



# High Accuracy/General-purpose/PD Flowmeter

## ULTRA OVAL

### METER SIZE: 39, 41, 45, 50, 52, 53, 55, 56, 57

## GENERAL SPECIFICATION

### GS.No.GBU005E-15N

### ■ GENERAL

Our workhorse PD flowmeter series is redesigned in this ULTRA OVAL with the most advanced multi-function electronic register (ULTRA register) capable of indicating the instantaneous flowrate and total flow on an easy-to-read LCD and of providing the pulse and analog output. Significantly improved performance along with compact and lightweight design are among the many benefits it offers.

### ■ FEATURES

1. Flow range expanded by 10 to 90% (over the previously offered OVAL meters of the same sizes).
2. Absence of mechanical reduction gear train combined with special carbon bearings contributes to low pressure loss and long life.
3. Thanks to pocketless design, the process fluid is virtually free from stagnation in the measuring chamber-beneficial to a broad range of fluids, particularly chemicals and foods.
4. Microprocessor-based ULTRA register indicates variables-total flow, both resettable and cumulative, instantaneous flowrate, selectable with mode select switch, plus alarm (low battery alarm) on the LCD.
5. Output signal is available in two channels simultaneously in the form of total flow (4/20mA DC factored or unfactored current pulses) and instantaneous flowrate signal (4 to 20mA DC analog).
6. A complete series of explosionproof models also available.
7. We also manufacture models approved for applicable high-pressure gas control law.



Meter sizes 39, 41, 45



Meter sizes 55, 56



Meter sizes 50, 52, 53



Meter size 57

### ■ GENERAL SPECIFICATIONS

#### ● Meter Body

Item		Description								
Meter size		39	41	45	50	52	53	55	56	57
Nominal size		10mm (※1)			20mm	25mm		40mm	50mm	
Flange rating	1 group	JIS 10K RF, ASME/JPI 150 RF								
	3 group	JIS 16, 20, 30K RF, ASME/JPI 300 RF, DIN PN 10, 16, 20, 25								
Flow range		See flow range tables (page 3).								
Operating temperature range	Standard	−10 to +120℃ (※2)								
	Low	_____			−60 to +60℃					
	High	_____			120 to 200℃	120 to 260℃				
	Jacketed	_____			_____	120 to 260℃				
Linearity		±0.35% or ±0.15%								
Materials	Body	SCS14 or ▲SCS16								
	Rear cover	SUS316 or ▲SUS316L								
	Rotors	39:Special carbon only, 41 to 57 : SUS316 or ▲SUS316L								
	Bearings	39:Special carbon only, 41 to 57 : Special carbon or ceramics (※3)								
	Shafts	SUS316 or ▲SU316L								
Jacketed	Connection	_____			Rc 1/2			Rc 3/4		
	Max. operating press.	_____			0.98MPa					
Flow direction		Right→ left (standard), left→ right, bottom→ top, top→ bottom								

※1: 1/2" for ASME and JPI flanged sensors.

※2: Applicable only to ATEX and FM explosionproof.

※3: With ceramics bearings, the max. allowable temperature is 60°C (For information, consult the factory.)

※ : ▲ Special

#### ● Flange Rating and Max. Operating Pressure (MPa)

Flange group	Temp.	JIS 10K RF	ASME/JPI 150 RF	JIS 20K RF	JIS 30K RF	ASME/JPI 300 RF
1	Max. 120°C	1.18	1.51	—	—	—
	Max. 200°C	1.18	1.25	—	—	—
	Max. 350°C	—	—	—	—	—
3	Max. 120°C	—	—	2.45	2.94	2.94
	Max. 200°C	—	—	1.7	1.7	1.7
	Max. 350°C	—	—	1.5	1.5	1.5

Applies to body material code C. For body material code E, consult the factory.

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## ● Register Specifications

Item			Description						
Meter size			※39	41	※45	50, 52, ※53	55, 56	※57	
Local display (LCD) (※3)	Cumulative totalizing counter (8 digits)		0.1 mL (std.)	0.001 L (std.)	0.001 L (std.)	0.01 L (std.)	0.1 L (std.)	[1L (std.)] (※1)	
	Reset counter (7digits)	C mode	1 mL, 0.01 L	0.01 L, 0.1 L	0.01 L, 0.1 L	0.1 L, 1 L	1 L, 0.01 m <sup>3</sup>	[0.01m <sup>3</sup> , 0.1m <sup>3</sup> ] (※1)	
	Instantaneous flow rate (5 digits)	b1 mode	1 mL/h (std.)	0.01 L/h (std.)	0.1 L/h (std.)	1 L/h (std.)	1 L/h (std.)	1 L/h (std.)	
		b2 mode	0.01 mL/min (std.)	0.0001 L/min (std.)	0.001 L/min (std.)	0.01 L/min (std.)			
Output signal	—	None	Local LCD only						
	Current	Analog	4 to 20 mADC Refer to diagram, page 6.						
		Pulse (※5,6)	Type	Scaled or unscaled : 0/1=4/20 mADC					
			Pulse width	Scaled: 1ms (std.), 50 ms      Unscaled: 2ms					
			Unit of scaled pulse	Same as of LCD counter (※2)					
	Open collector	Pulse (※5,6)	Type	Scaled or unscaled : NPN transistor output : Max. impressed voltage 30 VDC allowable current : 50 mA, transistor on voltage : 1.5VDC and below					
			Pulse width	Scaled: 1ms (std.), 50 ms      Unscaled: 2ms					
			Unit of scaled pulse	Same as of LCD counter (※2)					
	Voltage	Pulse (※5,6)	Type	Scaled or unscaled : [0]1 VDC Max. [1] 7 VDC Min.					
			Pulse width	Scaled: 1ms (std.), 50 ms      Unscaled: 2ms					
			Unit of scaled pulse	Same as of LCD counter (※2)					
	Power supply	Without output signal	Installed lithium battery      Life: 8 years (2 years with explosionproof construction ④ and ⑤ )						
With output signal		External power source : 12 to 45 VDC (analog, current pulse) 12 to 24 VDC (open collector, voltage pulse) 12 to 45 VDC (combination analog and current pulse) Current consumption :    Max. 30 mADC Refer to diagram in page 6. (※3)							
Transmission cable			Capture cable w/external shield (VCTF 1.25 mm <sup>2</sup> , finished O. D. 8.5 to 12mm) (※4)						
Transmission length			Max. 1km						
Transmission lines		2-wire system	Analog or current pulse						
		3-wire system	Open collector or voltage pulse						
		4-wire system	Analog + current pulse						
Ambient temperature			-10 to +60°C (Without dew condensation)						
Explosionproof configuration			Select either one from following two ① Non-explosionproof type      ⑤ FM      Class I, Division I / Group C, D T4 ② TIIS    Exd IIB T4 / Exia IIB T4, Exia IIB T3 (※7)      AEx / Exd IIB T4 ③ NEPSI    Exd IIB T4      ⑥ KOSHA    Exd IIB T4 ④ ATEX II 2G Exd IIB T4						
Applicable EU directive			EMC    2004 / 108 / EC ATEX    94 / 9 / EC (※8) PED    97 / 23 / EC (※9)						
Applicable EN standard			EMC    EN55011 : 1998 / A1 : 1999 Group 1, Class B    EN61000-6-2 : 1999 ATEX    EN60079-0 : 2006, EN60079-1 : 2007						
Degree of Protection for enclosure			IP66 (Dust-tight/Watertight Type)-IEC/EN60529 : 1991+A1 : 2000, JIS C 0920						
Material for housing			Aluminum die casting						
Finish			Munsell No. 2.5PB5/8 (baked melamine)						

\*1 : Values in [ ] are those for Type 57 high temperature, low temperature, and jacketed model.

