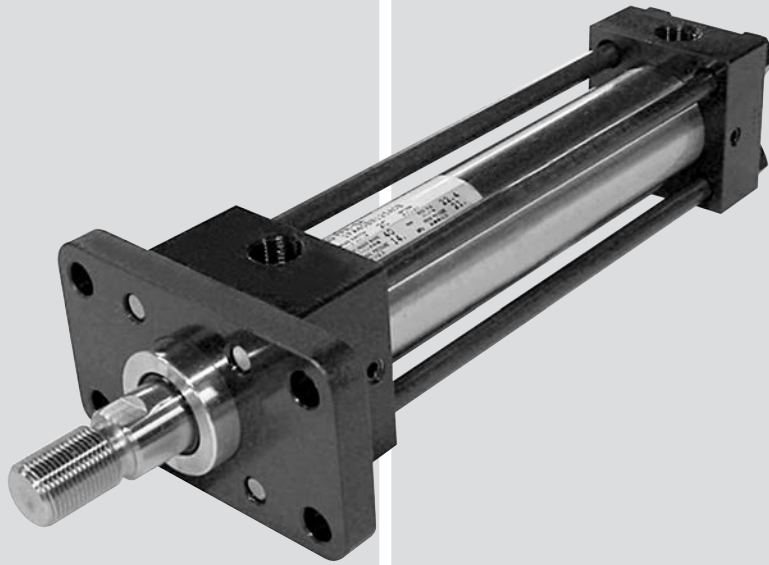


F Series

7 · 14MPa



Tie Rod Type Cylinder

■ 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 | $\phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100$ $\phi 125 \cdot \phi 140 \cdot \phi 150 \cdot \phi 160 \cdot \phi 180$ $\phi 200 \cdot \phi 224 \cdot \phi 250$ | $\phi 32 \cdot \phi 40 \cdot \phi 50 \cdot \phi 63 \cdot \phi 80 \cdot \phi 100$ $\phi 125 \cdot \phi 140$ |
| Maximum Allowable Pressure ^{Note2)} | 7MPa Cap Side: 8.8MPa Head Side: Rod Type A 14.7MPa, Rod Type B 12.7MPa, Rod Type C 10.8MPa 14MPa Cap Side: 17.7MPa Head Side: Rod Type A 17.7MPa, Rod Type B 17.7MPa, Rod Type C 13.7MPa | |
| 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°C to +80°C High Temperature Specifications: -10°C to +120°C | Standard Specifications: -10°C to +60°C High Temperature Specifications: -10°C to +100°C |
| 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°C. (Select a special high-temperature switch when temperatures will exceed 60°C)

■ 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.

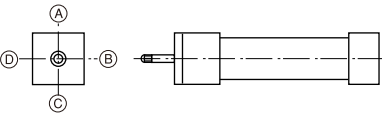
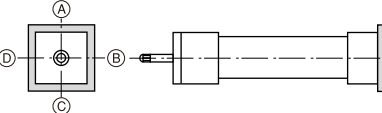
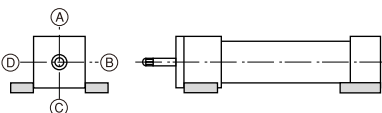
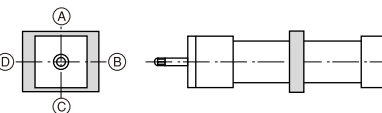
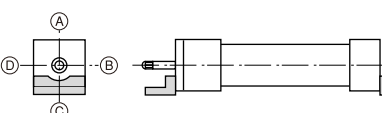
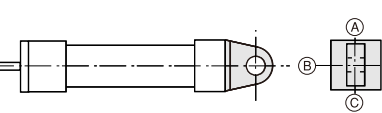
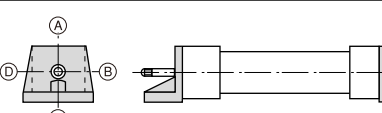
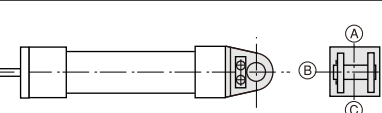
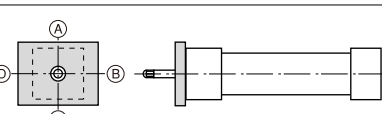
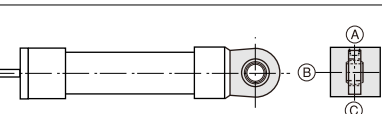
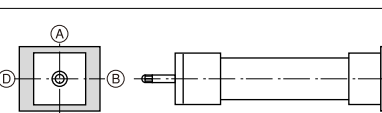
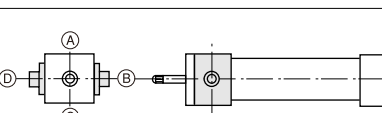
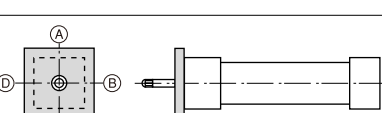
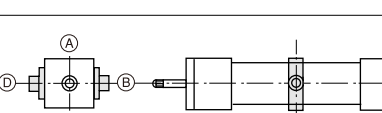
Note 2) The Minimum Cylinder Speed does not include cushion stroke operation.

■ 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.

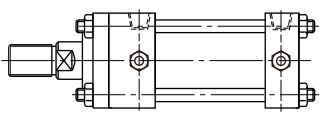
■ Mounting Type

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

■ Cover Securing Formats

| Securing Format | Appearance |
|-----------------|---|
| Tie-rod System |  |

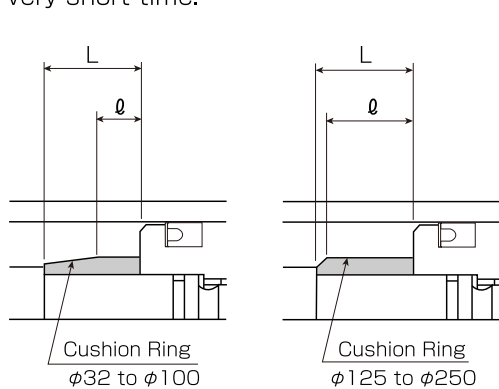
■ Cushion Symbols

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

Note 1) The $\phi 32$ A rod does not have a cushion on the Head-side. The cushion for the $\phi 40$ A rod is a fixed cushion on the head side.
 Note 2) For the double A rods ($\phi 32$ and $\phi 40$), 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:mm

| Bore | Cushion Ring Length (L) | Cushion Ring Parallel Section Length (ℓ) |
|--------------------------|-------------------------|--|
| $\phi 32$ | 15 | 6 |
| $\phi 40$ to $\phi 63$ | 20 | 8 |
| $\phi 80$ to $\phi 100$ | 25 | 8 |
| $\phi 125$ to $\phi 160$ | 25 | 21 |
| $\phi 180$ to $\phi 224$ | 30 | 26 |
| $\phi 250$ | 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 $\phi 32$ to $\phi 100$)
 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:mm

| 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 |

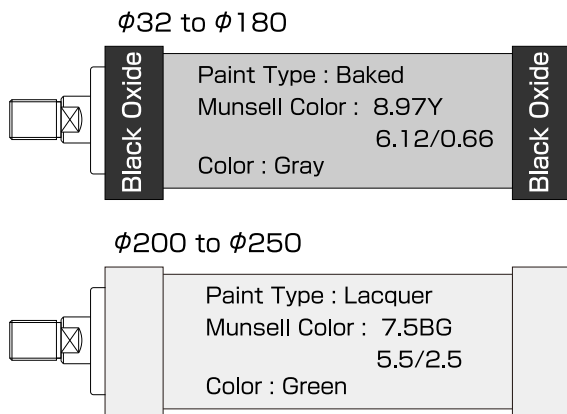
Note) The dimensions and precision of other parts conform to the former JIS B 8354 standard.

■ Slide Section Processing

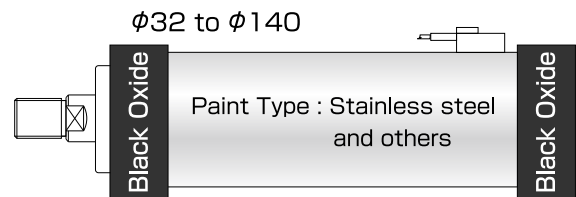
Piston Rod: Hard chrome plating processing (more than 2/100mm)

■ Tube Coating Colors

Standard



Switch Adjusted Specifications

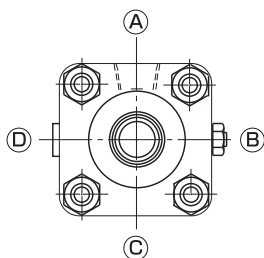


Note) If you have any questions with regard to the type of paint, please contact us.

■ 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 (A), (B), (C), (D).

3) In the case of no cushion, the standard positions are indicated by (A)⊙(D).

4) In the TA mounting type, the basic position for the head side is (A)⊙(C) or (A)⊙(C).

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 (A)(B)(D) and (B)(C)(D) 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°C to +80°C | -10°C to +80°C | -10°C to +120°C | -10°C to +120°C |
| 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.

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

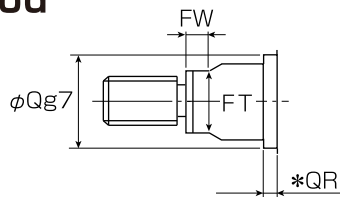
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲

| | |
|---|--|
| ① Series Name | FS: 7 MPa, FF: 14MPa |
| ② Switch Adjusted Specifications | "R" is affixed in the case of cylinders with switch adjusted specifications. FSR: 7MPa switch adjusted specifications; FFR: 14MPa switch adjusted specifications |
| ③ Single/Double Classification | S: Single Rod Type W: Double Rod Type |
| ④ Standard Special Classification (Note1) | A: Standard Dimensions |
| ⑤ Packing 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 |
| ⑥ Mounting | S·LA·LB·LC·FA·FB·FC·FD·CF·CA·CB·CC·TA·TC |
| ⑦ Bore (mm) | 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). |
| ⑧ Type of Rod | A: A Rod (Standard Equivalent) B: B Rod (Standard) C: C Rod (Standard) |
| ⑨ Cushion Format | B: Cushion on Both Sides R: Head-side Cushion H: Cap-side Cushion N: No Cushion |
| ⑩ Stroke Length (mm) | Indicate the stroke (refer to P.13 for Maximum Stroke) |
| ⑪ Port Location | Refer to P.15 and then indicate A, B, C or D. |
| ⑫ Cushion Valve Location | Refer to P.15 and then indicate A, B, C or D. O: No Cushion or Fixed Cushion |
| ⑬ Air Bleed Location | Refer to P.15 and then indicate A, B, C or D. No notation : Not necessary (Standard Equivalent) |
| 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: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. |
| ⑯ End Joint | T: Single Protrusion End Joint Y: Double Protrusion End Joint S: Spherical Bearing End Joint F: F Connector 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 G: Pin with Grease Nipple No notation: None } (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 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

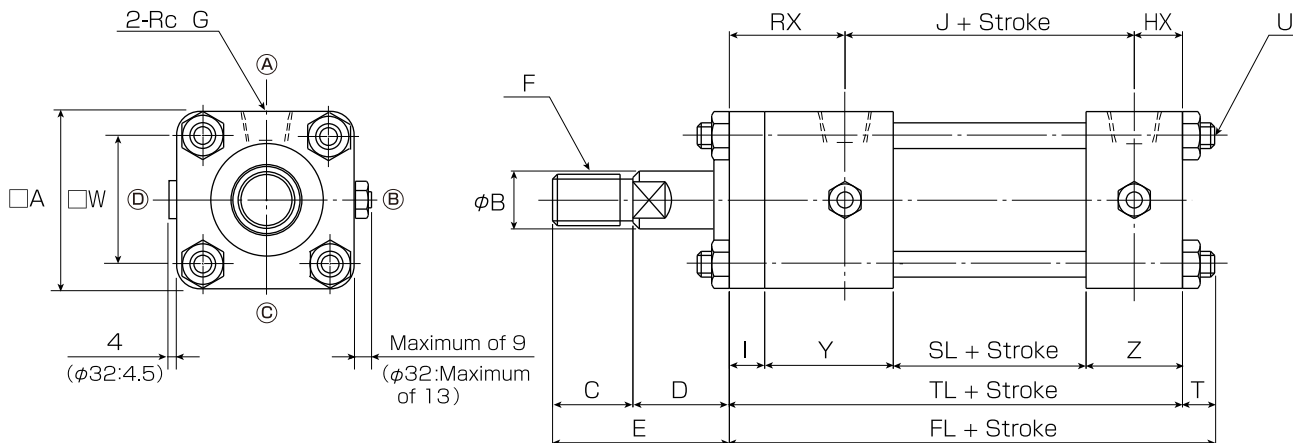


*QR Dimensions

| 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) A, B, C, D 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.

