



# TECHNICAL GUIDANCE

## Flowmeter for air conditioner

### CFW1000 Series STATIONARY USE

#### GENERAL

The CFW1000 is the liquid flowmeter mainly designed for air conditioner. The flow rate is detected by the differential pressure which is created by a Pitot tube inserted into the pipe.

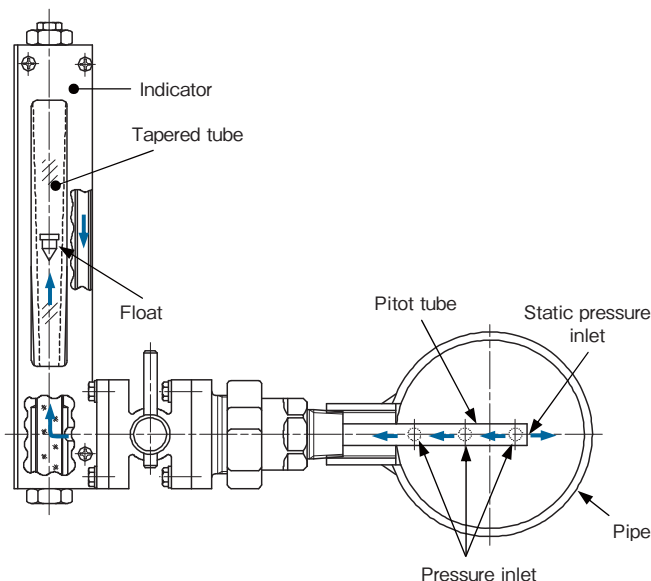
The CFW1000 is easy-to-install and cost-effective flowmeter suitable for water, cold water and hot water for air conditioning system in collective housings, office buildings and other facilities.

#### FEATURES

- ❑ Just weld a 20 mm (3/4 inch) socket in the existing pipe and screw the flowmeter into the socket
- ❑ Minimum pressure loss
- ❑ Single or double scales for accurate measurement depending on your applications
  - 20°C water calibrated scale
  - 60°C hot water in red and 7°C cold water in blue with double scales.
- ❑ For both horizontal and vertical pipes
- ❑ Light weight, cost effective and quick delivery

#### MEASURING PRINCIPLE

The Pitot tube inserted into the pipe which have two pressure inlets, one for the total pressure (dynamic + static pressure) and the other one for static pressure only. The liquid is introduced into the flowmeter as a bypass line by the pressure difference of the total and static pressure as shown by an arrow ← in the following schematics. The flow going through the tapered tube makes the float stay at a position on the scale corresponding to the total flow rate in the pipe.



#### STANDARD SPECIFICATIONS

- Measuring liquid : Water, Cold water, Hot water
- Main pipe size : 20 mm(3/4") to 450 mm(18")
- Indication accuracy :  $\pm 5\%$  (F.S.)
- Max. operating pressure
  - : CFW12(4) □□ - □□□ -10 1.0 MPa
  - : CFW12(4) □□ - □□□ -20 2.2 MPa
- Operating temperature : 0 to 80°C  
The operating temperature is typical one which may change according to operating or environment conditions. (Use the lining or plastics pipe within its allowable temperature)
- Mass : Approx. 2.3 kg  
(CFW12 □□ - □□□ -10 Approx. 1.8 kg)

MODEL CODE

|                       |      |       |     |    |        |  |
|-----------------------|------|-------|-----|----|--------|--|
| CFW1                  | □□□□ | -□□□  | -□□ | -□ | /□□□   | Description  |
| Installation type     | 2    |       |     |    |        | Horizontal   |
|                       | 4    |       |     |    |        | Vertical   |
| Indicator calibration | 1    |       |     |    |        | 20°C water   |
|                       | 2    |       |     |    |        | 7°C and 60°C water, double scale                                 |
| Scale range           | 1    |       |     |    |        | Scale range 1 See right table                                    |
|                       | 2    |       |     |    |        | Scale range 2 See right table                                    |
| Main pipe size        |      | -020  |     |    |        | 20 mm  |
|                       |      | -025  |     |    |        | 25 mm  |
|                       |      | -032  |     |    |        | 32 mm  |
|                       |      | -040  |     |    |        | 40 mm  |
|                       |      | -050  |     |    |        | 50 mm  |
|                       |      | -065  |     |    |        | 65 mm  |
|                       |      | -080  |     |    |        | 80 mm  |
|                       |      | -100  |     |    |        | 100 mm   |
|                       |      | -125  |     |    |        | 125 mm   |
|                       |      | -150  |     |    |        | 150 mm   |
|                       |      | -200  |     |    |        | 200 mm   |
|                       |      | -250  |     |    |        | 250 mm   |
|                       |      | -300  |     |    |        | 300 mm   |
|                       |      | -350  |     |    |        | 350 mm   |
|                       | -400 |       |     |    | 400 mm |  |
|                       | -450 |       |     |    | 450 mm |  |
| Pressure rating       |      | -10   |     |    |        | 1 MPa class  |
|                       |      | -20   |     |    |        | 2 MPa class  |
| Version               |      | -A    |     |    |        | Equiv. to CFW12□□-□□□-10   |
|                       |      | -B    |     |    |        | Equiv. to CFW12□□-□□□-20<br>Equiv. to CFW14□□-□□□-□□             |
| Option                |      | /CFT  |     |    |        | Three-way socket for 20 to 32 mm<br>Applied for only 1 MPa class |
|                       |      | /CFS  |     |    |        | Socket of welding for 40 mm or larger pipes                      |
|                       |      | /DEG  |     |    |        | Degreasing treatment   |
|                       |      | /BC6  |     |    |        | Material of fitting is CAC406                                    |
|                       |      | /PL   |     |    |        | For PVC lining pipe  |
| Additional function   |      | blank |     |    |        | Not provided   |
|                       |      | /Z    |     |    |        | Provided   |