\*2 : If factored pulse units other than above are required, consult the factory.

\*3 : Battery powered register features a local indicator alone; output signal is not available.

\*4 : For wiring of explosionproof type, do not fail to use the ancillary pressure-resistant packing. Also, in case of TIIS explosionproof type used under the ambient temperature of 45°C or higher, use a cable resistant to the temperature of 75°C or higher.

\*5 : Under certain circumstances, the max. flowrate may have limitations if the minimum factored pulse unit is chosen and the pulse width exceeds 1 msec. If this problem arises, consult the factory.

\*6 : With factored pulse unit indicated with an asterisk \*, pulse width other than 1 ms is NOT selectable.

However, in case of Type 57, this is applied to the standard type, sudden temp. change corresponding type, and standard, flowmeters or such.

\*7 : Explosionproof configuration of ULTRA OVAL register with batch control function.

\*8 : Details as 94/9/EC compliant explosionproof equipment

\*9 : Details as 97/23/EC compliant pressure equipment

Applicable hazardous area	Zone 1 and Zone 2
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Type of Machinery	Pressure machinery
Kind of the fluid	Liquid
Fluid group	1 and 2
DN (mm) Nominal size	10mm to 50mm
Max. operating pressure	2.94MPa (120°C)
Category	Para. 3, Sec. 3 of 97/23EC Directive

## ■ NOMINAL METER FACTORS

Meter size	Nominal meter factors mL/P	Max. frequency Hz	Max. flowrate m <sup>3</sup> /h	Pulse P/rev.
39	0.09838	33.9	0.012	2
41	0.4896	34.0	0.06	2
45	1.2339	94.6	0.42	4
50	4.968 [4.968]	111.8 [111.8]	2	4 [4]
52	9.664 [9.664]	109.2 [109.2]	3.8	4 [4]
53	17.513 [17.513]	101.5 [101.5]	6.4	4 [4]
55	23.07 [34.60]	168.6 [112.4]	14	6 [4]
56	37.33 [74.66]	178.6 [89.3]	24	8 [4]
57	98.04 [196.08]	124.7 [62.3]	44	8 [4]

\* : [ ] is for Low/High temperatures and it is a value with a jacket.

## ■ FLOW RANGES

### ● Meter sizes: 39 to 45

Linearity:  $\pm 0.35\%$ Operating temp. range:  $-10$  to  $+120^{\circ}\text{C}$ 

Unit in L/h

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to * 200mPa·s
39	2 to 12	1.4 to 12	0.7 to 12	0.35 to 12	0.2 to 12
41	18 to 60	12 to 60	4 to 60	2.5 to 60	1 to 60
45	50 to 420	35 to 420	15 to 420	10 to 420	5 to 420

\* Only model 45 can handle up to 1000mPa·s

● The standard accuracy for model 39 is  $\pm 0.35\%$ . Consult the factory for  $\pm 0.2\%$  accuracy model.Linearity:  $\pm 0.15\%$  (Option)Operating temp. range:  $-10$  to  $+120^{\circ}\text{C}$ 

Unit in L/h

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to * 200mPa·s
39	3 to 12	2 to 12	1 to 12	0.5 to 12	0.3 to 12
41	27 to 60	18 to 60	6 to 60	3.7 to 60	1.5 to 60
45	75 to 420	52 to 420	22 to 420	15 to 420	7.5 to 420

### ● Meter sizes: 50 to 57

1. Linearity:  $\pm 0.35\%$ Operating temp. range:  $-10$  to  $+120^{\circ}\text{C}$  (std.)Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
50	0.3 to 1.6	0.15 to 1.6	0.1 to 1.6	0.05 to 2	0.03 to 2
52	0.7 to 3	0.4 to 3	0.3 to 3	0.15 to 3.8	0.08 to 3.8
53	1.1 to 5	0.7 to 5	0.55 to 5	0.28 to 6.4	0.15 to 6.4
55	1.8 to 11	1.2 to 11	1 to 11	0.4 to 14	0.26 to 14
56	3.5 to 20	2.5 to 20	2 to 20	0.9 to 24	0.6 to 24
57	8 to 37	5 to 37	4 to 37	2 to 44	1.2 to 44

2. Linearity: 0.35%

Operating temp. range:  $120$  to  $200^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
50	0.6 to 1.4	0.3 to 1.4	0.2 to 1.4	0.09 to 1.8	0.05 to 1.8
52	1 to 2.7	0.8 to 2.7	0.5 to 2.7	0.23 to 3.4	0.15 to 3.8
53	2 to 4.5	1.4 to 4.5	0.9 to 4.5	0.35 to 5.7	0.28 to 6.4
55	3.6 to 9	2.4 to 9	1.5 to 9	0.6 to 12	0.4 to 14
56	7.5 to 18	5 to 18	3 to 18	1.4 to 21	0.9 to 24
57	15 to 33	10 to 33	6 to 33	3 to 39	2 to 44

3. Linearity: 0.35%

Operating temp. range:  $200$  to  $260^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
52	1 to 2.7	0.6 to 2.7	0.3 to 3.4	0.16 to 3.8
53	2 to 4.5	1.2 to 4.5	0.6 to 5.7	0.3 to 6.4
55	3.6 to 9	2 to 9	0.8 to 12	0.55 to 14
56	7.5 to 18	4 to 18	1.8 to 21	1.2 to 24
57	15 to 33	8 to 33	4 to 39	2.5 to 44

Note: 1. For measurement of high viscosity fluids (above 1000mPa·s), consult the factory.

2. For flow range of meters for low temperature service ( $-60$  to  $+60^{\circ}\text{C}$ ) refer to Table 1 or 4.3. For standard flowmeters ( $-10$  to  $+60^{\circ}\text{C}$ ) refer to Table 1 or 4.4. For flow range of meters compatible with thermal shock ( $-10$  to  $+120^{\circ}\text{C}$ ), refer to Table 2 or 5. (Thermal shock means sharp fluid temperature changes at a rate in excess of  $3^{\circ}\text{C}/\text{min}$ . or staircase changes in excess of  $30^{\circ}\text{C}$  between steps.)

### ● For flow range with “water,” select by temperature and viscosity brackets from the table below.

Temperature range	Viscosity range
Max. $30^{\circ}\text{C}$	0.8 to 2.0 mPa·s
30 to $80^{\circ}\text{C}$	0.3 to 0.8 mPa·s
80 to $120^{\circ}\text{C}$	Less than 0.3 mPa·s

4. Linearity: 0.15% (Option)

Operating temp. range:  $-10$  to  $+120^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
50	0.5 to 1.6	0.3 to 1.6	0.15 to 1.6	0.08 to 2	0.05 to 2
52	1 to 3	0.7 to 3	0.5 to 3	0.25 to 3.8	0.15 to 3.8
53	1.6 to 5	1.1 to 5	0.75 to 5	0.4 to 6.4	0.22 to 6.4

Operating temp. range:  $-10$  to  $+60^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
55	2.7 to 11	1.8 to 11	1.5 to 11	0.6 to 14	0.4 to 14
56	5.2 to 20	3.5 to 20	3 to 20	1.4 to 24	0.9 to 24
57	12 to 37	8 to 37	6 to 37	3 to 44	2 to 44

Operating temp. range:  $60$  to  $120^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

Viscosity Meter size	Less than 0.3mPa·s	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
55	4 to 11	2.7 to 11	2.2 to 11	0.9 to 14	0.6 to 14
56	8 to 20	5.2 to 20	4.5 to 20	2.1 to 24	1.3 to 24
57	18 to 37	12 to 37	9 to 37	4.5 to 44	3 to 44

