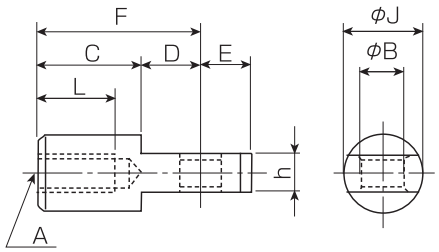
Symbol / Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	EB	SH
ϕ20	172	102	8	51	35	16	25	10	10	M8 P1.0	26	M24 P1.5	8	29	22	26.5	11	22
ϕ25	173	103	8	51	35	16	25	10	12	M10 P1.25	31	M24 P1.5	10	34	24	29	11	24.5
ϕ30	184	107	8	58	40	18	30	10	14	M12 P1.25	36	M26 P1.5	12	39	26	33	11	27

Units:mm

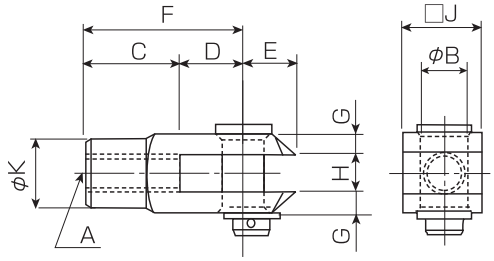
Symbol / Bore	d	H	B
ϕ20	M24 P1.5	8	30
ϕ25	M24 P1.5	8	30
ϕ30	M26 P1.5	8	32

■End Joint

Single Protrusion End Joint : T type



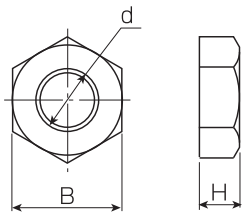
Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Units:mm

Symbol / Bore	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J/ ϕJ	ϕK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
ϕ20	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14
ϕ25	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
ϕ30	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21

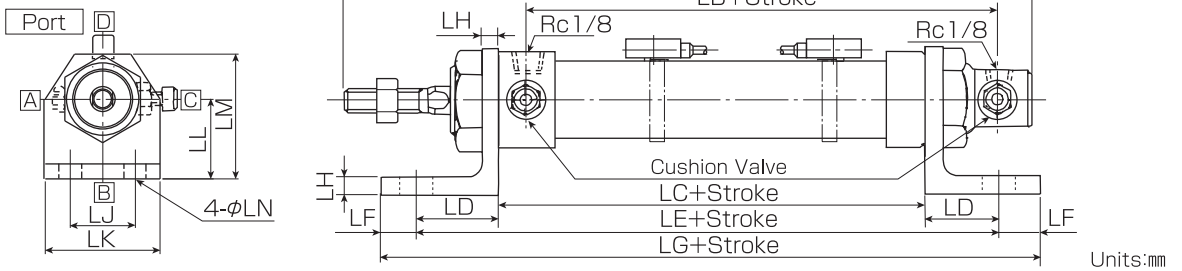
Lock Nut



Units:mm

Symbol / Bore	d	H	B
ϕ20	M8 P1.0	6.5	13
ϕ25	M10 P1.25	8	17
ϕ30	M12 P1.25	10	19

Axis Direction Foot (LB)

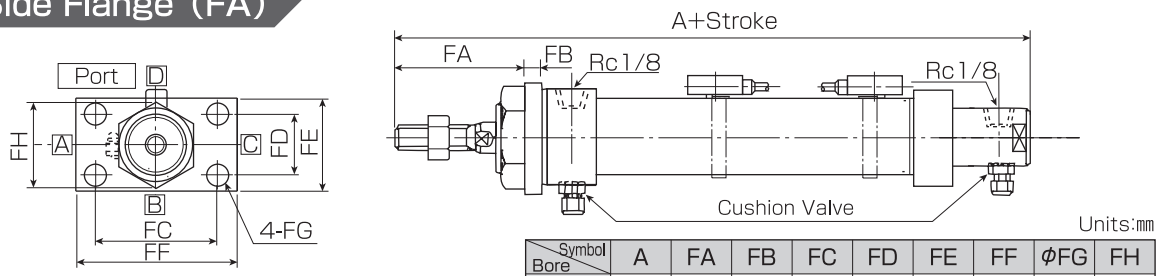


Units:mm

Symbol / Bore	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN
φ20	183	113	92	30	152	10	172	5.5	26	46	32	50	9
φ25	181	111	93	30	153	10	173	5.5	26	46	32	50	9
φ30	194	117	96	30	156	10	176	5.5	26	46	32	50	9

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)

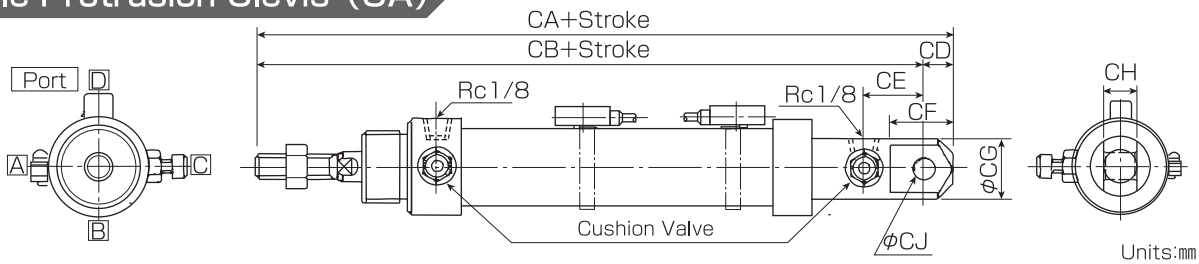


Units:mm

Symbol / Bore	A	FA	FB	FC	FD	FE	FF	φFG	FH
φ20	172	45	6	50	25	38	66	9	35
φ25	173	45	6	50	25	38	66	9	35
φ30	184	49	9	55	25	38	71	9	38

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA)

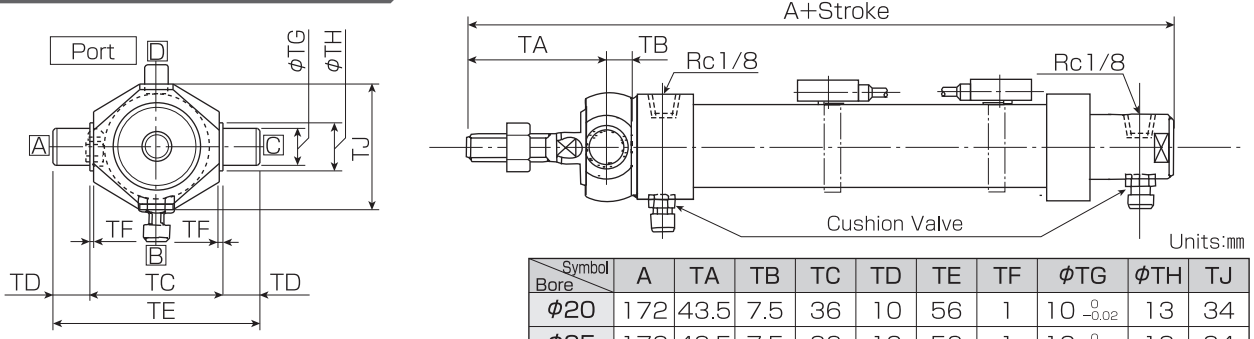


Units:mm

Symbol / Bore	CA	CB	CD	CE	CF	φCG	CH	φCJ
φ20	193	183	10	22	22	22	$10^{0}_{-0.2}$	$8^{+0.02}_{0}$
φ25	202	189	13	27	30	24	$12^{0}_{-0.2}$	$10^{+0.02}_{0}$
φ30	215	200	15	27	33	26	$14^{0}_{-0.2}$	$12^{+0.02}_{0}$

Note) Please refer to the ST type for other dimensions.

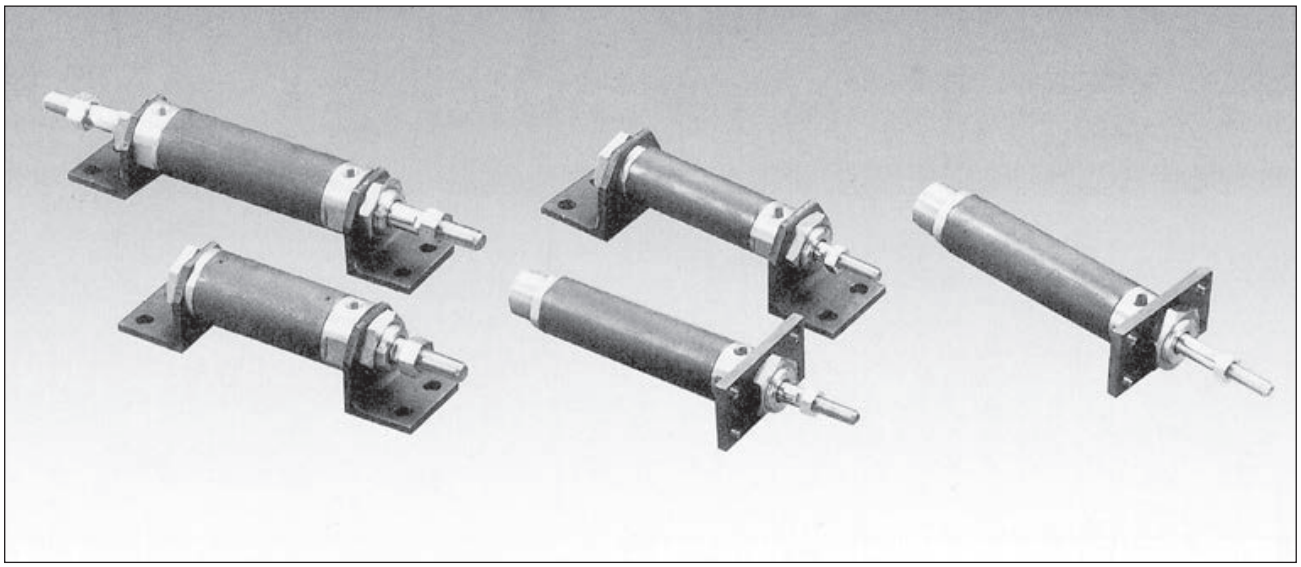
Head Side Trunnion (TA)



Units:mm

Symbol / Bore	A	TA	TB	TC	TD	TE	TF	φTG	φTH	TJ
φ20	172	43.5	7.5	36	10	56	1	$10^{0}_{-0.02}$	13	34
φ25	173	43.5	7.5	36	10	56	1	$10^{0}_{-0.02}$	13	34
φ30	184	50	8	42	12	66	1	$12^{0}_{-0.02}$	14	39

Note) Please refer to the ST type for other dimensions.



