



**QUICK
DELIVERY
LOW PRICE**

**ALL
STAINLESS STEEL**

ACCURACY $\pm 2.0\%$

Upgraded Excellent Flowmeter

- Visibility improved by convex scale plate made of resin
- Without stopping flow even in operation, maintenance can be carried out.
- Designed compactly and installed at any places
- Easy installation by screw or wafer connection
- Available with alarm contact

**By-Pass Orifice Type
ORIFLO METER
O-010 series**



STANDARD SPECIFICATION

Specification	Description
Measuring fluid	Liquid* (Equivalent to water) [Viscosity: less than 3cP] Not suitable for opaque liquids and slurries.
Available sizes	10 to 100mm
Process connection	Screw connection (Std.) JIS Rc thread Wafer connection (Std.) for JIS10K flanges (Except for 10, 15, 20 and 32mm)
Indication accuracy	± 2.0%F.S.
Max. Fluid temp.	120°C (60°C for alarm version)
Max. allowable temp. shock	80°C
Max. press.	1.0MPa
Rangeability	(Std.) 10:2
Isolation valve	Standard equipment
Option	Alarm function Detection system : Optical type Alarm : Change-over type of H or L alarm Power supply : DC12 to 24V Output : Open collector

Table-1

MODEL CODE

O	-	0	□	0	-	□	C	-	□	□	□	Description
Function	1											Local indicator
	2											Local indicator + Optical alarm (Change-over type of H or L alarm)
Process connection						S						Screw connection (Rc)
						W						Wafer connection (For JIS 10K) (Except 10, 15, 20 and 32mm)
Line size				0	1	0						10mm
				0	1	5						15mm
				0	2	0						20mm
				0	2	5						25mm
				0	3	2						32mm
				0	4	0						40mm
				0	5	0						50mm
				0	6	5						65mm
				0	8	0						80mm
				1	0	0						100mm

Table-2

MATERIAL

	Component	Material
Measuring tube	Screw connection	SCS14
	Wafer connection	SCS14
	Orifice plate	SUS304
Isolation valve	Body	SCS14
	Shaft / Packing	SUS316 / Viton
Indicator	Body	SCS14
	Tapered tube	Pyrex glass
	Float	SUS316
	Cover / Scale plate	SUS304 / ABS resin
	Packing	Viton

Table-3

*FLOW RATE OF LIQUIDS EQUIVALENT TO WATER MEASURED BY CONVERSION FORMULA

CONVERSION FORMULA

$$Q_w = Q_A \times \sqrt{\frac{\gamma_o (\gamma_f - \gamma)}{\gamma (\gamma_f - \gamma_o)}}$$

Q_w = Water converted flow rate
 Q_A = Designed flow rate of actual liquid
 γ_o : Designed density of actual liquid (g/cm³)
 γ : Density of water 1.0g/cm³
 γ_f : Density of float 7.9g/cm³
 (SUS304/316 7.9g/cm³)

Calculation example

$$\begin{aligned}
 Q_w &= 1 \times \sqrt{\frac{\gamma_o (\gamma_f - \gamma)}{\gamma (\gamma_f - \gamma_o)}} \\
 &= 1 \times \sqrt{\frac{1.4 (7.9 - 1)}{1 (7.9 - 1.4)}} \\
 &= 1 \times 1.219 \\
 &= 1.219\text{m}^3/\text{h}
 \end{aligned}$$

