



# TECHNICAL GUIDANCE

**MOST COST EFFECTIVE FLOW MEASUREMENT**

## O-1000 series

**ORIFLO METER**

### GENERAL

**O-1000** series ORIFLO METER is a flow meter consisting of an orifice plate and a metal tube variable area flow meter. Since the flow rate is measured with a "small sized" flow meter set to a by-pass pipes, the flow measurement even for "large sized" lines can be economically conducted. In addition to the local indication type, different types of outputs such as pneumatic and electric ones alarm contact as well as integration function are all available to meet various requirements.

### STANDARD SPECIFICATIONS

Detection type : Bypassed orifice type  
Measurable fluids : Liquids (viscosity: up to 3mPa·s) and Gases  
(Not suitable for slurry and steam)

Available tapping and sizes :

- |                                   |                      |
|-----------------------------------|----------------------|
| 1) 1D · 1/2D tap                  | 100mm(4B)~500mm(20B) |
| (□□-O-1□□□-□P)                    |                      |
| 2) Corner tap (with Orifice ring) | 50mm(2B)~500mm(20B)  |
| (□□-O-1□□□-□C)                    |                      |
| 3) Flange tap                     | 50mm(2B)~500mm(20B)  |
| (□□-O-1□□□-□F)                    |                      |
| 4) Vena tap                       | 200mm(8B)~500mm(20B) |
| (□□-O-1□□□-□V)                    |                      |

Note:550mm (22B) or more of can be supplied on request.

Temperature of liquid : -20~+200°C

Maximum usable pressure :

"Standard" ,

in case of liquid temperature of 120°C or less : 1.4MPa

in case of liquid temperature of more than  
120°C to 200°C : 1.2MPa

Maximum Dp : For liquids, 40kPa or 60kPa  
For gases, 40kPa or 60kPa

Accuracy : ± 3%(F.S.)

(Local indication)

Range ability : 40kPa; 10 : 2.5  
60kPa; 10 : 2

### TYPES AND FUNCTION

1) Local Indication only

O-140□-□□ type

2) Local Indication+Pneumatic output

O-13□-□□ type

Supply pressure : 1.4MPa

Output : 20~100kPa

Connection : Rc1/4 (air set optionally available)



3) Local indication+Electric output

□□-O-152□-□□ type

Supply voltage : DC24V (2 wire type)

Output signal : DC4~20mA

Max. load resistance : 600Ω at DC24V

Connection : G1/2

Enclosure : Water tight, equivalent to IP54,  
pressure tight Ex-proof (d2G4) or  
intrinsically safe explosion proof (Exib  
II C, T5, T6)

4) Local indication+integration+Scaled pulse output

□□-O-169□-□□ type

Integration : 6 digit, with reset.

Count : 50~2000c/h

Pulse output : Open collector output

Power supply : AC100V, 50/60Hz

Connection : G1/2

Enclosure : Watertight, equivalent to IP54, or  
Pressure tight Ex-proof (d2G4)

5) Local Indication+Alarm contact

□□-O-174□-□□ type

Alarm points : 1 or 2 points

Contact : SPDT micro switch

Capacity : AC125/250V, 5A (resistance loaded)

Connection : G1/2

Enclosure : Watertight, equivalent to IP54, or  
pressure tight Ex-proof (d2G4) or  
intrinsically safe explosion proof  
(i3nG5, intrinsically safe relay installed  
separately)

Material : Refer to ■ Material and Scope of supply.

MODEL CODE

		-	O-1			-		DESCRIPTION
Enclosure	E	P						Water tight
								Pressure tight ex-proof *1
	I	S						Intrinsically safe ex-proof *2
Features			4	0				Local Indication only
			3	1				Local Indication + Pneumatic output
			5	2				Local Indication + Electric output
			6	9				Local Indication + Integrated + Scale pulse output
			7	4				Local Indication + Alarm contact output
Flow directions of main pipes			1	-				Bottom to Top
			6	-				Left to right
			7	-				Right to Left
			8	-				Top to bottom
Position of indicator						A		Above main pipes
						B		Below main pipes
Tapping						P		1D · 1/2D tap
						C		Corner tap (with orifice ring)
						F		Flange tap
						V		Vena tap

\*1: Pressure tight explosion proof types:

The following are available.

EP-O-152□-□□

EP-O-169□-□□

EP-O-174□-□□

\*2: Intrinsically safe explosion proof type:

The following are available.