STANDARD SCALE RANGE TABLE

| CFW1□□□□ |       |                          |                          | Inside diameter of pipe mm |                    |                    |
|----------|-------|--------------------------|--------------------------|----------------------------|--------------------|--------------------|
| Size     |       | Scale range L/min        |                          | 1 MPa class *3, *5         | 2 MPa class *4, *5 | PVC lining pipe *1 |
| mm       | inch  | Scale range 1 *2         | Scale range 2 *1, *2     |                            |                    |                    |
| 20       | 3/4   | 12 to 100<br>[8 to 75]   | 10 to 60<br>[6 to 45]    | (26)                       | (21.4)             |                    |
| 25       | 1     | 18 to 150<br>[13 to 120] | 15 to 100<br>[10 to 75]  | (34)                       | (27.2)             |                    |
| 32       | 1 1/4 | 35 to 280<br>[25 to 220] | 25 to 180<br>[20 to 140] | (43)                       | (35.5)             | 29.5               |
| 40       | 1 1/2 | 35 to 300                | 30 to 180                | 41.6                       | 41.2               | 34.7               |
| 50       | 2     | 60 to 500                | 50 to 300                | 52.9                       | 52.7               | 46.2               |
| 65       | 2 1/2 | 100 to 800               | 80 to 500                | 67.9                       | 65.9               | 59.7               |
| 80       | 3     | 150 to 1200              | 120 to 700               | 80.7                       | 78.1               | 70.9               |
| 100      | 4     | 250 to 2000              | 200 to 1200              | 105.3                      | 102.3              | 95.2               |
| 125      | 5     | 400 to 3000              | 300 to 2000              | 130.8                      | 126.6              | 119.7              |
| 150      | 6     | 600 to 4500              | 400 to 2800              | 155.2                      | 151.0              | 142.0              |
| 200      | 8     | 1000 to 8000             | 700 to 4800              | 204.7                      | 199.9              |                    |
| 250      | 10    | 1500 to 12000            | 1200 to 7500             | 254.2                      | 248.8              |                    |
| 300      | 12    | 2000 to 17000            | 1600 to 10000            | 304.7                      | 297.9              |                    |
| 350      | 14    | 2500 to 22000            | 2000 to 13000            | 339.8                      | 333.4              |                    |
| 400      | 16    | 3500 to 28000            | 2800 to 17000            | 390.6                      | 381.0              |                    |
| 450      | 18    | 4500 to 35000            | 3500 to 22000            | 441.4                      | 428.6              |                    |

\*1 PVC lining type is available for the size 32 mm to 150 mm as marked gray.

Its scale range is shown in the column Scale range 2 as marked gray. Full-scale flow rates for the PVC lining pipe are calculated based on the inner diameter of ESLON® ESLOCOAT LX tee fittings (Sekisui Chemical Co., Ltd). The maximum rating is 1 MPa. If you use other fittings, additional calibration is needed. Please check "D" and "L" in the figure at the end of this document and the kind of pipe, and then contact us

\*2 Scale ranges of 20, 25, 32 mm size for 2 MPa class are shown in the brackets in above table.

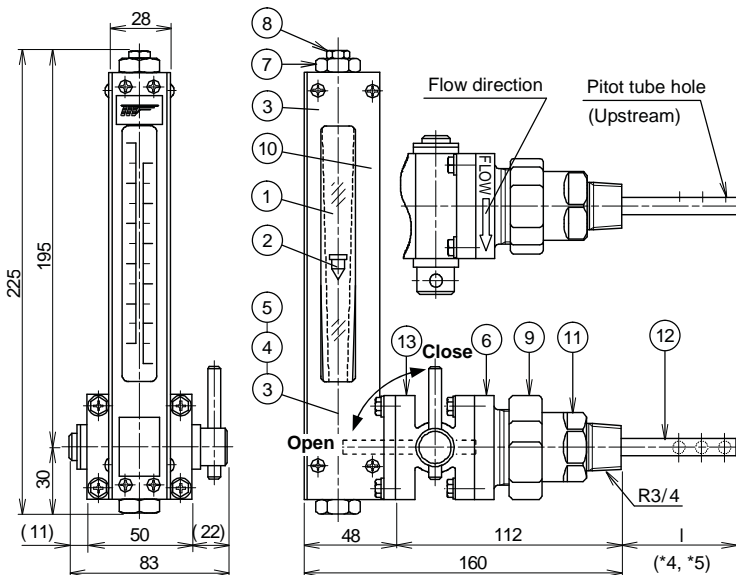
\*3 The inside diameter of main pipe of 20 to 32mm in 1MPa class is based on the three-way socket (JIS B 2301).(The three-way socket shall be attached upon request.)

