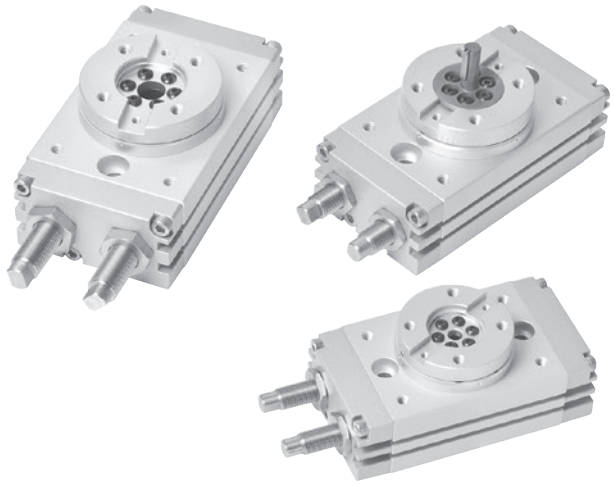
# MCRB series

## ROTARY ACTUATOR



## Features

- Twin rack and pinion fitted as standard.
- Can be adjusted between 0 and 190 degrees.
- Simple mounting of sensors.
- Magnetic as standard.

## Specification

| Model | | MCRB | | | |
|---|---|---|---|---|---|
| Acting type | | Double acting | | | |
| Tube I.D. (mm) | | 16 | 20 | 25 | 32 |
| Port size | | Rc1/8 | | | |
| Medium | | Air | | | |
| Max. operating pressure | Adjusting bolt | 1 MPa | | | |
| | Shock absorber | 0.6 MPa (*1) | | | |
| Min. operating pressure | | 0.1 MPa (*2) | | | |
| Proof pressure | | 1.5 MPa | | | |
| Ambient temperature | | -5~+60°C (No freezing) | | | |
| Lubrication | | Not required | | | |
| Cushion | | NBR spacer | | | |
| Allowable kinetic energy | Cushion pad | 0.007J | 0.040J | 0.081J | 0.32J |
| | Cushion | 0.039J | 0.116J | 0.294J | 1.6J |
| Stable rotation time regulation range | | 0.2~1.0 s/90° | | | |
| Sensor switch | | RCD (Please refer to page 5-5) | | | |
| Weight (kg) | | 0.7 | 1.16 | 1.57 | 3.07 |

*1. The maximum operating pressure of the actuator is restricted by the maximum allowable thrust of the shock absorber.

*2. No-load conditions.

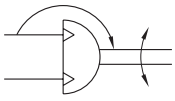
*3. The shock absorber is expendable. Replace when damping performance decrease.

## Order example

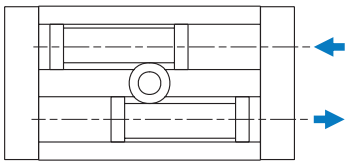
MCRB — 20R — FR — □

- MODEL
- TUBE I.D.
- ANGLE ADJUSTER
  Blank: Adjuster bolts
  **R**: Shock absorber
- TYPE
  Blank: Standard type
  **FR**: Flange rod type
- PORT THREAD
  Blank: Rc thread
  **G**: G thread
  **NPT**: NPT thread

