

C SERIES FLOWMETER WITH CONSTANT FLOW VALVE

PURGE SET

GENERAL

C series Constant Flow Valves keep flow rate of gases or liquids even when the supply or load pressure changes. Control valve with diaphragm automatically acts following the change of pressure. They are normally delivered together with flowmeter as a "Purge set".

Primary(Inlet) pressure variation control type and Secondary(Outlet) pressure variation control type are ready to meet all possible applications.



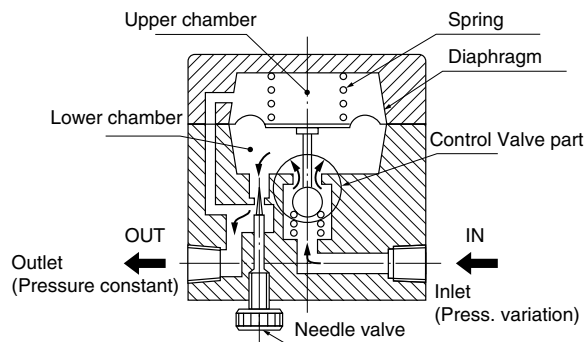
LINEUP

| Type | C-11 P ₁ (INLET) Variation C-12 P ₂ (OUTLET) Variation | C-21 P ₁ (INLET) Variation C-22 P ₂ (OUTLET) Variation | C-31 P ₁ (INLET) Variation C-32 P ₂ (OUTLET) Variation | C-41 P ₁ (INLET) Variation C-42 P ₂ (OUTLET) Variation |
|---|---|---|---|---|
| Applicable Fluid | Gases only | Gases and liquids | Gases and liquids | Gases and liquids |
| Max.Process Press {MPa (kgf/cm ²)} | 0.7 (7) | 1 (10) | 0.8 (8) | 0.8 (8) |
| Max.Process Temp (°C) | 120 | 120 | 120 | 120 |
| Controllable Dp range {MPa (kgf/cm ²)} | C-11 0.03~0.3 (0.3~3) C-12 0.05~0.3 (0.5~3) | 0.06~0.4 (0.6~4.0) | 0.1~0.5 (1.0~5.0) | 0.1~0.6 (1.0~6.0) |
| Control Accuracy (%F.S.) | ±3 | ±5 | ±5 | ±5 |
| Process connection | Rc 1/8 thread | Rc 1/4 thread | Rc 3/8 thread | Rc 1/2 thread |
| Approx. Weight (kg) | 0.2 | 0.9 | 2.3 | 8.0 |

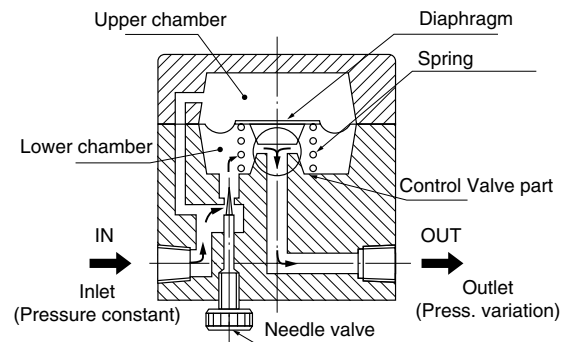
OPERATION PRINCIPLE

In the PRIMARY (INLET) PRESSURE VARIATION CONTROL TYPE, the fluid, of which inlet pressure varies, is introduced from IN to the lower chamber of the C series Constant Flow Valve. The load pressure (Secondary pressure) is connected to the upper chamber.

The differential pressure between the lower chamber and the upper chamber is always constant thanks to the function of the Spring and the Diaphragm. The differential pressure across the needle valve is kept always constant and the flow rate of the fluid is proportional only to the opening of needle valve. The opposite action is taken for SECONDARY (OUTLET) PRESSURE VARIATION CONTROL TYPE and the flow rate is kept also constant even when the load pressure changes.

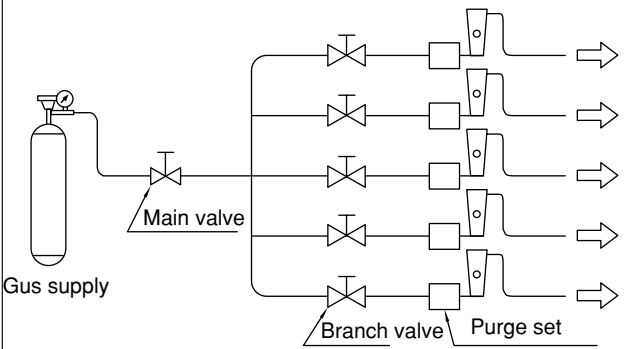
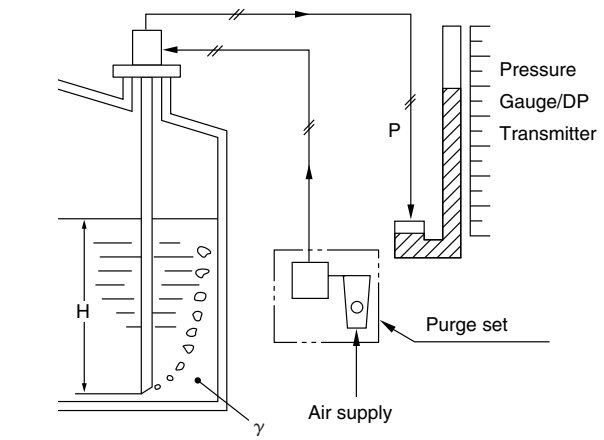
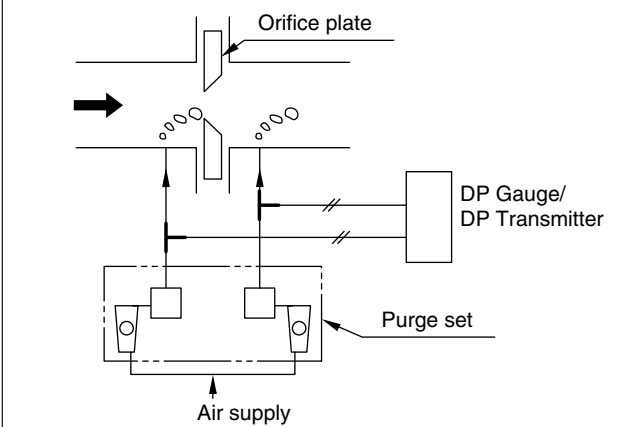
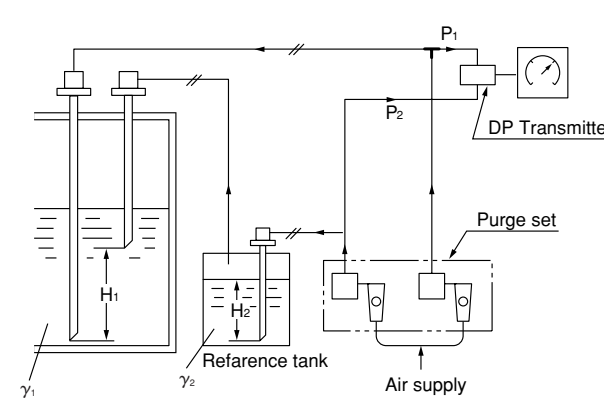