\*4 The inside diameter of main pipe of 20 to 32mm in 2 MPa class is based on three-way socket (Sch 40). The three-way socket is supplied by customer.

\*5 The inside diameter of main pipe more than 40mm in 1 MPa class is based on SGP (JIS G3452) Carbon steel pipe for piping, and the inside diameter in 2 MPa class is based on the carbon steel pipe for STPG (JIS G 3454 Sch 40) for pressure piping.

DIMENSION AND MATERIAL

CFW12□□-□□□-10-A



\*6 The dimension of "l" in Pitot tube is typical one which is our standard. The dimension may change depending on your pipes or sockets. In such case please check "D" and "L" in the figure at the end of this document and the kind of pipe, and then contact us.

| CFW12□□-□□□-10-A |                      |                      |
|------------------|----------------------|----------------------|
| No.              | Parts name           | Material             |
| ①                | Tapered tube         | Heat-resistant glass |
| ②                | Float                | Titanium             |
| ③                | Upper & Lower body   | SCS 14               |
| ④                | Strainer             | SUS 316              |
| ⑤                | O ring               | NBR                  |
| ⑥                | Pitot tube joint     | SCS 14               |
| ⑦                | Cap                  | SUS 316              |
| ⑧                | Air elimination plug | SUS 316              |
| ⑨                | Cap nut              | SCS 13               |
| ⑩                | Cover                | SUS 304/ABS          |
| ⑪                | Fitting              | SCS14*1              |
| ⑫                | Pitot tube           | SUS316               |
| ⑬                | Valve                | SCS14                |
|                  | Axis                 | SUS316               |
|                  | O ring               | NBR                  |
| ⑭                | Socket               | SS400*2              |
| ⑮                | Three-way socket     | FCMB*3               |

Length of Pitot tube "l"

| Size   | *4  | *5  |
|--------|-----|-----|
| 20 mm  | 30  |     |
| 25 mm  | 32  |     |
| 32 mm  | 42  | 65  |
| 40 mm  | 63  | 70  |
| 50 mm  | 69  | 76  |
| 65 mm  | 79  | 88  |
| 80 mm  | 88  | 98  |
| 100 mm | 102 | 115 |
| 125 mm | 117 | 131 |
| 150 mm | 133 | 148 |
| 200 mm | 98  |     |
| 250 mm | 113 |     |
| 300 mm | 128 |     |
| 350 mm | 135 |     |
| 400 mm | 151 |     |
| 450 mm | 166 |     |

\*4 For SGP and STPG pipes  
\*5 For PVC lining pipes

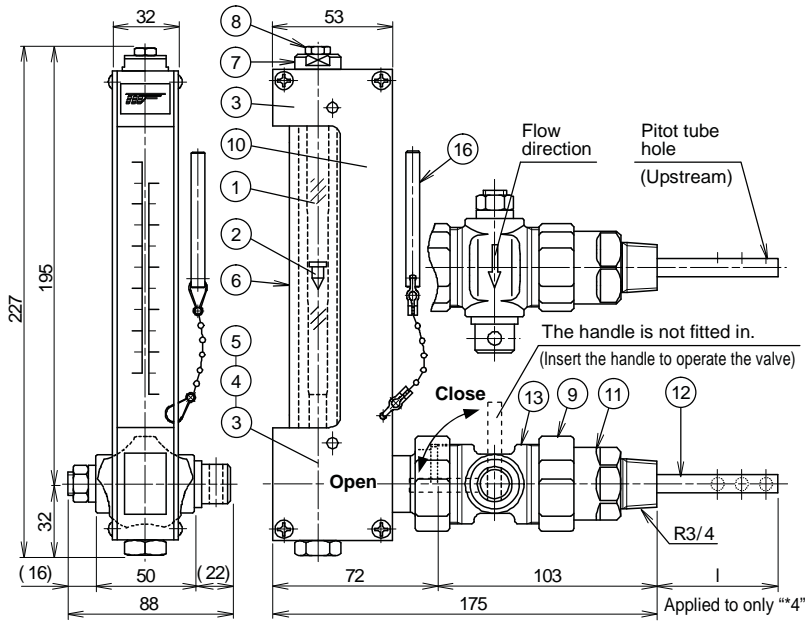
\*1 CAC406 is available as the material of fitting on request.