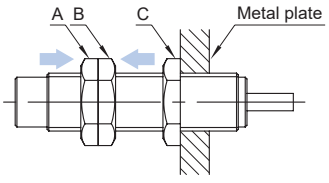
## Symbol



## Action profile

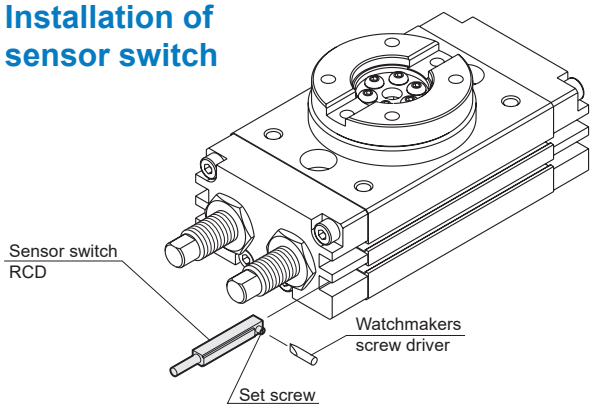


## Installation guide of shock absorber

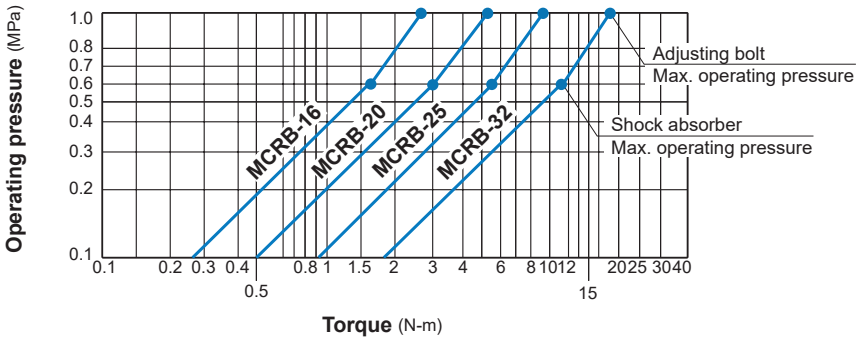



1. Install 3 nuts on the shock absorber as the picture shown.
2. Bind the A nut and B nut together via tightening them with different rotating direction.
3. Hold B nut and rotate C nut to bind the plate and C nut together.
4. Unbind the A nut and B nut. The installation is complete.

## Installation of sensor switch



## Torque diagram



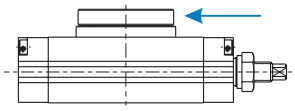
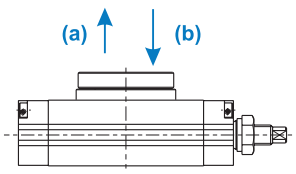
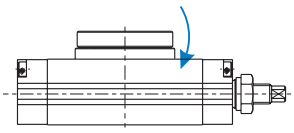

## Theoretic force

Unit: N·m

| Model | | MCRB | | | |
|---|---|---|---|---|---|
| Tube I.D. | | 16 | 20 | 25 | 32 |
| Operating pressure (MPa) | **0.1** | 0.26 | 0.5 | 0.91 | 1.88 |
| | **0.2** | 0.52 | 1 | 1.81 | 3.78 |
| | **0.3** | 0.78 | 1.5 | 2.72 | 5.66 |
| | **0.4** | 1.04 | 2.01 | 3.62 | 7.56 |
| | **0.5** | 1.31 | 2.51 | 4.55 | 9.44 |
| | **0.6** | 1.57 | 3 | 5.45 | 11.32 |
| | **0.7** | 1.83 | 3.5 | 6.36 | 13.23 |
| | **0.8** | 2.09 | 4.02 | 7.26 | 15.12 |
| | **0.9** | 2.35 | 4.52 | 8.17 | 17.01 |
| | **1.0** | 2.61 | 5.03 | 9.08 | 18.9 |

## Allowable load

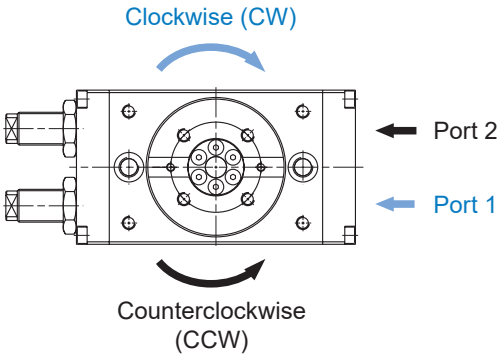
Set the load and moment to be applied to the table within the allowable values shown in the table below.
(Values outsize of limitations will cause excessive play, deteriorate accuracy, and shorten service life.)

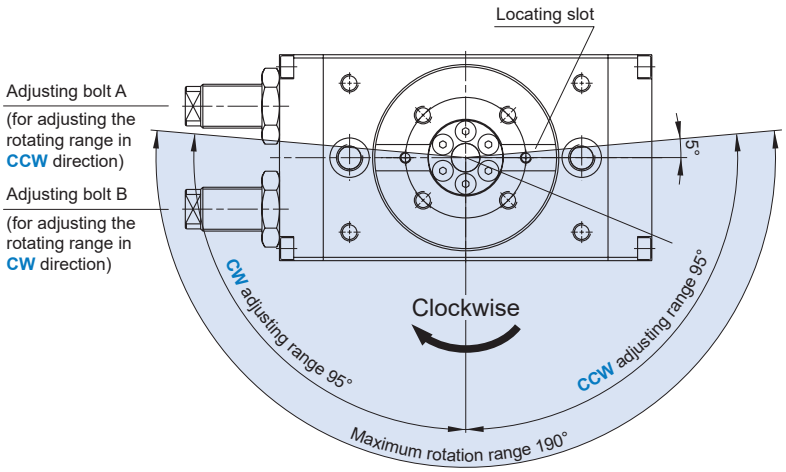
| Pictures |  |  |  | |
|---|---|---|---|---|
| Tube I.D. | Allowable radial load (N) | Allowable thrust load (N) | | Allowable moment (N.m) |
| | | **(a)** | **(b)** | |
| 16 | 78 | 74 | 78 | 2.4 |
| 20 | 196 | 197 | 363 | 5.3 |
| 25 | 314 | 296 | 451 | 9.7 |
| 32 | 390 | 493 | 708 | 18 |