PRIMARY (INLET) PRESSURE VARIATION CONTROL TYPE (C-□1)



SECONDARY (OUTLET) PRESSURE VARIATION CONTROL TYPE (C-□2)

APPLICATIONS

| | |
|---|--|
| <div>● SUPPLY PRESSURE VARIATION</div> <div><p>Gas supply</p><p>Main valve</p><p>Branch valve</p><p>Purge set</p></div> <div>As shown above, in case one large supply line branches into several lines and the supply pressure changes because of stoppage of some branches. Primary Pressure Variation type Purge set will be suitable in keeping the purging volume of fluid.</div> <div>Recommended Model of Purgeset: CP-1-1111</div> | <div>● LEVEL MEASUREMENT</div> <div><p>Pressure Gauge/DP Transmitter</p><p>P</p><p>Purge set</p><p>Air supply</p><p>γ</p><p>H</p></div> <div>Liquid level in tanks is measured by the Back-pressure at the edge of purging pipe. The outlet pressure at the tank bottom changes depending on the liquid level, and constant bubbling is required. Thus, Secondary Pressure Variation type purge set is used for this application. A Dp transmitter is often connected to pressure line instead of pressure gauge for remote transmission.</div> <div>Recommended Model of Purgeset: CP-2-1111, CP-22-100-B</div> |
| <div>● PURGING FOR ORIFICE PLATE APPLICATION</div> <div><p>Orifice plate</p><p>DP Gauge/DP Transmitter</p><p>Purge set</p><p>Air supply</p></div> <div>For the measurement of flow rate of corrosive liquids and/or liquids with solids by orifice plate, an equal pressure purging both to Hi and Lo pressure parts so as not to introduce liquid and/or solids into Dp bypass line. Dual mount type purge set used.</div> <div>Recommended Model of Purgeset: CP-221-2A</div> | <div>● DENSITY MEASUREMENT</div> <div><p>P1</p><p>P2</p><p>DP Transmitter</p><p>Purge set</p><p>Air supply</p><p>Reference tank</p><p>γ_1</p><p>γ_2</p><p>H1</p><p>H2</p></div> <div>For continuous measurement of density of liquid in tanks, Air purging system is used as shown above.</div> <div>Recommended Model of Purgeset: CP-221-2A</div> |

C-1 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-11 INLET PRESSURE VARIATION CONTROL TYPE

C-12 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

| | |
|----------------------|---------------------------------------|
| GASES | : Max. 3L/min (nor) *1 |
| MAX.OP.PRESS. | : 0.7MPa (7kg/cm ² G) |
| TEMP. | : Max. 120°C |
| Min. Required DP | : 0.03MPa (0.3kg/cm ²) *2 |
| Max. Controllable DP | : 0.3MPa (3kg/cm ²) |
| CONTROL ACCURACY | : ±3%(F.S.) |

MATERIAL CONSTRUCTION :

| PART NAME | MATERIAL | |
|-----------|----------|------------------|
| | STANDARD | OPTION |
| BODY | SUS304 | Aluminum, SUS316 |
| DIAPHRAGM | CR | VITON |
| SPRING | SUS304 | SUS316 |
| SEAL | NBR | VITON |

STANDARD PROCESS CONNECTION : Rc1/8 Thread

*1: Air, 0°C, 1atm

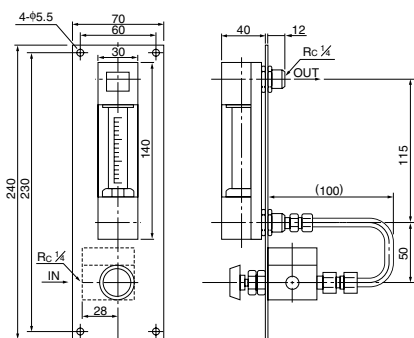
*2: 0.05MPa (0.5kg/cm²) for **C-12** version

● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

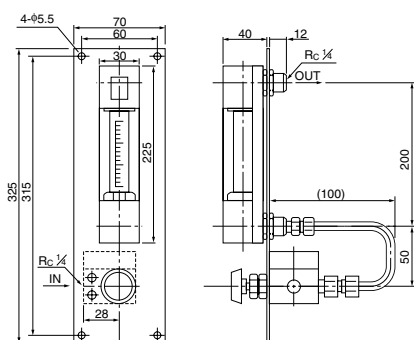
CP-11-100

Possible Scale Ranges as PURGE SET
Air (0°C, 1atm) Min. 10~100mL/min (nor)
Max. 0.3~3L/min (nor)

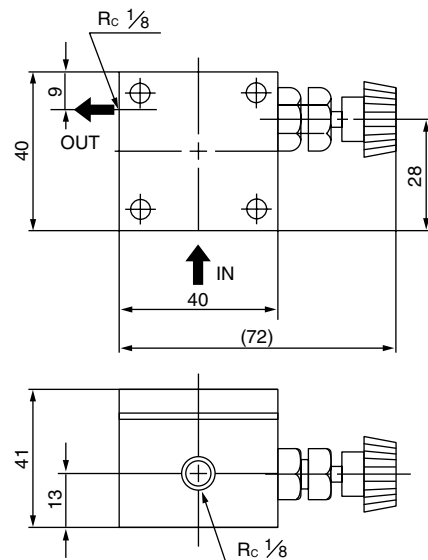


CP-11-200

Possible Scale Ranges as PURGE SET
Air (0°C, 1atm) Min. 10~100mL/min (nor)
Max. 0.3~3L/min (nor)



● DIMENTION OF CONSTANT FLOW VALVE UNIT



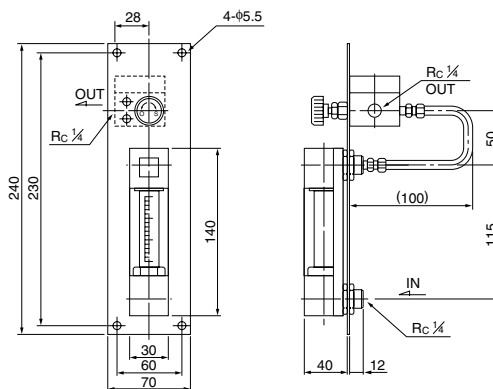
The above figure shows Type C-11 which is the primary pressure fluctuation type.