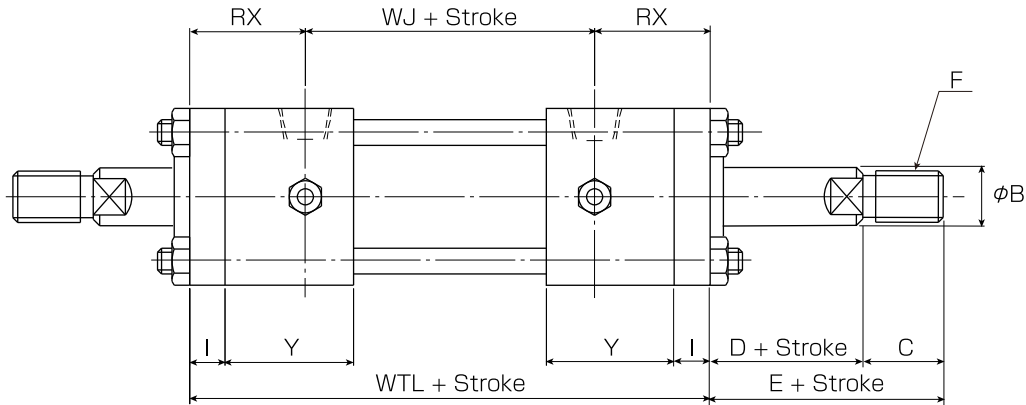
S Type Basic Table of Dimensions

[□ 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



※ $\phi 200$ 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 |
| $\phi 32$ | 14 | 18 | 48 | M12 P1.5 | 35 | 12 | 8 | 22.4 | 25 | 55 | M16 P1.5 | 40 | 19 | 10 | 10 | 30 |
| $\phi 40$ | 18 | 25 | 55 | M16 P1.5 | 36 | 14 | 10 | 28 | 30 | 60 | M20 P1.5 | 44 | 24 | 10 | 12 | 30 |
| $\phi 50$ | 22.4 | 30 | 60 | M20 P1.5 | 40 | 19 | 10 | 35.5 | 35 | 70 | M24 P1.5 | 53 | 30 | 15 | 12 | 35 |
| $\phi 63$ | 28 | 35 | 70 | M24 P1.5 | 46 | 24 | 10 | 45 | 45 | 80 | M30 P1.5 | 65 | 41 | 15 | 13 | 35 |
| $\phi 80$ | 35.5 | 45 | 80 | M30 P1.5 | 55 | 30 | 15 | 56 | 60 | 100 | M39 P1.5 | 80 | 50 | 15 | 12 | 40 |
| $\phi 100$ | 45 | 60 | 100 | M39 P1.5 | 65 | 41 | 15 | 71 | 75 | 120 | M48 P1.5 | 95 | 65 | 25 | 14 | 45 |
| $\phi 125$ | 56 | 75 | 120 | M48 P1.5 | 80 | 50 | 20 | 90 | 95 | 150 | M64 P2 | 115 | 85 | 30 | 17 | 55 |
| $\phi 140$ | 63 | 80 | 130 | M56 P2 | 85 | 58 | 20 | 100 | 110 | 165 | M72 P2 | 125 | 95 | 30 | 17 | 55 |
| $\phi 150$ | 67 | 85 | 135 | M60 P2 | 90 | 60 | 25 | 100 | 115 | 170 | M76 P2 | 125 | 95 | 30 | 15 | 55 |
| $\phi 160$ | 71 | 95 | 150 | M64 P2 | 95 | 65 | 25 | 112 | 120 | 175 | M80 P2 | 140 | 105 | 30 | 16 | 55 |
| $\phi 180$ | 80 | 110 | 165 | M72 P2 | 105 | 75 | 25 | 125 | 140 | 200 | M95 P2 | 150 | 120 | 35 | 18 | 60 |
| $\phi 200$ | 90 | 120 | 175 | M80 P2 | 115 | 85 | 30 | 140 | 150 | 215 | M100 P2 | 170 | 133 | 35 | 19 | 65 |
| $\phi 224$ | 100 | 140 | 200 | M95 P2 | 125 | 95 | 30 | 160 | 180 | 245 | M120 P2 | 190 | 155 | 35 | 9 | 65 |
| $\phi 250$ | 112 | 150 | 215 | M100 P2 | 140 | 105 | 30 | 180 | 195 | 260 | M130 P2 | 215 | 170 | 45 | 9 | 65 |

Note1) The cushion for the $\phi 40$ A Rod is a fixed cushion on the head-side.

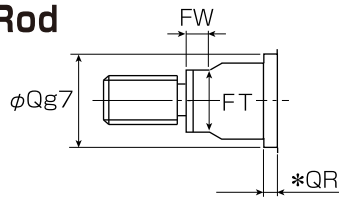
Note2) The $\phi 32$ A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod

Units:mm

| Symbol Bore | Double Rod | |
|----------------|------------|-----|
| | WTL | WJ |
| $\phi 32$ | 166 | 94 |
| $\phi 40$ | 166 | 94 |
| $\phi 50$ | 182 | 98 |
| $\phi 63$ | 194 | 106 |
| $\phi 80$ | 222 | 110 |
| $\phi 100$ | 232 | 116 |
| $\phi 125$ | 264 | 132 |
| $\phi 140$ | 276 | 140 |
| $\phi 150$ | 288 | 148 |
| $\phi 160$ | 304 | 158 |
| $\phi 180$ | 322 | 174 |
| $\phi 200$ | 362 | 192 |
| $\phi 224$ | 370 | 190 |
| $\phi 250$ | 416 | 202 |

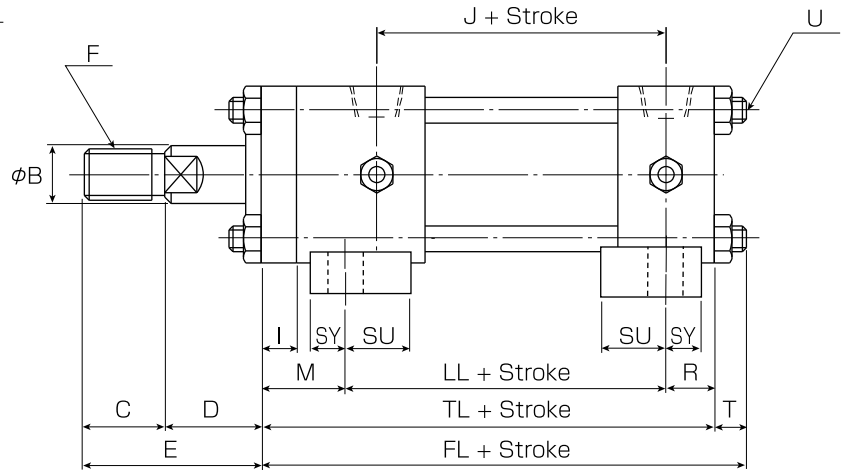
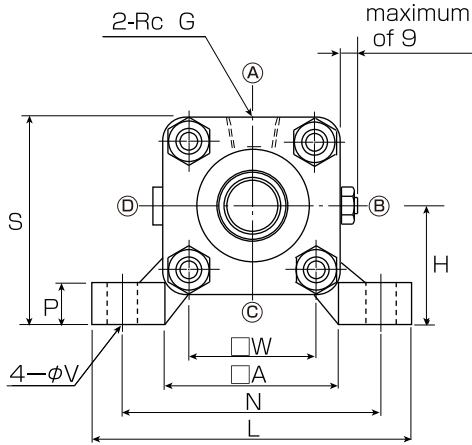
LA Single Rod



*QR Dimensions

| Standard Specifications | | Coolant Proof Specifications | | | |
|-------------------------|---|------------------------------|-------|-------|-------|
| | | Bore | A rod | B rod | C rod |
| B, C Rods | φ32 : 12 | φ32 | 9 | 11 | 10 |
| | φ40 to φ200 : 10 | φ40 | 11 | 9 | 9 |
| | φ224 or φ250 : 9 | φ50 | 11 | 9 | 9 |
| A Rods | φ32 to φ250 : Please refer to the table. | φ63 | 13 | 9 | 9 |
| | | φ80 | 12 | 9 | 9 |
| | | φ100 | — | 10 | 9 |
| | | φ100 | — | 10 | 9 |

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



Note 1) (A)(B)(C)(D) 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

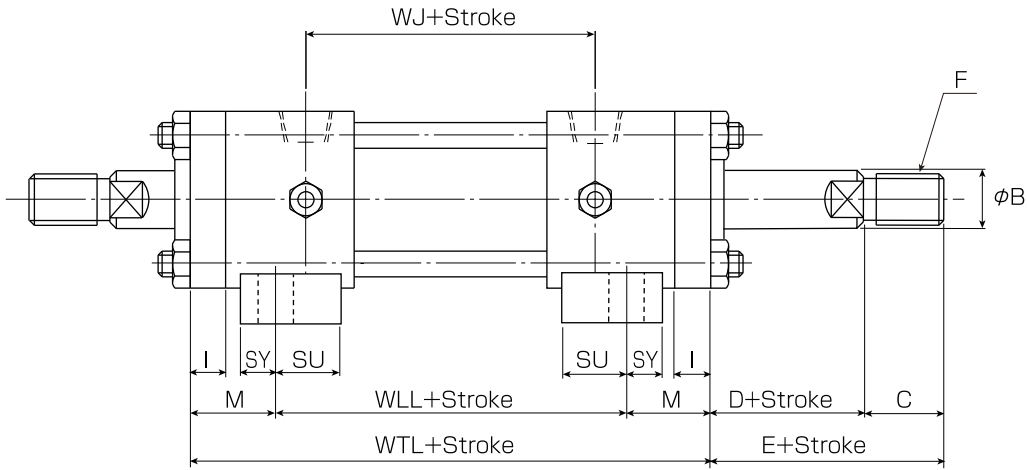
[□ indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

| Symbol Bore | B Rod | | | | D | TL | J | LL | FL | I | M | R | T | SUS | SY | U | □A | □W | N | L | P | H | S | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|-----|-----|----|------|------|----|-----|----|--------------|-----|-----|-----|-----|----|------------|-------|----|------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | | | |
| 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: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 |

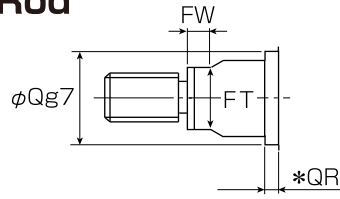
Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

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 |
| 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 |

LB (Only for 7MPa) Single Rod

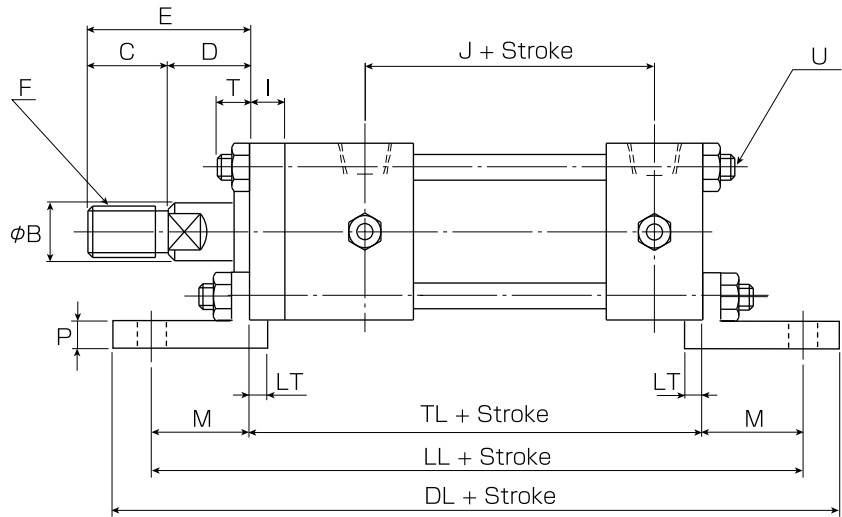
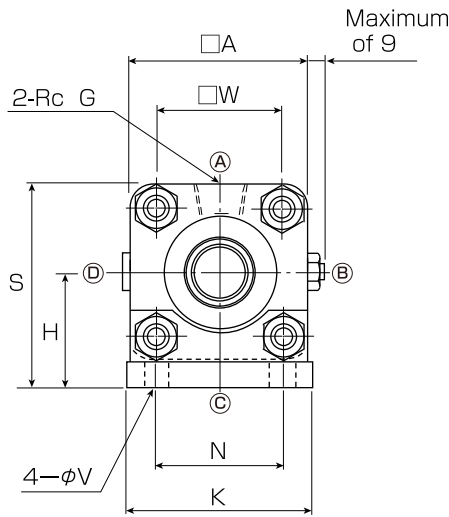


*QR Dimensions

| 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) (A),(B),(C),(D) 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.]