Optional code: /BC6

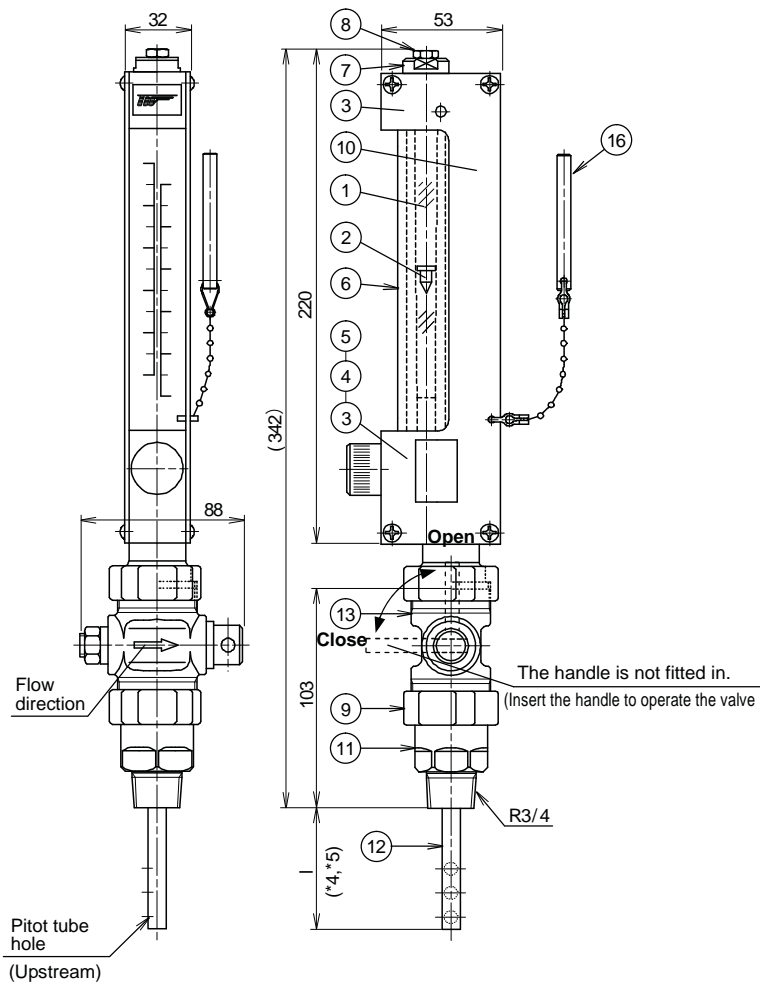
\*2 The socket made of SS400 is supplied as an accessory upon request. The socket made of other than SS400 is supplied by the customers. See ⑭ "Socket" at page 3.

\*3 For the 1MPa class, three way socket is supplied upon request. Its material other than FCMB is provided by customers. For the 2 MPa class, the part made of proper material such as S25C is selected and provided by customers considering pipe sch40. See ⑮ "Three-way socket" at page 3.

CFW12□□-□□□-20-B



CFW14□□-□□□-□0-B

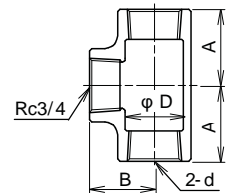
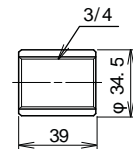


\*6 The dimension of "l" in Pitot tube is typical one which is our standard. The dimension may change depending on your pipes or sockets. In such case please check "D" and "L" in the figure at the end of this document and the kind of pipe, and then contact us.

| CFW12□□-□□□-20-B, CFW14□□-□□□-□0-B |                      |  |
|------------------------------------|----------------------|--|
| No.                                | Parts name           | Material                                   |
| ①                                  | Tapered tube         | Heat-resistant glass                       |
| ②                                  | Float                | Titanium                                   |
| ③                                  | Upper body           | SCS14                                      |
|                                    | Lower body           | (CFW1200) SCS14/CAC406<br>(CFW1400) CAC406 |
| ④                                  | Strainer             | SUS316                                     |
| ⑤                                  | O ring               | NBR  |
| ⑥                                  | Sight glass          | Acryl                                      |
| ⑦                                  | Cap                  | SUS316                                     |
| ⑧                                  | Air elimination plug | SUS316                                     |
| ⑨                                  | Cap nut              | SCS13                                      |
| ⑩                                  | Cover                | SUS304                                     |
| ⑪                                  | Fitting              | SCS14*1                                    |
| ⑫                                  | Pitot tube           | SUS316                                     |
| ⑬                                  | Valve                | SCS14                                      |
|                                    | Axis                 | SUS316                                     |
|                                    | O ring               | NBR  |
| ⑭                                  | Socket               | SS400*2                                    |
| ⑮                                  | Three-way socket     | FCMB*3                                     |
| ⑯                                  | Handle               | SUS304                                     |

- \*1 CAC406 is available as the material of fitting on request. Optional code :/BC6
- \*2 The socket made of SS400 is supplied as an accessory upon request. The socket made of other than SS400 is supplied by the customers.
- \*3 For the 1MPa class, three-way socket is supplied upon request. Its material other than FCMB is provided by customers. For the 2 MPa class, the part made of proper material such as S25C is selected and provided by customers considering pipe sch40.