For Type C-12 of the secondary pressure fluctuation type, the direction of "IN" and "OUT" gets reverse, and the height shall be 35mm instead of 41mm.

OUTLET PRESSURE VARIATION CONTROL TYPE

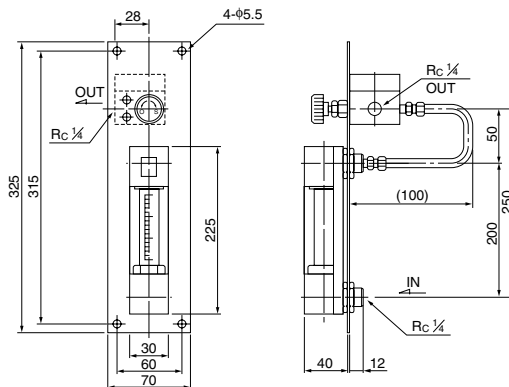
CP-12-100

Possible Scale Ranges as PURGE SET
Air (0°C, 1atm) Min. 10~100mL/min (nor)
Max. 0.3~3L/min (nor)



CP-12-200

Possible Scale Ranges as PURGE SET
Air (0°C, 1atm) Min. 10~100mL/min (nor)
Max. 0.3~3L/min (nor)



C-2 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-21 INLET PRESSURE VARIATION CONTROL TYPE**C-22** OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS : Max. 2L/min. *1

GASES : Max. 50L/min (nor) *2

MAX.OP.PRESS. : 1MPa (10kg/cm²G)

TEMP. : Max. 120°C

Min. Required DP : 0.06MPa (0.6kg/cm²)Max. Controllable DP : 0.4MPa (4kg/cm²)

CONTROL ACCURACY : ±5%(F.S.)

MATERIAL CONSTRUCTION :

| PART NAME | MATERIAL | |
|-----------|----------|--------|
| | STANDARD | OPTION |
| BODY | SCS14 | - |
| DIAPHRAGM | CR | VITON |
| SPRING | SUS304 | SUS316 |
| SEAL | NBR | VITON |

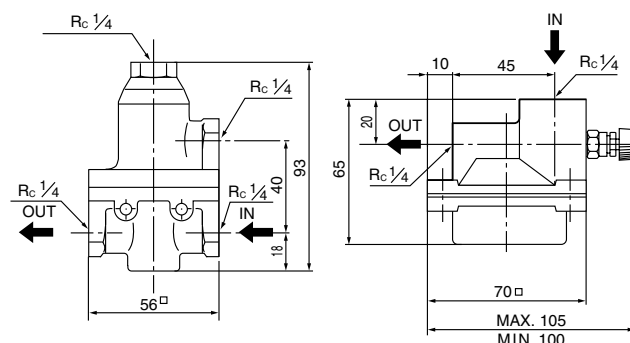
STANDARD PROCESS CONNECTION : Rc1/4 Thread

*1: Water (Density 1.0g/cm³, Viscosity 1.0cP)

*2: Air, 0°C, 1atm

● DIMENTION OF CONSTANT FLOW VALVE UNIT

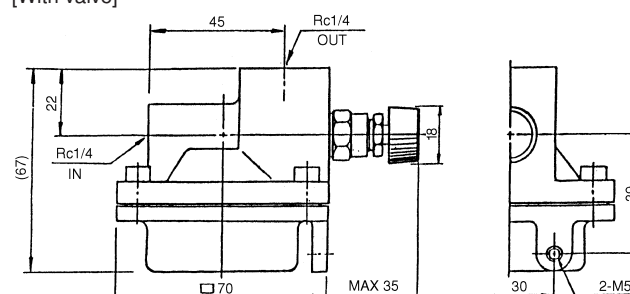
[Without valve]



C-21 TYPE

C-22 TYPE

[With valve]



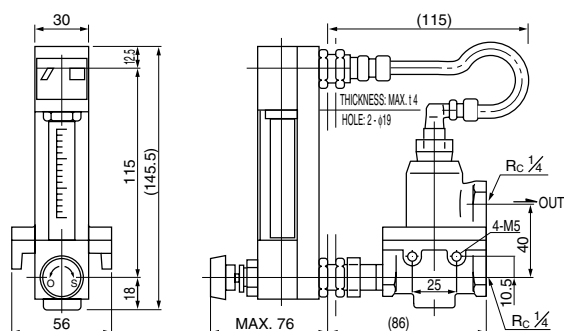
C-21 TYPE

● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE (Also used for OUTLET PRESSURE VARIATION in liquid applications)

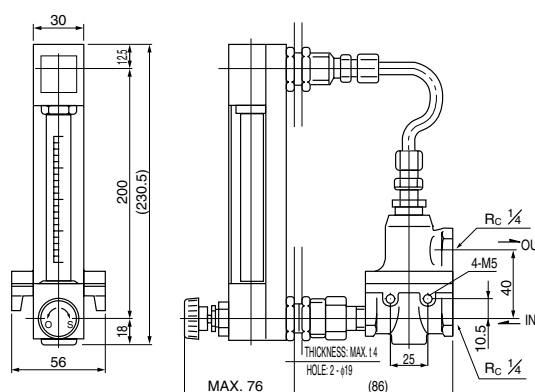
CP-21-100

Possible Scale Ranges as PURGE SET
 Water Min.0.003~0.03L/min.
 Max.0.4~2L/min.
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)



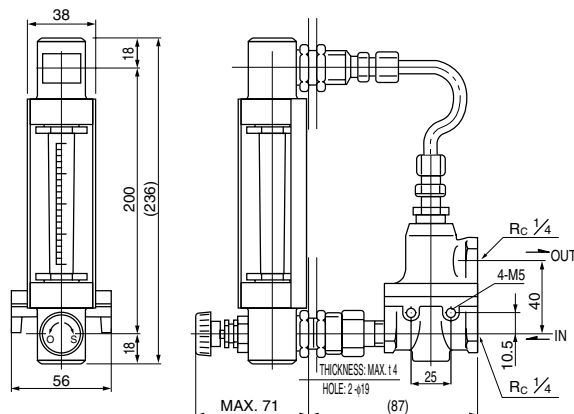
CP-21-200

Possible Scale Ranges as PURGE SET
 Water Min.0.007~0.07L/min.
 Max.0.2~2L/min.
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)