Density of liquid 1.4g/cm³
 Full scale In case of 1m³/h

O-020 OPTICAL ALARM UNIT

MAIN FEATURES

Detective method	Infrared detective method by 2 sensors	Output response speed	0.5 seconds or less
Detection hysteresis	3mm	Backup	Condenser method, power failure, repeating cycle, interval of more than 5 minutes required, maintaining operation for 3 seconds or more
Measuring object	Transparent liquid detection	Connection	Cable output, 4-core shield
Float material	SUS316	Fixation	Tightening screw by metal piece
Detecting speed of float	About 7.5m/sec or less	Housing	Simple, drip-proof
Detecting time interval	About 150 μ sec	Operating environment	Improper under direct sunlight, improper in vibration environment
Display	LED in 2 colors Green: Normal condition when turning on power Red: At the time of alarm	Operating temperature/humidity	0 to 50°C / 90%RH or less (Not to be dewed)
Alarm	High alarm, low alarm, switch change	Storing temperature/humidity	-5 to +50°C / 90%RH or less (Not to be dewed)
Output logic	Positive logic, negative logic, switch change	Power supply	DC12 to 24V \pm 10%, 35mA or less
Switch change	Setup change after turning power off, reading out SW condition when turning on power.	Consumption current	35mA or less at DC12V
Output	Photocoupler DC30V DC100mA max open drain	Mass	About 50g
Output isolation	AC1500V or more		

WIRING AND SIGNAL

Cable color	Signal
Black	Power supply GND
Red	Power supply +
White	Pulse output open drain
Grey	Pulse output GND
Bold black	Shield

SWITCHING FUNCTION

SW No	Item	OFF	ON
1	Alarm change	Low alarm	High alarm
2	Output logic	NO.	NC.
3	When turning on power	Alarm	Non-alarm

EXTERNAL DRAWING

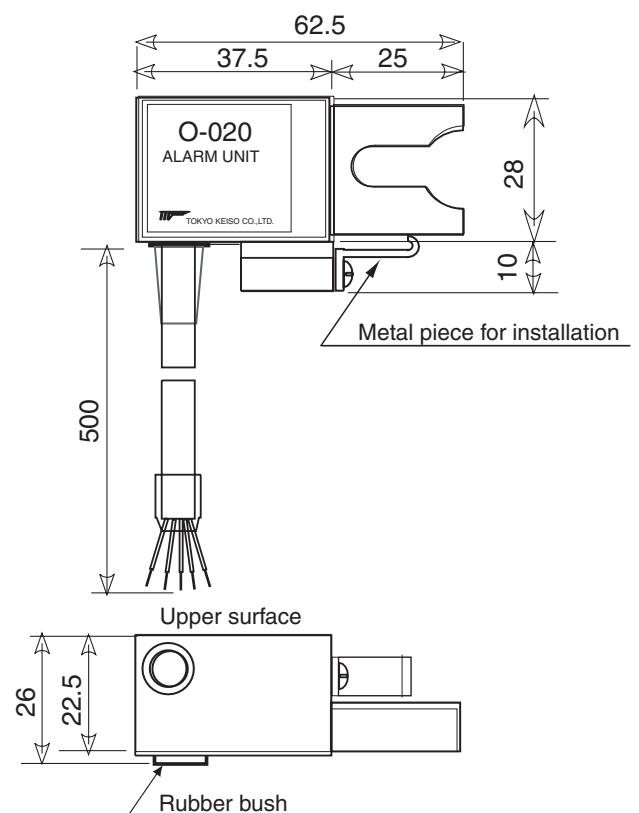


Fig.1

FEATURES OF O-020 OPTICAL ALARM UNIT

1. Detection of operating direction of float

Since the passage direction of float both upward and downward can be detected by two sensors which receive light, no external memory unit is required. The alarm function (High and Low) can be obtained by this unit independently.

2. Backup function of power supply

Even if the power supply is downed for 3 seconds, the operation is maintained by electric double layer type condenser.

3. High speed response

Since a float is monitored in high speed, the movement of float in 7.5m/sec. can be followed.

4. Not influenced by external light

- Using the visible light cutoff type infrared sensor
- Synchronization of detection
- This unit is hardly influenced by external light and fluorescent lamp because of adoption of AC detection method.

5. Open drain output

Since output is isolated by photo MOS relay, this unit can drive the large current in spite of the low consumption current. (100mA)

6. Abundant switching function

The change is possible just by changing the switch.

- The logic of output can be changed. Switchover of positive logic and negative logic.
- Switchover of high and low alarm functions
- Condition at the time of turning on the power.

7. Visibility of alarm condition

Since the radiating LED is used for the display, the alarm condition can be correctly recognized.

8. Not influenced by external disturbance

The gap of operation (Hysteresis width) is 3mm, and as the detection delay of 0.5 seconds is available, resulting in avoiding the occurrence of chattering.