Specifications

Series Name	Single rod type:M70S	Double rod type:M70D
Bore	φ20·φ25·φ30	
Nominal Pressure	7MPa	
Proof Pressure	10.5MPa	
Minimum Working Pressure	0.3MPa or less	
Range of Operating Speed	10 to 300㎜/s	
Range of Operating Temperature	−10℃ to +80℃	
Cushion Format Note)	None	
Hydraulic Oil Applied	General purpose mineral hydraulic oil	
Thread Tolerance	JIS6g/6H	

Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) Please refer to the 〈Attention when using it〉 on P.179 for the application hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	150	200	Maximum
Bore	φ20	○	○	○	○	○	○	300
	φ25	○	○	○	○	○	○	300
	φ30	○	○	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

■Code

M70S - 1 LB 25×25 E - T - J

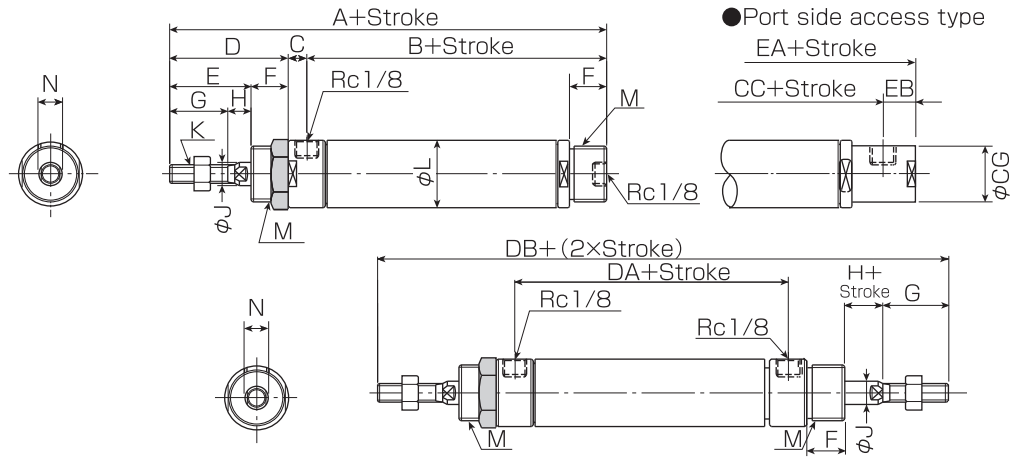
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Series Name	M70S:Single rod type M70D:Double rod type
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA) / Cap Side Trunnion (TB)
④ Bore (㎜)	20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Port Location Note)	No notation:None E: Cap-side port side access (ST, FA and TA only) The double rod type provides Cap-side port side access type only. (No specific code is required.)
⑦ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint
⑧ Bellows	No notation : None J:With Bellows

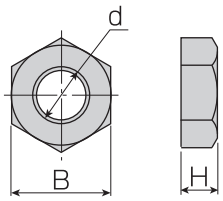
Note) Please refer to the dimensional outline drawing for the port position.

Basic Type [ST]

■With Mounting Nut



Mounting nut
(Shaded area)



Units:㎜

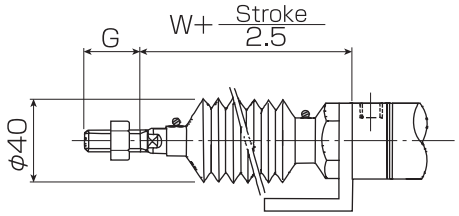
Symbol / Bore	A	B	C	D	E	F	G	H	ϕJ	K	L	M	N	Port side access type				Double Rod type	
														EA	EB	CC	ϕCG	DA	DB
ϕ20	138	79	8	51	35	16	25	10	10	M8 P1.0	29	M24 P1.5	8	143	11	73	18	91	209
ϕ25	138	79	8	51	35	16	25	10	12	M10 P1.25	34	M24 P1.5	10	143	11	73	22	91	209
ϕ30	148	82	8	58	40	18	30	10	14	M12 P1.25	39	M26 P1.5	12	154	12	76	26	94	226

Units:㎜

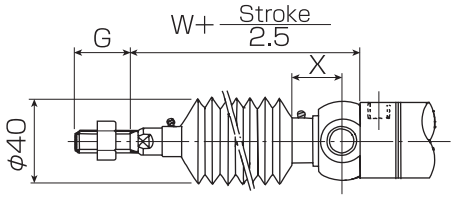
Symbol / Bore	d	H	B
ϕ20	M24 P1.5	8	30
ϕ25	M24 P1.5	8	30
ϕ30	M26 P1.5	8	32

■With Bellows (Material: Nylon tarporin, Heat resistance: 80℃)

Example 1: Foot (LB)



Example 2 : Trunnion (TA)



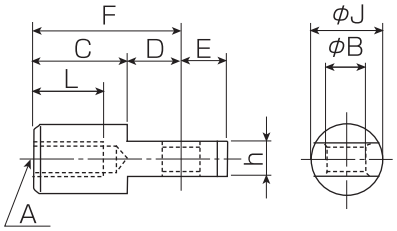
Units:㎜

Symbol / Bore	W	G	X
ϕ20	55	25	23
ϕ25	55	25	23
ϕ30	59	30	24

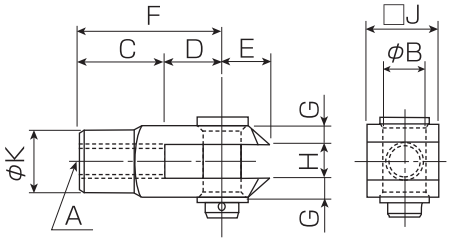
Note) For a cylinder with 37.5 mm or shorter stroke (with dust cover), calculate "W + 15".

■End Joint

Single Protrusion End Joint : T type



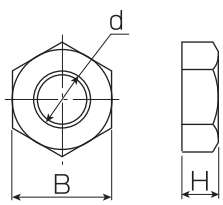
Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Units:㎜

Symbol / Bore	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J / ϕJ	ϕK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
ϕ20	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14.0
ϕ25	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
ϕ30	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21.0

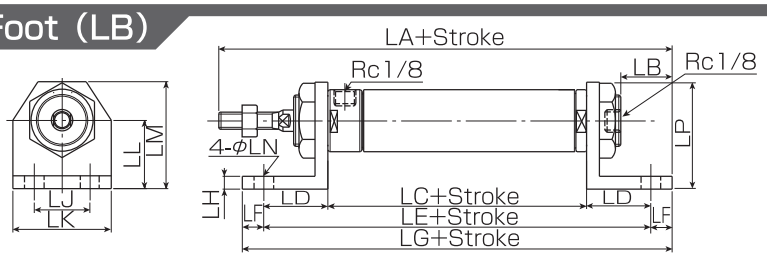
Lock Nut



Units:㎜

Symbol / Bore	d	H	B
ϕ20	M8 P1.0	6.5	13
ϕ25	M10 P1.25	8	17
ϕ30	M12 P1.25	10	19

Axis Direction Foot (LB)

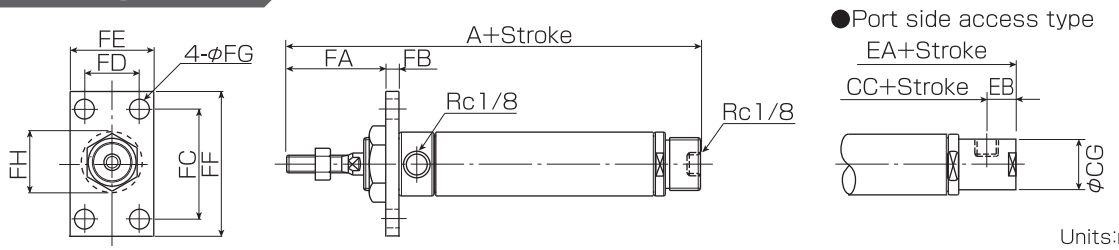


Units:mm

Bore \ Symbol	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN	LP
φ20	162	24	71	30	131	10	151	6	26	46	32	50	9	46.5
φ25	162	24	71	30	131	10	151	6	26	46	32	50	9	49.0
φ30	172	24	74	30	134	10	154	6	26	46	32	50	9	51.5

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)

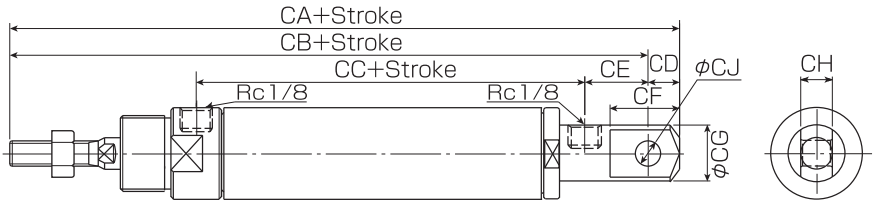


Units:mm

Bore \ Symbol	A	FA	FB	FC	FD	FE	FF	φFG	FH	Port side access type			
										EA	EB	CC	CG
φ20	138	45	6	50	25	38	66	9	35	143	11	73	18
φ25	138	45	6	50	25	38	66	9	35	143	11	73	22
φ30	148	49	9	55	25	38	71	9	38	154	12	76	26

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA) 〈Port side access type only〉

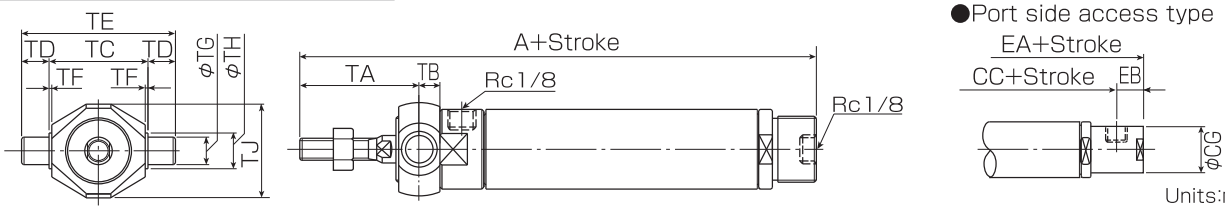


Units:mm

Bore \ Symbol	CA	CB	CC	CD	CE	CF	φCG	CH	φCJ
φ20	162	152	73	10	20	22	18	$10^{\ 0}_{-0.2}$	$8^{+0.02}_{\ 0}$
φ25	170	157	73	13	25	30	22	$12^{\ 0}_{-0.2}$	$10^{+0.02}_{\ 0}$
φ30	184	169	76	15	27	33	26	$14^{\ 0}_{-0.2}$	$12^{+0.02}_{\ 0}$

Note) Please refer to the ST type for other dimensions.

Head Side Trunnion (TA)



Units:mm

Bore \ Symbol	A	TA	TB	TC	TD	TE	TF	φTG	φTH	TJ	Port side access type			
											EA	EB	CC	φCG
φ20	138	$43.5^{\ 0}_{-0.8}$	$7.5^{+0.8}_{\ 0}$	36±0.1	10	56±0.2	1	$10^{\ 0}_{-0.02}$	13	34	143	11	73	18
φ25	138	$43.5^{\ 0}_{-0.8}$	$7.5^{+0.8}_{\ 0}$	36±0.1	10	56±0.2	1	$10^{\ 0}_{-0.02}$	13	34	143	11	73	22
φ30	148	$50.0^{\ 0}_{-0.8}$	$8.0^{+0.8}_{\ 0}$	42±0.1	12	66±0.2	1	$12^{\ 0}_{-0.02}$	14	39	154	12	76	26

Note) Please refer to the ST type for other dimensions.

MINI Series
MR70 Series ■ 7MPa

Specifications

Series Name	MR70		
Bore	φ20·φ25·φ30		
Nominal Pressure	7MPa		
Proof Pressure	10.5MPa		
Minimum Working Pressure	0.3MPa or less		
Range of Operating Speed	10 to 300㎜/s		
Range of Operating Temperature	−10℃ to +80℃		
Cushion Format	None		
Hydraulic Oil Applied	General purpose mineral hydraulic oil		
Thread Tolerance	JIS6g/6H		
Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) Please refer to the 〈Attention when using it〉 on P.179 for the application hydraulic fluid.

Standard stroke

Units:㎜

Stroke		25	50	75	100	150	200	Maximum
Bore	φ20	○	○	○	○	○	○	300
	φ25	○	○	○	○	○	○	300
	φ30	○	○	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

Switch Specifications

Type	10
Rated Voltage	AC/DC5 to 100V
Rated Current	5 to 50mA (Indicator Lamp is red 3 to 50mA)
Maximum Contact Capacity	AC/DC 10VA
Closed Circuit Voltage Drops	2.5V or less
Impact Resistance	30G
Lead Length	Side access
	Standard length : 1 m (Special order : 5 m)
Indicator Lamp	LED lights at all aspects ON.
Leak Current at OFF	0
Contact Dielectric Strength	200 VDC for one minute, Leak current: 1 mA or less
Protective construction	IP67

Note 1) To select a switch, check the current rating of the small relay coil, and the input current of PLC (programmable controller), and use the switch within the above operating current range.
Note 2) "Type 10" provides IP68 enclosure rating. It shall be tested depending on submersion depth.
Note 3) Red and green switches are available. There is no difference in performance.