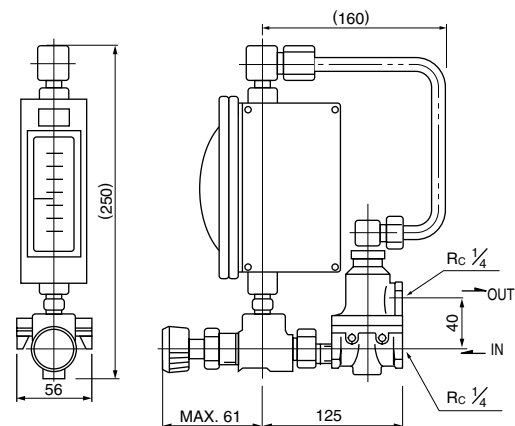


CP-21-400

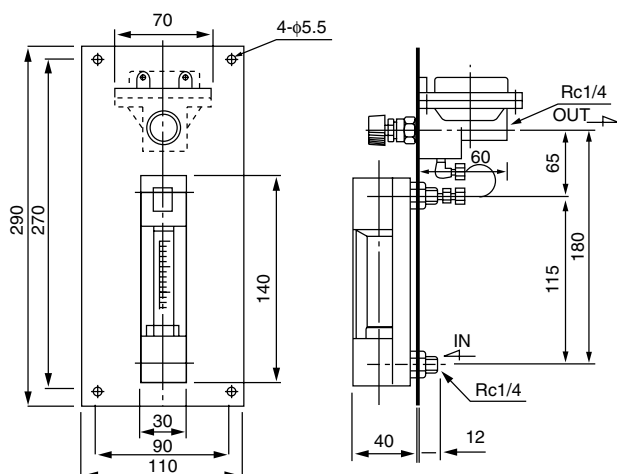
Possible Scale Ranges as PURGE SET
 Water Min.0.007~0.07L/min.
 Max.0.2~2L/min.
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)

**CM-21-900**

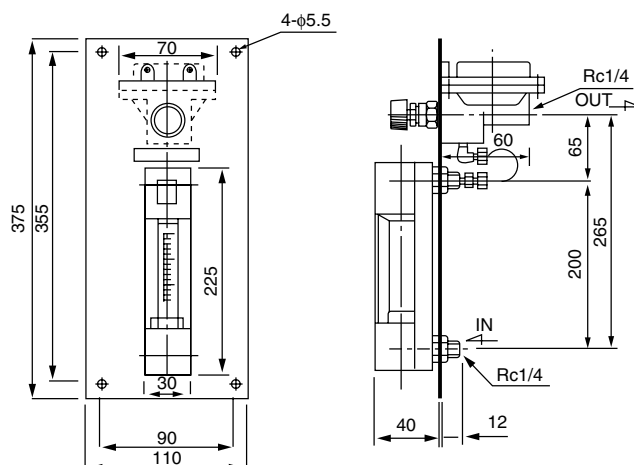
Possible Scale Ranges as PURGE SET
 Water Min.0.008~0.04L/min.
 Max.0.2~2L/min.
 Air Min.0.2~1L/min (nor)
 (0°C,1atm) Max.6~60L/min (nor)

**OUTLET PRESSURE VARIATION CONTROL TYPE****CP-22-100**

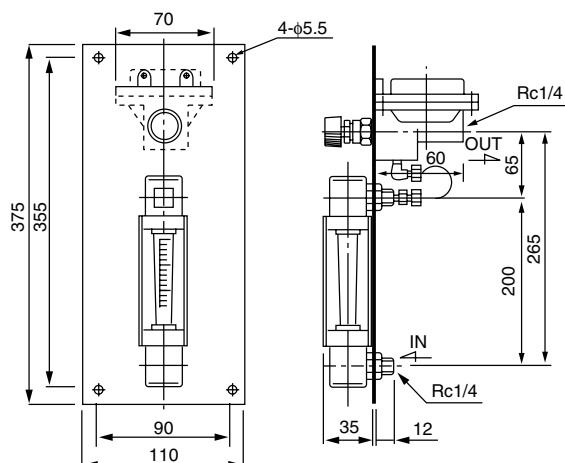
Possible Scale Ranges as PURGE SET
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)

**CP-22-200**

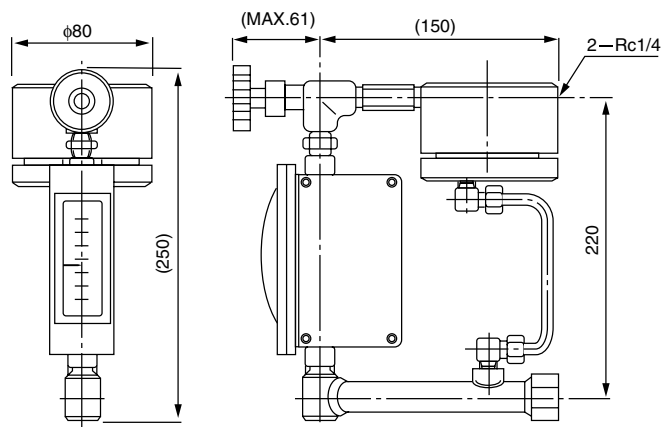
Possible Scale Ranges as PURGE SET
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)

**CP-22-400**

Possible Scale Ranges as PURGE SET
 Air Min.0.1~1L/min (nor)
 (0°C,1atm) Max.5~50L/min (nor)

**CM-22-900**

Possible Scale Ranges as PURGE SET
 Air Min.0.2~1L/min (nor)
 (0°C,1atm) Max.6~60L/min (nor)



C-3 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-31 INLET PRESSURE VARIATION CONTROL TYPE

C-32 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS : Max. 5L/min. *1

GASES : Max. 150L/min (nor) *2

MAX.OP.PRESS. : 0.8MPa (8kg/cm²G)

TEMP. : Max. 120°C

Min. Required DP : 0.1MPa (1.0kg/cm²) *2

Max. Controllable DP : 0.5MPa (5kg/cm²)

CONTROL ACCURACY : ±5%(F.S.)