5. Linearity:  $\pm 0.15\%$  (Option)Operating temp. range:  $120$  to  $200^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

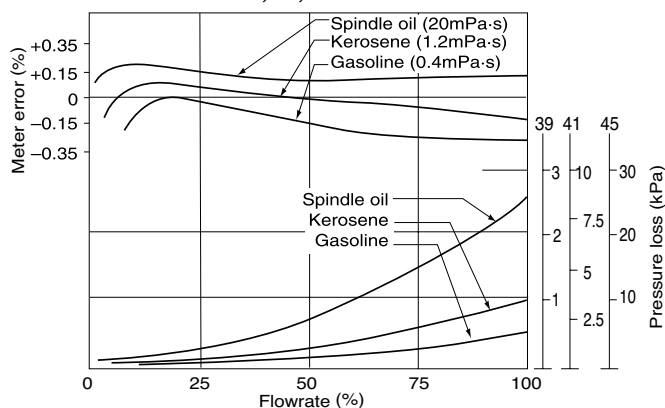
Viscosity Meter size	0.3mPa·s to 0.8mPa·s	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
50	0.45 to 1.4	0.3 to 1.4	0.15 to 1.8	0.08 to 1.8
52	1.5 to 2.7	0.9 to 2.7	0.55 to 3.4	0.33 to 3.8
53	2.4 to 4.5	1.5 to 4.5	0.9 to 5.7	0.49 to 6.4
55	4 to 9	2.7 to 9	1.3 to 12	0.9 to 14
56	8 to 18	5.2 to 18	3.1 to 21	1.9 to 24
57	18 to 33	12 to 33	6.7 to 39	4.5 to 44

6. Linearity:  $\pm 0.15\%$  (Option)Operating temp. range:  $200$  to  $260^{\circ}\text{C}$ Unit :  $\text{m}^3/\text{h}$ 

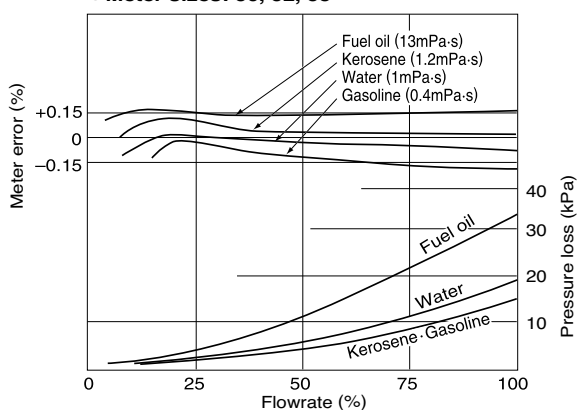
Viscosity Meter size	0.8mPa·s to 2mPa·s	2mPa·s to 5mPa·s	5mPa·s to 1000mPa·s
52	1.5 to 2.7	0.9 to 3.4	0.49 to 3.8
53	2.4 to 4.5	1.3 to 5.7	0.73 to 6.4
55	4 to 9	1.9 to 12	1.3 to 14
56	8 to 18	4.6 to 21	2.8 to 24
57	18 to 33	10 to 39	6.7 to 44