Minimum stroke that can install switch ▶ In case of one switch : 10㎜ / In case of two switches : 25㎜

■Code

MR70 - 1 LB 25×25 E - SB 101 - T - J

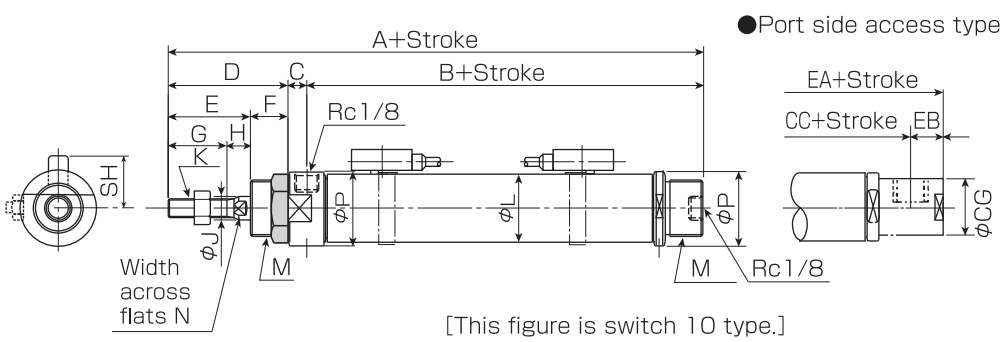
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	MR70
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA) / Cap Side Trunnion (TB)
④ Bore (㎜)	20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Port Location Note)	No notation : Standard E: Cap-side port, side access (ST, FA and TA only)
⑦ Switch Quantity	SO: No switch (Body only) SR: Head-side switch (1 piece) SH: Cap-side switch (1 piece) SB: Two switches SC: Three switches
⑧ Switch Type	101:10 type, 1m cord (Standard) 105:10 type, 5m cord (Standard Equivalent)
⑨ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint
⑩ Bellows	No notation : None J:With Bellows

Note) Please refer to the dimensional outline drawing for the port position.

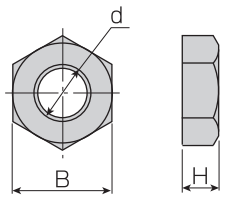
Basic Type [ST]

■With Mounting Nut



[This figure is switch 10 type.]

Mounting nut
(Shaded area)



Units:mm

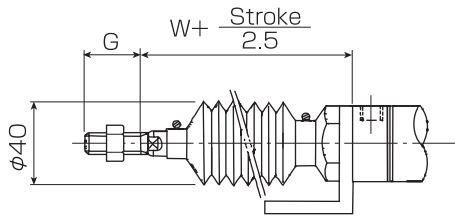
Bore \ Symbol	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Switch	Port side access type			
															SH	EA	EB	CC	ϕCG
ϕ20	150	91	8	51	35	16	25	10	10	M8 P1.0	26	M24 P1.5	8	29	22	155	11	85	18
ϕ25	150	91	8	51	35	16	25	10	12	M10 P1.25	31	M24 P1.5	10	34	24.5	155	11	85	22
ϕ30	160	94	8	58	40	18	30	10	14	M12 P1.25	36	M26 P1.5	12	39	27	166	12	88	26

Units:mm

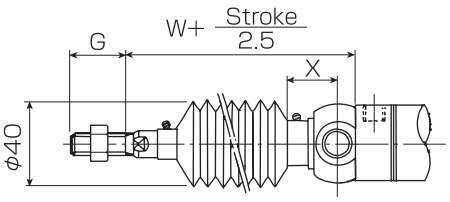
Bore \ Symbol	d	H	B
ϕ20	M24 P1.5	8	30
ϕ25	M24 P1.5	8	30
ϕ30	M26 P1.5	8	32

■With Bellows (Material: Nylon tarporin, Heat resistance: 80℃)

Example 1: Foot (LB)



Example 2 : Trunnion (TA)



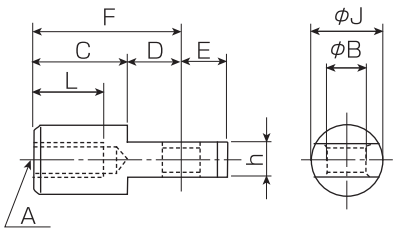
Units:mm

Bore \ Symbol	W	G	X
ϕ20	55	25	23
ϕ25	55	25	23
ϕ30	59	30	24

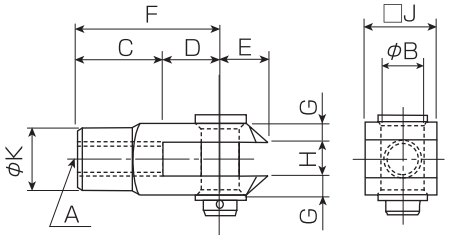
Note) For a cylinder with 37.5 mm or shorter stroke (with dust cover), calculate "W + 15".

■End Joint

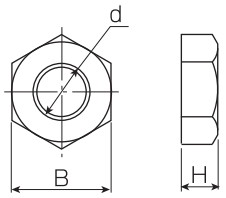
Single Protrusion End Joint : T type



Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Lock Nut



Units:mm

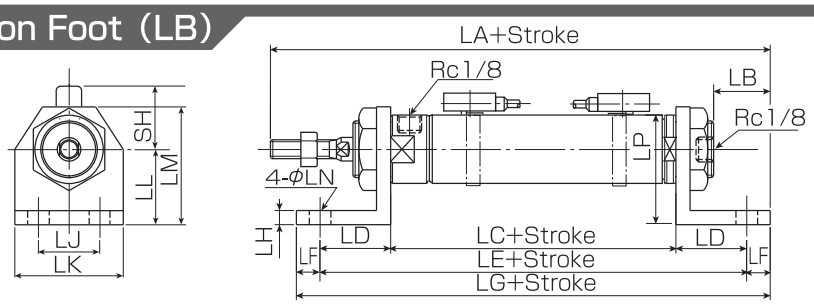
Bore \ Symbol	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J/ ϕJ	ϕK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
ϕ20	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14.0
ϕ25	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
ϕ30	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21.0

Units:mm

Bore \ Symbol	d	H	B
ϕ20	M8 P1.0	6.5	13
ϕ25	M10 P1.25	8	17
ϕ30	M12 P1.25	10	19

MINI Series
MR70 Series ■ 7MPa

Axis Direction Foot (LB)

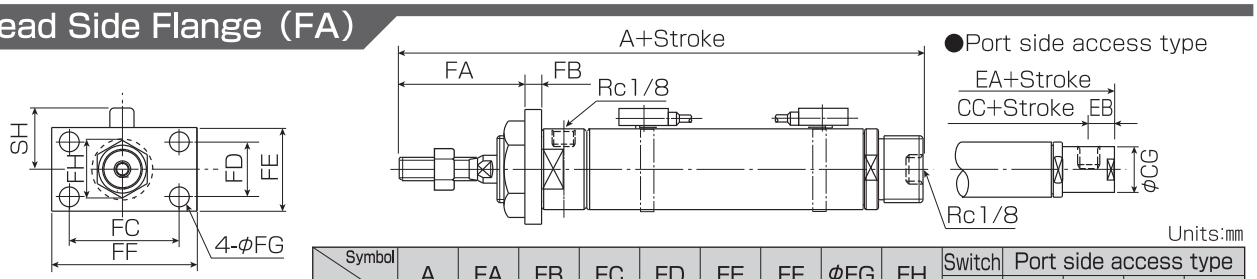


Units:mm

Bore \ Symbol	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN	LP	Switch SH
φ20	174	24	83	30	143	10	163	6	26	46	32	50	9	46.5	22
φ25	174	24	83	30	143	10	163	6	26	46	32	50	9	49.0	24.5
φ30	184	24	86	30	146	10	166	6	26	46	32	50	9	51.5	27

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)

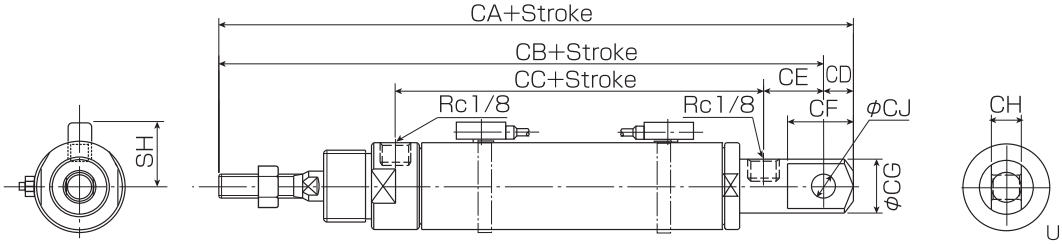


Units:mm

Bore \ Symbol	A	FA	FB	FC	FD	FE	FF	φFG	FH	Switch SH	Port side access type EA	EB	CC	φCG
φ20	150	45	6	50	25	38	66	9	35	22	155	11	85	18
φ25	150	45	6	50	25	38	66	9	35	24.5	155	11	85	22
φ30	160	49	9	55	25	38	71	9	38	27	166	12	88	26

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA) 〈Port side access type only〉

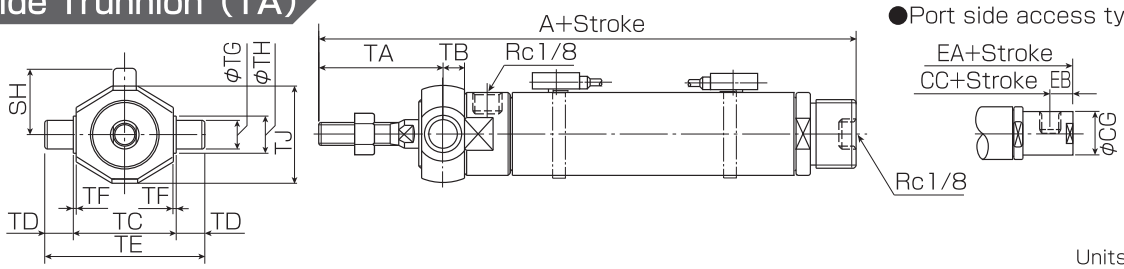


Units:mm

Bore \ Symbol	CA	CB	CC	CD	CE	CF	φCG	CH	φCJ	Switch SH
φ20	174	164	85	10	20	22	18	$10^{0}_{-0.2}$	$8^{+0.02}_{0}$	22
φ25	182	169	85	13	25	30	22	$12^{0}_{-0.2}$	$10^{+0.02}_{0}$	24.5
φ30	196	181	88	15	27	33	26	$14^{0}_{-0.2}$	$12^{+0.02}_{0}$	27

Note) Please refer to the ST type for other dimensions.