MATERIAL CONSTRUCTION :

| PART NAME | MATERIAL | |
|-----------|----------|--------|
| | STANDARD | OPTION |
| BODY | SCS14 | |
| DIAPHRAGM | CR | VITON |
| SPRING | SUS304 | SUS316 |
| SEAL | NBR | VITON |

STANDARD PROCESS CONNECTION : Rc3/8Thread

*1: Water (Density 1.0g/cm³, Viscosity 1.0cP)

*2: Air, 0°C, 1atm

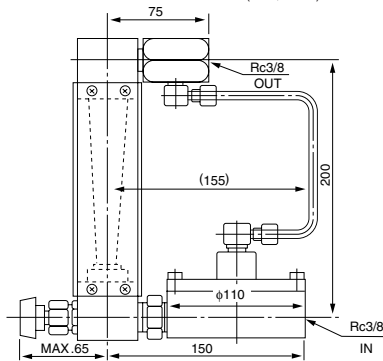
● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

(Also used for OUTLET PRESSURE VARIATION in liquid applications)

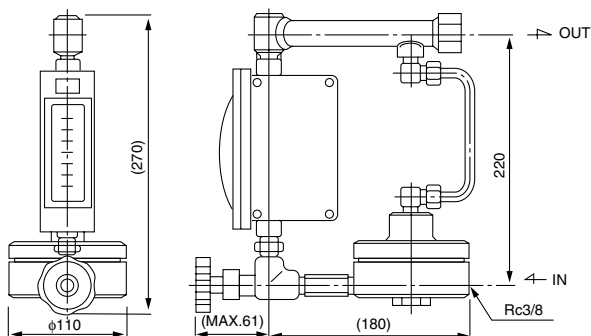
CP-31-500

Possible Scale Ranges as PURGE SET
 Water Min.0.2~2L/min.
 Max.0.5~5L/min.
 Air (0°C,1atm) Min.5~50L/min (nor)
 Max.15~150L/min (nor)

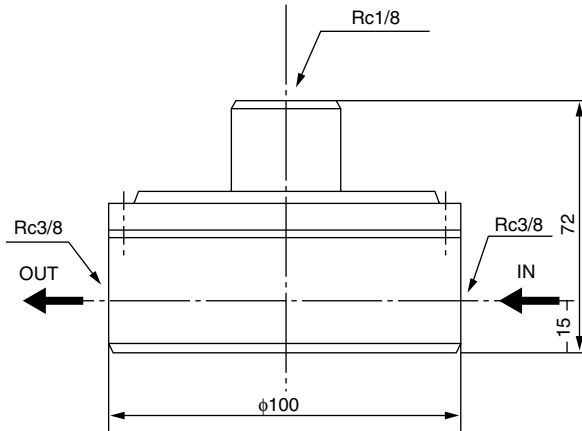


CM-31-900

Possible Scale Ranges as PURGE SET
 Water Min.0.2~2L/min.
 Max.0.5~5L/min.
 Air (0°C,1atm) Min.6~60L/min (nor)
 Max.15~150L/min (nor)



● DIMENTION OF CONSTANT FLOW VALVE UNIT

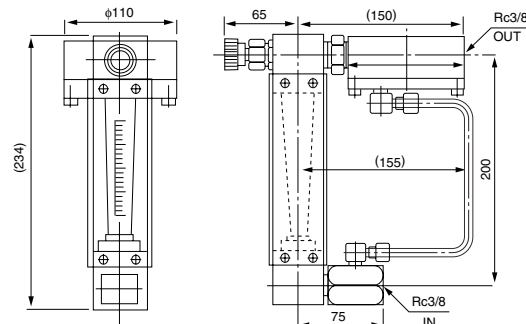


C-31

OUTLET PRESSURE VARIATION CONTROL TYPE

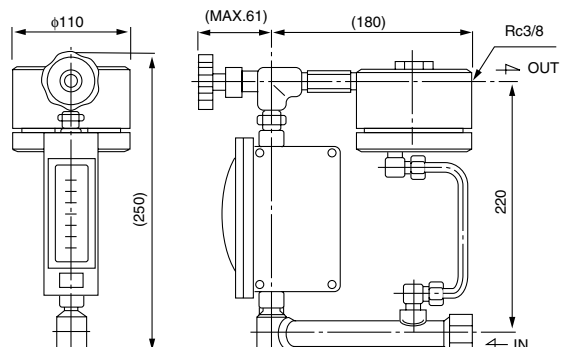
CP-32-500

Possible Scale Ranges as PURGE SET
 Air (0°C,1atm) Min.5~50L/min (nor)
 Max.15~150L/min (nor)



CM-32-900

Possible Scale Ranges as PURGE SET
 Air (0°C,1atm) Min.6~60L/min (nor)
 Max.15~150L/min (nor)



C-4 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-41 INLET PRESSURE VARIATION CONTROL TYPE

C-42 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS : Max. 10L/min. *1

GASES : Max. 300L/min (nor) *2

MAX.OP.PRESS. : 0.8MPa (8kg/cm²G)

TEMP. : Max. 120°C

Min. Required DP : 0.1MPa (1.0kg/cm²)

Max. Controllable DP : 0.6MPa (6kg/cm²)

CONTROL ACCURACY : ±5%(F.S.)

MATERIAL CONSTRUCTION :

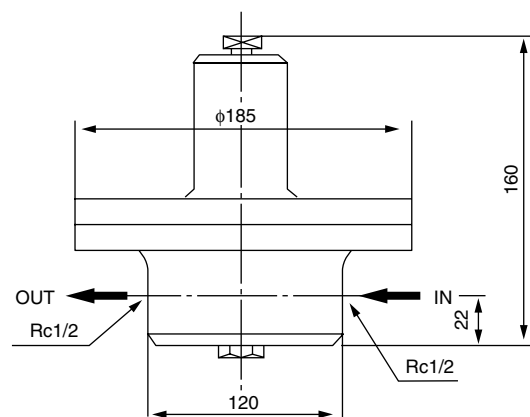
| PART NAME | MATERIAL | |
|-----------|----------|--------|
| | STANDARD | OPTION |
| BODY | SUS304 | SUS316 |
| DIAPHRAGM | CR | VITON |
| SPRING | SUS304 | SUS316 |
| SEAL | NBR | VITON |

STANDARD PROCESS CONNECTION : Rc1/2 Thread

*1: Water (Density 1.0g/cm³, Viscosity 1.0cP)