- ⑭ Socket (Model code :/CFS)  
40 mm or more, common to 1 and 2 MPa classes
- ⑮ Three-way socket (Model code :/CFT)  
20 to 32 mm, only for 1 MPa class



Length of Pitot tube "l"

| Size   | *4  | *5  |
|--------|-----|-----|
| 20 mm  | 30  | /   |
| 25 mm  | 32  | /   |
| 32 mm  | 42  | 65  |
| 40 mm  | 63  | 70  |
| 50 mm  | 69  | 76  |
| 65 mm  | 79  | 88  |
| 80 mm  | 88  | 98  |
| 100 mm | 102 | 115 |
| 125 mm | 117 | 131 |
| 150 mm | 133 | 148 |
| 200 mm | 98  | /   |
| 250 mm | 113 | /   |
| 300 mm | 128 | /   |
| 350 mm | 135 | /   |
| 400 mm | 151 | /   |
| 450 mm | 166 | /   |

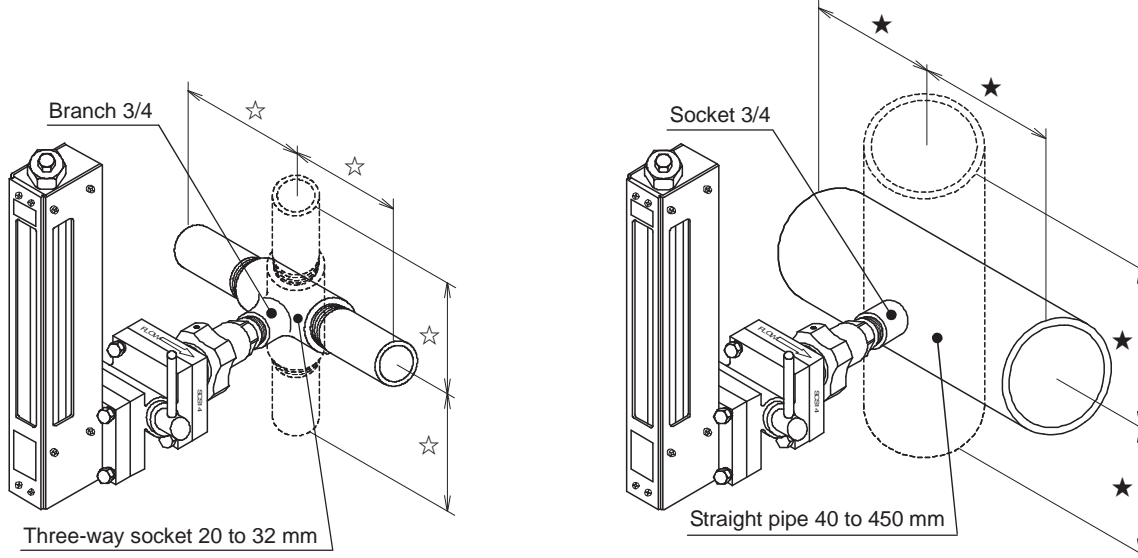
Dimensions of three-way socket (JIS B 2301)

| Size  | d      | A  | B  |
|-------|--------|----|----|
| 20 mm | Rc3/4  | 33 | 33 |
| 25 mm | Rc1    | 35 | 36 |
| 32 mm | Rc11/4 | 36 | 41 |