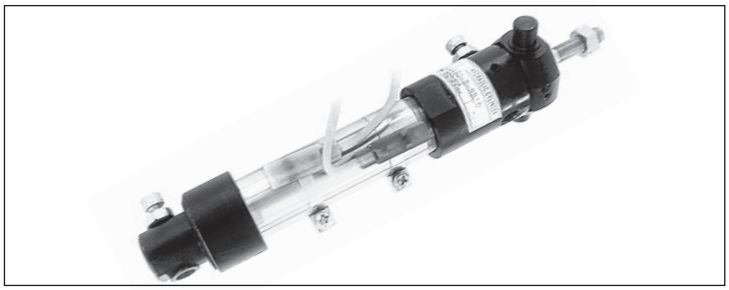
Head Side Trunnion (TA)



Units:mm

Bore \ Symbol	A	TA	TB	TC	TD	φTE	TF	φTG	φTH	TJ	Switch SH	Port side access type EA	EB	CC	φCG
φ20	150	$43.5^{0}_{-0.8}$	$7.5^{+0.8}_{0}$	36±0.1	10	56±0.2	1	$10^{0}_{-0.02}$	13	34	22	155	11	85	18
φ25	150	$43.5^{0}_{-0.8}$	$7.5^{+0.8}_{0}$	36±0.1	10	56±0.2	1	$10^{0}_{-0.02}$	13	34	24.5	155	11	85	22
φ30	160	$50.0^{0}_{-0.8}$	$8.0^{+0.8}_{0}$	42±0.1	12	66±0.2	1	$12^{0}_{-0.02}$	14	39	27	166	12	88	26

Note) Please refer to the ST type for other dimensions.



Specifications

Series Name	MRK70		
Bore	φ20·φ25·φ30		
Nominal Pressure	7MPa		
Proof Pressure	10.5MPa		
Minimum Working Pressure	0.3MPa		
Range of Operating Speed	10 to 300㎜/s		
Range of Operating Temperature	−10℃ to +60℃		
Hydraulic Oil Applied	General purpose mineral hydraulic oil		
Thread Tolerance	JIS6g/6H		
Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) The phosphoric acid ester cannot be used for the hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	150	200	Maximum
Bore	φ20	○	○	○	○	○	○	300
	φ25	○	○	○	○	○	○	300
	φ30	○	○	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

Switch Specifications

Type	10
Rated Voltage	AC/DC5 to 100V
Rated Current	5 to 50mA (Indicator Lamp is red 3 to 50mA)
Maximum Contact Capacity	AC/DC 10VA
Closed Circuit Voltage Drops	2.5V or less
Impact Resistance	30G
Lead Length	Side access
	Standard length : 1 m (Special order : 5 m)
Indicator Lamp	LED lights at all aspects ON.
Leak Current at OFF	0
Contact Dielectric Strength	200 VDC for one minute, Leak current: 1 mA or less
Protective construction	IP67

Note 1) To select a switch, check the current rating of the small relay coil, and the input current of PLC (programmable controller), and use the switch within the above operating current range.
Note 2) "Type 10" provides IP68 enclosure rating. It shall be tested depending on submersion depth.
Note 3) Red and green switches are available. There is no difference in performance.

Minimum stroke that can install switch ▶ In case of one switch : 10㎜ / In case of two switches : 25㎜

■Code

MRK70 - 1 LB 25×25 B A - SB 101 - T

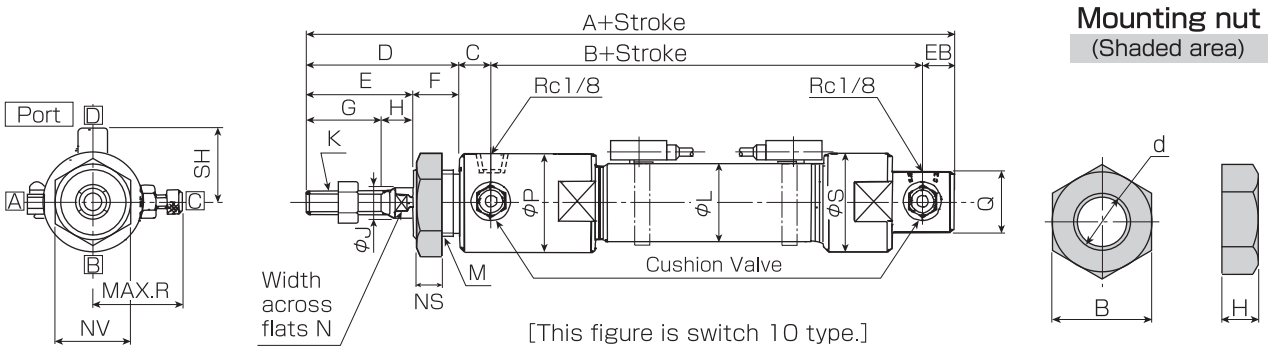
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	MRK70
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA)
④ Bore (㎜)	20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Cushion Format	R:Cushion on Head side H:Cushion on Cap side B:Cushion on both sides (Standard) N:None
⑦ Cushion valve location Note)	No notation : Standard (C position) A:A position B:B position
⑧ Switch Quantity	SO: No switch SR: Head-side switch (1 piece) SH: Cap-side switch (1 piece) SB: Two switches SC: Three switches
⑨ Switch Code	101:10 type, 1m cord (Standard) 105:10 type, 5m cord (Standard Equivalent)
⑩ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint

Note) The standard cushion valve position is shown in the outer dimension drawing. If the cushion valve position is different from the standard position, specify the "A", "B" or "C" symbol shown in the figure.

Basic Type [ST]

■With Mounting Nut



Units:㎜

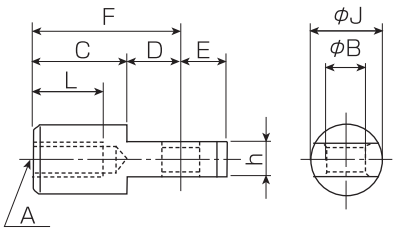
Bore \ Symbol	A	B	C	D	E	F	G	H	ϕJ	K	ϕL	M	N	ϕP	ϕQ	Switch SH	EB	R	NS	NV	ϕS
ϕ20	166	95	10	51	35	16	25	10	10	M8 P1.0	26	M24 P1.5	8	33	22	22	10	30.5	8	30	35
ϕ25	167	94	10	53	37	16	25	12	12	M10 P1.25	31	M26 P1.5	10	38	26	24.5	10	34	8	32	42
ϕ30	191	105	10	66	44	22	30	14	14	M12 P1.25	36	M33 P1.5	12	43	30	27	10	36	8	41	46

Units:㎜

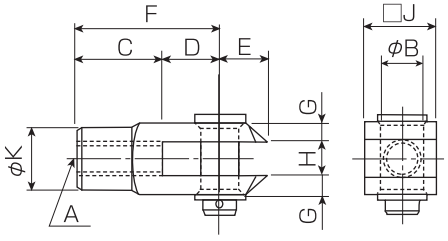
Bore \ Symbol	d	H	B
ϕ20	M24 P1.5	8	30
ϕ25	M24 P1.5	8	32
ϕ30	M26 P1.5	8	41

■End Joint

Single Protrusion End Joint : T type



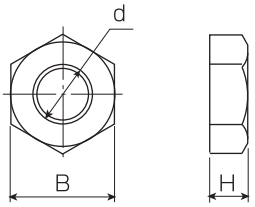
Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Units:㎜

Bore \ Symbol	A	B bore dia	B shaft dia	C Y joint	C T joint	D Y joint	D T joint	E Y joint	E T joint	F	G	H	h	□J/ ϕJ	ϕK	L
ϕ20	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14.0
ϕ25	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
ϕ30	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21.0

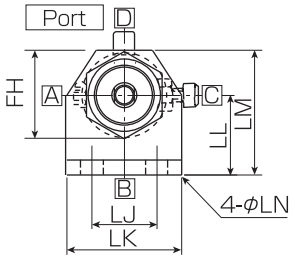
Lock Nut

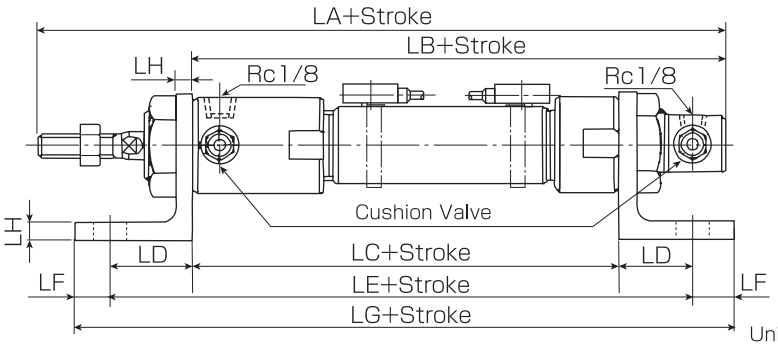


Units:㎜

Bore \ Symbol	d	H	B
ϕ20	M8 P1.0	6.5	13
ϕ25	M10 P1.25	8	17
ϕ30	M12 P1.25	10	19

Axis Direction Foot (LB)



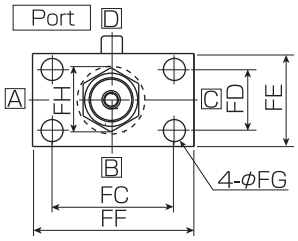


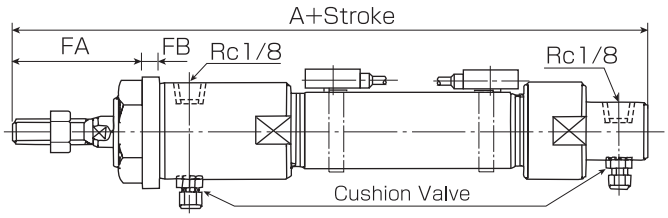
Units:㎜

Bore \ Symbol	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN	FH
φ20	181	130	94	30	154	10	174	6	26	46	32	50	9	35
φ25	183	130	93	30	153	10	173	6	26	46	32	50	9	38
φ30	212	146	104	34	172	11	194	9	30	50	40	65	11	48

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)



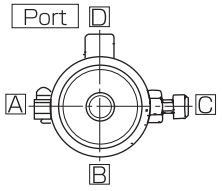


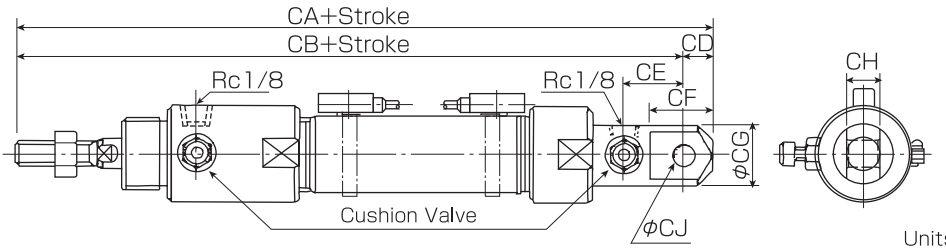
Units:㎜

Bore \ Symbol	A	FA	FB	FC	FD	FE	FF	φFG	FH
φ20	166	45	6	50	25	38	66	9	35
φ25	167	47	6	50	25	38	66	9	38
φ30	191	54	12	62	31	50	82	11	48

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA) 〈Port side access type only〉



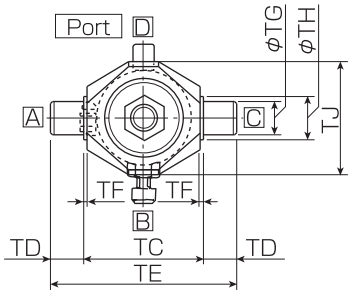


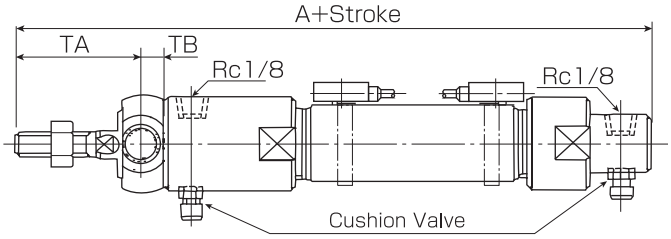
Units:㎜

Bore \ Symbol	CA	CB	CD	CE	CF	φCG	φCJ	CH
φ20	186	176	10	20	22	22	$8^{+0.02}_{0}$	$10^{0}_{-0.2}$
φ25	196	183	13	26	30	26	$10^{+0.02}_{0}$	$12^{0}_{-0.2}$
φ30	223	208	15	27	33	30	$14^{+0.018}_{0}$	$15^{0}_{-0.2}$

Note) Please refer to the ST type for other dimensions.