*2: Air, 0°C, 1atm

● DIMENTION OF CONSTANT FLOW VALVE UNIT



C-41,C-42

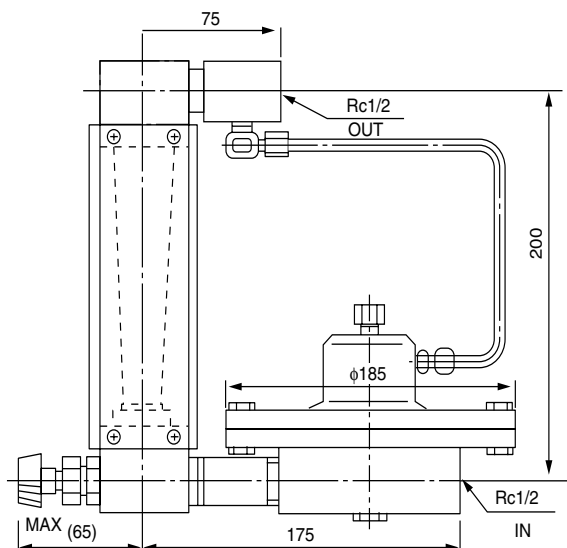
● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

(Also used for OUTLET PRESSURE VARIATION in liquid applications)

CP-41-500

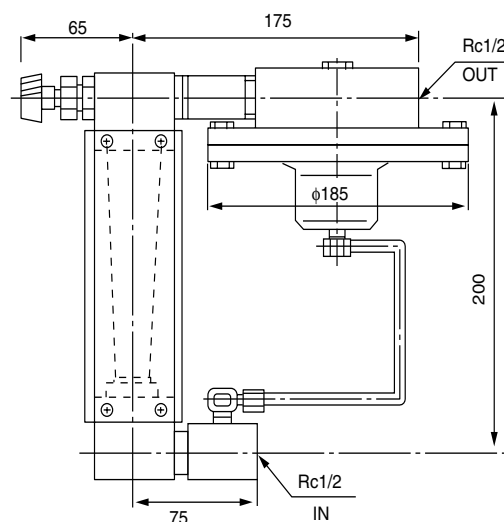
Possible Scale Ranges as PURGE SET
 Water Min.0.5~5L/min.
 Max.1~10L/min.
 Air Min.15~150L/min (nor)
 Max.30~300L/min (nor)
 (0°C,1atm)



OUTLET PRESSURE VARIATION CONTROL TYPE

CP-42-500

Possible Scale Ranges as PURGE SET
 Air Min.15~150L/min (nor)
 Max.30~300L/min (nor)
 (0°C,1atm)



SPECIAL VERSIONS

PANEL MOUNT TYPE CP-221-1AO, U

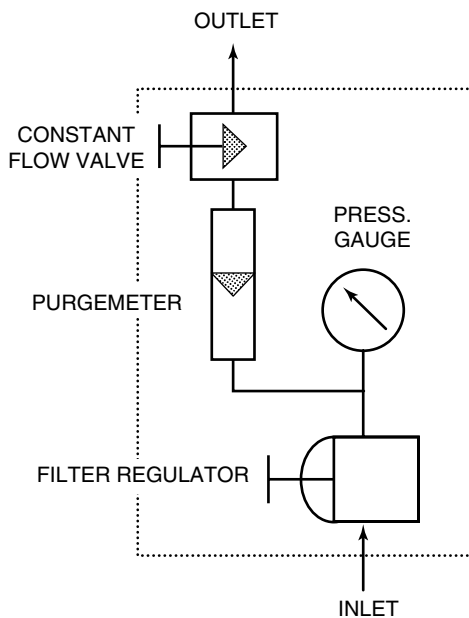
● OUTLINE

This is a combination of ONE purge set, one filter regulator and inlet pressure gauge on one panel board.

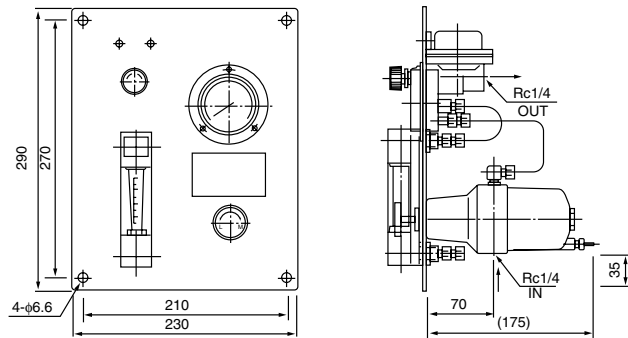
The necessary components for air purging are combined in one panel board that offers easy installation at site.

Stable purging flow is maintained even when the secondary (load) pressure varies.

● BLOCK DIAGRAM OF SYSTEM



● DIMENTION



This is a dimension of CP-221-1AO (Wall/panel mount type.)

U bolt fixture is provided for U bolt installation type of CP-221-1AU.

● STANDARD SPECIFICATION

| | |
|----------------------|---|
| Type | : Secondary pressure variation control type (Single loop) |
| Supply air | : Max. 0.99MPa (9.9kg/cm ² G) |
| Primary press. | : To be adjusted to 0.06MPa (0.6kg/cm ² G) higher than the maximum of secondary press. |
| Secondary press. | : 0.06MPa~ (0.6kg/cm ² G~) |
| Possible scale range | : Min. 0.1~1L/min (nor) Max. 5~50L/min (nor) |
| Indication accuracy | : ±5% F.S. |
| Control accuracy | : ±5% F.S. |
| Process conn. | : Rc 1/4 thread Other threads on request |
| Installation | : Std. Wall/panel mount Opt. U bolt installation type (CP-221-1AU) |

PANEL MOUNT DUAL TYPE CP-221-2AO, U

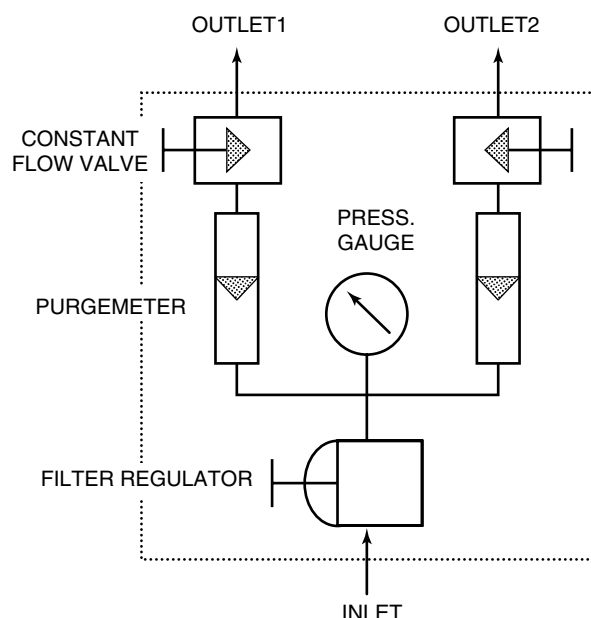
● OUTLINE

This is a combination of TWO purge sets, one filter regulator and inlet pressure gauge on one panel board.