## METER ERRORS AND PRESSURE LOSSES

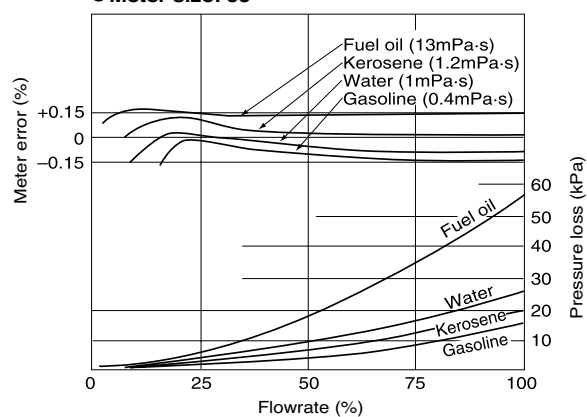
### ● Meter sizes: 39, 41, 45



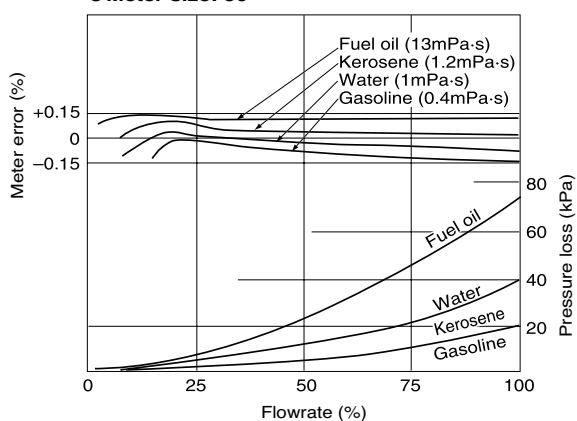
### ● Meter sizes: 50, 52, 53



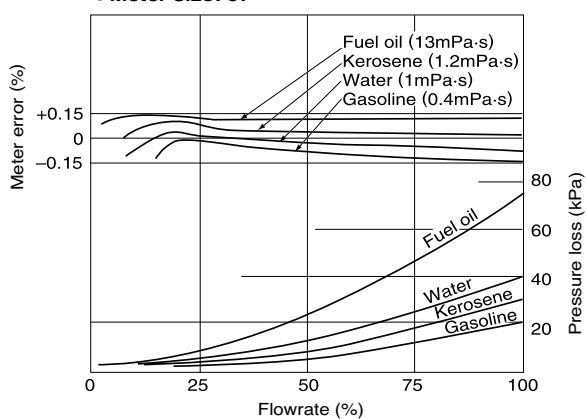
### ● Meter size: 55



### ● Meter size: 56

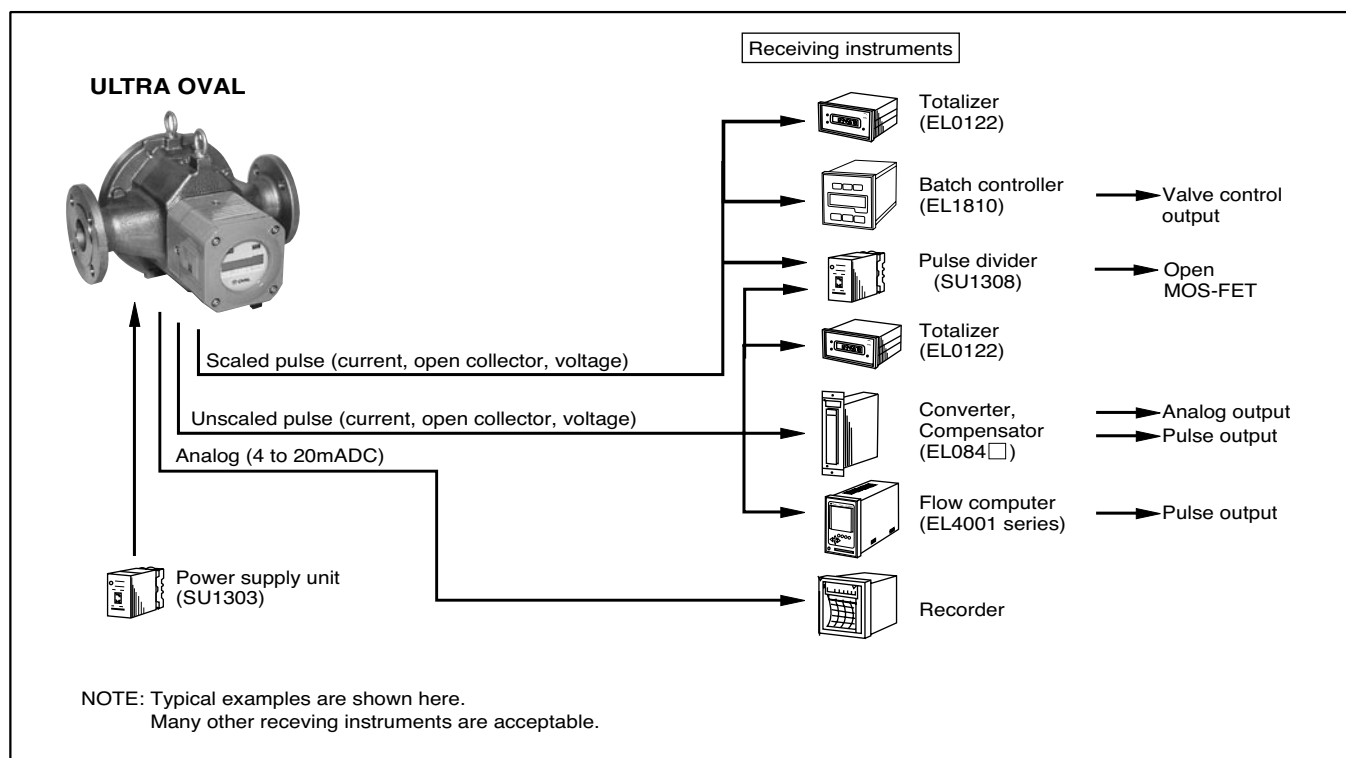


### ● Meter size: 57



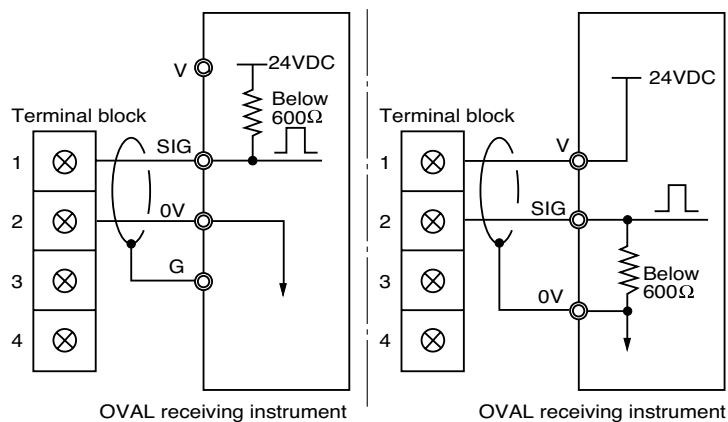
NOTE: 100% flowrate shows the maximum flowrate at individual viscosity.

## ■ HOOKUP WITH RECEIVING INSTRUMENTS

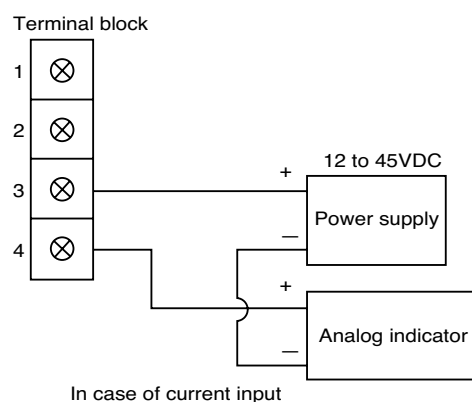


## ■ WIRING CONNECTIONS

### (1) Current pulse output (2-wire system)

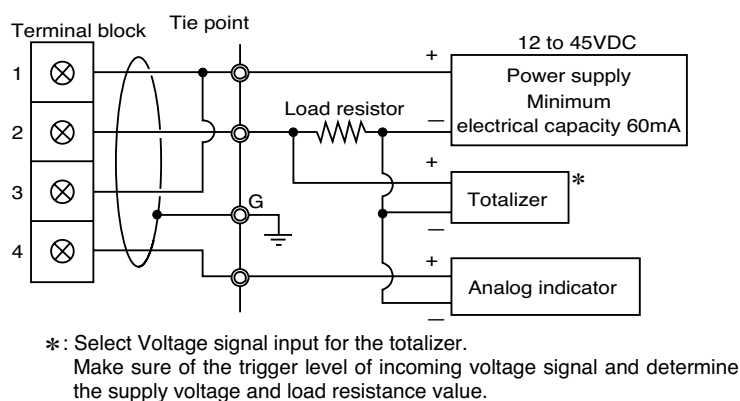


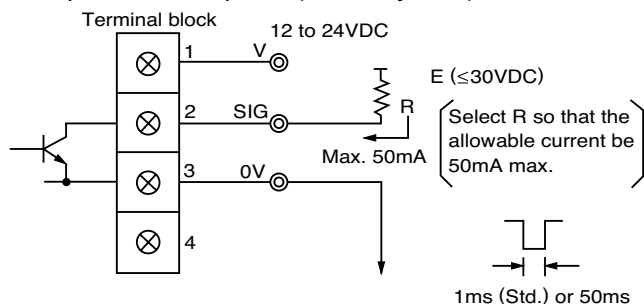
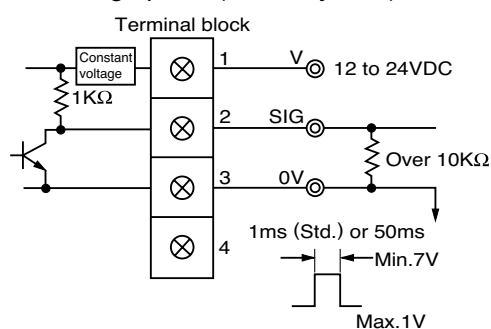
### (2) Analog output (2-wire system)



NOTE: To accept a voltage signal, couple an external load resistor (see acceptable load resistance range on page 6).

### (3) Current pulse + Analog output (4-wire system)



**(4) Open collector pulse (3-wire system)****(5) Voltage pulse (3-wire system)**

### ● Range of Load Resistance (for current pulse and analog output)

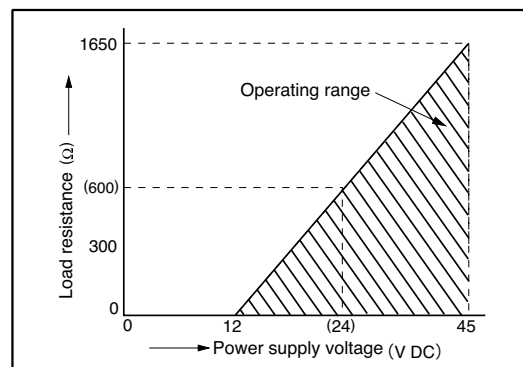
This instrument uses a two-wire transmission line for analog and pulse signals, so the line serves for both power supply and signal.

A DC power supply is required for transmission loop.

When connecting a meter to the loop, ensure that the meter and the load resistance of cable conductor is within the operating limits shown in the figure at right.