## Rotating direction and angle

- When the port 1 is pressurized, the flange rotates in clockwise (CW) direction.
- When the port 2 is pressurized, the flange rotates in counter-clockwise (CCW) direction.

  The rotating angle range can be adjust by the method shown as right figure.



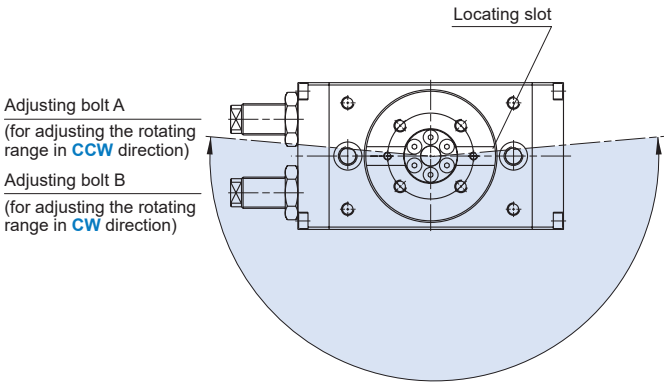

NOTE

- The figure shows the rotating range and use the pin hole as indicator.
- The locating slot in the figure locates at the situation which the CCW & CW rotating range are both adjusted at 90°.

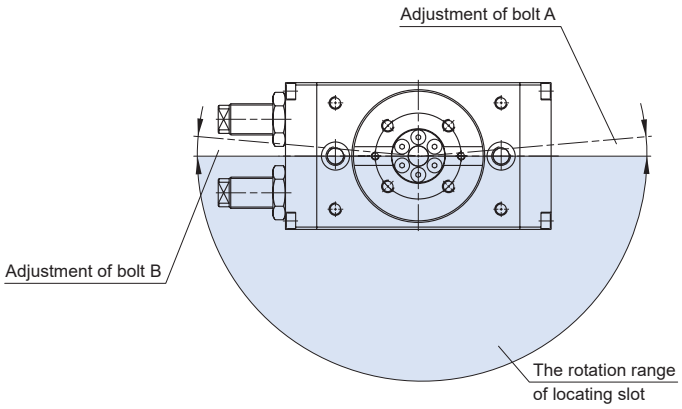
## Rotating range adjusting example

- The followed figures show the rotating range of different adjustment via bolt A and B. (The drawings also show the rotation ranges of the locating slot.)