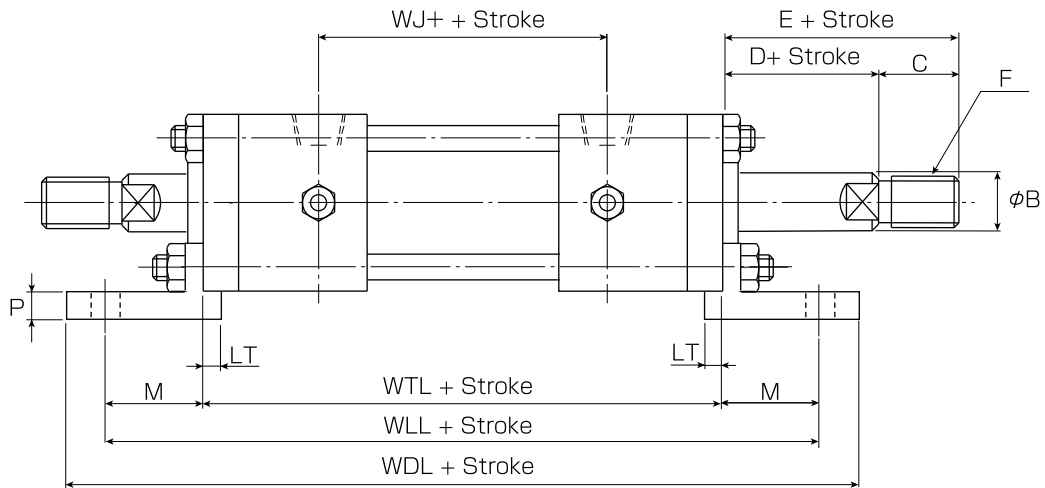
Units:mm

| Symbol Bore | B Rod | | | | D | TL | J | I | LL | DL | M | LT | P | T | U | □A | □W | N | K | H | S | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|----|-----|-----|-----|-----|----|----|--------------|-----|-----|-----|-----|-----------|-------|----|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | |
| 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 | 1 1/4 |
| 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 | 1 1/2 |
| 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 | 1 1/2 |
| 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: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.

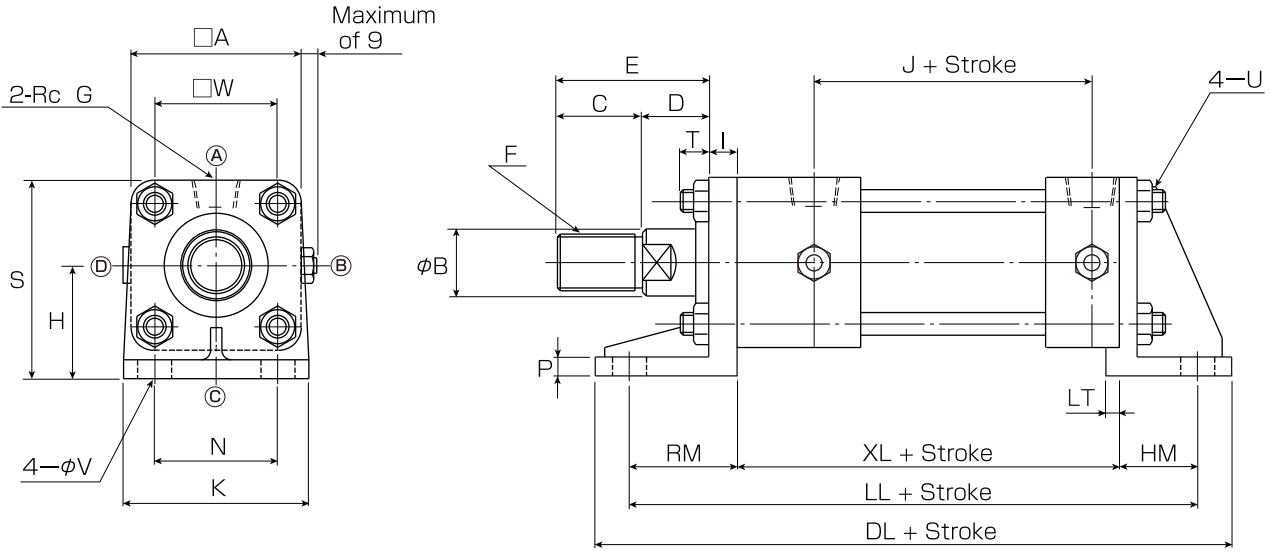
Note2) The φ32 A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod

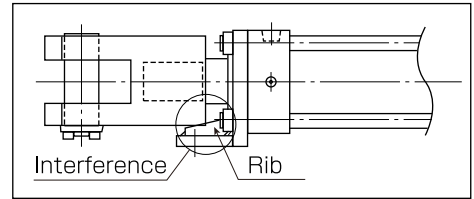
Units:mm

| Symbol Bore | Double Rod | | | |
|----------------|------------|-----|-----|-----|
| | WLL | WTL | WJ | WDL |
| φ32 | 230 | 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 |

LC Single Rod



- Note 1) (A),(B),(C),(D) 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.]

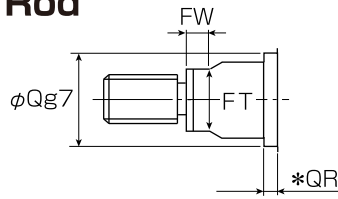
Units:mm

| Symbol Bore | B Rod | | | | D | XL | J | I | LL | DL | RM | HM | LT | P | T | U | □A | □W | N | K | H | S | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|----|-----|-----|-----|-----|-----|----|----|--------------|-----|-----|-----|-----|-----------|-------|----|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | | |
| 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

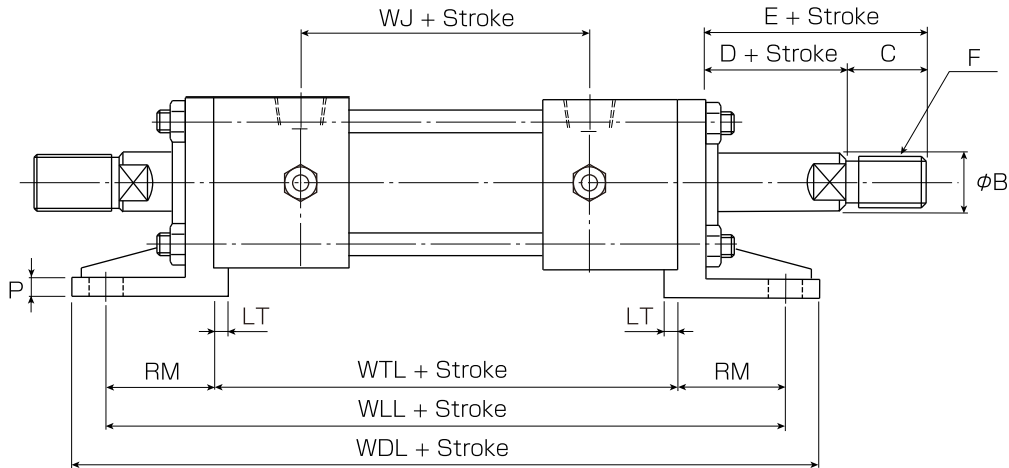


*QR Dimensions

| Standard Specifications | |
|-------------------------|--|
| B, C Rods | $\phi 32 : 12$ $\phi 40 \text{ to } \phi 250 : 10$ |
| A Rods | $\phi 40 \text{ to } \phi 250 :$ Please refer to the table. |

| Coolant Proof Specifications | | | |
|------------------------------|-------|-------|-------|
| Bore | A rod | B rod | C rod |
| $\phi 32$ | 9 | 11 | 10 |
| $\phi 40$ | 11 | 9 | 9 |
| $\phi 50$ | 11 | 9 | 9 |
| $\phi 63$ | 13 | 9 | 9 |
| $\phi 80$ | 12 | 9 | 9 |
| $\phi 100$ | — | 10 | 9 |

Note) Coolant Proof Specifications are from $\phi 32$ to $\phi 100$. The $\phi 100$ A Rod is not being produced.



* $\phi 200$ 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 |
| $\phi 32$ | 14 | 18 | 48 | M12 P1.5 | 35 | 12 | 8 | 22.4 | 25 | 55 | M16 P1.5 | 40 | 19 | 10 | 10 | 30 |
| $\phi 40$ | 18 | 25 | 55 | M16 P1.5 | 36 | 14 | 10 | 28 | 30 | 60 | M20 P1.5 | 44 | 24 | 10 | 12 | 30 |
| $\phi 50$ | 22.4 | 30 | 60 | M20 P1.5 | 40 | 19 | 10 | 35.5 | 35 | 70 | M24 P1.5 | 53 | 30 | 15 | 12 | 35 |
| $\phi 63$ | 28 | 35 | 70 | M24 P1.5 | 46 | 24 | 10 | 45 | 45 | 80 | M30 P1.5 | 65 | 41 | 15 | 13 | 35 |
| $\phi 80$ | 35.5 | 45 | 80 | M30 P1.5 | 55 | 30 | 15 | 56 | 60 | 100 | M39 P1.5 | 80 | 50 | 15 | 12 | 40 |
| $\phi 100$ | 45 | 60 | 100 | M39 P1.5 | 65 | 41 | 15 | 71 | 75 | 120 | M48 P1.5 | 95 | 65 | 25 | 14 | 45 |
| $\phi 125$ | 56 | 75 | 120 | M48 P1.5 | 80 | 50 | 20 | 90 | 95 | 150 | M64 P2 | 115 | 85 | 30 | 17 | 55 |
| $\phi 140$ | 63 | 80 | 130 | M56 P2 | 85 | 58 | 20 | 100 | 110 | 165 | M72 P2 | 125 | 95 | 30 | 17 | 55 |
| $\phi 150$ | 67 | 85 | 135 | M60 P2 | 90 | 60 | 25 | 100 | 115 | 170 | M76 P2 | 125 | 95 | 30 | 15 | 55 |
| $\phi 160$ | 71 | 95 | 150 | M64 P2 | 95 | 65 | 25 | 112 | 120 | 175 | M80 P2 | 140 | 105 | 30 | 16 | 55 |
| $\phi 180$ | 80 | 110 | 165 | M72 P2 | 105 | 75 | 25 | 125 | 140 | 200 | M95 P2 | 150 | 120 | 35 | 18 | 60 |
| $\phi 200$ | 90 | 120 | 175 | M80 P2 | 115 | 85 | 30 | 140 | 150 | 215 | M100 P2 | 170 | 133 | 35 | 19 | 65 |
| $\phi 224$ | 100 | 140 | 200 | M95 P2 | 125 | 95 | 30 | 160 | 180 | 245 | M120 P2 | 190 | 155 | 35 | 9 | 65 |
| $\phi 250$ | 112 | 150 | 215 | M100 P2 | 140 | 105 | 30 | 180 | 195 | 260 | M130 P2 | 215 | 170 | 45 | 9 | 65 |

Note 1) The cushion for the $\phi 40$ A Rod is a fixed cushion on the head-side.