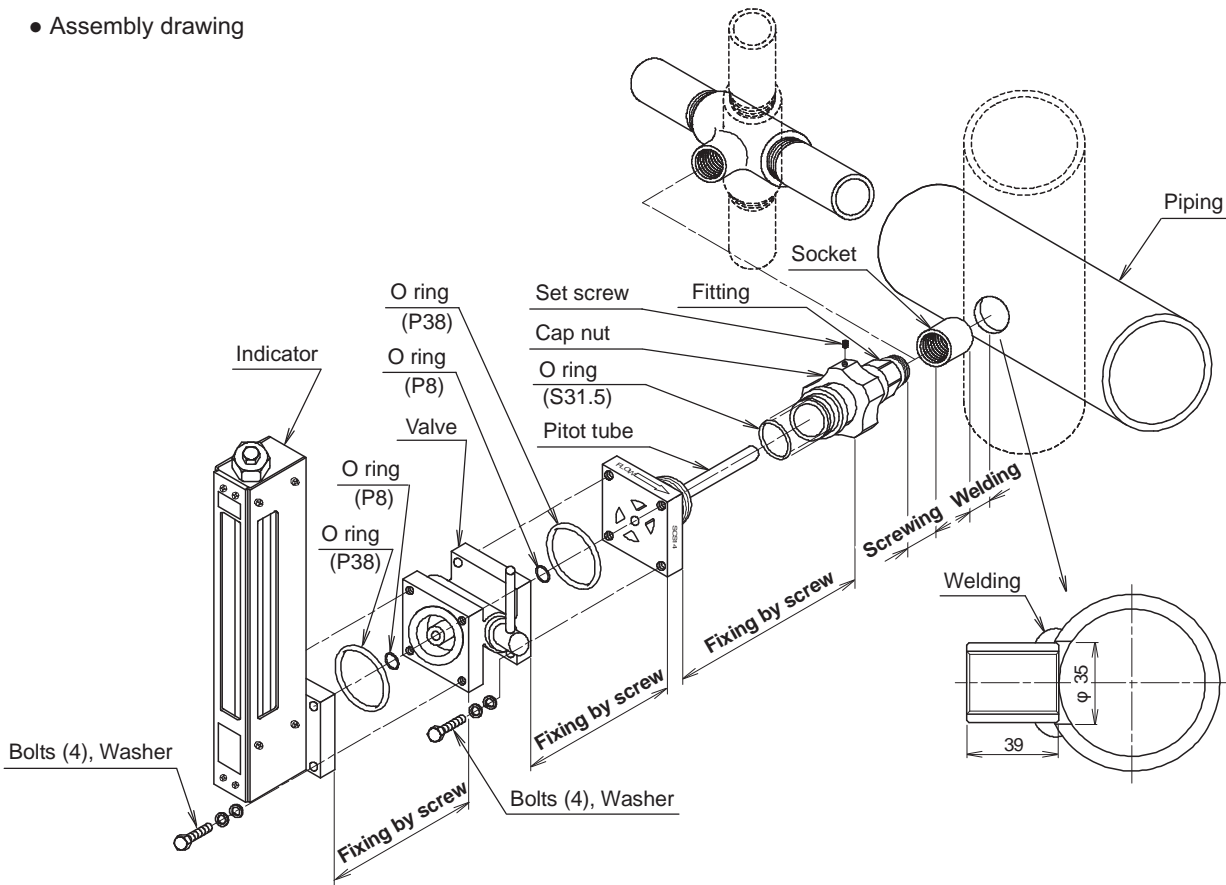
- \*4 For SGP and STPG pipes
- \*5 For PVC lining pipes

INSTALLATION, STRAIGHT RUNS AND ASSEMBLY DRAWING

- Horizontal installation: CFW12□□-□□□-10-A



- Assembly drawing



- Installation

1) Keep the upstream and downstream straight runs as follows.