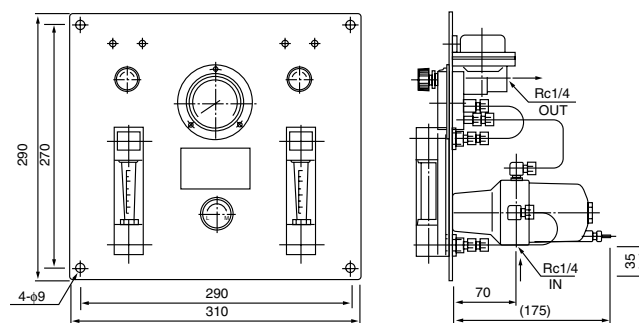
This saves the cost for normal purging process.

This is also widely used for air purging for orifice flow measurement where equal purging pressure to two lines is required.

● BLOCK DIAGRAM OF SYSTEM



● DIMENTION



This is a dimension of CP-221-2AO (Wall/panel mount type.)
U bolt fixture is provided for U bolt installation type of CP-221-2AU.

● STANDARD SPECIFICATION

| | |
|----------------------|---|
| Type | : Secondary pressure variation control type (Dual loop) |
| Supply air | : Max. 0.99MPa (9.9kg/cm ² G) |
| Primary press. | : To be adjusted to 0.06MPa (0.6kg/cm ² G) higher than the maximum of secondary press. |
| Secondary press. | : 0.06MPa~ (0.6kg/cm ² G~) |
| Possible scale range | : Min. 0.1~1L/min (nor) Max. 5~50L/min (nor) |
| Indication accuracy | : ±5% F.S. |
| Control accuracy | : ±5% F.S. |
| Process conn. | : Rc 1/4 thread Other threads on request |
| Installation | : Std. Wall/panel mount Opt. U bolt installation type (CP-221-2AU) |

SPECIAL VERSIONS

AIR PURGING LEVEL MEASUREMENT TYPE (With PGT Purging Pipe) CP-22-100-B

● OUTLINE

This is a combination of purge set, filter regulator, pressure gauges for inlet and outlet and switching valve (Measure/Blow) on one panel board.

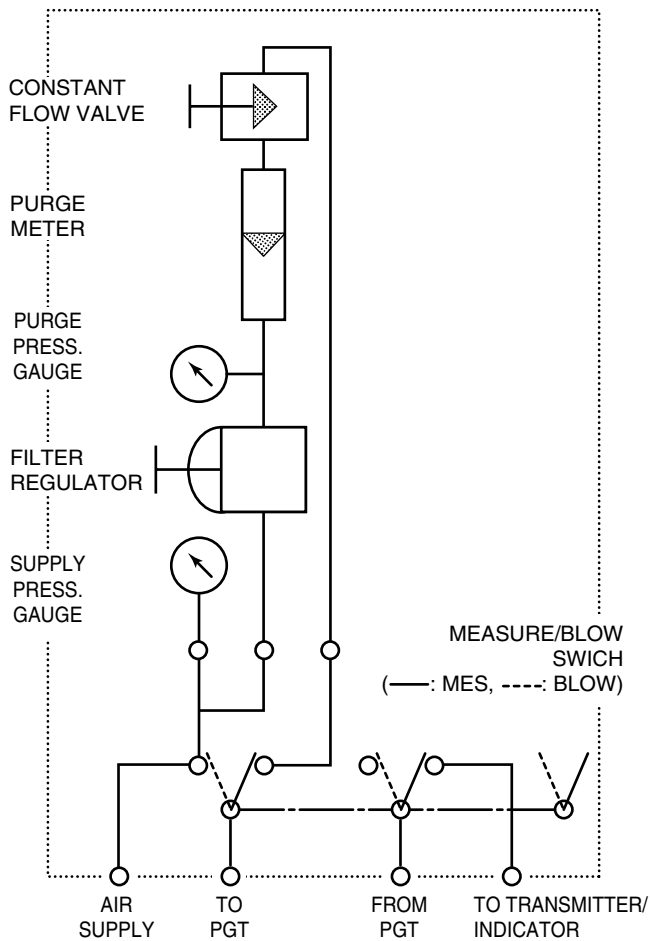
This version is mainly used for liquid level measurement by tank bottom pressure together with PGT type purging pipe.

Supplied air is always bubbled into liquid in tank.

Thus, it is very much suitable for the measurement of level of liquid with solids, particles and very sticky liquids.



● BLOCK DIAGRAM OF SYSTEM



● STANDARD SPECIFICATION

CP-22-100-B Purgeset

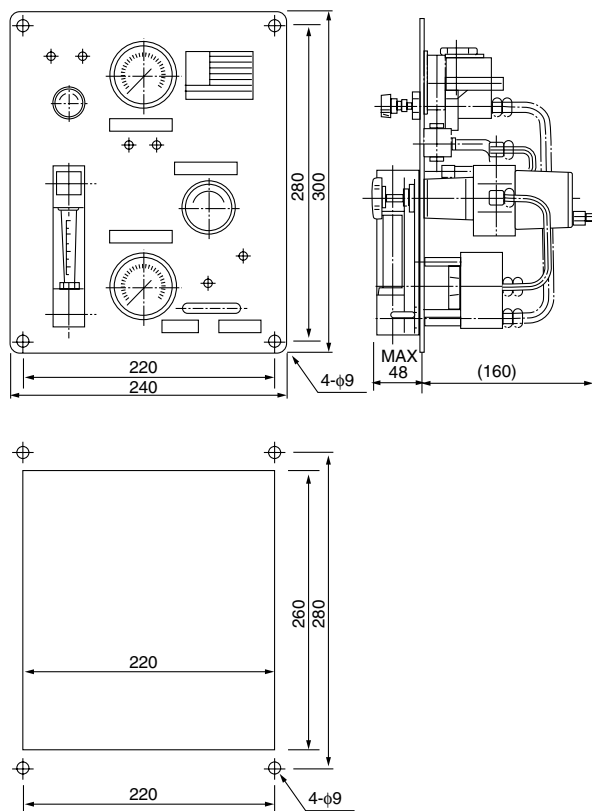
| | |
|---------------------|---|
| Type | : Secondary pressure variation control type |
| Supply air | : 0.3~0.99MPa (3~9.9kg/cm ² G) |
| Primary press. | : To be adjusted to 0.2MPa (2kg/cm ² G) |
| Secondary press. | : 0~0.15MPa (0~1.5kg/cm ² G) (Corresponding to 0~15000mm water level) |
| Calibration | : Air, 20°C, 1atm. |
| Scale range | : 0.12~1.2L/min (std) |
| Indication accuracy | : ±5% F.S. |
| Control accuracy | : ±5% F.S. |
| Process conn. | : Rc 1/4 thread Other threads on request |
| Installation | : Std. Wall/panel mount (Water proof housing on request) |