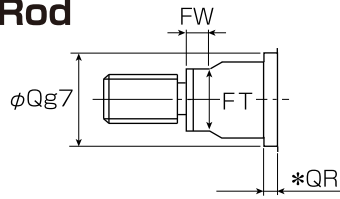
Note 2) The $\phi 32$ A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod

Units:mm

| Symbol Bore | Double Rod | | | |
|----------------|------------|-----|-----|-----|
| | WLL | WTL | WJ | WDL |
| $\phi 32$ | 230 | 144 | 94 | 256 |
| $\phi 40$ | 230 | 144 | 94 | 256 |
| $\phi 50$ | 252 | 156 | 98 | 282 |
| $\phi 63$ | 278 | 164 | 106 | 314 |
| $\phi 80$ | 322 | 186 | 110 | 362 |
| $\phi 100$ | 342 | 192 | 116 | 388 |
| $\phi 125$ | 396 | 216 | 132 | 454 |
| $\phi 140$ | 416 | 224 | 140 | 476 |
| $\phi 150$ | 438 | 232 | 148 | 498 |
| $\phi 160$ | 454 | 242 | 158 | 524 |
| $\phi 180$ | 492 | 256 | 174 | 572 |
| $\phi 200$ | 558 | 288 | 192 | 638 |
| $\phi 224$ | 598 | 286 | 190 | 688 |
| $\phi 250$ | 674 | 322 | 202 | 774 |

FA Single Rod

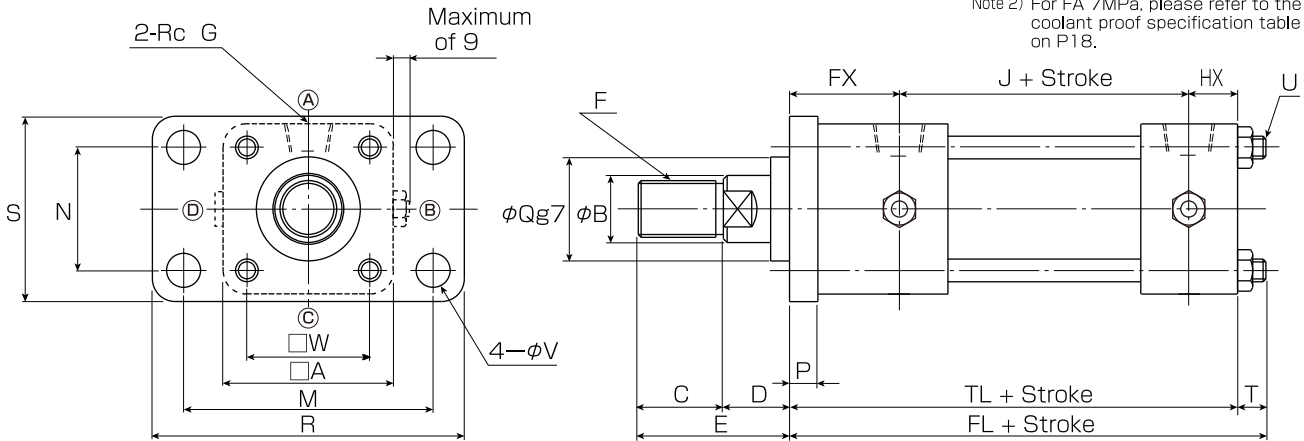


*QR Dimensions

| Standard Specifications | | Coolant Proof Specifications (For FA·14MPa) | | | |
|-------------------------|---|---|-------|-------|-------|
| B, C Rods | φ32 to φ250 :10 | Bore | A rod | B rod | C rod |
| A Rods | φ32 to φ250 : Please refer to the table. | 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 P.18.



Note 1) (A)(B)(C)(D) 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.]

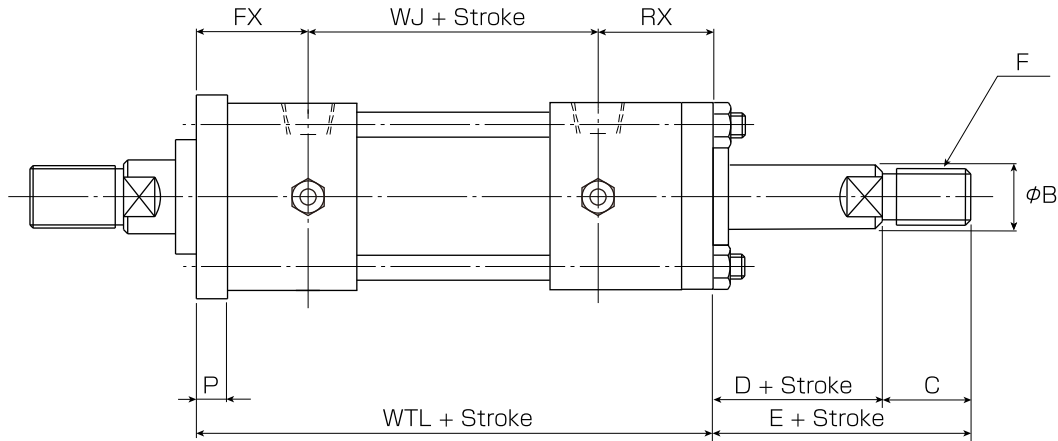
Units:mm

| Symbol Bore | B Rod | | | | | D | TL | J | FL | FX | HX | P | T | U | □A | □W | M | R | N | S | φV | Rc G |
|----------------|-------|-----|-----|-------------|-----|----|--------------|-----|--------------|--------------|----|------------|----|--------------|-----|-----|-----|-----|-----|-----|----|-------|
| | φB | C | E | F | φQ | | | | | | | | | | | | | | | | | |
| 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) these () 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.

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: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 | 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) these () 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.

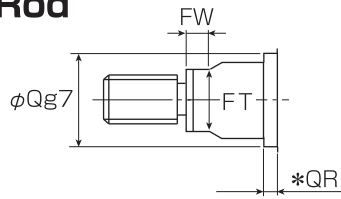
Note3) The φ32 A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod

Units:mm

| 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

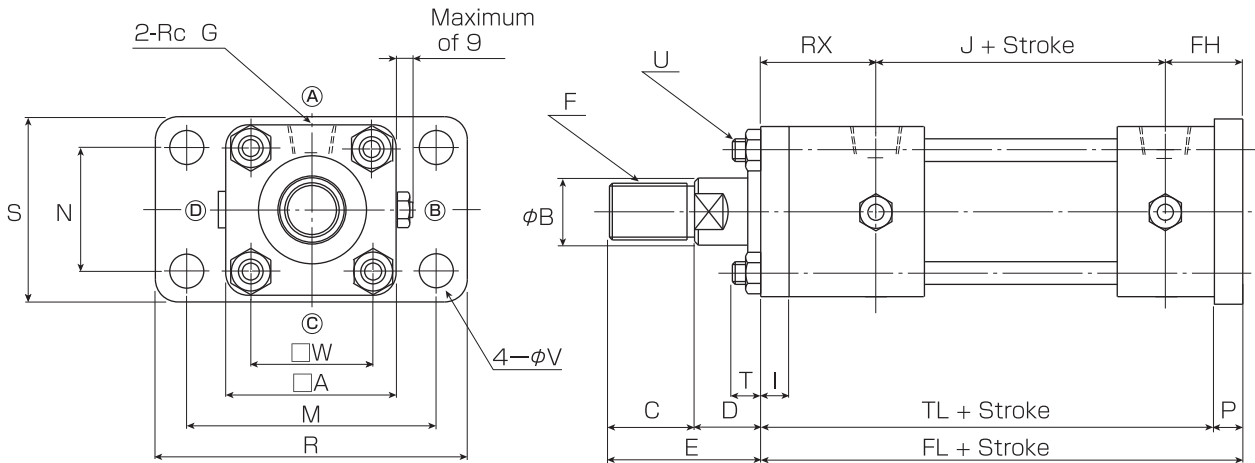


*QR Dimensions

| 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) A, B, C, D 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 | 1 1/4 |
| 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 | 1 1/2 |
| 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 | 1 1/2 |
| 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) These () 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.]

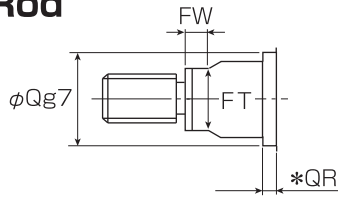
Units:mm

| 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.

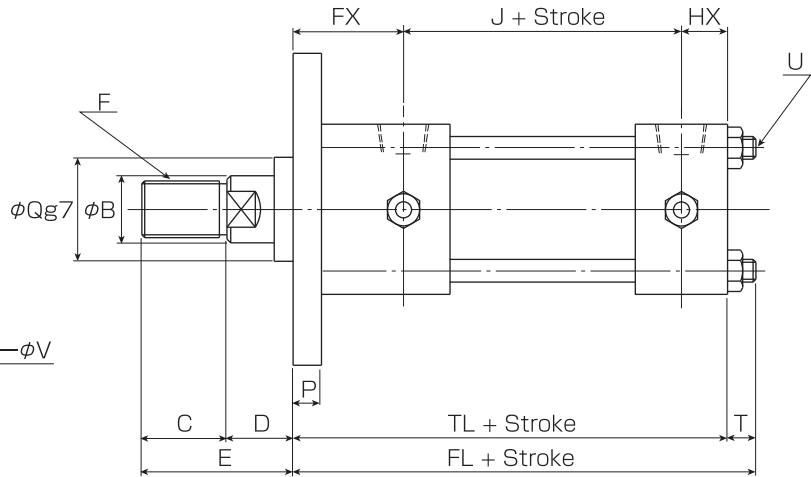
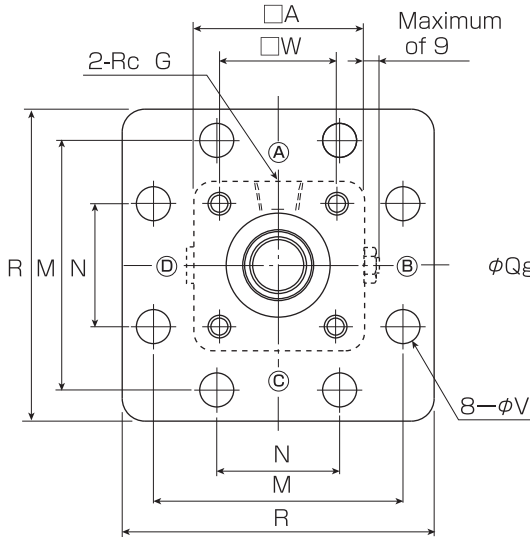
FC Single Rod



*QR Dimensions

| Standard Specifications | | Coolant Proof Specifications | | | |
|-------------------------|----------------------------|------------------------------|-------|-------|-------|
| | | Bore | A rod | B rod | C rod |
| B, C Rods | φ40 to φ200 : 10 | φ40 | 11 | 9 | 9 |
| | φ224 or φ250 : 9 | φ50 | 11 | 9 | 9 |
| | | φ63 | 13 | 9 | 9 |
| A Rods | φ32 to φ250 : | φ80 | 12 | 9 | 9 |
| | Please refer to the table. | φ100 | — | 10 | 9 |
| | | | | | |

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



- Note 1) ①, ②, ③, ④ 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

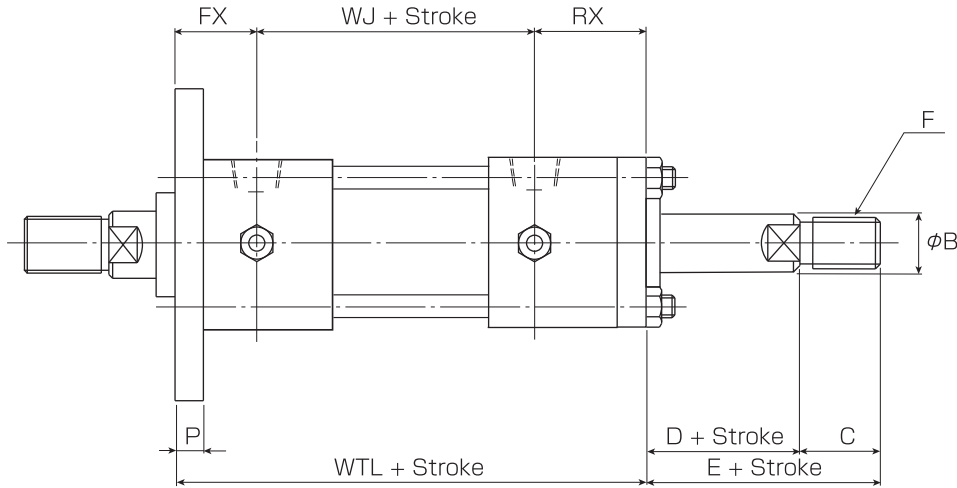
[] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

| Symbol Bore | B Rod | | | | | D | TL | J | FL | FX | HX | P | T | U | □A | □W | N | M | R | φV | RcG |
|----------------|-------|-----|-----|-------------|-----|----|-----|-----|-----|-----|----|----|----|--------------|-----|-----|-----|-----|-----|----|-------|
| | φB | C | E | F | φQ | | | | | | | | | | | | | | | | |
| 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 specifications on P.18 for the wrench-hold specifics (both sides) for the B Rod.