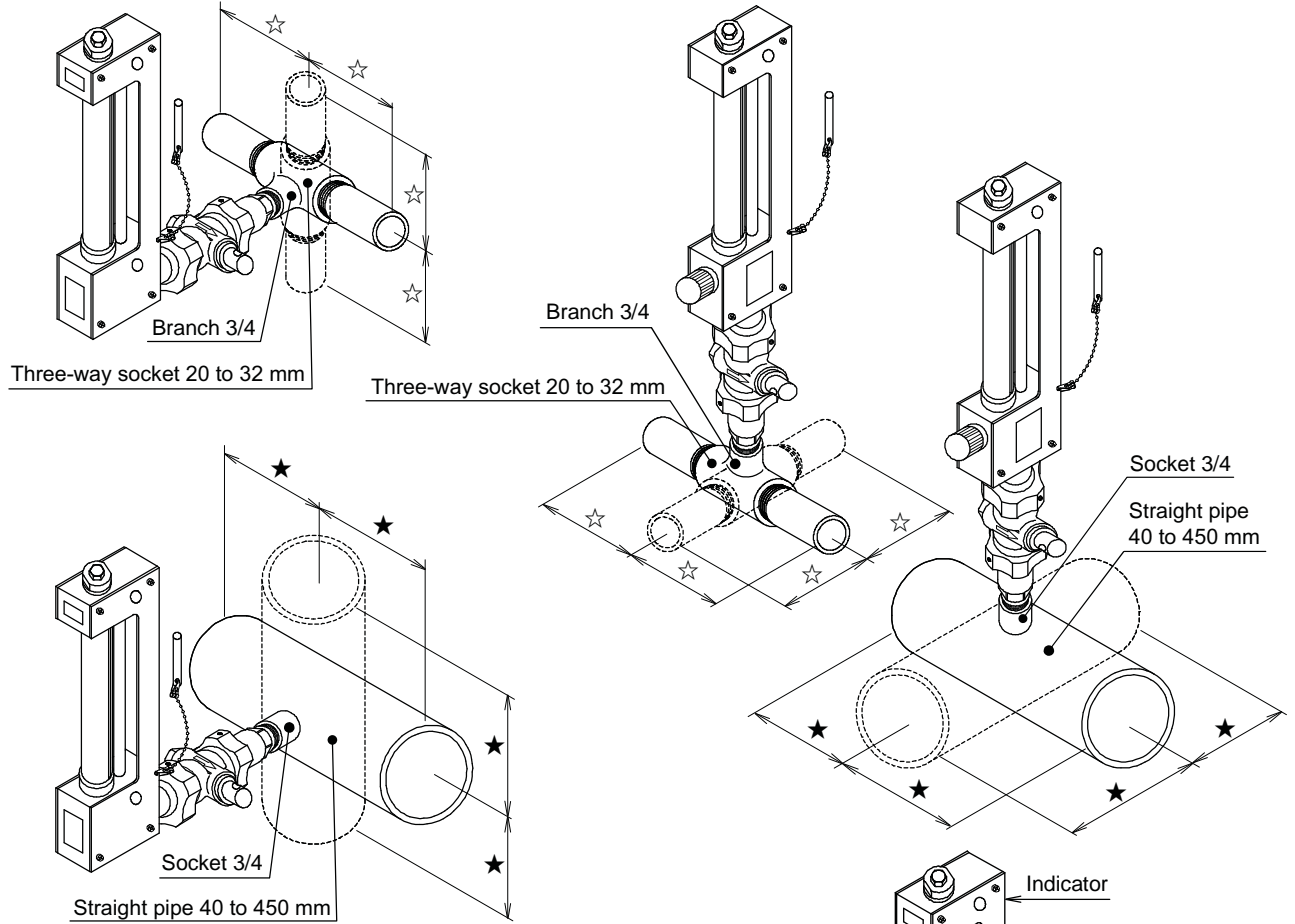
| Pipe size         | Upstream    | Downstream |
|-------------------|-------------|------------|
| 32 mm or less (☆) | 10D or more | 5D or more |
| 40 mm or more (★) | 5D or more  | 3D or more |

Note : D is the inside diameter of main pipe.

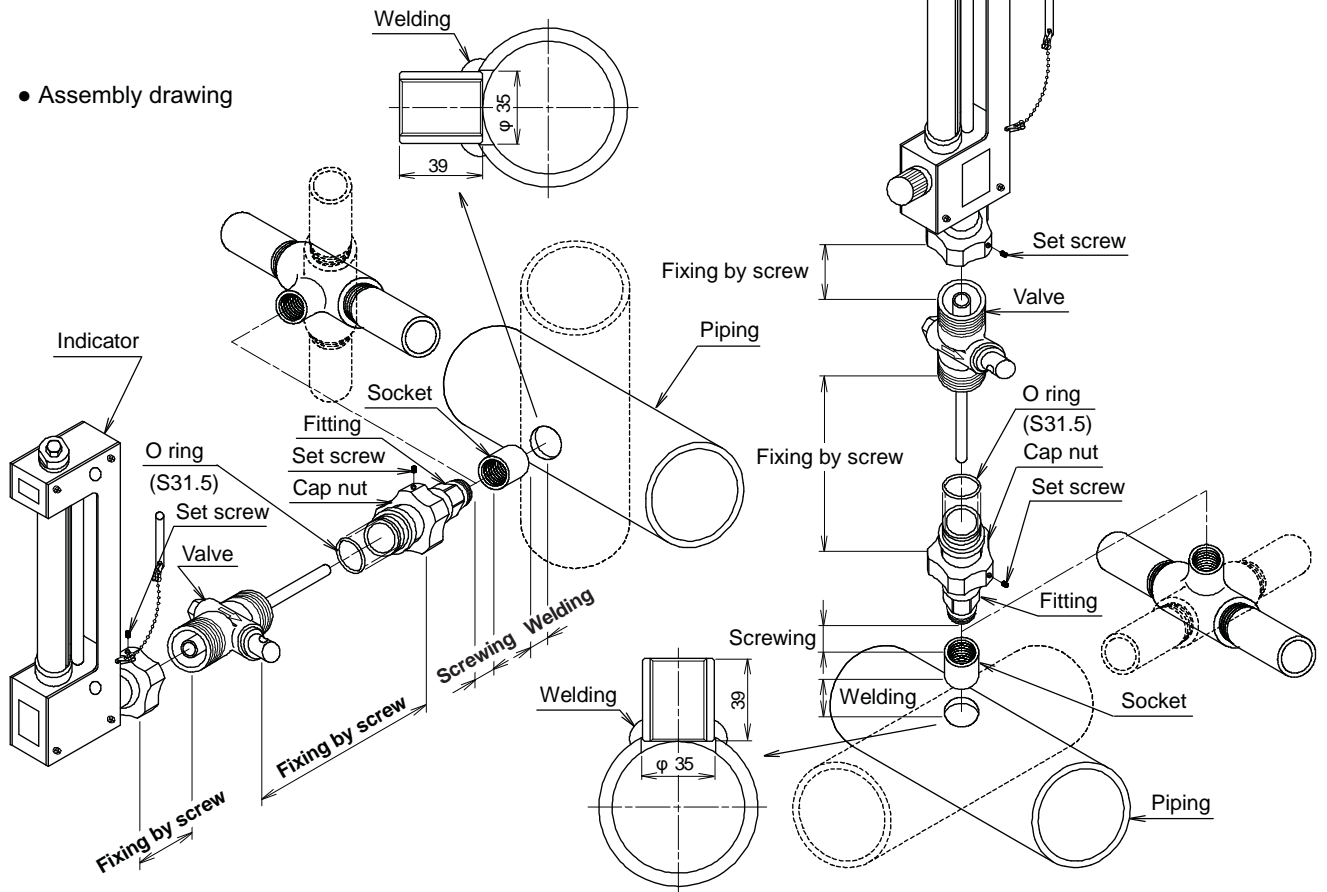
- 2) To install the flowmeters, drill a hole of 35mm diameter into the pipe having more than or equal to 40mm diameter. Use the three-way socket for the pipe having 20 to 32 mm diameter. Select and drill the hole at right place so that the final fixed posture of tapered tube should be vertical.
- 3) Weld the socket to the drilled hole. The centerline of the socket must be perpendicular to the one of the pipe.
- 4) Screw the CFW1000 into the welded socket to complete the installation.