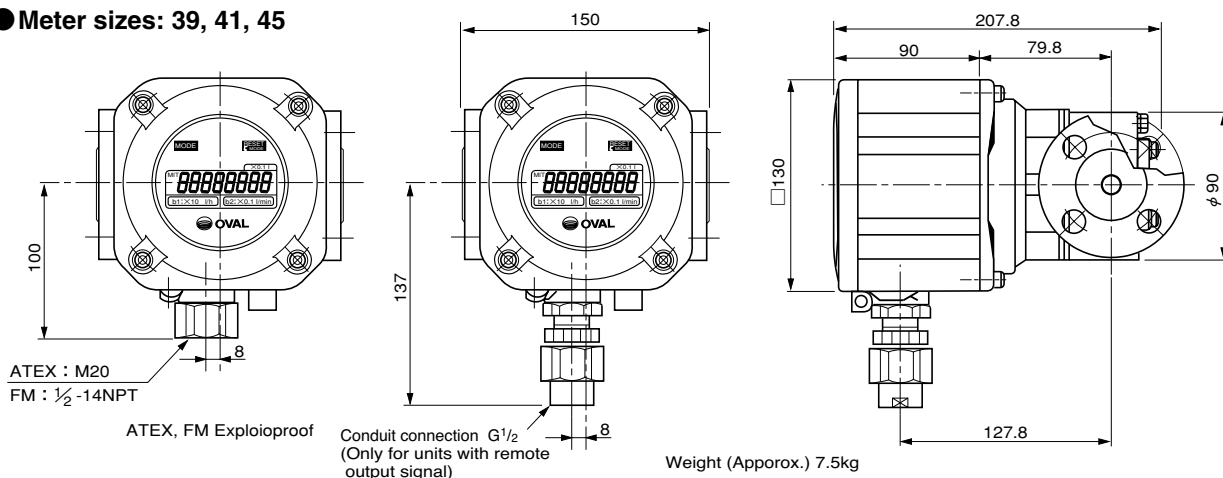
Standard: Power supply voltage = 24VDC

Load resistance = 250Ω



### ■ OUTLINE DIMENSIONS [Standard register type A provided] (Unit in mm)

#### ● Meter sizes: 39, 41, 45

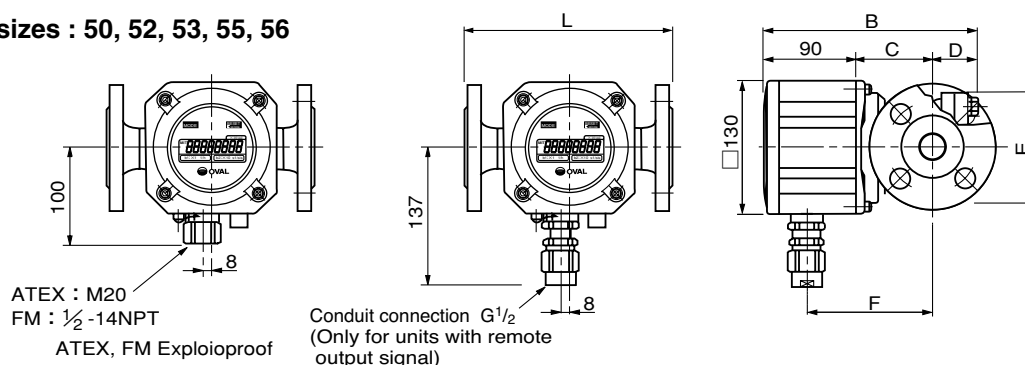


Note: 1. For batch controller equipped ULTRA register, refer to General Specification (No. GBC201E).

# **OUTLINE DIMENSIONS [Standard ULTRA register type A provided] (Unit in mm)**

## **Standard (Types: LUS)**

### **● Meter sizes : 50, 52, 53, 55, 56**



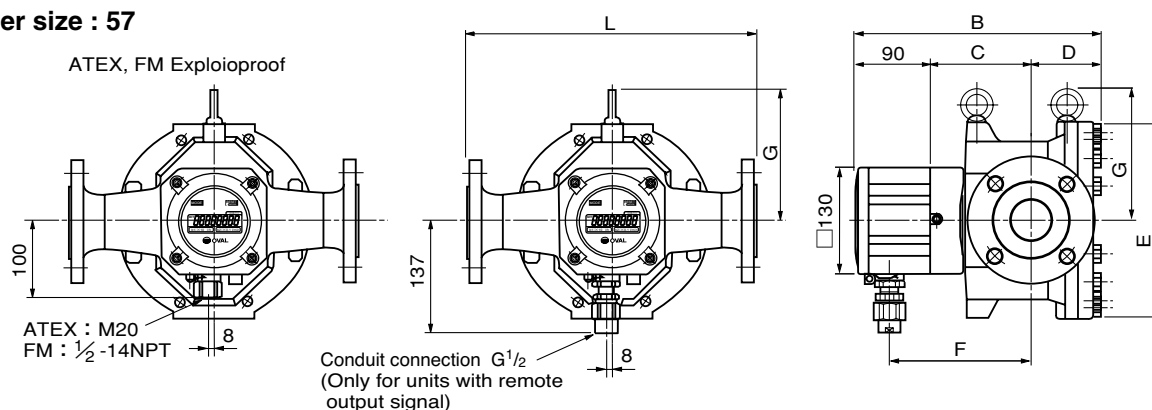
### **1. Flange rating 1 group**

Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
50	JIS 10K RF	200	216.8	86.8	40	φ96	134.8	9kg
	ASME/JPI 150 RF	198						
52	JIS 10K RF	200	207.8	74.8	43	□ 106	122.8	10kg
	ASME/JPI 150 RF	200						
53	JIS 10K RF	200	231.3	85.8	55.5	□ 106	133.8	11kg
	ASME/JPI 150 RF	200						
55	JIS 10K RF	230	244.8	92.8	62	□ 130	140.8	16kg
	ASME/JPI 150 RF	233						
56	JIS 10K RF	250	269.8	106.8	73	□ 154	154.8	20kg
	ASME/JPI 150 RF	258						

### **2. Flange rating 3 group**

Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
50	JIS 20K RF	204	216.8	86.8	40	φ96	134.8	12kg
	JIS 30K RF	208						
	ASME/JPI 300 RF	204						
52	JIS 20K RF	204	207.8	74.8	43	□ 106	122.8	13kg
	JIS 30K RF	212						
	ASME/JPI 300 RF	207						
53	JIS 20K RF	204	231.3	85.8	55.5	□ 106	133.8	14kg
	JIS 30K RF	212						
	ASME/JPI 300 RF	207						
55	JIS 20K RF	234	248.8	94.8	64	φ163	142.8	22kg
	JIS 30K RF	242						
	ASME/JPI 300 RF	240						
56	JIS 20K RF	254	271.8	109.8	72	φ193	157.8	26kg
	JIS 30K RF	262						
	ASME/JPI 300 RF	263						

### **● Meter size : 57**



### **1. Flange rating 1 group**

Meter size	Flange rating	L	B	C	D	E	F	G	Weight (Approx.)
57	JIS 10K RF	350	299.8	124.8	85	φ240	172.8	171.5	36kg
	ASME/JPI 150 RF	357							

### **2. Flange rating 3 group**

Meter size	Flange rating	L	B	C	D	E	F	G	Weight (Approx.)
57	JIS 20K RF	354	308.3	131.8	87	φ260	179.8	171.5	47kg
	JIS 30K RF	362							
	ASME/JPI 300 RF	363							

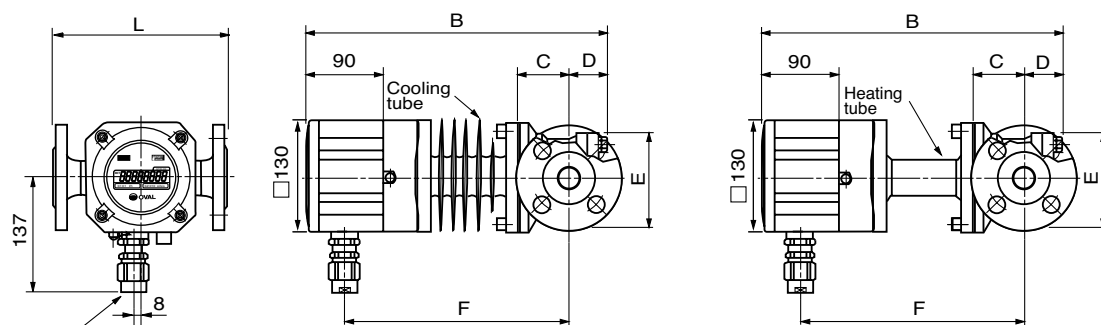
In case the other Flange rating dimensions are requested consult factory.