FC Double Rod



* $\phi 200$ 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

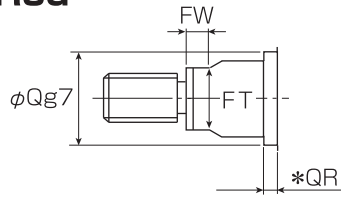
| Symbol Bore | C Rod | | | | | | | A Rod | | | | | | | | |
|----------------|----------|-----|-----|-------------|----------|-----|----|----------|-----|-----|-------------|----------|-----|----|----|----|
| | ϕB | C | E | F | ϕQ | FT | FW | ϕB | C | E | F | ϕQ | FT | FW | QR | D |
| $\phi 32$ | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| $\phi 40$ | 18 | 25 | 55 | M16 P1.5 | 36 | 14 | 10 | 28 | 30 | 60 | M20 P1.5 | 44 | 24 | 10 | 12 | 30 |
| $\phi 50$ | 22.4 | 30 | 60 | M20 P1.5 | 40 | 19 | 10 | 35.5 | 35 | 70 | M24 P1.5 | 53 | 30 | 15 | 12 | 35 |
| $\phi 63$ | 28 | 35 | 70 | M24 P1.5 | 46 | 24 | 10 | 45 | 45 | 80 | M30 P1.5 | 65 | 41 | 15 | 13 | 35 |
| $\phi 80$ | 35.5 | 45 | 80 | M30 P1.5 | 55 | 30 | 15 | 56 | 60 | 100 | M39 P1.5 | 80 | 50 | 15 | 12 | 40 |
| $\phi 100$ | 45 | 60 | 100 | M39 P1.5 | 65 | 41 | 15 | 71 | 75 | 120 | M48 P1.5 | 95 | 65 | 25 | 14 | 45 |
| $\phi 125$ | 56 | 75 | 120 | M48 P1.5 | 80 | 50 | 20 | 90 | 95 | 150 | M64 P2 | 115 | 85 | 30 | 17 | 55 |
| $\phi 140$ | 63 | 80 | 130 | M56 P2 | 85 | 58 | 20 | 100 | 110 | 165 | M72 P2 | 125 | 95 | 30 | 17 | 55 |
| $\phi 150$ | 67 | 85 | 135 | M60 P2 | 90 | 60 | 25 | 100 | 115 | 170 | M76 P2 | 125 | 95 | 30 | 15 | 55 |
| $\phi 160$ | 71 | 95 | 150 | M64 P2 | 95 | 65 | 25 | 112 | 120 | 175 | M80 P2 | 140 | 105 | 30 | 16 | 55 |
| $\phi 180$ | 80 | 110 | 165 | M72 P2 | 105 | 75 | 25 | 125 | 140 | 200 | M95 P2 | 150 | 120 | 35 | 18 | 60 |
| $\phi 200$ | 90 | 120 | 175 | M80 P2 | 115 | 85 | 30 | 140 | 150 | 215 | M100 P2 | 170 | 133 | 35 | 19 | 65 |
| $\phi 224$ | 100 | 140 | 200 | M95 P2 | 125 | 95 | 30 | 160 | 180 | 245 | M120 P2 | 190 | 155 | 35 | 10 | 65 |
| $\phi 250$ | 112 | 150 | 215 | M100 P2 | 140 | 105 | 30 | 180 | 195 | 260 | M130 P2 | 215 | 170 | 45 | 10 | 65 |

Note) The cushion for the $\phi 40$ A Rod is a fixed cushion on the head-side.

■ Double Rod Units:mm

| Symbol Bore | Double Rod | | |
|----------------|------------|-----|-----|
| | WTL | WJ | RX |
| $\phi 32$ | — | — | — |
| $\phi 40$ | 166 | 94 | 36 |
| $\phi 50$ | 182 | 98 | 42 |
| $\phi 63$ | 194 | 106 | 44 |
| $\phi 80$ | 222 | 110 | 56 |
| $\phi 100$ | 232 | 116 | 58 |
| $\phi 125$ | 264 | 132 | 66 |
| $\phi 140$ | 276 | 140 | 68 |
| $\phi 150$ | 288 | 148 | 70 |
| $\phi 160$ | 304 | 158 | 73 |
| $\phi 180$ | 322 | 174 | 74 |
| $\phi 200$ | 362 | 192 | 85 |
| $\phi 224$ | 369 | 190 | 90 |
| $\phi 250$ | 415 | 202 | 107 |

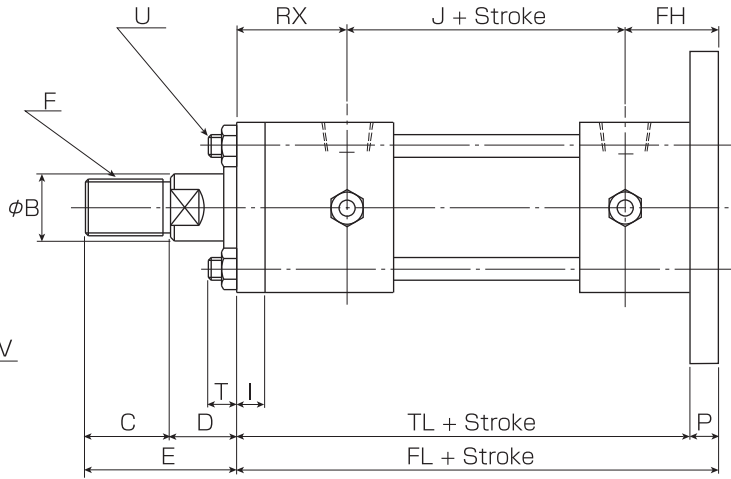
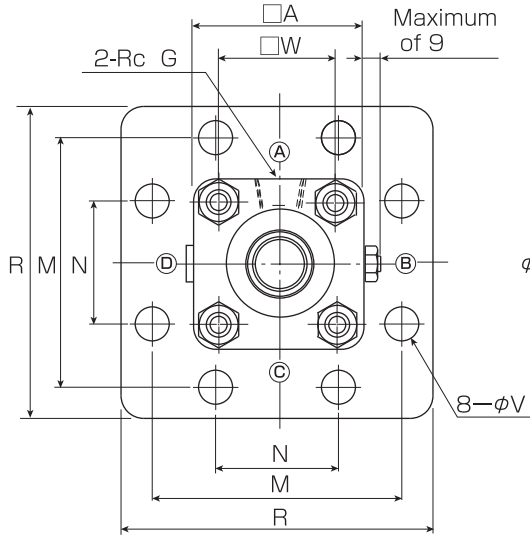
FD Single Rod



*QR Dimensions

| Standard Specifications | | Coolant Proof Specifications | | | |
|-------------------------|----------------------------|------------------------------|-------|-------|-------|
| | | Bore | A rod | B rod | C rod |
| B, C Rods | φ40 to φ200 : 10 | φ40 | 11 | 9 | 9 |
| | φ224 or φ250 : 9 | φ50 | 11 | 9 | 9 |
| | | φ63 | 13 | 9 | 9 |
| A Rods | φ32 to φ250 : | φ80 | 12 | 9 | 9 |
| | Please refer to the table. | φ100 | — | 10 | 9 |
| | | | | | |

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



Note 1) (A),(B),(C),(D) 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:mm

| Symbol Bore | B Rod | | | | D | TL | J | FL | RX | FH | P | T | I | U | □A | □W | N | M | R | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|-----|-----|----|----|----|----|--------------|-----|-----|-----|-----|-----|----|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | |
| 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

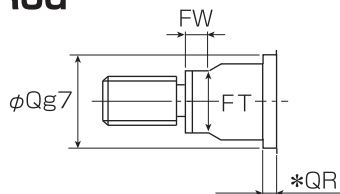
[The A Rod thread diameter conforms to our company's standards and corresponds to the B Rod 's.]

Units:mm

| Bore | C Rod | | | | | | | A Rod | | | | | | | | | |
|------|--------|-----|-----|-------------|-----|-----|----|-------|-----|-----|-------------|-----|-----|----|----|----|---|
| | Symbol | 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.

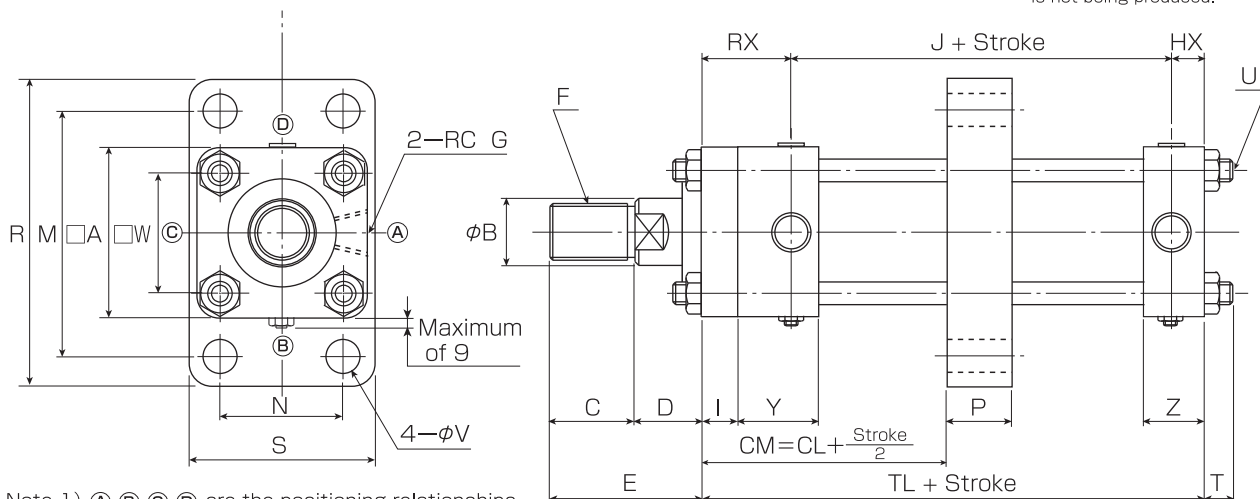
CF Single Rod



*QR Dimensions

| Standard Specifications | | Coolant Proof Specifications | | | |
|-------------------------|---|------------------------------|-------|-------|-------|
| B, C Rods | φ32 : 12 | Bore | A rod | B rod | C rod |
| | φ40 to φ200 : 10 | φ32 | 9 | 11 | 10 |
| | φ224 or φ250 : 9 | φ40 | 11 | 9 | 9 |
| A Rods | φ32 to φ250 : Please refer to the table. | 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) (A), (B), (C), (D) 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

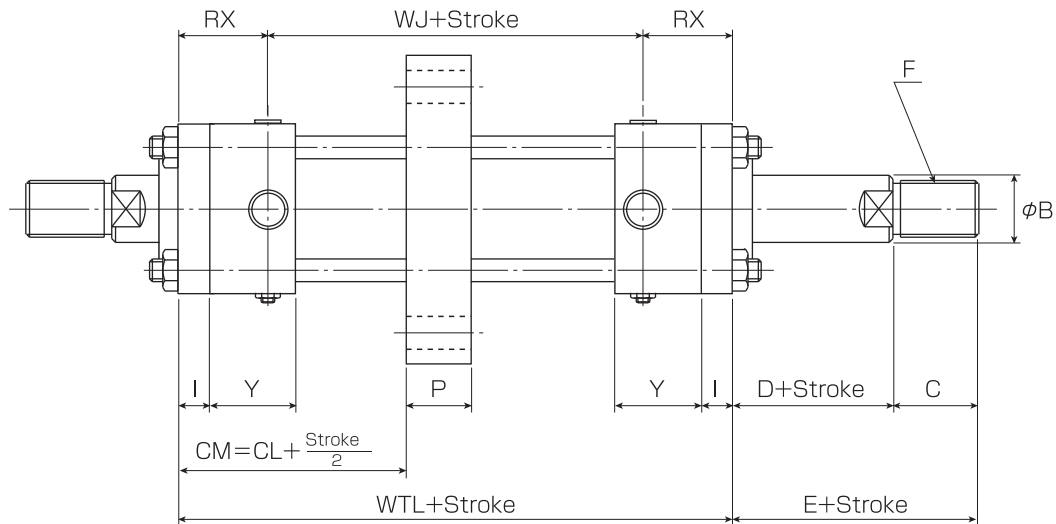
[□] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

| Symbol Bore | B Rod | | | | G | D | TL | J | RX | HX | I | Y | Z | T | U | □A | □W | N | M | CL | φV | S | R | P |
|----------------|-------|-----|-----|--------------|-------|----|-----|-----|-----|----|----|-----|----|----|--------------|-----|-----|-----|-----|-----|----|-----|-----|-----|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | | |
| 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 |

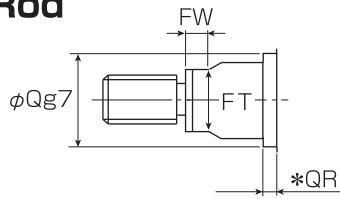
Note1) The cushion for the φ40 A Rod is a fixed cushion on the head-side.