Head Side Trunnion (TA)





Units:㎜

Bore \ Symbol	A	TA	TB	TF	TC	TD	TE	φTG	φTH	TJ
φ20	166	43.5	7.5	1	36±0.1	10	56	$10^{0}_{-0.02}$	13	34
φ25	167	45	8	1	42±0.1	12	66	$12^{0}_{-0.02}$	14	39
φ30	191	55	11	1	52±0.1	14	80	$18^{0}_{-0.02}$	20	49

Note) Please refer to the ST type for other dimensions.

MINI Series
M140 Series ■ 14MPa

Specifications

Series Name	Single rod type:M140S	Double rod type:M140D
Bore	φ15·φ20·φ25·φ30	
Nominal Pressure	14MPa	
Proof Pressure	21MPa	
Minimum Working Pressure	0.5MPa or less	
Range of Operating Speed	10 to 300㎜/s	
Range of Operating Temperature	−10℃ to +80℃	
Cushion Format	Cushion stroke 17mm (option)	
Hydraulic Oil Applied	General purpose mineral hydraulic oil	
Thread Tolerance	JIS6g/6H	

Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) Please refer to the 〈Attention when using it〉 on P.179 for the application hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	Maximum
Bore	φ15	○	○	○	○	300
	φ20	○	○	○	○	300
	φ25	○	○	○	○	300
	φ30	○	○	○	○	300

Note) Able to produce any stroke which between 25㎜~300㎜.

■Code

M140S - 1 LB 25×25 E B A - T - J

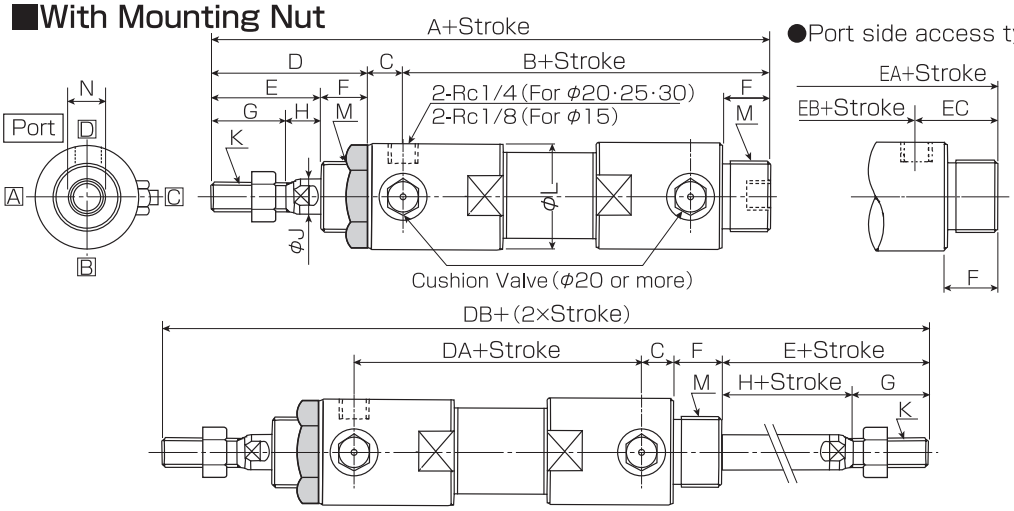
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series Name	M140S:Single rod type M140D:Double rod type
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA) / Cap Side Trunnion (TB)
④ Bore (㎜)	15·20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Port Location Note1)	No notation:Standard E: Cap-side port side access (ST, FA and TA only) The double rod type provides Cap-side port side access type only. (No specific code is required.)
⑦ Presence of cushion Note2)	No notation:No Cushion B:Cushion on both sides H:Cushion on Cap side R:Cushion on Head side
⑧ Cushion valve location Note3)	No notation:Standard (C position) A:A position B:B position
⑨ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint
⑩ Bellows	No notation:None J:With Bellows

Note 1) Please refer to the dimensional outline drawing for the port position.
Note 2) There is no cushion of 15mm in inside diameter of cylinder.
Note 3) The standard cushion valve position is shown in the outer dimension drawing. If the cushion valve position is different from the standard position, specify the "A", "B" or "C" symbol shown in the figure.
Note 4) When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Basic Type [ST]

■With Mounting Nut



When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:㎜

Symbol / Bore	A	B	C	D	E	F	G	H	φJ	K	φL	M	N	Port side access type			Double Rod	
														EA	EB	EC	DA	DB
φ15	112	57	8	47	31	16	20	11	10	M8 P1.0	30	M24 P1.5	8	120	41	24	41	151
φ20	150	83	12	55	37	18	25	12	12	M10 P1.25	36	M26 P1.5	10	150	53	30	56	190
φ25	163	87	12	64	42	22	30	12	14	M12 P1.25	42	M33 P1.5	12	163	53	34	56	208
φ30	185	101	12	72	50	22	35	15	16	M14 P1.5	48	M33 P1.5	14	185	67	34	70	238

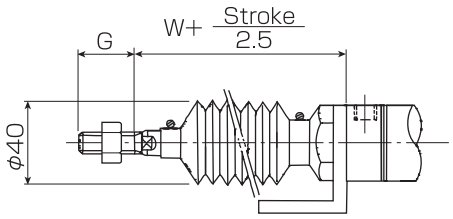
Note) Each dimension with the mounting lug is the same as the single rod type.

Units:㎜

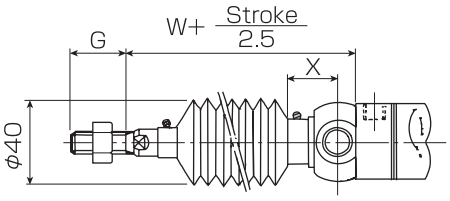
Symbol / Bore	d	H	B
φ15	M24 P1.5	8	30
φ20	M26 P1.5	8	32
φ25	M33 P1.5	10	41
φ30	M33 P1.5	10	41

■With Bellows (Material: Nylon tarporin, Heat resistance: 80℃)

Example 1: Foot (LB)



Example 2 : Trunnion (TA)



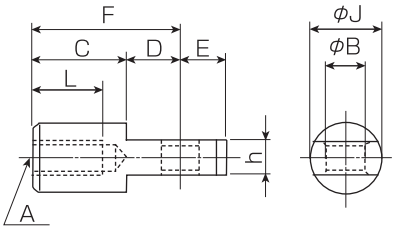
Units:㎜

Symbol / Bore	W	G	X
φ15	55	20	23
φ20	59	25	25
φ25	67	30	25
φ30	67	35	25

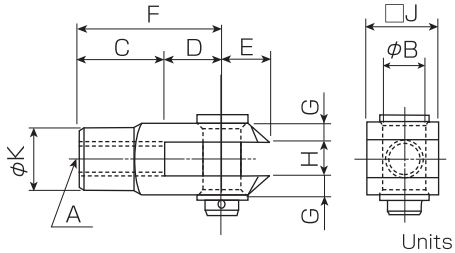
Note) For a cylinder with 37.5 mm or shorter stroke (with dust cover), calculate "W + 15".

■End Joint

Single Protrusion End Joint : T type



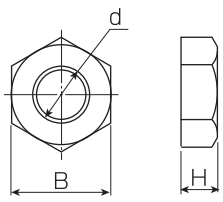
Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Units:㎜

Symbol / Bore	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J / φJ	φK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
φ15	M8 P1.0	$8^{+0.022}_{0}$	$8^{-0.013}_{-0.035}$	16	20	16	12	10	10	32	4	$8^{+0.1}_{0}$	$8^{0}_{-0.1}$	16	14	14.0
φ20	M10 P1.25	$10^{+0.022}_{0}$	$10^{-0.013}_{-0.035}$	20	25	20	15	12	12	40	5	$10^{+0.1}_{0}$	$10^{0}_{-0.1}$	20	18	17.5
φ25	M12 P1.25	$12^{+0.027}_{0}$	$12^{-0.016}_{-0.043}$	24	30	24	18	14	14	48	6	$12^{+0.2}_{0}$	$12^{0}_{-0.2}$	24	20	21.0
φ30	M14 P1.5	$14^{+0.027}_{0}$	$14^{-0.016}_{-0.043}$	28	35	28	21	16	16	56	6.5	$14^{+0.2}_{0}$	$14^{0}_{-0.2}$	27:□J 28:φJ	24	24.5

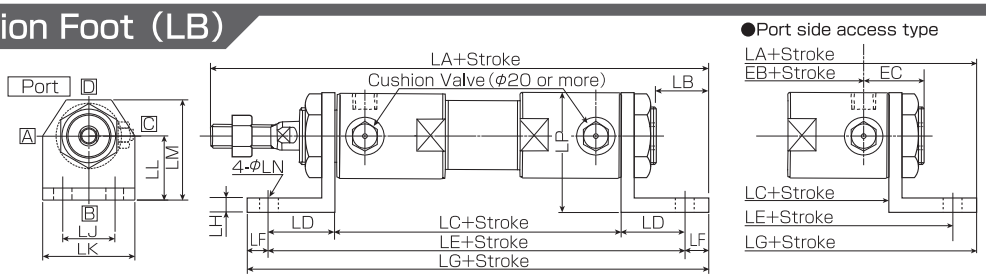
Lock Nut



Units:㎜

Symbol / Bore	d	H	B
φ15	M8 P1.0	6.5	13
φ20	M10 P1.25	8	17
φ25	M12 P1.25	10	19
φ30	M14 P1.5	11	22

Axis Direction Foot (LB)



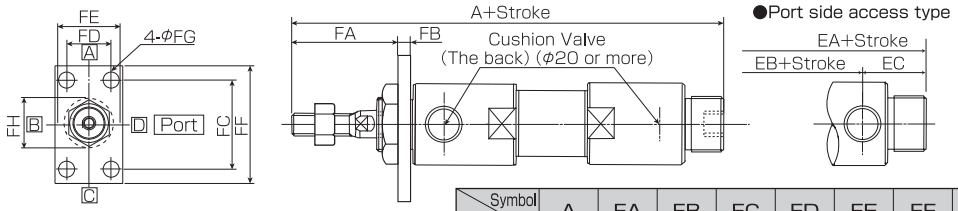
When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Bore \ Symbol	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN	LP	Port side access type					
															LA	EB	EC	LC	LE	LG
φ15	136	24	49	30	109	10	129	6	26	46	32	50	9	47	144	41	24	57	117	137
φ20	172	22	77	30	137	10	157	6	26	46	32	50	9	50	172	53	30	77	137	157
φ25	186	23	77	34	145	11	167	9	30	50	40	65	11	61	186	53	34	77	145	167
φ30	208	23	91	34	159	11	181	9	30	50	40	65	11	64	208	67	34	91	159	181

Note) Please refer to the ST type for other dimensions.

Head Side Flange (FA)



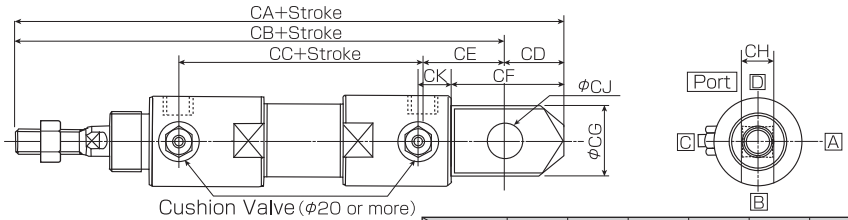
When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Bore \ Symbol	A	FA	FB	FC	FD	FE	FF	φFG	FH	Port side access type		
										EA	EB	EC
φ15	112	41	6	50	25	38	66	9	35	120	41	24
φ20	150	46	9	55	25	38	71	9	38	150	53	30
φ25	163	52	12	62	31	50	82	11	48	163	53	34
φ30	185	60	12	62	31	50	82	11	48	185	67	34

Note) Please refer to the ST type for other dimensions.