9. Correspondence with power supply

This unit can be driven by DC12 to 14V, and as it can be driven in less than maximum 30mA, it can cope with the various applications.

APPLICATIONS

Monitoring of cooling water lines, etc.

SCALE RANGE

Liquid (Water) Standard DP: 15kPa

Size	Scale range	Subdivision	Size	Scale range	Subdivision
10mm	0.1 to 0.5m ³ /h	0.01	40mm	2 to 10m ³ /h	0.2
15mm	0.2 to 1.0m ³ /h	0.02	50mm	3.6 to 18m ³ /h	0.5
20mm	0.5 to 2.5m ³ /h	0.05	65mm	6 to 30m ³ /h	1
25mm	1 to 5m ³ /h	0.1	80mm	8 to 40m ³ /h	1
32mm	1.6 to 8m ³ /h	0.2	100mm	14 to 70m ³ /h	2

Table-4

SUBDIVISION OF GRADUATION

Scale range is as follows.

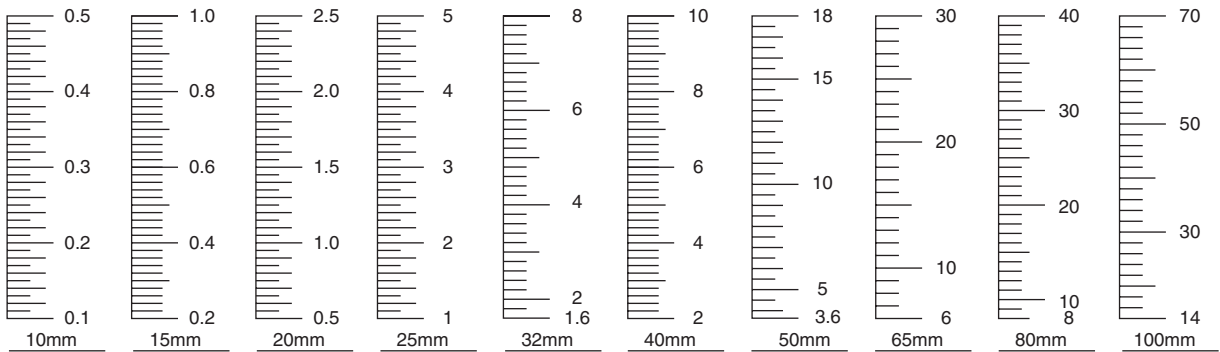


Fig-2

EXTERNAL DIMENSION

Screw connection type (Process connection code S)

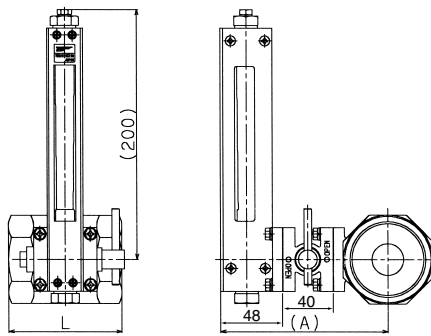


Fig-3

Size	Measuring tube SCS14		
	L	A	Mass (kg)
10mm	70	105	1.5
15mm	70	105	1.5
20mm	70	110	1.7
25mm	70	110	1.8
32mm	74	120	2.0
40mm	85	120	2.1
50mm	90	130	2.6
65mm	120	175	4.0
80mm	120	185	4.3
100mm	160	200	7.5

Table-5

Wafer connection type (Process connection code W)

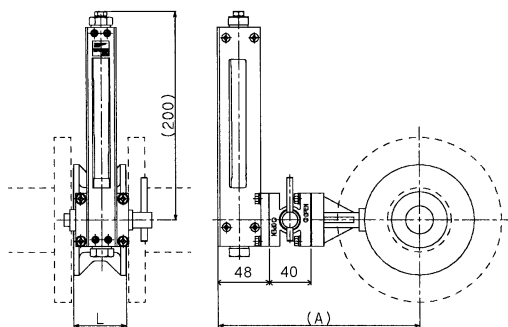


Fig-4

Size	Measuring tube SCS14		
	L	A	Mass (kg)
25mm	50	170	2.3
40mm	50	180	2.5
50mm	50	190	2.8
65mm	50	200	3.1
80mm	50	205	3.3
100mm	50	215	3.8

Table-6

SUGGESTIONS

STRAIGHT RUN UPSTREAM AND DOWNSTREAM REQUIRED

The following straight run is recommended for accurate measurement:

	90° elbow	Fully opened valves
Upstream	6D	8D
Downstream	3D	3D

D : Diameter of process piping

Table-7

READING OF FLOW RATE

The flow rate is to be read by the position of float and engraved graduation.