IS-O-174□-□□

POSSIBLE SCALE RANGES FOR LINE SIZES

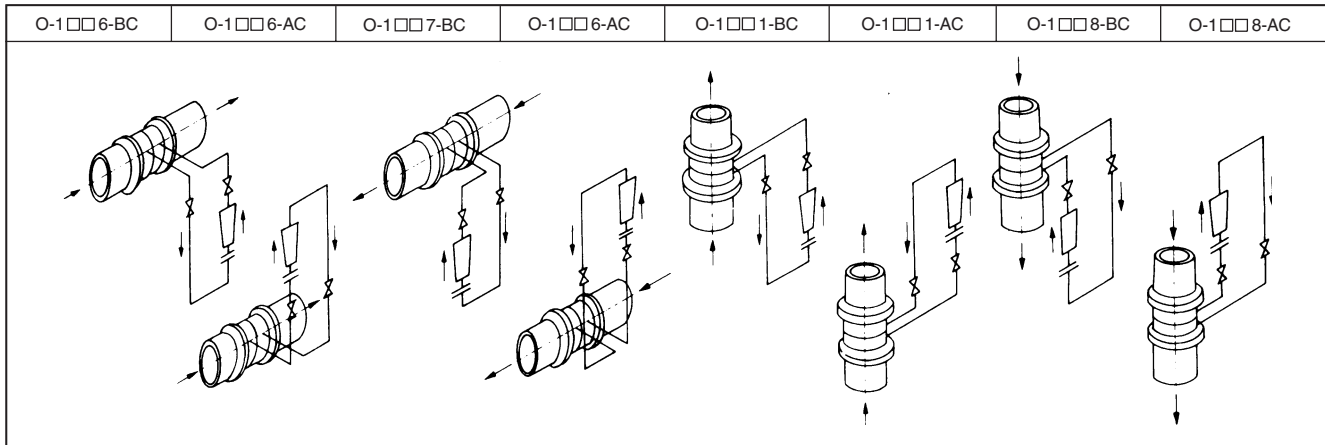
Sizes (mm)	Water (m³/h)		Air m³/h (nor)	
	40kPa	60KPa	40kPa	60KPa
50	5~ 30	5~ 40	80~ 800	100~ 1000
65	6~ 50	8~ 60	130~ 1100	160~ 1400
80	8~ 70	10~ 90	180~ 1700	220~ 2200
100	12~ 120	15~ 150	300~ 3000	350~ 3500
125	20~ 160	30~ 200	450~ 4000	600~ 5000
150	30~ 250	40~ 300	600~ 5500	700~ 7000
200	40~ 400	50~ 500	1000~ 10000	1200~ 12000
250	60~ 600	80~ 800	1600~ 15000	2000~ 20000
300	90~ 900	120~1200	2400~ 20000	3000~ 25000
350	120~1200	150~1500	3000~ 23000	4000~ 35000
400	150~1500	200~2000	4000~ 29000	5000~ 45000
450	200~2000	250~2500	5000~ 38000	6000~ 55000
500	250~2500	300~3000	6000~ 50000	7000~ 70000

Full scales of flow meters can be set within scopes for each size. Range abilities are, in case of the maximum differential pressure 40kPa, 10: 2.5 and, in case of the maximum differential pressure 60kPa, 10: 2.

Notes: 1. The calculation of figures in the above flow range list has been made on the premises that SGP, a JIS code name for a carbon steel pipe for ordinary piping, had been used for main pipes. In case of pipes other than SGP, multiply the above liquid quantity by (the inner diameter of a pipe used ÷ the inner diameter of a SGP pipe) <sup>2</sup>.

2. The water flow value means the maximum flow range that can be measured in case of specific gravity : 1.0 and viscosity: 1mPa·s

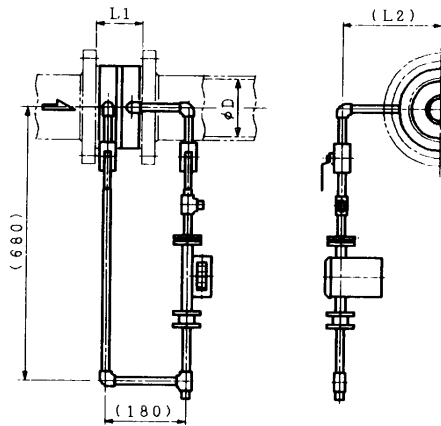
DIRECTION OF FLOW AND BYPASS PIPING



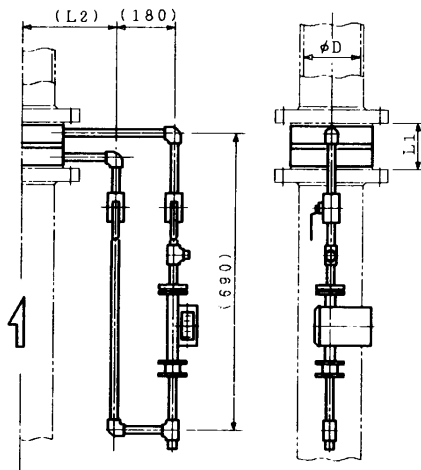
Corner tap type (This applies to other tap types as well)