Single Protrusion Clevis (CA) 〈Port side access type only〉



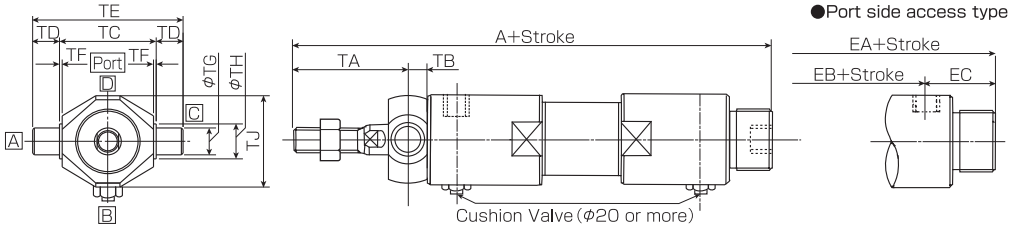
When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Bore \ Symbol	CA	CB	CC	CD	CE	CF	φCG	CH	φCJ	CK
φ15	135	122	41	13	26	30.5	26	$12^{-0.1}_{-0.3}$	$10^{+0.02}_{0}$	—
φ20	171	155	56	16	32	35.5	28	$14^{-0.1}_{-0.3}$	$12^{+0.02}_{0}$	12.5
φ25	184	167	56	17	35	39.5	31	$18^{-0.1}_{-0.3}$	$16^{+0.02}_{0}$	13.5
φ30	214	194	70	20	40	47.5	38	$20^{-0.1}_{-0.3}$	$18^{+0.02}_{0}$	15.5

Note) Please refer to the ST type for other dimensions.

Head Side Trunnion (TA)



When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Bore \ Symbol	A	TA	TB	TC	TD	TE	TF	φTG	φTH	TJ	Port side access type		
											EA	EB	EC
φ15	112	39.5	$7.5^{+0.8}_{0}$	36±0.1	10	56±0.2	1	$10^{0}_{-0.02}$	13	34	120	41	24
φ20	150	47.0	$8.0^{+0.8}_{0}$	42±0.1	12	66±0.2	1	$12^{0}_{-0.02}$	14	39	150	53	30
φ25	163	53.0	$11.0^{+0.8}_{0}$	52±0.1	14	80±0.2	1	$18^{0}_{-0.02}$	20	49	163	53	34
φ30	185	61.0	$11.0^{+0.8}_{0}$	52±0.1	14	80±0.2	1	$18^{0}_{-0.02}$	20	49	185	67	34

Note) Please refer to the ST type for other dimensions.

Specifications

Series Name	M210		
Bore	φ15·φ20·φ25·φ30		
Nominal Pressure	21MPa		
Proof Pressure	31.5MPa		
Minimum Working Pressure	0.7MPa以下		
Range of Operating Speed	10 to 200㎜／s		
Range of Operating Temperature	−10℃ to +80℃		
Cushio Format	None		
Hydraulic Oil Applied	General purpose mineral hydraulic oil		
Thread Tolerance	JIS6g/6H		
Stroke Tolerance (Grade A) Units:㎜	100 and below	101 to 250	251 to 300
	+0.8 0	+1.0 0	+1.25 0

Note) Please refer to the 〈Attention when using it〉 on P.179 for the application hydraulic fluid.

Standard Stroke

Units:㎜

Stroke		25	50	75	100	Maximum
Bore	φ15	○	○	○	○	300
	φ20	○	○	○	○	300
	φ25	○	○	○	○	300
	φ30	○	○	○	○	300

Note) Able to produce any stroke by maximum stroke.

■Code

M210 - 1 LB 25×25 E - T - J

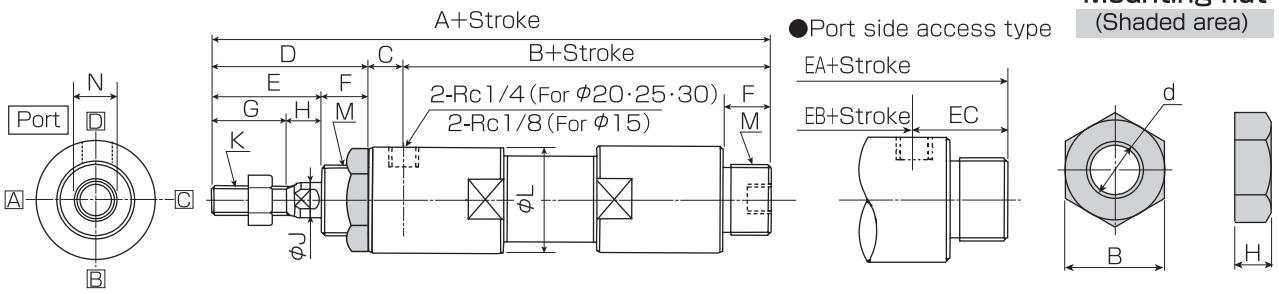
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Series Name	M210
② Packing Material	1:Nitrile Rubber
③ Mounting	Basic (ST) / Axis Direction Foot (LB) / Head Side: Flange (FA) / Single Protrusion Clevis (CA) / Head Side Trunnion (TA)
④ Bore (㎜)	15·20·25·30
⑤ Stroke Length (㎜)	Indicate the stroke. (1-mm step, until 300 mm)
⑥ Port Location	No notation : Standard E: Cap-side port, side access (ST, FA and TA only)
⑦ End Joint	T:Single Protrusion End Joint Y:Double Protrusion End Joint
⑧ Bellows	No notation : None J:With Bellows

Note 1) Please refer to the dimensional outline drawing for the port position.
Note 2) When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Basic Type [ST]

■With Mounting Nut



Units:mm

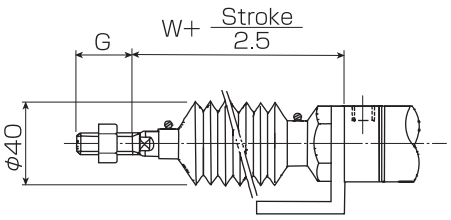
Symbol / Bore	A	B	C	D	E	F	G	H	φJ	K	φL	M	N	Port side access type		
														EA	EB	EC
φ15	112	57	8	47	31	16	20	11	10	M8 P1.0	30	M24 P1.5	8	120	41	24
φ20	150	83	12	55	37	18	25	12	12	M10 P1.25	36	M26 P1.5	10	150	53	30
φ25	163	87	12	64	42	22	30	12	16	M14 P1.5	42	M33 P1.5	14	163	53	34
φ30	185	101	12	72	50	22	35	15	18	M16 P1.5	48	M33 P1.5	16	185	67	34

Units:mm

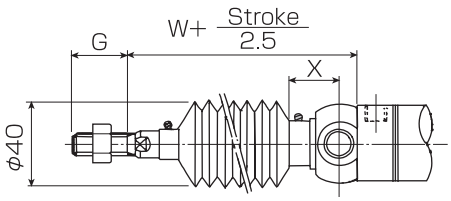
Symbol / Bore	d	H	B
φ15	M24 P1.5	8	30
φ20	M26 P1.5	8	32
φ25	M33 P1.5	10	41
φ30	M33 P1.5	10	41

■With Bellows (Material: Nylon tarporin, Heat resistance: 80℃)

Example 1: Foot (LB)



Example 2 : Trunnion (TA)



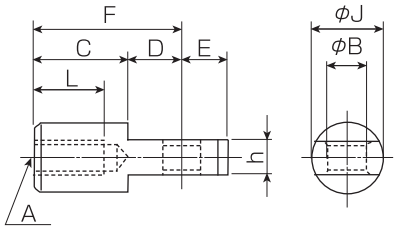
Units:mm

Symbol / Bore	W	G	X
φ15	55	20	23
φ20	59	25	25
φ25	67	30	25
φ30	67	35	25

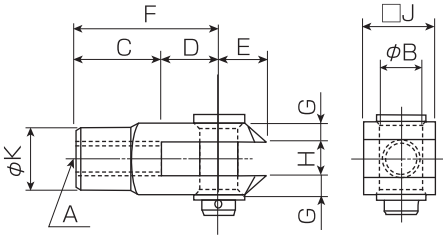
Note) For a cylinder with 37.5 mm or shorter stroke (with dust cover), calculate "W + 15".

■End Joint

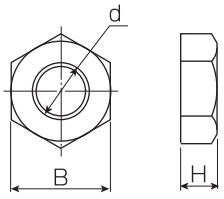
Single Protrusion End Joint : T type



Double Protrusion End Joint: Y type
: Pin, Washer, Split pin



Lock Nut



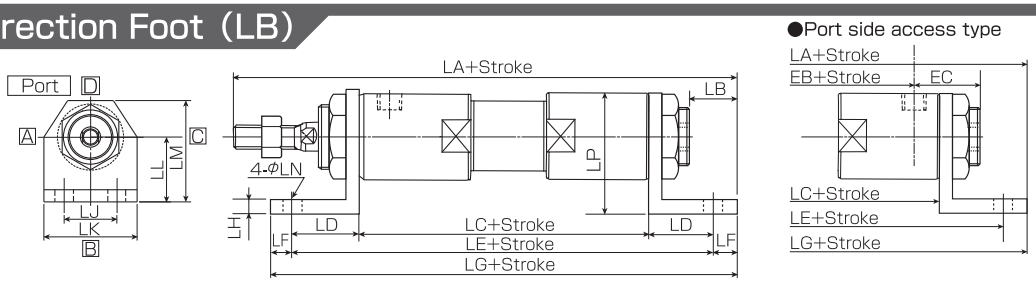
Units:mm

Symbol / Bore	A	B bore dia	B shaft dia	C		D		E		F	G	H	h	□J/φJ	φK	L
				Y joint	T joint	Y joint	T joint	Y joint	T joint							
φ15	M8 P1.0	8 +0.022 0	8 +0.013 −0.035	16	20	16	12	10	10	32	4	8 +0.1 0	8 −0 −0.1	16	14	14.0
φ20	M10 P1.25	10 +0.022 0	10 +0.013 −0.035	20	25	20	15	12	12	40	5	10 +0.1 0	10 −0 −0.1	20	18	17.5
φ25	M14 P1.5	14 +0.027 0	14 −0.016 −0.043	28	35	28	21	16	16	56	6.5	14 +0.2 0	14 −0 −0.2	27:□J 28:φJ	24	24.5
φ30	M16 P1.5	16 +0.027 0	16 −0.016 −0.043	32	40	32	24	19	19	64	8	16 +0.2 0	16 −0 −0.2	32	26	28.0

Units:mm

Symbol / Bore	d	H	B
φ15	M8 P1.0	6.5	13
φ20	M10 P1.25	8	17
φ25	M14 P1.5	11	22
φ30	M16 P1.5	13	24

Axis Direction Foot (LB)