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 | |
|----------------|------------|-----|
| | 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 |

CA Single Rod

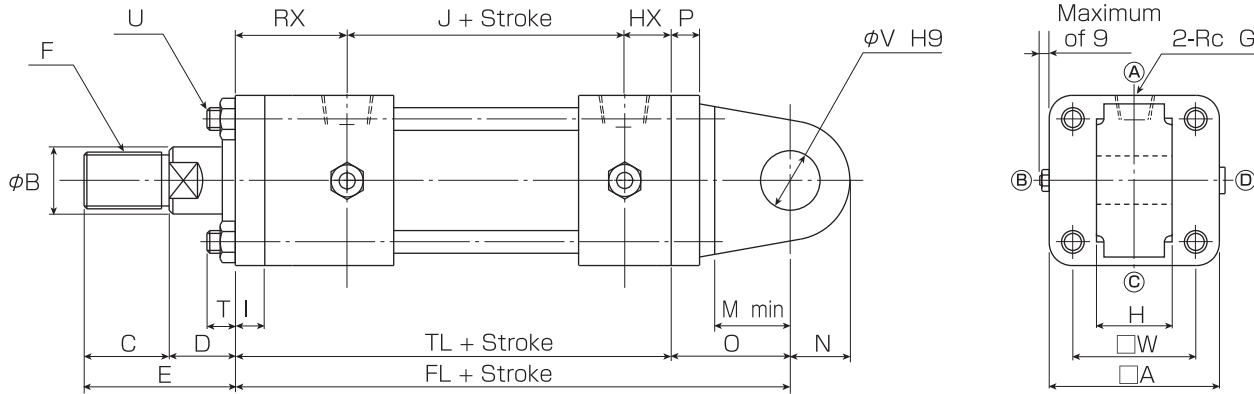


*QR Dimensions

| 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 | | | | D | TL | J | FL | RX | HX | P | T | I | M | N | O | φV | U | □A | □W | H | RcG | |
|----------------|-------|-----|-----|-------------|----|-----|-----|-----|-----|----|----|----|----|-----|------|-----|------|--------------|-----|-----|------|------------------------------------|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | |
| 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.]

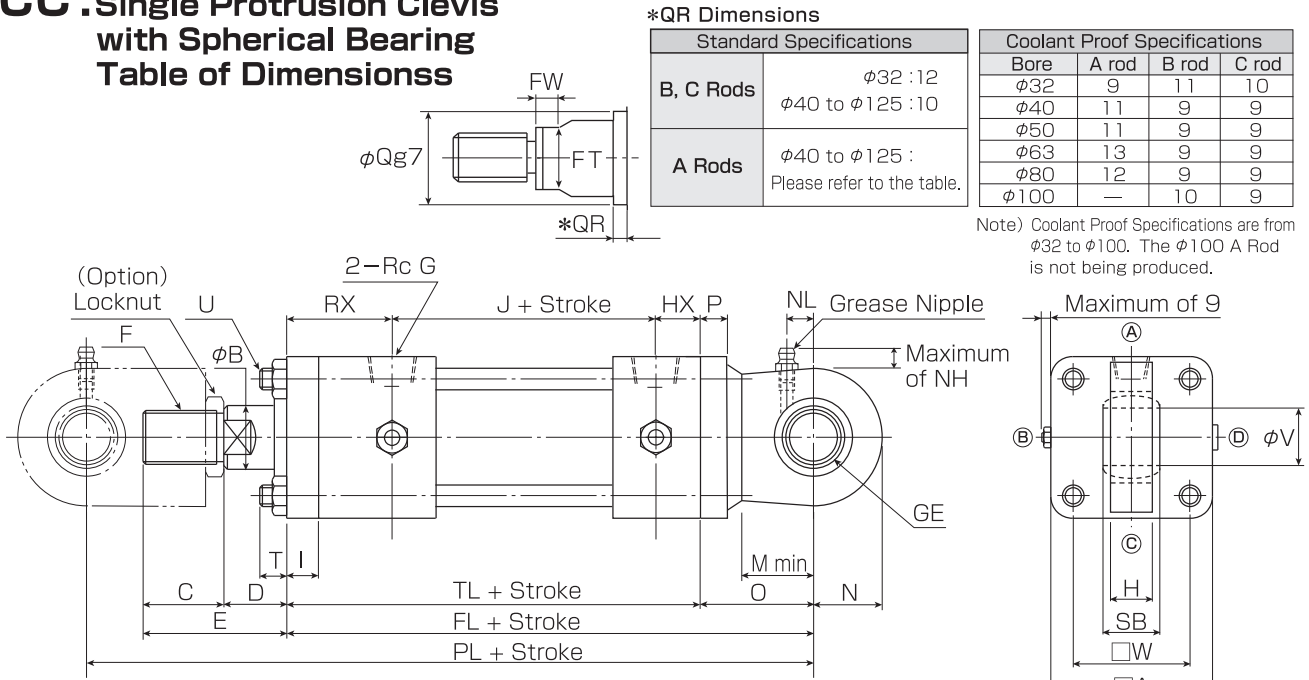
Units:mm

| 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 Dimensions



- Note 1) ①, ②, ③, ④ 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.

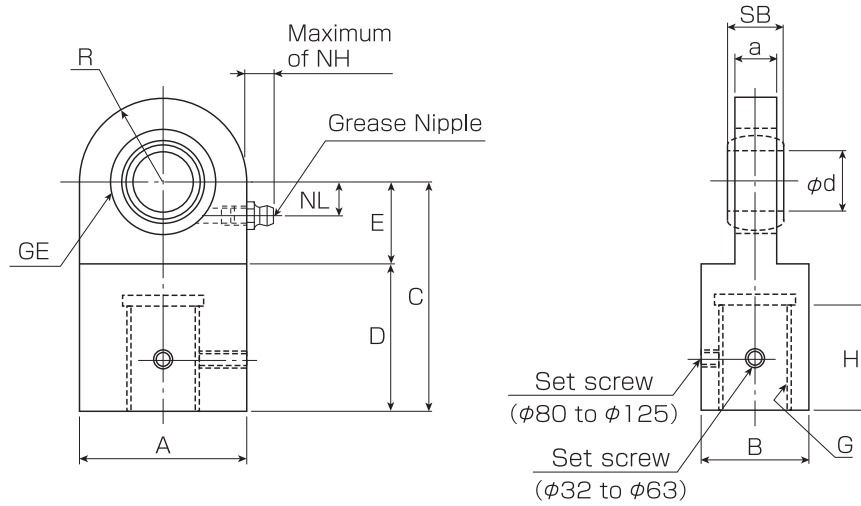
Pin with Grease Nipple Units:mm

| 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.

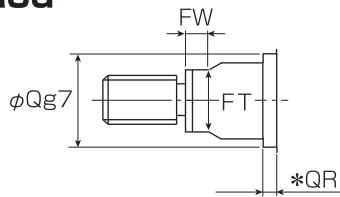
■ Pin with Grease Nipple Units:mm

| 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 Single Rod

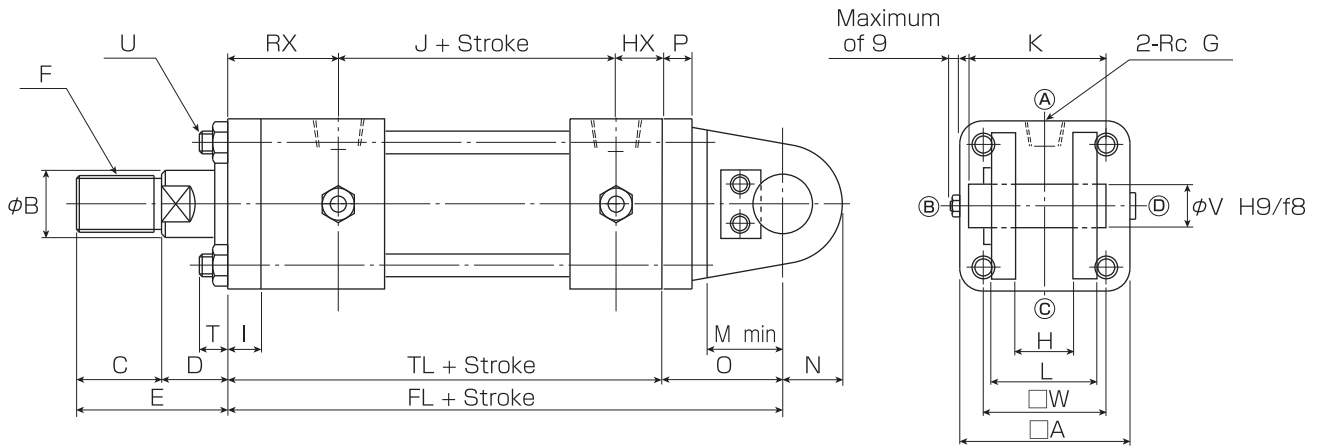


*QR Dimensions

| Standard Specifications | |
|-------------------------|------------------------------|
| B, C Rods | $\phi 32 : 12$ |
| | $\phi 40$ to $\phi 200 : 10$ |
| | $\phi 224$ or $\phi 250 : 9$ |
| A Rods | $\phi 32$ to $\phi 250 :$ |
| | Please refer to the table. |

| Coolant Proof Specifications | | | |
|------------------------------|-------|-------|-------|
| Bore | A rod | B rod | C rod |
| $\phi 32$ | 9 | 11 | 10 |
| $\phi 40$ | 11 | 9 | 9 |
| $\phi 50$ | 11 | 9 | 9 |
| $\phi 63$ | 13 | 9 | 9 |
| $\phi 80$ | 12 | 9 | 9 |
| $\phi 100$ | — | 10 | 9 |

Note) Coolant Proof Specifications are from $\phi 32$ to $\phi 100$. The $\phi 100$ A Rod is not being produced.



- Note 1) (A),(B),(C),(D) are the positioning relationships of the port, valve, etc.
- Note 2) Pins are included as standard up to $\phi 125$. They are offered as options above $\phi 140$.
- 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.50.
- Note 4) The 32 bore check valve will just be out of 4mm from the cover surface.

■ CB Type Basic Table of Dimensions

[indicates no switch, switch adjusted specifications (up to $\phi 140$) are common ranges.]

Units:mm

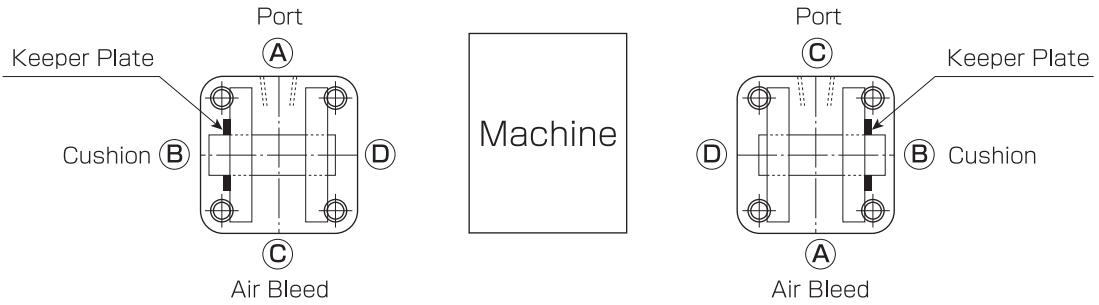
| Symbol Bore | B Rod | | | | D | TL | J | FL | RX | HX | P | T | I | M | N | O | ϕV | U | □A | □W | H | L | K | RcG |
|----------------|----------|-----|-----|-------------|----|-----|-----|-----|-----|----|----|----|----|-----|------|-----|----------|--------------|-----|-----|--------------------------------------|------|------|-------|
| | ϕB | C | E | F | | | | | | | | | | | | | | | | | | | | |
| $\phi 32$ | 18 | 25 | 55 | M16 P1.5 | 30 | 141 | 90 | 179 | 36 | 15 | 11 | 10 | 11 | 20 | 16 | 38 | 16 | M8 P1.25 | 55 | 40 | 25 ^{+0.4} _{+0.1} | 50 | 62 | 3/8 |
| $\phi 40$ | 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 ^{+0.4} _{+0.1} | 50 | 62 | 3/8 |
| $\phi 50$ | 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 ^{+0.4} _{+0.1} | 63.5 | 76.5 | 1/2 |
| $\phi 63$ | 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 ^{+0.4} _{+0.1} | 80 | 93 | 1/2 |
| $\phi 80$ | 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 ^{+0.4} _{+0.1} | 80 | 93 | 3/4 |
| $\phi 100$ | 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 ^{+0.4} _{+0.1} | 100 | 117 | 3/4 |
| $\phi 125$ | 71 | 95 | 140 | M64 P2 | 45 | 220 | 129 | 320 | 66 | 25 | 24 | 23 | 24 | 63 | 50 | 100 | 50 | M22 P1.5 | 165 | 122 | 63 ^{+0.4} _{+0.1} | 126 | 143 | 1 |
| $\phi 140$ | 80 | 110 | 160 | M72 P2 | 50 | 230 | 137 | 350 | 68 | 25 | 26 | 24 | 26 | 80 | 63 | 120 | 63 | M24 P1.5 | 185 | 138 | 80 ^{+0.6} _{+0.1} | 160 | 183 | 1 |
| $\phi 150$ | 85 | 115 | 165 | M76 P2 | 50 | 240 | 145 | 362 | 70 | 25 | 28 | 27 | 28 | 80 | 63 | 122 | 63 | M27 P1.5 | 196 | 148 | 80 ^{+0.6} _{+0.1} | 160 | 183 | 1 |
| $\phi 160$ | 90 | 120 | 175 | M80 P2 | 55 | 253 | 155 | 390 | 73 | 25 | 31 | 27 | 31 | 90 | 71 | 137 | 71 | M27 P1.5 | 210 | 160 | 80 ^{+0.6} _{+0.1} | 160 | 183 | 1 |
| $\phi 180$ | 100 | 140 | 195 | M95 P2 | 55 | 275 | 171 | 425 | 74 | 30 | 33 | 29 | 33 | 100 | 80 | 150 | 80 | M30 P1.5 | 235 | 182 | 100 ^{+0.6} _{+0.1} | 200 | 225 | 1 1/4 |
| $\phi 200$ | 112 | 150 | 205 | M100 P2 | 55 | 301 | 181 | 471 | 85 | 35 | 36 | 31 | 37 | 115 | 90 | 170 | 90 | M33 P1.5 | 262 | 200 | 125 ^{+0.6} _{+0.1} | 251 | 276 | 1 1/2 |
| $\phi 224$ | 125 | 180 | 240 | M120 P2 | 60 | 305 | 180 | 490 | 90 | 35 | 41 | 36 | 42 | 125 | 100 | 185 | 100 | M39 P1.5 | 292 | 225 | 125 ^{+0.6} _{+0.1} | 251 | 280 | 1 1/2 |
| $\phi 250$ | 140 | 195 | 260 | M130 P2 | 65 | 346 | 197 | 531 | 107 | 42 | 48 | 39 | 47 | 125 | 100 | 185 | 100 | M42 P1.5 | 325 | 250 | 125 ^{+0.6} _{+0.1} | 251 | 280 | 2 |

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

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.]