Note: For batch controller equipped ULTRA register, refer to General Specification (No. GBC201E).

## ■ OUTLINE DIMENSIONS [Standard ULTRA register type A provided] (Unit in mm)

### ● With cooling or heating tube (Types: LUS)

#### ● Metersize : 50, 52 and 53

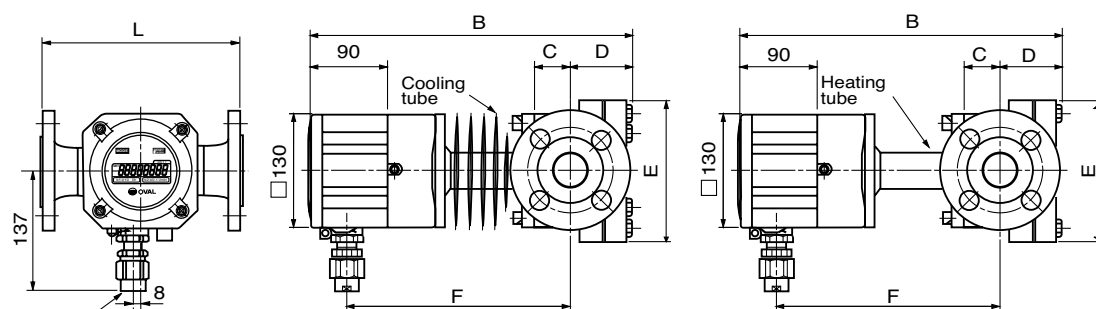


Conduit connection G<sup>1</sup>/<sub>2</sub> (female)  
(Only for units with remote output signal)

#### Flange rating 1 group

Meter size	Flange rating	L	B (Overall length)	C	D	E	F	Weight (Approx.)
50	JIS 10K RF	200	296.8	17	43	φ96	211.8	W/Cooling tube 14kg W/Heating tube 13kg
	ASME/JPI 150 RF	198						
52	JIS 10K RF	200	353.3	59	47	□ 106	264.3	W/Cooling tube 17kg W/Heating tube 16kg
	ASME/JPI 150 RF	200						
53	JIS 10K RF	200	376.8	70	59.5	□ 106	275.3	W/Cooling tube 18kg W/Heating tube 17kg
	ASME/JPI 150 RF	200						

#### ● Metersize : 55, 56

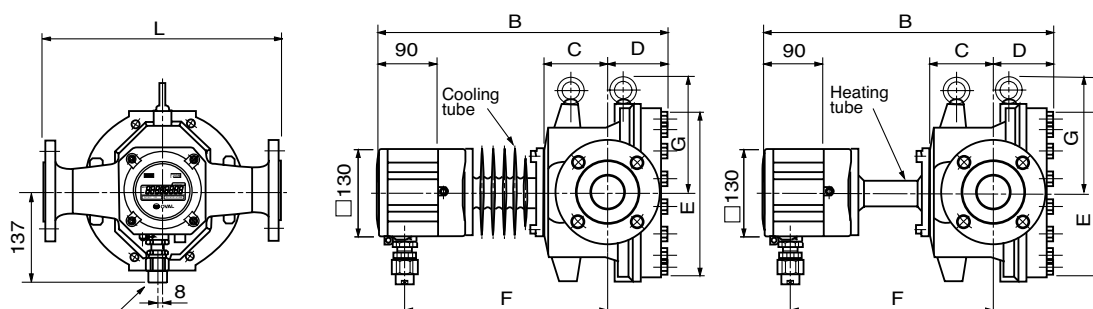


Conduit connection G<sup>1</sup>/<sub>2</sub> (female)  
(Only for units with remote output signal)

#### Flange rating 1 group

Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
55	JIS 10K RF	230	371.3	43	71	φ163	258.3	W/Cooling tube 23kg W/Heating tube 22kg
	ASME/JPI 150 RF	233						
56	JIS 10K RF	250	391.3	63	76	φ193	273.3	W/Cooling tube 27kg W/Heating tube 26kg
	ASME/JPI 150 RF	258						

#### ● Metersize : 57



Conduit connection G<sup>1</sup>/<sub>2</sub> (female)  
(Only for units with remote output signal)

#### Flange rating 1 group

Meter size	Flange rating	L	B	C	D	E	F	G	Weight (Approx.)
57	JIS 10K RF	350	424.3	90	87	φ260	295.3	171.5	W/Cooling tube 43kg W/Heating tube 42kg
	ASME/JPI 150 RF	357							

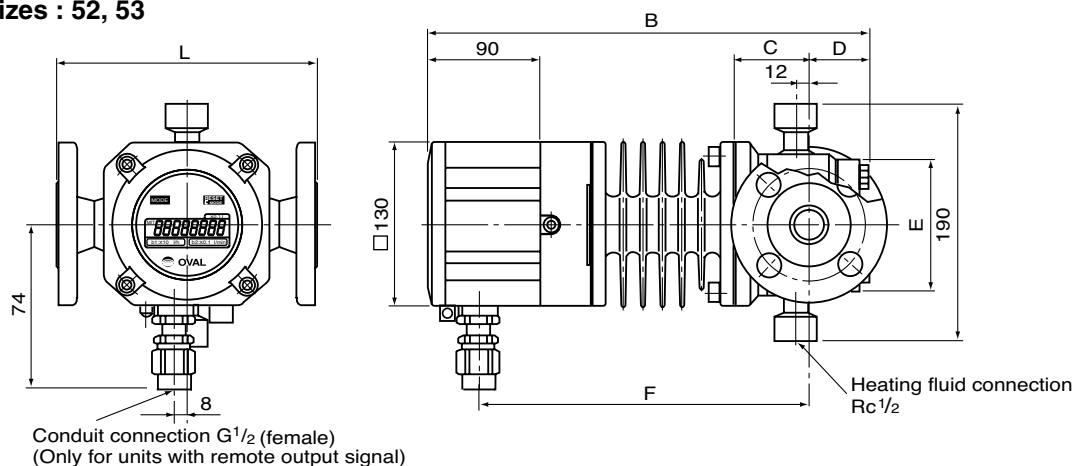
Note: For batch controller equipped ULTRA register, refer to General Specification (No. GBC201E).