**STANDARD SIZES OF BYPASS PIPES**

- (1) Corner tap type  
 • Horizontal pipes



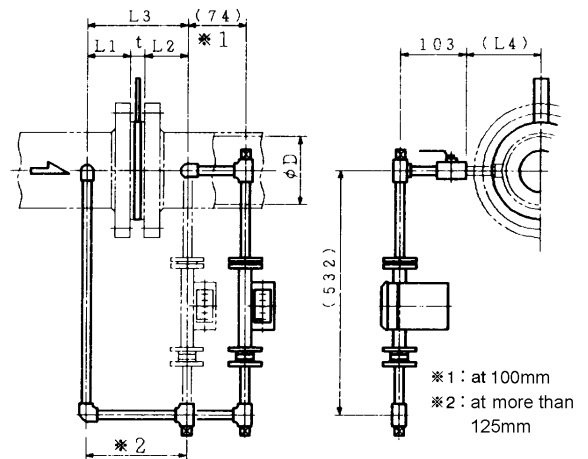
- Vertical pipes (down to up)



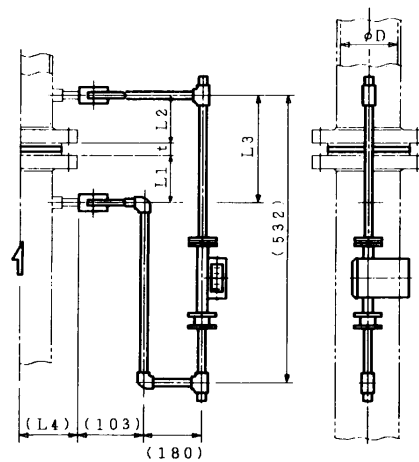
Main pipe sizes		L1	L2
50mm	2B	68	125
65mm	2 1/2B	68	135
80mm	3B	68	140
100mm	4B	71	150
125mm	5B	71	165
150mm	6B	71	180
200mm	8B	71	205
250mm	10B	71	245
300mm	12B	71	265
350mm	14B	71	290
400mm	16B	71	325
450mm	18B	71	355
500mm	20B	71	380

Figures for "L1" include sizes of gaskets. In case of 50mm, 65mm and 80mm, it is t1.5mm x 2pcs and 100mm, t3 x 2pcs. Figures for "t" include sizes of gaskets. (t3mm x 2pcs)

- (2) 1D·1/2D tap type  
 • Horizontal pipes



- Vertical pipes (down to up)



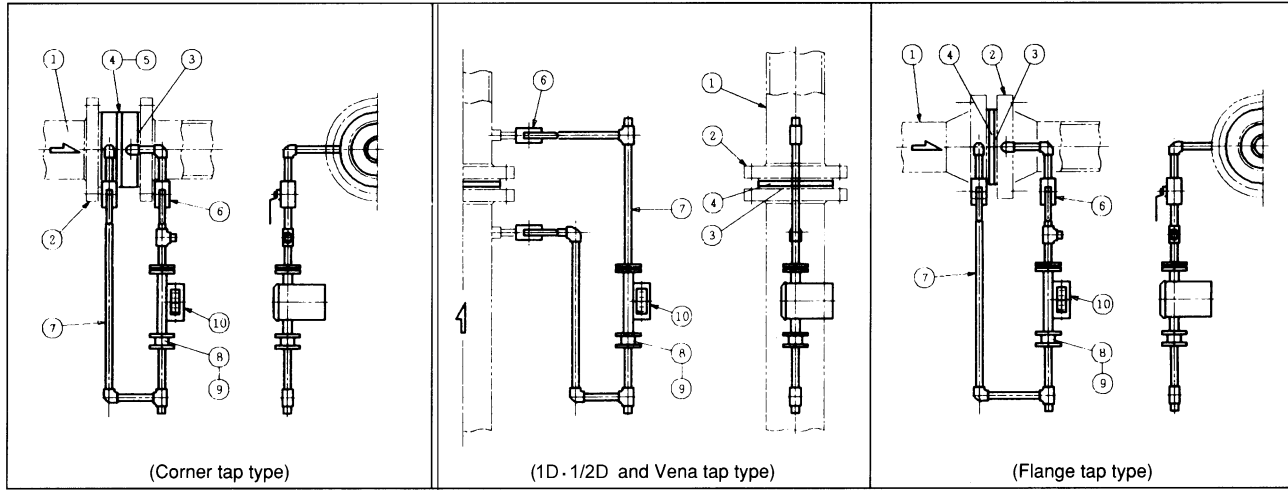
Main pipe sizes		L1	L2	t	L3	L4
50mm	2B	/	/	/	/	/
65mm	2 1/2B	/	/	/	/	/
80mm	3B	/	/	/	/	/
100mm	4B	102	47	9	158	110
125mm	5B	128	59	9	196	130
150mm	6B	152	71	10	233	150
200mm	8B	202	95	10	307	170
250mm	10B	251	119	11	381	210
300mm	12B	302	144	11	457	230
350mm	14B	337	162	11	510	250
400mm	16B	388	186	12	586	280
450mm	18B	438	212	12	662	310
500mm	20B	489	237	12	738	350