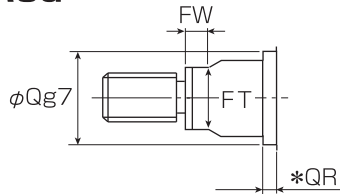
Units:mm

| 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

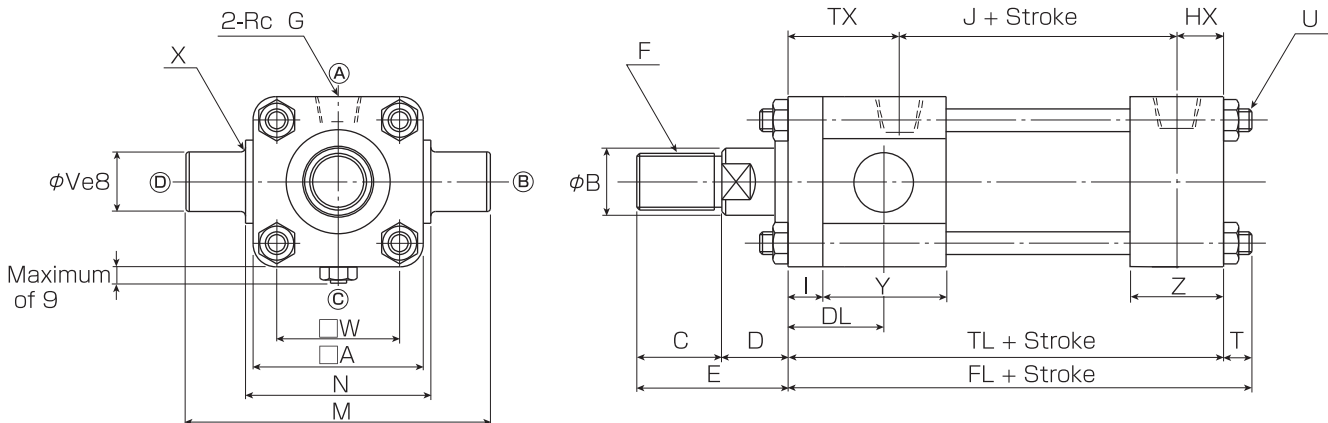


*QR Dimensions

| 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) A, B, C, D 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

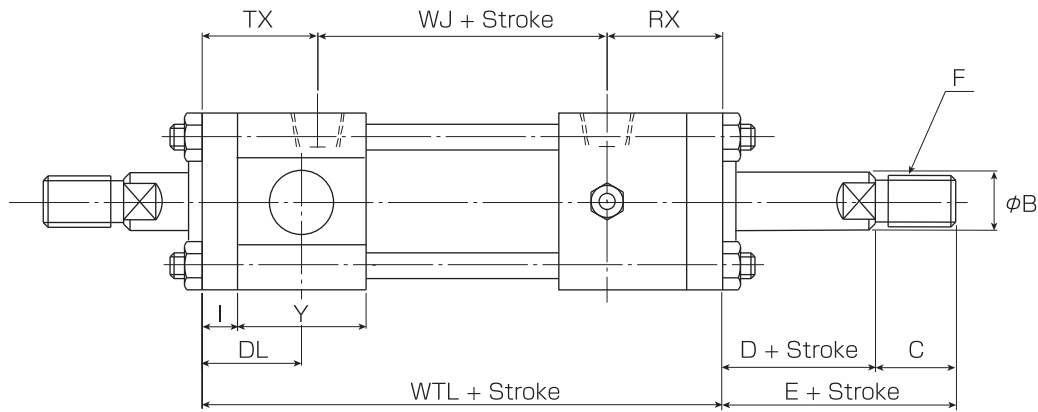
[] indicates no switch, switch adjusted specifications (up to φ140) are common ranges.]

Units:mm

| Symbol Bore | B Rod | | | | D | TL | J | FL | TX | HX | I | Y | Z | DL | T | U | □A | □W | N | M | X | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|-----|-----|----|----|-----|----|-----|----|--------------|-----|-----|-----------------------------------|-----|------|------|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | |
| 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: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.

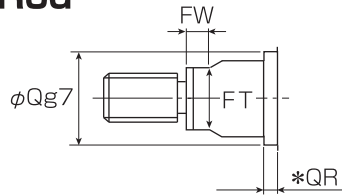
Note2) The ϕ32 A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod

Units:mm

| Symbol Bore | Double Rod | | |
|----------------|------------|-----|-----|
| | 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 |

TC Single Rod

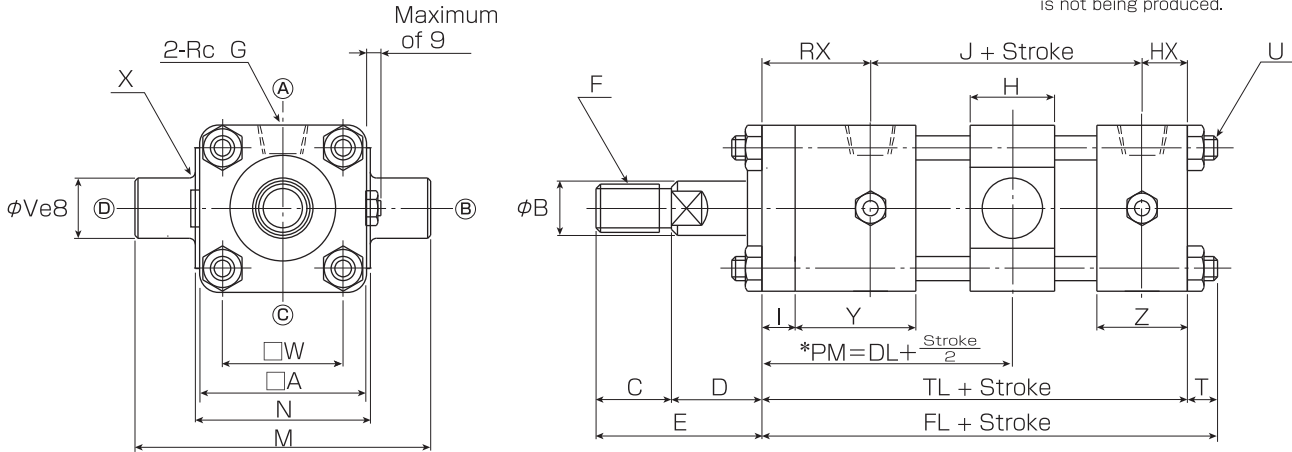


*QR Dimensions

| Standard Specifications | |
|-------------------------|---|
| B, C Rods | $\phi 32 : 12$ |
| | $\phi 40$ to $\phi 200 : 10$ |
| | $\phi 224$ or $\phi 250 : 9$ |
| A Rods | $\phi 32$ to $\phi 250 :$ Please refer to the table. |

| Coolant Proof Specifications | | | |
|------------------------------|-------|-------|-------|
| Bore | A rod | B rod | C rod |
| $\phi 32$ | 9 | 11 | 10 |
| $\phi 40$ | 11 | 9 | 9 |
| $\phi 50$ | 11 | 9 | 9 |
| $\phi 63$ | 13 | 9 | 9 |
| $\phi 80$ | 12 | 9 | 9 |
| $\phi 100$ | — | 10 | 9 |

Note) Coolant Proof Specifications are from $\phi 32$ to $\phi 100$. The $\phi 100$ A Rod is not being produced.



Note 1) A, B, C, D 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 3/2 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

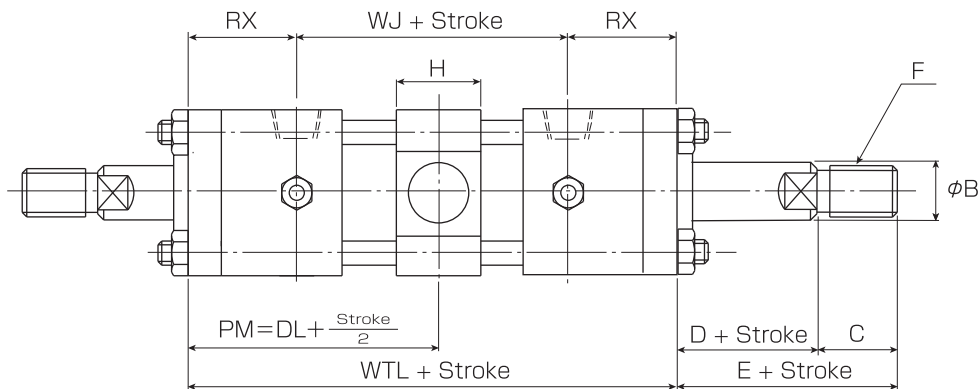
[indicates no switch, switch adjusted specifications (up to $\phi 140$) are common ranges.]

Units:mm

| Symbol Bore | B Rod | | | | D | TL | J | FL | DL | RX | HX | I | Y | Z | T | H | U | □A | □W | N | M | X | φV | RcG |
|----------------|-------|-----|-----|-------------|----|-----|-----|-----|-----|-----|----|----|-----|----|----|-----|--------------|-----|-----|-----------------------------------|-----|------|------|-------|
| | φB | C | E | F | | | | | | | | | | | | | | | | | | | | |
| 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: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.

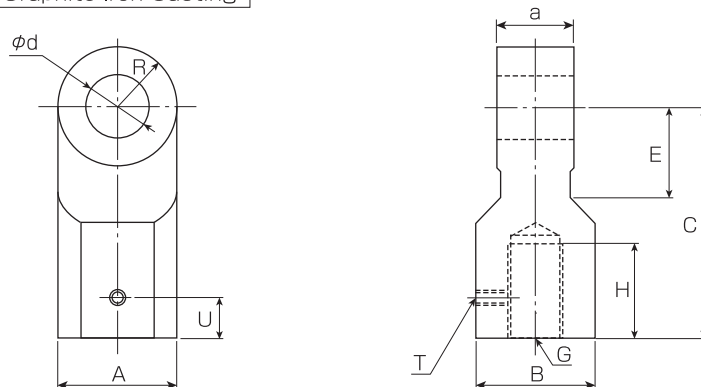
Note2) The φ32 A Rod corresponds to the standard. There is no cushion on the head side.