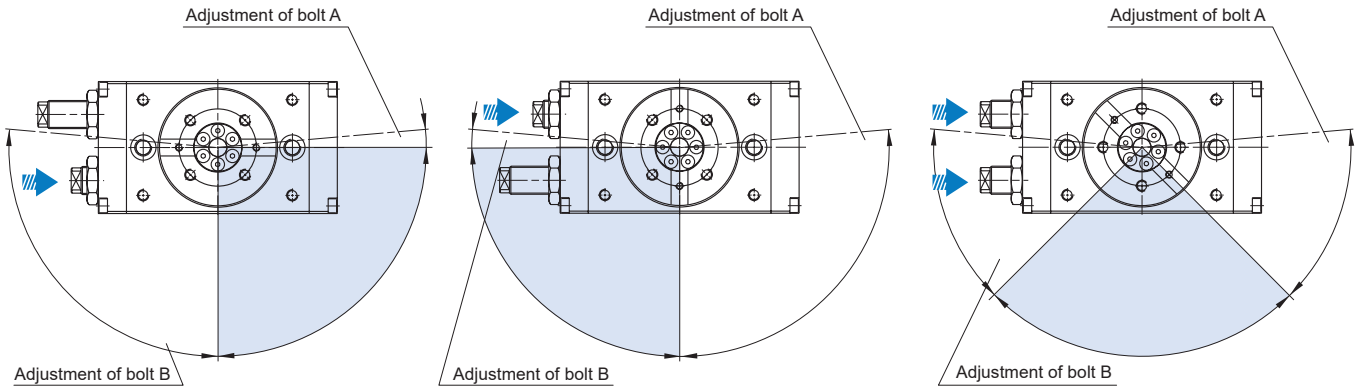
### 190° (Max) Rotation




### 180° Rotation

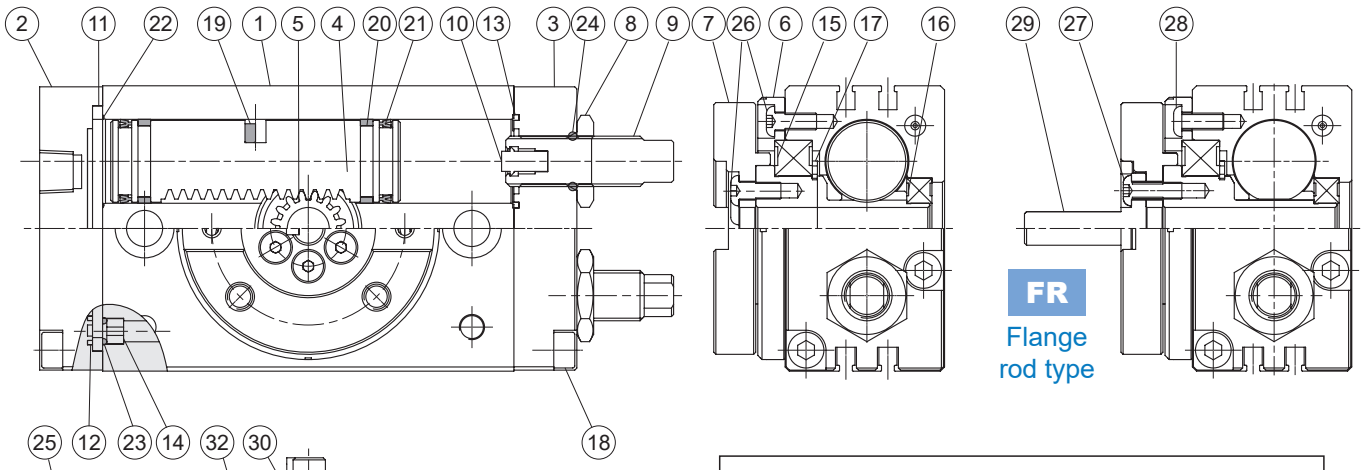


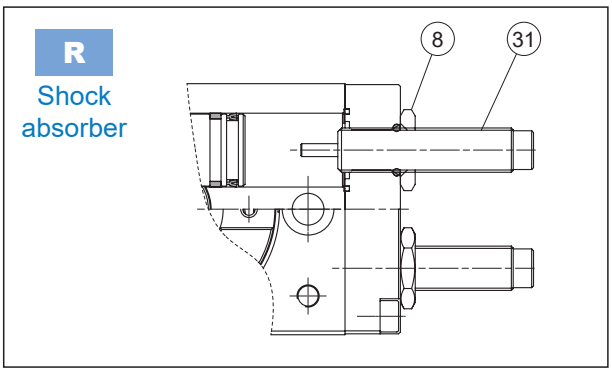

### 90° Rotation



# MCRB Inside structure & Parts list

## ROTARY ACTUATOR




## Material

| No. | Part name | Material | Q'y | Repair kits (inclusion) |
|---|---|---|---|---|
| 1 | Body | Aluminum alloy | 1 | |
| 2 | Cover | Aluminum alloy | 1 | |
| 3 | End cover | Aluminum alloy | 1 | |
| 4 | Piston | Stainless steel | 2 | |
| 5 | Pinion | SCM | 1 | |
| 6 | Bearing retainer | Aluminum alloy | 1 | |
| 7 | Table | Aluminum alloy | 1 | |
| 8 | Seal nut | Stainless steel | 2 | |
| 9 | Adjusting bolt *1 | Stainless steel | 2 | |
| 10 | Cushion pad *1 | NBR | 2 | ● |
| 11 | Plate | Aluminum alloy | 1 | |
| 12 | Packing | NBR | 1 | ● |
| 13 | Packing | NBR | 2 | ● |
| 14 | Fixed | Copper | 2 | |
| 15 | Ball bearing | Bearing steel | 1 | |
| 16 | Ball bearing | Bearing steel | 1 | |
| 17 | Snap ring | Spring steel | 1 | |
| 18 | Bolt | Stainless steel | 8 | |
| 19 | Magnet | Magnet material | 2 | |
| 20 | Wear ring | Resin | 4 | |
| 21 | Piston packing | NBR | 4 | ● |