# **■ OUTLINE DIMENSIONS [Standard ULTRA register type A provided] (Unit in mm)**

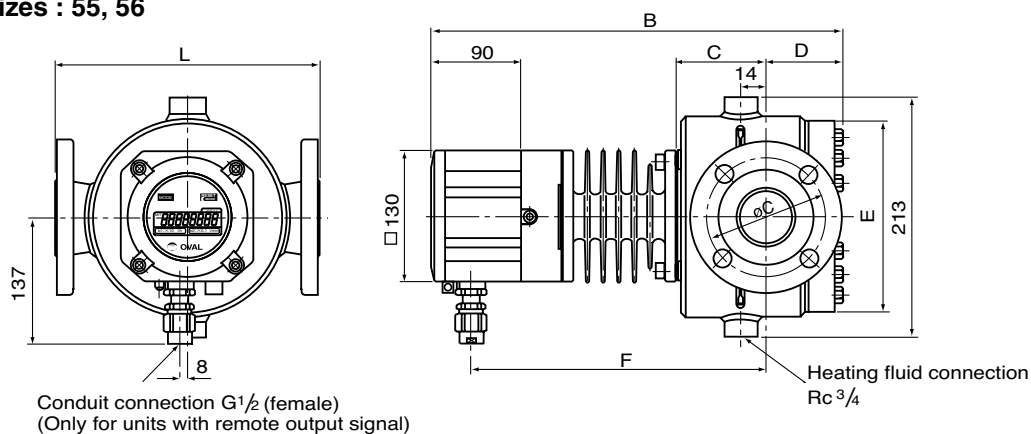
## **● Jacketed type (Type: LUJ)**

### **●Meter sizes : 52, 53**



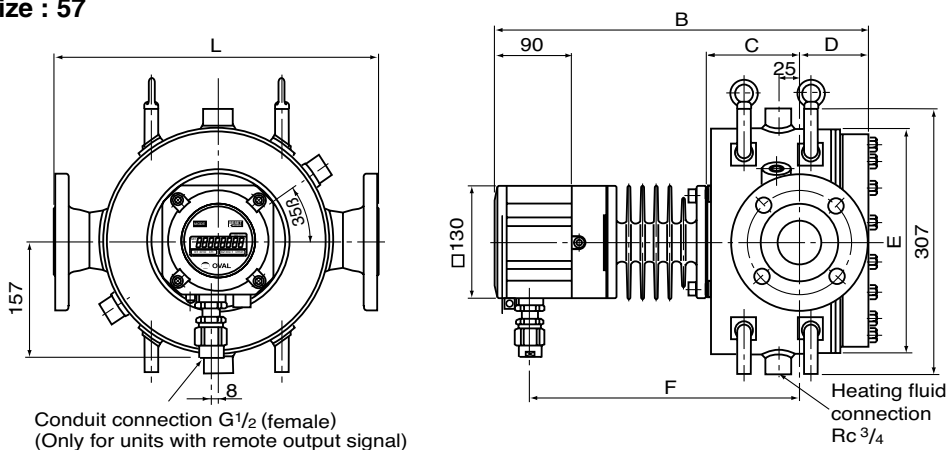
Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
52	JIS 10K RF	200	352.8	58.5	47	□ 106	263.8	13kg
	ASME/JPI 150 RF	200						
53	JIS 10K RF	200	376.3	69.5	59.5	□ 106	274.8	13.7kg
	ASME/JPI 150 RF	200						

### **●Meter sizes : 55, 56**



Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
55	JIS 10K RF	250	396.3	69	70	φ163	283.3	25kg
	ASME/JPI 150 RF	253						
56	JIS 10K RF	300	423.3	89	77	φ193	299.3	31kg
	ASME/JPI 150 RF	306						

### **●Meter size : 57**

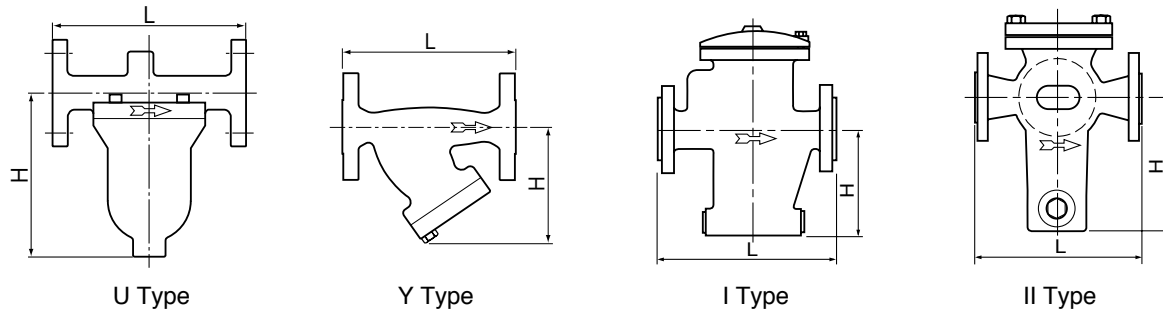


Meter size	Flange rating	L	B	C	D	E	F	Weight (Approx.)
57	JIS 10K RF	350	451.8	117.5	87	φ260	322.8	52kg
	ASME/JPI 150 RF	357						

## ■ STRAINERS

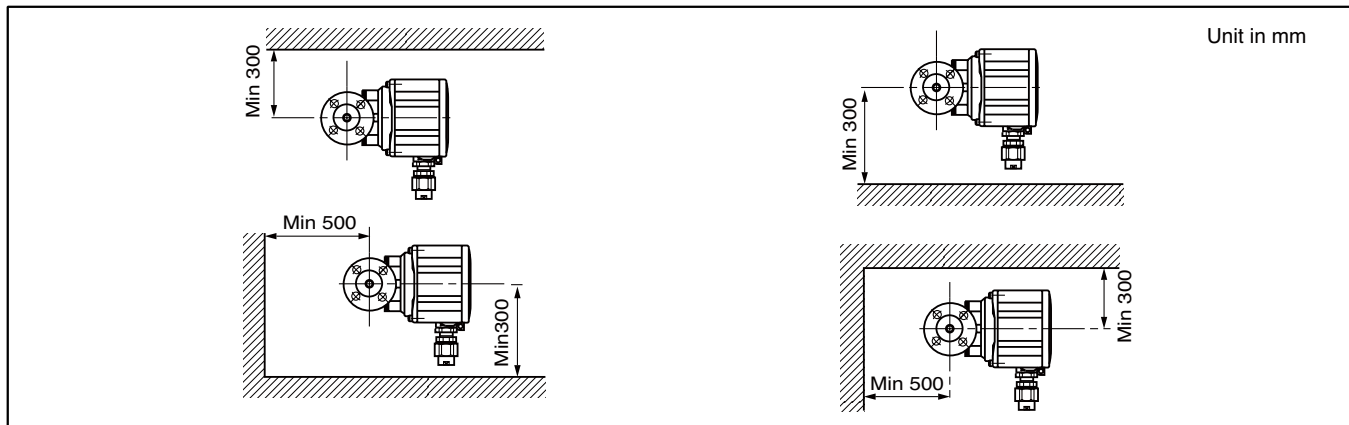
It is essential that a strainer be provided immediately upstream of, or as close as to, the flowmeter to prevent solids suspended in the process fluid from entering the meter, possibly leading to costly downtime.

※ The diagrams represent typical designs.



(Note) For details of each strainer, refer to the general specification No. GCB001 and GCB002.

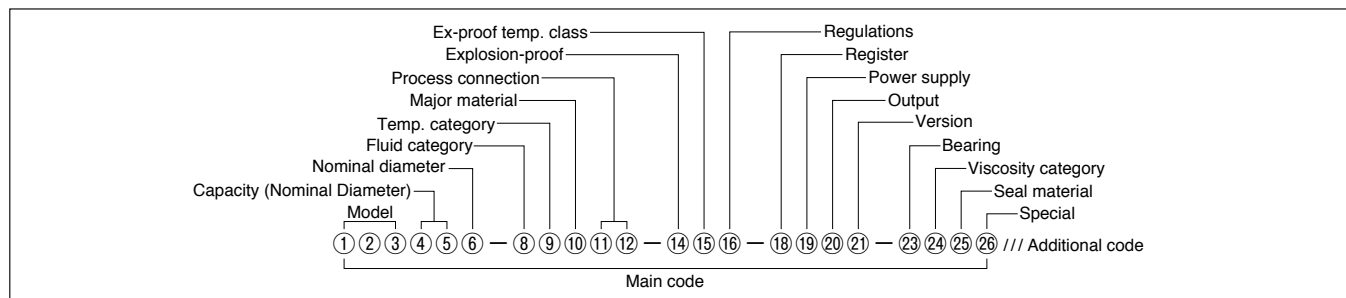
## ■ REQUIRED SPACE AROUND THE METER



## ■ OPERATING PRECAUTIONS

1. Every OVAL flowmeter is carefully assembled and precisely adjusted to measure flows down to minute flows before it leaves the factory. Take every precaution in uncrating, installation in the piping assembly, and testing.
2. Never allow foreign solids to enter the measuring chamber.
3. Flush the piping assembly thoroughly.
4. Avoid allowing the meter rotors to spin uncontrolled by directing a stream of air, etc. or allowing the fluid to flow excessively - even momentarily.
5. It is essential that a strainer (supplied by OVAL) exclusively designed for OVAL flowmeters be used.
6. This flowmeter is not provided with subtract function. If pulsation in the flow (where the fluid moves back and forth in the pipeline under the influence of pressure) or reversal of flow exists, the total counter may show erratic reading, accumulating all incoming pulses irrespective of flow direction.