PGT Purging Pipe

| | |
|----------------------------------|---|
| Available material | : 304SS, 316SS or PVC |
| Pipe size | : |
| Stainless steel | 10, 15, 20 and 25mm |
| PVC | 18 and 26mm |
| Max. Length | : |
| Stainless steel | 16000mm (Pipe will be connected for longer than 4000mm) |
| PVC | 4000mm |
| Process conn. | : |
| Fixed welded flanges | 10mm~25mm Std. JIS 10K flange |
| Adjustable flanges | 15mm~40mm Std. JIS 10K flange |
| Other flange standard on request | |
| Connection of purging | : Std. Rc 1/4 thread Other threads on request |

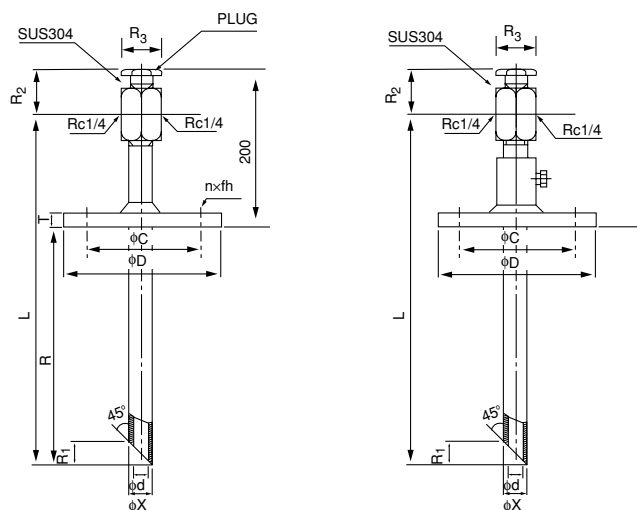
● DIMENSION

CP-22-100-B PURGE SET



PGT PURGING PIPE

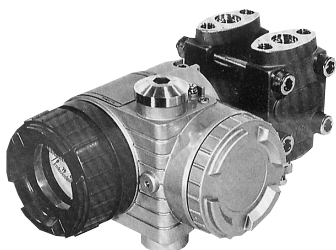
Stainless steel material



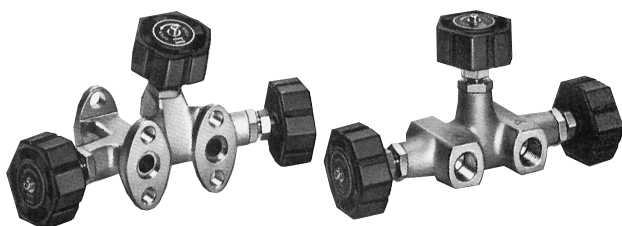
| Tube size (X2) | d | d1 | R1 | R2 | R3 | R4 | D | C | T | E | nXh | Flange std. |
|----------------|------|----|------|----|----|----|-----|-----|----|----|------|-------------|
| 10A (17.3) | 11.3 | 23 | 17.3 | 46 | 32 | 30 | 90 | 65 | 12 | 65 | 4X15 | FW10AJIS10K |
| | | | | | | | 95 | 70 | 12 | 65 | 4X15 | FS15AJIS10K |
| 15A (21.7) | 15.7 | 27 | 21.7 | 46 | 32 | 35 | 95 | 70 | 12 | 65 | 4X15 | FW15AJIS10K |
| | | | | | | | 100 | 75 | 14 | 65 | 4X15 | FS20AJIS10K |
| 20A (27.2) | 21.2 | 33 | 27.2 | 39 | 41 | 40 | 100 | 75 | 14 | 65 | 4X15 | FW20AJIS10K |
| | | | | | | | 125 | 90 | 14 | 65 | 4X19 | FS25AJIS10K |
| 25A (34) | 28 | 41 | 34 | 39 | 41 | 45 | 125 | 90 | 14 | 65 | 4X19 | FW25AJIS10K |
| | | | | | | | 140 | 105 | 16 | 65 | 4X19 | FS40AJIS10K |

● OPTION DEVICES

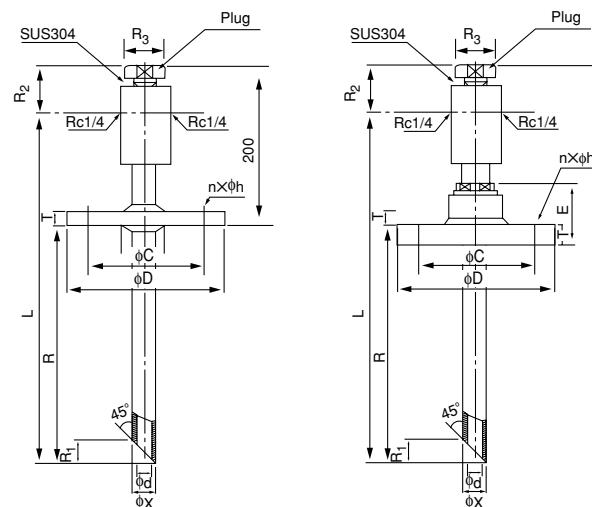
FCX DIFFERENTIAL PRESSURE TRANSMITTER



3 WAY VALVE



PVC material



| Tube size (φX) | d | d1 | R1 | R2 | R3 | R4 | D | C | T | E | F | nXh | Flange std. |
|-------------------|----|----|----|----|----|----|-----|-----|----|----|------|-------------|-------------|
| 18A (18) | 13 | 26 | 18 | 46 | 32 | 50 | 90 | 65 | 17 | 24 | 4X15 | FW10AJIS10K | |
| | | | | | | | 125 | 90 | 14 | | | | 46 |
| 26A (26) | 20 | 34 | 26 | 45 | 41 | 50 | 100 | 75 | 20 | 32 | 4X15 | FW20AJIS10K | |
| | | | | | | | 140 | 105 | 16 | | | | 46 |

* Specification is subject to change without notice.

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