| No. | Part name | Material | Q'y | Repair kits (inclusion) |
|---|---|---|---|---|
| 22 | O-ring | NBR | 2 | ● |
| 23 | O-ring | NBR | 2 | ● |
| 24 | O-ring | NBR | 2 | ● |
| 25 | Screw | Carbon steel | 2 | |
| 26 | Bolt | Carbon steel | 10 | |
| 27 | Bolt *2 | Carbon steel | 6 | |
| 28 | Bolt *2 | Carbon steel | 4 | |
| 29 | Rotate shaft *2 | Carbon steel | 1 | |
| 30 | Round key *2 | Carbon steel | 1 | |
| 31 | Shock absorber *3 | – | 2 | |
| 32 | Round key | Carbon steel | 1 | |

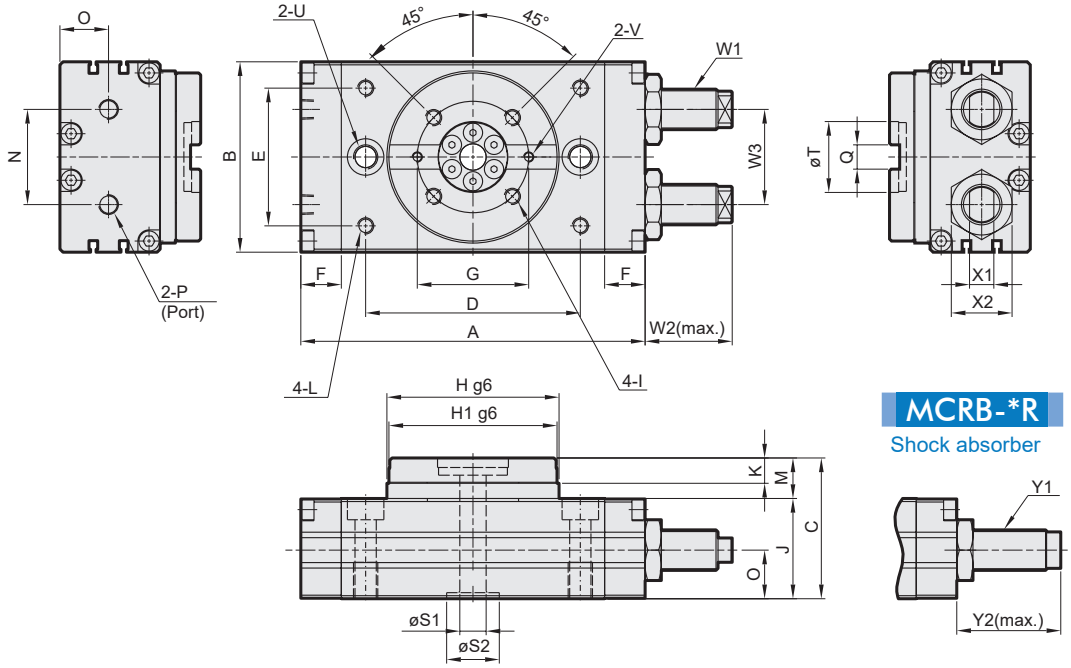
*1. Only suitable for adjuster bolts.
*2. No.27~30 for (FR) flange rod type.
*3. Only suitable for (R) shock absorber.

## Order example of repair kits

| Tube I.D. | Repair kits | |
|---|---|---|
| | Adjuster bolts | Shock absorber (R) |
| ø16 | **PS-MCRB-16** | **PS-MCRB-16R** |
| ø20 | **PS-MCRB-20** | **PS-MCRB-20R** |
| ø25 | **PS-MCRB-25** | **PS-MCRB-25R** |
| ø32 | **PS-MCRB-32** | **PS-MCRB-32R** |