■ Double Rod Units:mm

| Symbol Bore | Double Rod | |
|----------------|------------|-----|
| | 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 |

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>

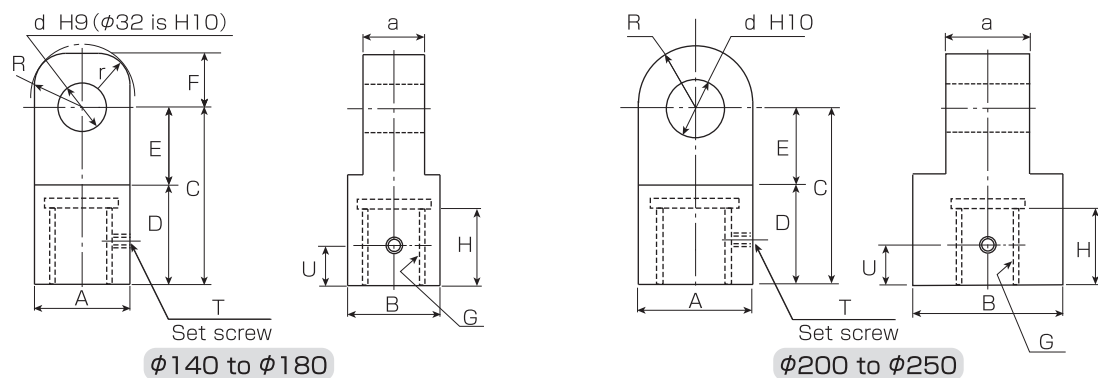
Units:mm

| 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 |



Single Protrusion End Joint Dimension Table <B (A), C Rods>

Units:mm

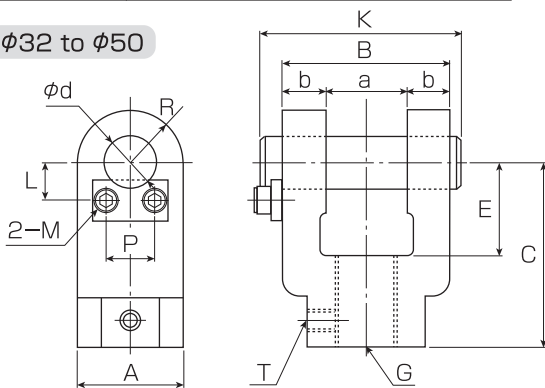
| Symbol Bore | φd | a | A | B | C | D | E | F | G | | H | | r | R | T | U | | Parts Code | |
|----------------|----|-------------------------------------|-----|-----|-----|-----|-----|----|-----------|-----------|-------|-------|----|------|-----|-------|-------|------------|----------|
| | | | | | | | | | 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 |

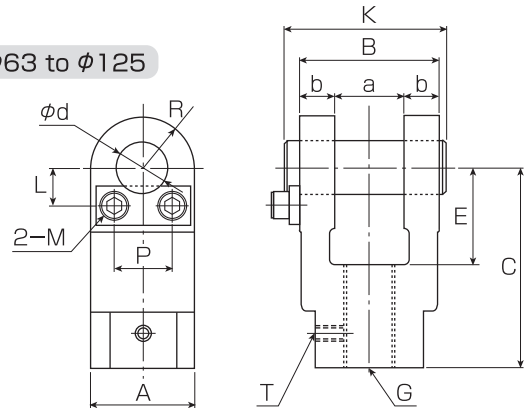
Double Protrusion End Joint : Y type

| 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)

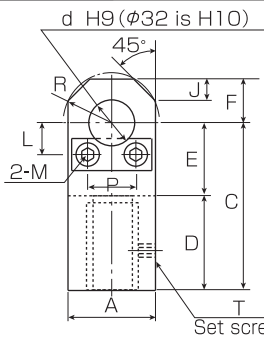
Units:mm

| 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 |

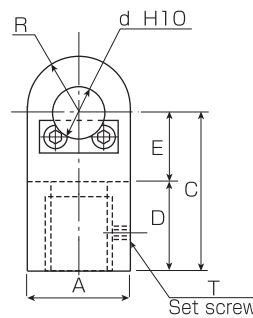
Note) The φ32 C rod of T becomes M6.

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.

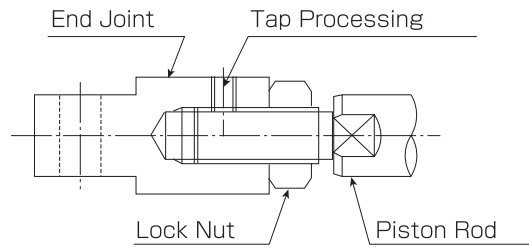
Units:mm

| 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 | | | | | |
| 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 |

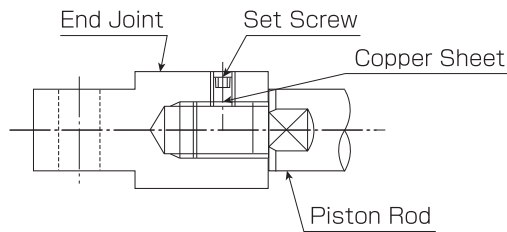
Shipping Methods for Cylinders with End Joint

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



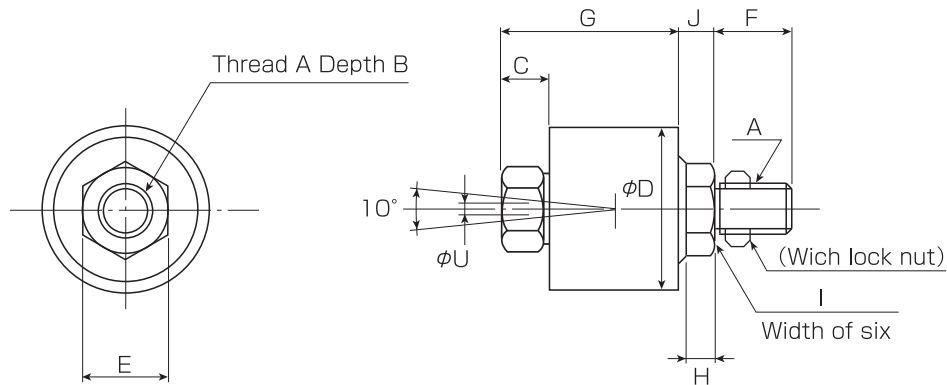
The end joint and lock nut are loosely assembled on the piston rod before shipping.
The lock nut is not tightened so it will have to be tightened after adjusting the position of the end joint.

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 nominal pressure. Confirm the usage load before use.

■ Table of Dimensions

Units:mm

| Bore B Rod | Symbol C Rod | Parts Code | A | B | C | D | E | F | G | H | I | J | U | Usage loads (N) | | Mass (kg) |
|---------------|-----------------|---------------|---------|----|----------|----|----|----|----------|---|----|------|---|-----------------|----------|--------------|
| | | | | | | | | | | | | | | 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).

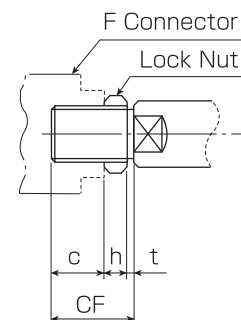
■ The screw length with F Connector

Units:mm

| Bore B Rod | Symbol C Rod | Parts Code | A | B | c | h | t | Size CF |
|---------------|-----------------|---------------|---------|----|------|----|-----|---------------------|
| | | | | | | | | (The screw length.) |
| 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 |

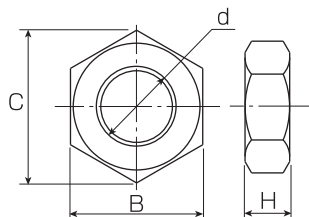
Note 1) The size CF (The screw length) is the one having calculated for the reference.

Note 2) Three types of lock nuts are available.

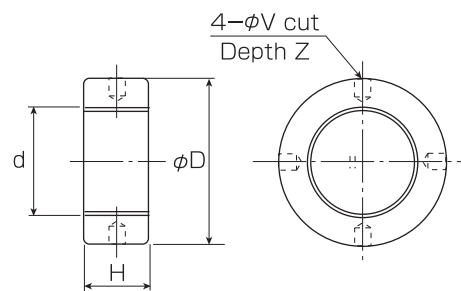


Lock Nut

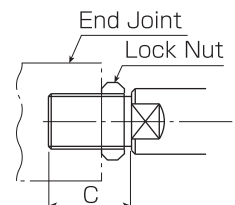
| Bore | Material |
|-------------|-------------------------------------|
| φ32 to φ250 | Rolled Steels for General structure |



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



φ200 to φ250



※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.

Table of Dimensions <B(A), C Rods>

Units:mm

| 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 |

Recommended Thread Lengths with Lock Nuts

Units:mm

| 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 Structural Use |

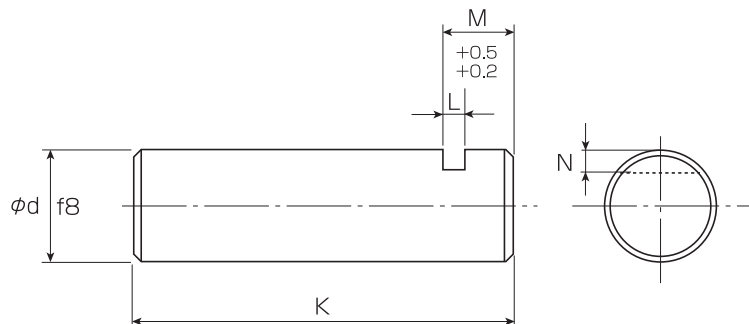


Table of Dimensions

Units:mm

| 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

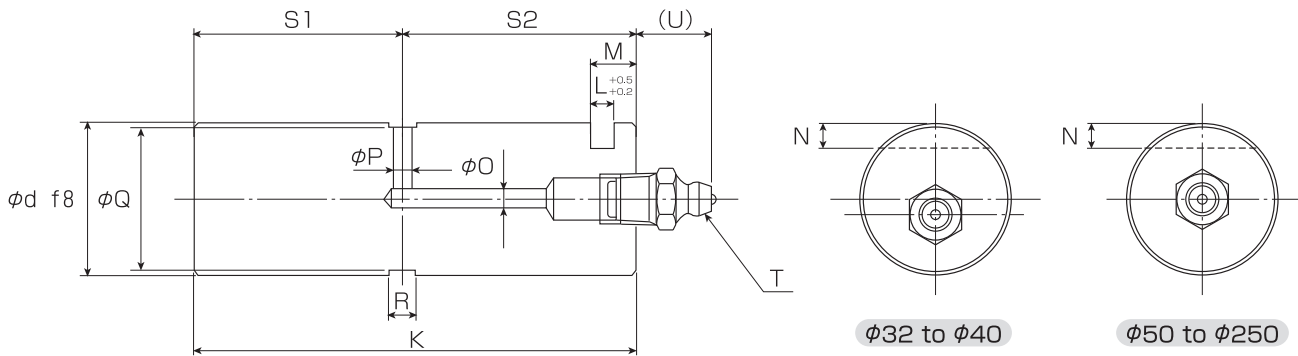


Table of Dimensions

Units:mm

| Bore | Symbol | 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) |
| | 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 |

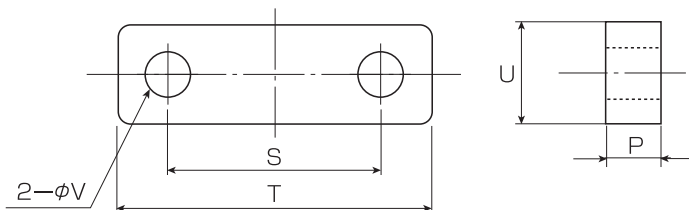


Table of Dimensions

Units:mm

| Bore | Symbol | 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 |

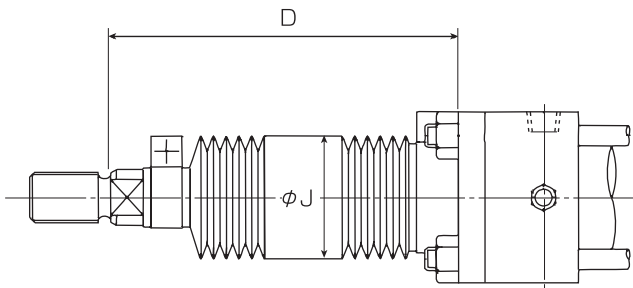
■ Bellows

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

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:mm

| Symbol | B·C Rod | | | A Rod | | |
|--------|---------|---------|----------------------|---------|---------|----------------------|
| | J | | D | J | | D |
| Bore | 5 to 49 | from 50 | | 5 to 49 | from 50 | |
| 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:mm

| Symbol | B·C Rod | | | A Rod | | |
|--------|---------|---------|----------------------|---------|---------|----------------------|
| | J | | D | J | | D |
| Bore | 6 to 59 | from 60 | | 6 to 59 | from 60 | |
| 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:mm

| Symbol | B·C Rod | | | A Rod | | |
|--------|---------|---------|----------------------|---------|---------|----------------------|
| | J | | D | J | | D |
| Bore | 7 to 69 | from 70 | | 7 to 69 | from 70 | |
| 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: Omm) | | | | | | | | | | | | | | | | | | | | | | 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 | 61.8 | 72.1 | 67.9 | 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 | 62.6 | 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: Omm) | | | | | | | | | | | 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 |

■ 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 |
| 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 |

Calculation Formula :

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

Calculation Example:

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

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: Omm) | | | | | | | | | | | | | | | | 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 | 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: Omm) | | | | | | | | 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 |