L1 includes thickness of gaskets. t3 x 2pcs  
 L1 and L2 are for SGP piping.  
 For other piping material; L1=1D, L2=1/2D-(t-3) : D=Pipe diameter

**SUGGESTIONS FOR INSTALLATION ;**

1. Straight runs both up and down stream are required for accurate measurement. Refer to instruction manual for details.
2. Since the pressure loss within the bypass pipe is pre-calculated, do a specified bypass piping in accordance with the related approval drawing.
3. If you need bypass pipes of which sizes are different from those of standard ones due to a piping design in your factory, please contact us.

MATERIAL AND SCOPE OF SUPPLY



Part No.	Names of parts	Material Class		
		1	2	3
①	Main pipe	Customer's scope		
②	Orifice flange	Customer's scope (Available as an optional accessory)		
③	Flange gasket	Customer's scope (Available as an optional accessory)		
④	Main pipe orifice	SUS 304	SUS 304	SUS 316
⑤	Orifice ring	SS 400	SUS 304	SUS 316
⑥	Ball valve	BSBFE 2	SCS 13A	SCS 14A
⑦	Bypass pipe	SGP (W) (STPG)	SUS 304	SUS 316
⑧	Bypass orifice	SUS 304	SUS 304	SUS 316
⑨	Gasket	For liquids: Non-asbestos/ For gases: NBR or fluoric rubber		
⑩	Flow meter	SS 400 (SUS 304)	SUS 304	SUS 316

MATERIAL AND SCOPE OF SUPPLY

Common	Model	<input type="checkbox"/> -O-1 <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/>			
	Name of fluid				
	Specific gravity				
	Viscosity				
	Pressure				
	Temperature				
	Scale range				
Main Pipe	Material class	<input type="checkbox"/> Material class 1 <input type="checkbox"/> Material class 2 <input type="checkbox"/> Material class 3 <input type="checkbox"/> Special( )			
	Material	<input type="checkbox"/> Size _____mm <input type="checkbox"/> SGP pipe <input type="checkbox"/> STPG and STPT pipes sch No. _____ <input type="checkbox"/> Stainless steel pipe sch No. _____ <input type="checkbox"/> Lining pipe (inner diameter _____mm) Others (outer diameter _____mm and inner diameter _____mm) <input type="checkbox"/> Hard PVC pipe ( VP VU) <input type="checkbox"/> STPY pipe (thickness _____mm)			
Transmitter specifications	Connection	with Pneumatic transmitter O-131 <input type="checkbox"/>	with Electric transmitter O-152 <input type="checkbox"/>	with Integrator O-169 <input type="checkbox"/>	with Alarm contact O-174 <input type="checkbox"/>
	Enclosure	<input type="checkbox"/> Standard Rc 1/4 <input type="checkbox"/>	<input type="checkbox"/> Standard G 1/2 <input type="checkbox"/>	<input type="checkbox"/> Standard G 1/2 <input type="checkbox"/>	<input type="checkbox"/> Standard G 1/2 <input type="checkbox"/>
	Power supply	<input type="checkbox"/> Dust and Weather proof only	<input type="checkbox"/> Dust and Weather proof <input type="checkbox"/> Press.tight ex-proof	<input type="checkbox"/> Dust and Weather proof only <input type="checkbox"/> Press.tight ex-proof	<input type="checkbox"/> Dust and Weather proof only <input type="checkbox"/> Press.tight ex-proof <input type="checkbox"/> Intrinsically safe(Including barrier)
	Alarm point	-	Standard: DC24V	AC _____ V _____ Hz	-
	Setting point	-	-	-	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> Upper limit <input type="checkbox"/> Lower limit
	Pulse per hour(At full scale)	-	-	-	c/h -
Accessories	with air set	<input type="checkbox"/> with pressure proof packing adaptor	<input type="checkbox"/> with pressure proof packing adaptor	<input type="checkbox"/> with pressure proof packing adaptor <input type="checkbox"/> Intrinsically safe relay	

\* Specification subject to change without notice.

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