# MCRB Dimensions ø16~ø32

## ROTARY ACTUATOR



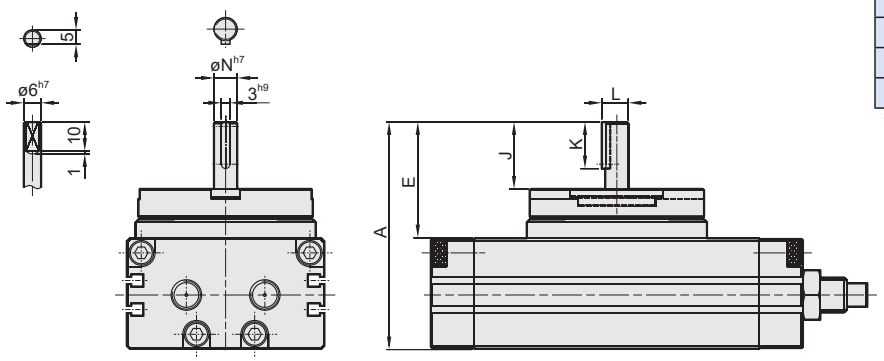

| Code / Tubr I.D. | A | B | C | D | E | F | G | H | H1 | I | J | K | L | M | N | O | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 108 | 58 | 47 | 62 | 38 | 15 | 38 | 50 | 48 | M5×7dp,P.C.D38 | 33 | 8 | M5×8dp | 14 | 26 | 15.5 | Rc1/8 |
| 20 | 128 | 68 | 55 | 78 | 47 | 15 | 46 | 62.5 | 60 | M6×7dp,P.C.D46 | 38 | 10 | M6×8dp | 17 | 27 | 18.5 | Rc1/8 |
| 25 | 135.5 | 77 | 58.5 | 84 | 55 | 15.5 | 48 | 67 | 65 | M6×9dp,P.C.D48 | 41.5 | 10 | M6×8dp | 17 | 37 | 20 | Rc1/8 |
| 32 | 170 | 94 | 69.5 | 106 | 68 | 20 | 55 | 85 | 83 | M8×10dp,P.C.D55 | 49.5 | 12.5 | M8×8.5dp | 20 | 47 | 24 | Rc1/8 |

| Code / Tubr I.D. | Q | S1 | S2 | T | U | V | W1 | W2 |
|---|---|---|---|---|---|---|---|---|
| 16 | $8^{+0.03}_{-0}$ (wide)×3.3dp | 6 | 17 $H9^{+0.043}_{0}$×2.5dp | 24 $H9^{+0.052}_{0}$×3dp | 2-ø6.8 thru,ø11×6.5dp,M8×12dp(sink) | M3×4dp | M10×1.0 | 27 |
| 20 | $10^{+0.03}_{-0}$ (wide)×3.5dp | 10 | 22 $H9^{+0.052}_{0}$×2.5dp | 32 $H9^{+0.062}_{0}$×3dp | 2-ø8.6 thru,ø14×8.5dp,M10×15dp(sink) | M4×6dp | M12×1.0 | 23 |
| 25 | $12^{+0.03}_{-0}$ (wide)×4dp | 13 | 22 $H9^{+0.052}_{0}$×3dp | 32 $H9^{+0.062}_{0}$×3.7dp | 2-ø8.6 thru,ø14×8.5dp,M10×15dp(sink) | M4×5dp | M14×1.5 | 36 |
| 32 | $12^{+0.03}_{-0}$ (wide)×5dp | 13 | 26 $H9^{+0.052}_{0}$×3dp | 35 $H9^{+0.062}_{0}$×4.7dp | 2-ø10.5 thru,ø18×10.5dp,M12×18dp(sink) | M5×5dp | M20×1.5 | 43 |

| Code / Tubr I.D. | W3 | X1 | X2 | Y1 | Y2 |
|---|---|---|---|---|---|
| 16 | 26 | 7 | 17 | FK-1008L-S | 24 |
| 20 | 32 | 8 | 19 | FK-1210L-S | 36.5 |
| 25 | 37 | 8 | 22 | FK-1412L-S | 41 |
| 32 | 47 | 12 | 30 | FK-2016L-S | 55 |

## Flange rod type

ø16 ø20~ø32




| Code / Tubr I.D. | A | E | J | K | L | N |
|---|---|---|---|---|---|---|
| 16 | 64.5 | 31.5 | 17.5 | - | - | - |
| 20 | 78 | 40 | 23 | 16 | 9.2 | 8 |
| 25 | 81.5 | 40 | 23 | 20 | 11.2 | 10 |
| 32 | 109.5 | 60 | 40 | 20 | 13.2 | 12 |

* Other dimensions are the same as standard type.