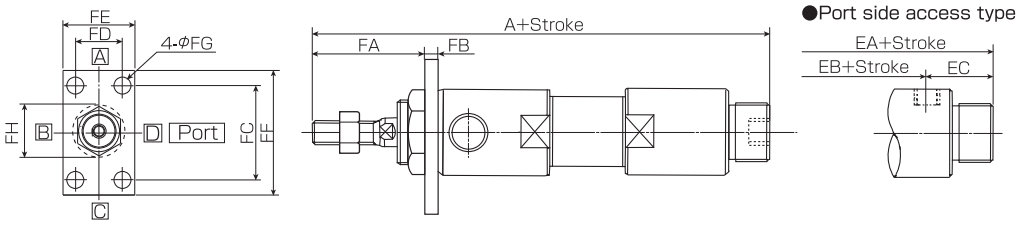


When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Symbol / Bore	LA	LB	LC	LD	LE	LF	LG	LH	LJ	LK	LL	LM	φLN	LP	Port side access type					
															LA	EB	EC	LC	LE	LG
φ15	136	24	49	30	109	10	129	6	26	46	32	50	9	47	144	41	24	57	117	137
φ20	172	22	77	30	137	10	157	6	26	46	32	50	9	50	172	53	30	77	137	157
φ25	186	23	77	34	145	11	167	9	30	50	40	65	11	61	186	53	34	77	145	167
φ30	208	23	91	34	159	11	181	9	30	50	40	65	11	64	208	67	34	91	159	181

Head Side Flange (FA)

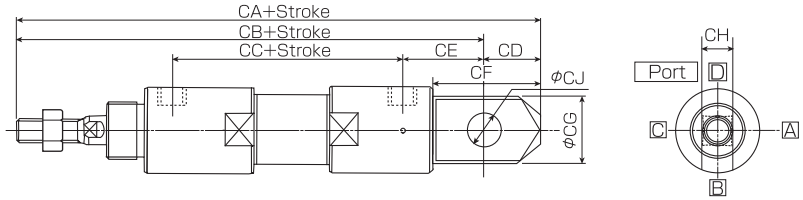


When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Symbol / Bore	A	FA	FB	FC	FD	FE	FF	φFG	FH	Port side access type		
										EA	EB	EC
φ15	112	41	6	50	25	38	66	9	35	120	41	24
φ20	150	46	9	55	25	38	71	9	38	150	53	30
φ25	163	52	12	62	31	50	82	11	48	163	53	34
φ30	185	60	12	62	31	50	82	11	48	185	67	34

Single Protrusion Clevis (CA) 〈Port side access type only〉

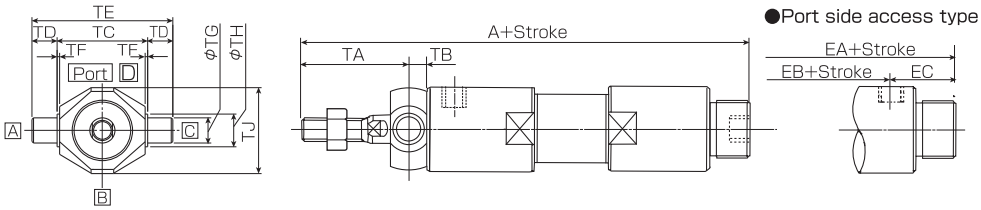


When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Symbol / Bore	CA	CB	CC	CD	CE	CF	φCG	CH	φCJ
φ15	135	122	41	13	26	30.5	26	12 $^{-0.1}_{-0.3}$	10 $^{+0.02}_{0}$
φ20	171	155	56	16	32	35.5	28	14 $^{-0.1}_{-0.3}$	12 $^{+0.02}_{0}$
φ25	184	167	56	17	35	39.5	31	18 $^{-0.1}_{-0.3}$	16 $^{+0.02}_{0}$
φ30	214	194	70	20	40	47.5	38	20 $^{-0.1}_{-0.3}$	18 $^{+0.02}_{0}$

Head Side Trunnion (TA)



When the stroke is 25mm or less, it applies to the dimension of the stroke 25mm.

Units:mm

Symbol / Bore	A	TA	TB	TC	TD	TE	TF	φTG	φTH	TJ	Port side access type		
											EA	EB	EC
φ15	112	39.5	7.5 $^{+0.8}_{0}$	36±0.1	10	56±0.2	1	10 $^{0}_{-0.02}$	13	34	120	41	24
φ20	150	47.0	8 $^{+0.8}_{0}$	42±0.1	12	66±0.2	1	12 $^{0}_{-0.02}$	14	39	150	53	30
φ25	163	53.0	11 $^{+0.8}_{0}$	52±0.1	14	80±0.2	1	18 $^{0}_{-0.02}$	20	49	163	53	34
φ30	185	61.0	11 $^{+0.8}_{0}$	52±0.1	14	80±0.2	1	18 $^{0}_{-0.02}$	20	49	185	67	34

MINI Series
Mass Table

■MR35

Units: kg

Bore	Basic Mass (Stroke:0)					Stroke Mass per 10mm
	ST	LB	FA	CA	TA (TB)	
φ20	0.23	0.52	0.34	0.30	0.31	0.012
φ25	0.30	0.59	0.39	0.46	0.36	0.016
φ30	0.41	0.70	0.55	0.60	0.56	0.022

■MRK35

Units: kg

Bore	Basic Mass (Stroke:0)					Stroke Mass per 10mm
	ST	LB	FA	CA	TA (TB)	
φ20	0.32	0.61	0.43	0.39	0.40	0.012
φ25	0.40	0.69	0.49	0.56	0.46	0.016
φ30	0.53	0.82	0.67	0.73	0.68	0.020

■M70

Units: kg

Bore	Basic Mass (Stroke:0)										Stroke Mass per 10mm	
	ST		LB		FA		CA		TA (TB)			
	S	D	S	D	S	D	S	D	S	D	S	D
φ20	0.47	0.69	0.74	0.96	0.56	0.78	0.56	—	0.53	0.75	0.033	0.040
φ25	0.58	0.88	0.85	1.15	0.67	0.97	0.73	—	0.64	0.94	0.042	0.050
φ30	0.82	1.32	1.10	1.56	0.95	1.45	0.87	—	0.92	1.42	0.050	0.062

■MR70

Units: kg

Bore	Basic Mass (Stroke:0)					Stroke Mass per 10mm
	ST	LB	FA	CA	TA (TB)	
φ20	0.46	0.73	0.56	0.45	0.52	0.023
φ25	0.59	0.86	0.69	0.62	0.65	0.030
φ30	0.84	1.11	0.97	0.89	0.94	0.036

■MRK70

Units: kg

Bore	Basic Mass (Stroke:0)					Stroke Mass per 10mm
	ST	LB	FA	CA	TA (TB)	
φ20	0.65	0.92	0.75	0.74	0.78	0.023
φ25	0.80	1.07	0.80	0.84	0.88	0.030
φ30	1.14	1.69	1.39	1.31	1.35	0.036

■M140

Units: kg

Bore	Basic Mass (Stroke:0)										Stroke Mass per 10mm	
	ST		LB		FA		CA		TA (TB)			
	S	D	S	D	S	D	S	D	S	D	S	D
φ15	0.46	0.54	0.73	0.80	0.59	0.66	0.50	—	0.56	0.64	0.030	0.034
φ20	0.81	0.92	1.08	1.20	0.94	1.05	0.83	—	0.91	1.02	0.036	0.045
φ25	1.21	1.41	1.76	1.96	1.46	1.66	1.20	—	1.42	1.62	0.044	0.056
φ30	1.66	1.80	2.21	2.35	1.91	2.05	1.73	—	1.87	2.01	0.054	0.070

■M210

Units: kg

Bore	Basic Mass (Stroke:0)					Stroke Mass per 10mm
	ST	LB	FA	CA	TA	
φ15	0.47	0.74	0.60	0.50	0.57	0.030
φ20	0.83	1.10	0.96	0.85	0.93	0.036
φ25	1.22	1.77	1.47	1.19	1.43	0.044
φ30	1.72	2.27	1.97	1.78	1.93	0.079

Calculation Formula : Weight of cylinder (kg) = Basic weight + Addition weight ×Stroke/10 (㎜)

MINI Series
Pisron Area・Theoretical Output

■MR35・MRK35・M70・MR70・MRK70

Units: N

Bore	Push・Pull	Piston Area (cm²)	Theoretical Output	
			3.5MPa	7MPa
φ20	Push	3.1	1085	2170
	Pull	2.3	805	1610
φ25	Push	4.9	1715	3430
	Pull	3.7	1295	2590
φ30	Push	7.0	2450	4900
	Pull	5.4	1890	3780

■M140

Units: N

Bore	Push・Pull	Piston Area (cm²)	Theoretical Output
			14MPa
φ15	Push	1.7	2380
	Pull	0.9	1260
φ20	Push	3.1	4340
	Pull	2.0	2800
φ25	Push	4.9	6860
	Pull	3.3	4620
φ30	Push	7.0	9800
	Pull	5.0	7000

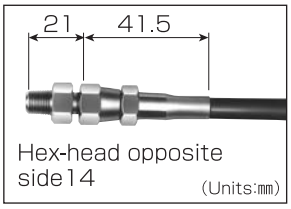
■M210

Units: N

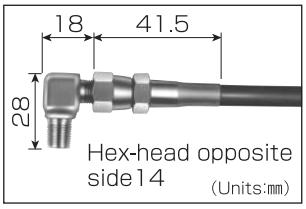
Bore	Push・Pull	Piston Area (cm²)	Theoretical Output
			21MPa
φ15	Push	1.7	3570
	Pull	0.9	1890
φ20	Push	3.1	6510
	Pull	2.0	4200
φ25	Push	4.9	10290
	Pull	2.9	6090
φ30	Push	7.0	14700
	Pull	4.5	9450

Hose・Coupling

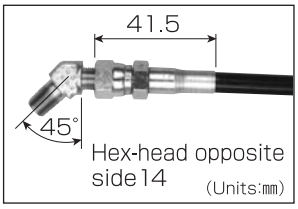
- Proof pressure : 21MPa
- Bore : 3.2㎜
- Outside diameter : 8.2㎜
- Both ends coupling
- Connected caliber : R1/8
- Minimum bend radius : 15㎜
- Fluid contact part of hose : Nylon



Straight



Elbow



Elbow shape of 45°

Order sign

●Fluid contact part of hose

M210 **N** **L** **5**

- **M210**: Hose・Coupling
- **N** **L**: Kind of coupling (Please direct the coupling at both ends respectively.)
  N:Straight
  L:Elbow
  V:Elbow shape of 45°
- **5**: Length of hose (Units:m) (Example) 5m

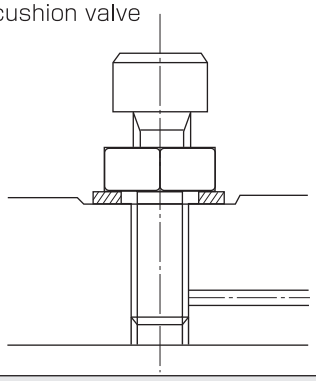
●Order example : For The length of the hose is 5m,The coupling at both ends is straight,Elbow

↓

M210-NL-5

Cushion adjsutment

Enlarged view of cushion valve



⚠ CAUTION Before adjustment, make sure that hydraulic pressure is not applied to the cylinder.

❶ Loosen the cushion nut by 1/4 counterclockwise turn with a single-ended wrench. (Figs. Ⓐ and Ⓑ)

❷ If the cushion valve is turned clockwise with a hexagon rod wrench, the cushion speed lowers. Turning the cushion valve counterclockwise increases the cushion speed.

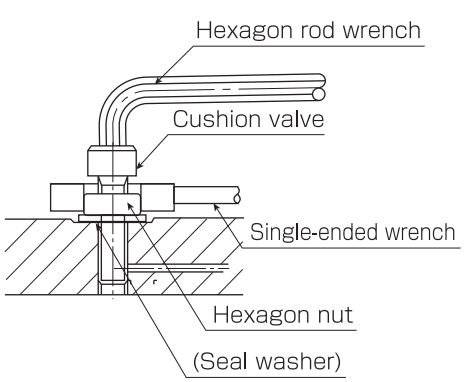
⚠ CAUTION If the cushion valve is excessively turned clockwise, abnormal surge pressure may be generated. If the cushion valve is excessively turned counterclockwise, the cushion has no effect, and the cushion may come off when the cylinder operates.
If you turn the cushion valve counterclockwise, make sure that the head of the cushion bolt does not protrude from the cylinder body by 13 mm or more.