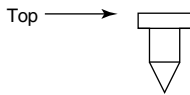


Fig-5

- By changing the direction of indicator, ORIFLO may be used for any flow directions such as "bottom to top", "left to right", "right to left" and "top to bottom". This change can be carried out in the field as well.

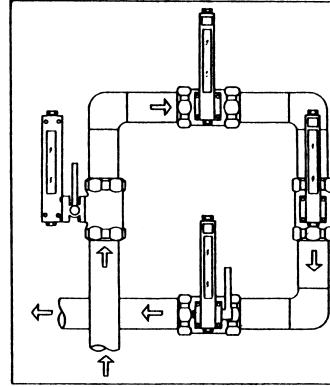


Fig-6

TECHNICAL DATA

OPERATION PRINCIPLE

As shown in the figure, differential pressure is produced across the main orifice plate by flow velocity which corresponds to flow rate. A small sized flowmeter (Variable area flowmeter) is mounted onto this differential pressure production unit. By this arrangement, the flow rate through the flowmeter corresponds to the flow rate through the main piping.

Thus, scale range for main piping can be engraved onto the small sized flowmeter and the flow rate through the main piping is indicated by the position of float of the flowmeter.

Normally, an isolation valve is provided between the measuring tube and the indicator for the purpose of the maintenance of indicator with no interference of process operation.

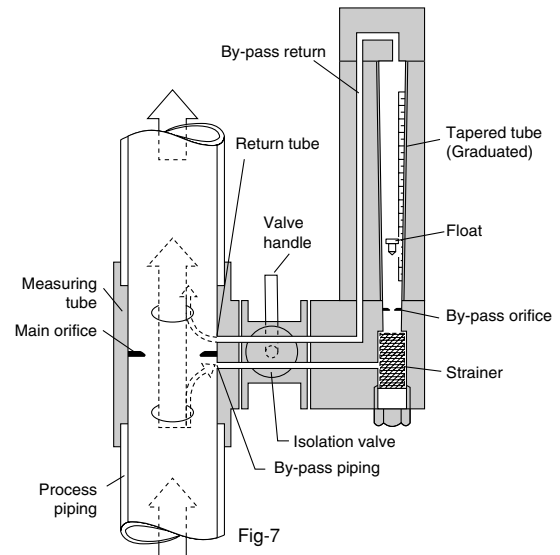


Fig-7

PACKING STYLE

This flowmeter consists of such sections as a measuring tube, an isolation valve and an indication section, and they are packed in a plain box and delivered. This flowmeter is also available in assembling, but the flow direction shall be specified. Consult with us about details.

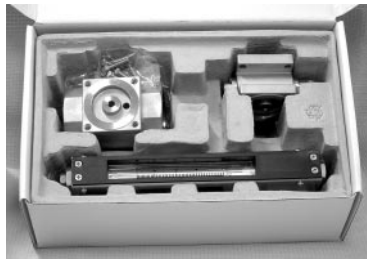


Fig-8

MEASUREMENT OF GASES IN SMALL TO LARGE FLOW RATE AND WATER IN LARGE FLOW RATE

As a series of ORIFLO METER, O -180 / 780 is provided. In addition to the standard application, this flowmeter can comply with broad applications because the measurement of gases and water in large flow rate and in high temperature, etc. can be carried out.

* Specification is subject to change without notice.

TOKYO KEISO CO., LTD.

Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558
 Tel : 03-3431-1625 (KEY) ; Fax : 03-3433-4922
 e-mail : overseas.sales@tokyokeiso.co.jp ; URL : http://www.tokyokeiso.co.jp