• Horizontal installation: CFW12□□-□□□-20-B

• Vertical installation: CFW14□□-□□□-□0-B



• Assembly drawing

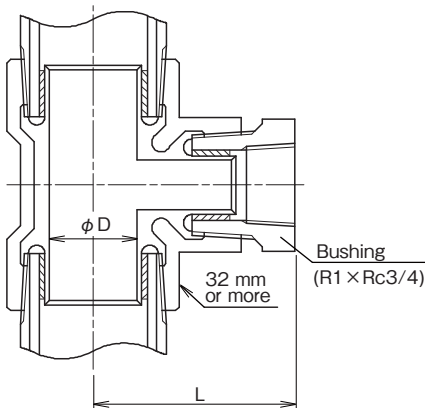


## SUGGESTIONS

- ❑ The model CFW1 □□□ - □□□ -10 flowmeter is calibrated based on the inside diameter of JIS G3452 SGP. The model CFW1 □□□ - □□□ -20 flowmeter is calibrated on JIS G3454 STPG Sch.40. If pipes are different from above, consult TOKYO KEISO. Specific calibration is required.
- ❑ Run the fluid fully in the pipe. Otherwise it could not be measured.

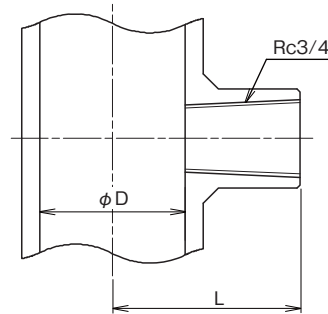
## LINING PIPING

- ❑ Only scale range 2 is available for the pipe lined with PVC. The flow rate is based on when the flow runs through the inside diameter of the pipe which consists of a tee joint of the Eslo coat LX made by Sekisui Chemical Co.'s Eslon®. If you use other fittings, additional calibration is needed. Please check "D" and "L" in the drawing below and contact us.
- ❑ When the main pipe size is between 32 mm and 150 mm, provide either one of the following tee joint and bushing assembly to make the connection size 20 mm:
  - A tee joint with 25 mm in branch line + A bushing with 25 mm x 20 mm
  - A tee joint with larger than 25 mm in branch line + One or more bushings in series to make the final connection size 20 mm
 For further consultation inform us of the dimension "L" in the following drawing.



## OTHER PIPING

- ❑ Available for other piping. Consult factory for details. Inform of the type of piping and dimension of "L" and "D" of the following figure.



## ORDERING INFORMATION

- ❑ Inform us the kind of your pipe and installation method when inquiring or ordering the flowmeter.

## CAUTIONS ON USING CFW1000 SERIES



This flowmeter has a glass tube which is subject to the pressure from the piping. Avoid the use of CFW1000 Series for the following services.

1. Liquid services subject to impulse pressure in the process.
2. Secondary accidents might occur due to the breakage of glass in such services :
  - Toxic fluids such as poisons, stimulant and narcotics
  - Flammable fluids
  - Explosive fluids
3. Any services where scattering of glass fragments might cause a serious injury.
4. The installation places of the flowmeters where breakage of glass might be caused by the accidents from the surrounding piping or equipment.
5. On-off operation where breakage of glass might be caused by the collision of the float inside meter due to the abrupt change of flow.
6. Services where the heat shock by abrupt change of temperature.

\* Specification is subject to change without notice.

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