❸ After cushion valve adjustment is completed, tighten the hexagon nut with a single-ended wrench with the tightening torque given in the table below, while fastening the cushion valve with a hexagon rod wrench. (Fig. Ⓒ)

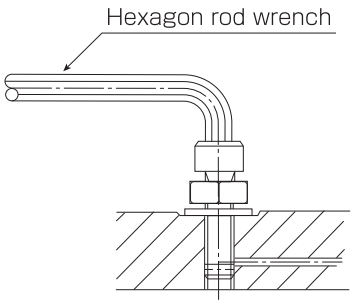
Hexagon nut tightening torque	3.92 to 4.9 N·m
Width across flats of hexagon nut	10mm
Width across flats of hexagon rod wrench	4mm

Adjusting method

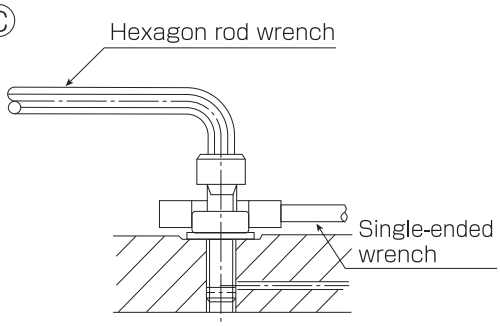
Ⓐ



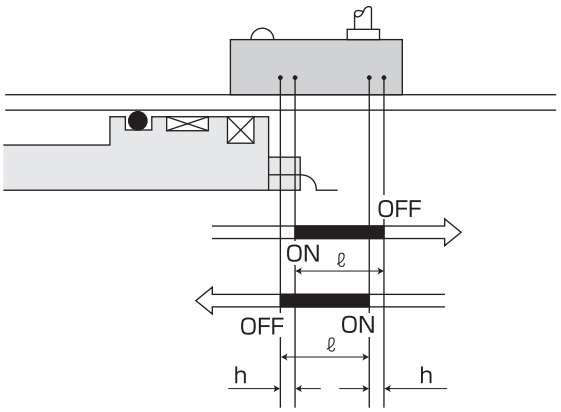
Ⓑ



Ⓒ



Switch working area and corresponding difference



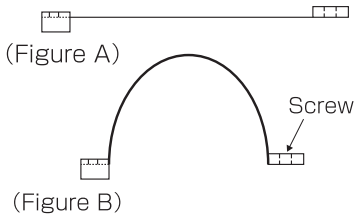
Operating distance (ℓ) :
Range of piston stroke between the switch-ON position and the switch-OFF position in the same direction of the piston stroke

Hysteresis (h) :
Distance between the switch-ON position and the switch-OFF position in the reverse direction of the piston stroke.

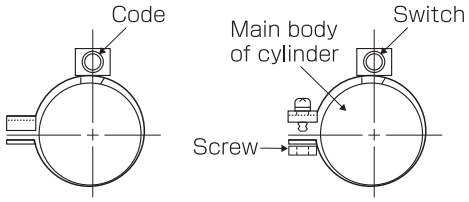
Units:㎜

Symbol / Bore	ℓ	h
10 type	7 to 8	2 to 3

10 switch



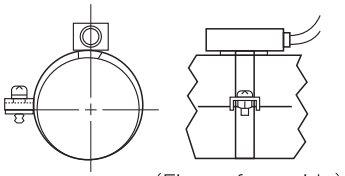
① Curve the band around the screw bracket.
(Fig. B)



② Mount the switch at the top of the cylinder, with the screw bracket located nearly at 90- angle to the switch. (Fig. C)

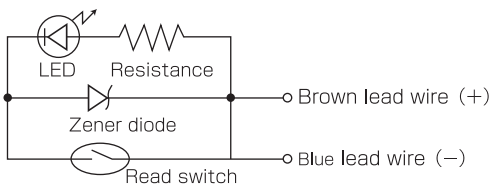
For the switch of "Type 10", hook the band onto the bracket at the bottom of the switch. (Fig. C)

③ Insert a cross-recessed screw from the ⊓ - shaped bracket, to screw into the bracket on the mounting surface. (Fig. D)



④ If the switch is fastened without shaking, the switch is properly mounted. (Fig. E)
(The screwdriver's tightening torque should be approx. 60 to 80 N·cm.)

Internal circuit chart of switch 10 Type



The maximum stroke that can be used

Since the "MINI Series" cylinders provide a piston rod with a small diameter, the piston stroke is limited. Pay attention to "Maximum allowable stroke".

Calculating formula of The maximum stroke that can be used
Mini Hydraulic Cylinder General form

"Maximum allowable stroke" (S) can be determined by the following the procedure below:

①Determine "coefficient of terminal" (n) from the terminal coefficient table.

②Determine an intersection (A) by extending a horizontal line from the intersection of "Pressure setting" and "Bore of Cylinder" and "Coefficient of terminal (n)" in the nomograph. Then, determine "Maximum mounting length (L)" on the line connecting the intersection (A) and "Piston rod diameter∗".

③Determine a mounting length (Lo) in retracted status from the outer dimension drawing, and calculate "Maximum stroke" (S) with the following formula:

S=L−Lo

S : Stroke (mm)
L : Mounting length in extended status (mm)
Lo ∗ : Mounting length in retracted status (mm)

∗ Determine "Lo" from the outer dimension drawing for each type.

ex) M140 Series

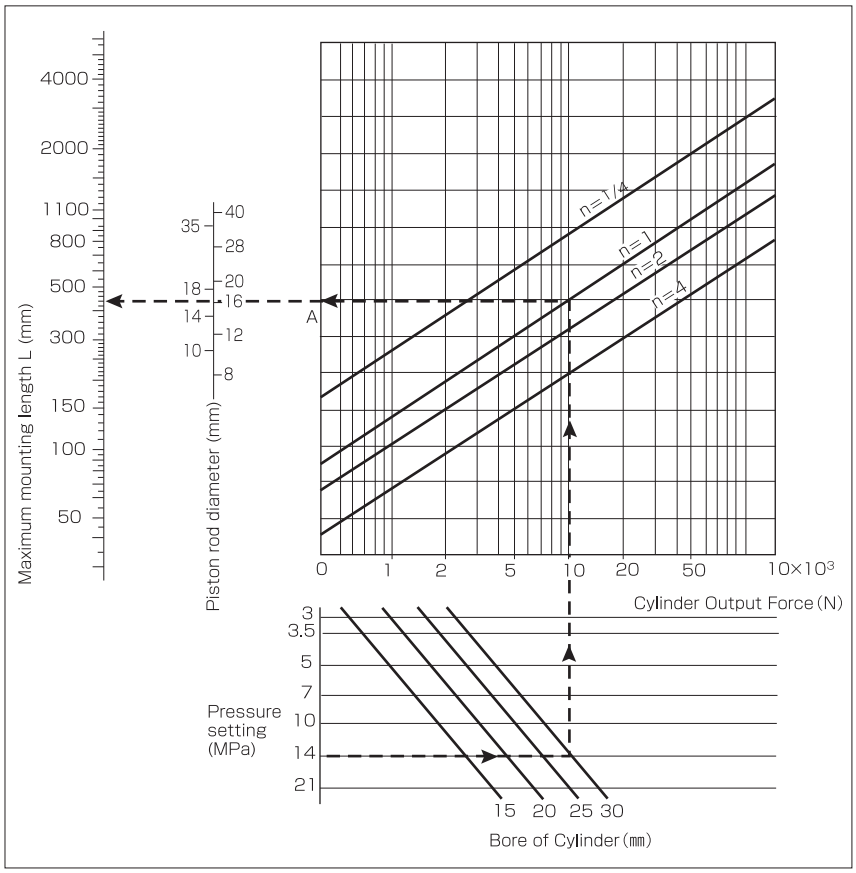
Maximum allowable stroke (S) for mounting type "CA", under the conditions of "14 MPa pressure setting", "φ30 mm cylinder bore diameter" and "φ16 mm piston rod diameter" is determined as follows:

① n = 1 (as shown in terminal coefficient table)

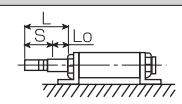
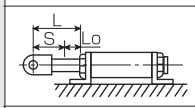
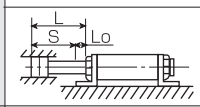
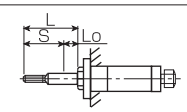
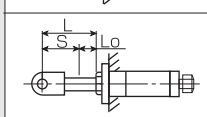
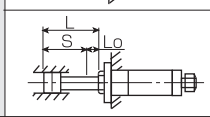
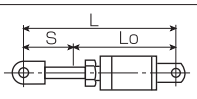
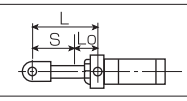
② Apply the above conditions to the nomo graph below. (See the broken line in the monograph.)
The line extended from intersection (A) passes through the rod diameter of φ16 mm, and you can determine the mounting length (L) in extended status. L≒430

③ According to the standard dimension drawing for the M140 series CA type:
Lo = 229, and S = L − Lo.
Therefore, maximum allowable stroke (S) is determined at 201 mm
(S≒430 − 229≒201).

■Nomograph used to determine maximum stroke



■Coefficient of terminal

Mounting	Use conditions	Coefficient of terminal (n)
LB		1/4
		2
		4
FA		1/4
		2
		4
CA		1
TA		1

Note) If the maximum stroke exceeds 300 mm, please consult us.

Surge Pressure

The proof pressure of the cylinder during operation is calculated as 1.5 times larger than the maximum pressure for normal operation. However, in applications with high-speed valve switching and high-speed cylinder operation, "surge pressure" will be generated, which is several times higher than the normal operating pressure. For applications where high surge pressure is expected, you should select a cylinder that provides sufficiently high proof pressure.

Hydraulic Oil

To use general-purpose mineral hydraulic oil, select oil equivalent to JIS K2213 No. 1 or No. 2, and use the oil within a viscosity range of 20 to 400 cst. Synthetic hydraulic oil (e.g. phosphoric ester oil) can be used under conditions similar to those for general-purpose mineral hydraulic oil. However, the packing material should be fluoro rubber.Water-based hydraulic oil (e.g. water-glycol hydraulic oil, W/O emulsion oil) can be used in the same manner as general-purpose mineral hydraulic oil. However, the cylinder service life will be shortened.

Packing Material

Type of hydraulic oil \ Packing Material		Nitrile Rubber	Fluoric Rubber
General-purpose Mineral Hydraulic Oil		○	○
Synthetic hydraulic oil		×	○
Aqueous formulation hydraulic fluid	Water-Glycol-type Operating Oil	○	×
	Emulsions of Water in Mineral Oil	○	○
	Emulsions of Mineral Hydraulic Oil in Water	○	○

Note 1) indicates "Applicable". I indicates "Not applicable".
Note 2) The operating temperature range for the packing is −10℃ to + 80℃.
Note 3) Nitrile rubber is used as the standard material. To order fluoro rubber packing, please contact us separately. The packing shape changes depending on the material.

MEMO

HORIUCHI MACHINERY

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Head Office : 1-37,Oimatsu-cho, Sakai-ku, Sakai-shi, Osaka, Japan. 590-0824
Ph.81-72-241-1601 Fax 81-72-280-2026

Overseas Dept : Sankyo Sakaisuji Hommachi Bldg.,3th Fl.,1-8-2, Bakuromachi, Chuo-ku, Osaka-shi, Osaka, Japan. 541-0059
Ph.81-6-6263-6060 Fax 81-6-6263-6200 IP Ph. 81-50-3734-7366

http://www.horiuchi.co.jp e-mail : osaka@horiuchi.co.jp

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