## ■ PRODUCT CODE EXPLANATION



### ● Main code (Meter model: 39, 41, 45)

①	②	③	Model
L	U	S	ULTRA OVAL (integral type) all stainless
④	⑤	Capacity (Nominal Diameter) ※1	
3	9	10mm (3/8") ND (Big)	
4	1	10mm (3/8") ND (Big)	
4	5	10mm (3/8") ND (Big)	
⑥	Nominal diameter		
4	Nominal diameter (Big) integral type		
⑦	—		
⑧	Fluid category		
L	Liquid		
⑨	Temp. category		
0	60°C and lower		
1	Over 60°C up to 120°C		
⑩	Major material		
C	SCS14 (SUS316)		
S	SCS16 (SUS316L)		
Z	Special		
⑪	⑫	Process connection	
J	1	JIS10K RF	
J	B	JIS16K RF	
J	2	JIS20K RF	
J	3	JIS30K RF	
A	1	ASME150 RF	
A	3	ASME300 RF	
P	1	JPI150 RF	
P	3	JPI300 RF	
D	1	DIN10 RF	
D	B	DIN16 RF	
D	3	DIN25 RF	
Z	9	Special	
⑬	—		
⑭	Explosion-proof		
0	Non-explosionproof		
4	TIIS		
5	ATEX	※2	
6	FM	※2	
7	NEPSI		
8	KOSHA	※2	
T	ITRI	※3	
⑮	Ex-proof temp. class		
0	Non-explosionproof		
3	T3		
4	T4		

\*1: JPI/ASME flange standard is 1/2".

\*2: When register code ⑮ is "A", selectable.

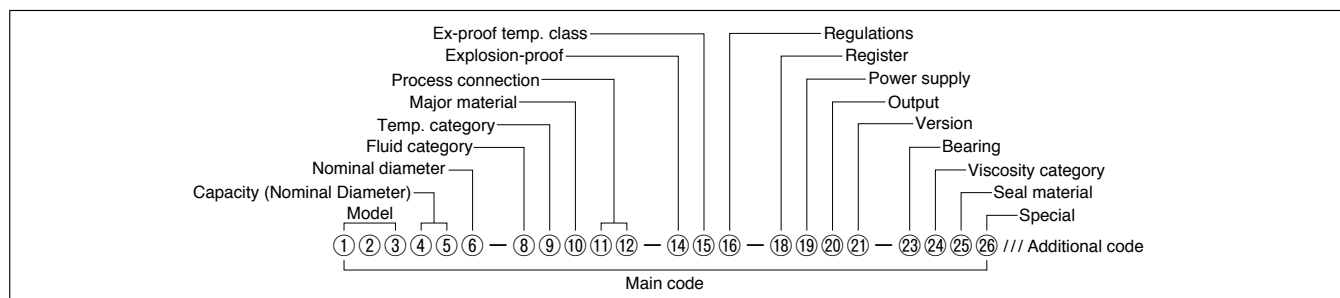
\*3: When register code ⑮ is "A, B", selectable.

\*4: See General Specification Sheet No. GBC201 for detail.

\*5: When register code ⑮ is "B", selectable.

⑯	Regulations	
0	Standard	
G	High Pressure Gas Safety Act (Approved product)	w/Material test certificate
H	High Pressure Gas Safety Act (Individual test)	w/Material test certificate (Designed on PO issued)
J	High Pressure Gas Safety Act (Completion inspection)	w/Material test certificate
L	Gas Business Act (Approved product)	w/Material test certificate (Designed on PO issued)
M	Gas Business Act	w/Material test certificate
Q	Electricity Business Act (Certificate required)	w/Material test certificate (Designed on PO issued)
R	Electricity Business Act	w/Material test certificate
T	Fire Service Act	w/Material test certificate
A	Nuclear power	w/Material test certificate (Designed on PO issued)
C	CRN pattern approval. Only when capacity (ND) ④ to ⑤ is "41"	
K	CRN pattern approval + material test certificate. Only when capacity (ND) ④ to ⑤ is "41"	w/Material test certificate
F	w/Material test certificate	
Z	Special	
⑰	—	
⑱	Register	
A	Standard ULTRA register	
B	Batch controller equipped ULTRA register (LW74E/LW76E) *4	
⑲	Power supply	
0	External power supply (standard)	
V	Battery drive	
⑳	Output	
G	Standard output (open collector pulse output)	
A	Analog	
D	Current pulse	
B	Voltage pulse	
T	Current pulse + analog	
N	No output	
1	Pneumatic 1 step open and close (V4) (LW74E) *5	
2	Pneumatic 2 step open and close (LW76E) *5	
3	Pneumatic 1 step open and close (V3) (LW74E) *5	
Z	Special	
㉑	Version	
A	Version A	
㉒	—	
㉓	Bearing	
0	Standard (carbon bearing)	
2	Standard (strong alkali carbon)	
8	Polymerizing liquid (carbon bearing)	
5	Highly corrosive liquid (ceramic bearing)	
6	Hydrogen peroxide solution (ceramic bearing)	
7	Highly corrosive polymerizing liquid (ceramic bearing)	
㉔	Viscosity category	
0	Below 200mPa·s Dedicated to 39 to 45 Shaped or sintered rotor	
1	200mPa·s and over Dedicated to 39 to 45 Shaped or sintered rotor. Only for 45 special cut	
5	Below 200mPa·s (sintered rotors inapplicable) Only for 41 cut rotor	
6	200mPa·s and over (sintered rotors inapplicable) Only for 45 special cut is applied on cut rotor	
㉕	Seal material	
F	O-ring (FPM), gasket (T#1120)	
C	O-ring (IIR), gasket (T#1120)	
T	O-ring (PTFE), gasket (V7020)	
P	O-ring (PTFE), gasket (V7035)	
Z	Special	
㉖	Special	
0	Standard	
Z	Special	

## ■ PRODUCT CODE EXPLANATION



### ● Main code (Meter model: 50, 52, 53, 55, 56, 57)

①	②	③	Model
L	U	S	ULTRA OVAL (integral type) all stainless
L	U	J	ULTRA OVAL (integral std. jacket) Element: stainless steel
④	⑤	Capacity (Nominal Diameter) ※1	
5	0	20mm (3/4") ND (Big)	
5	2	25mm (1") ND (Big)	
5	3	25mm (1") ND (Big)	
5	5	40mm (1.1/2") ND (Big)	
5	6	50mm (2") ND (Big)	
5	7	50mm (2") ND (Big)	
⑥	Nominal diameter		
4	Nominal diameter (Big) integral type		
⑦	—		
⑧	Fluid category		
L	Liquid		
⑨	Temp. category		
0	60°C and lower		
1	Over 60°C up to 120°C		
2	Over 120°C up to 200°C w/Cooling fin		
3	Over 200°C and up to 260°C w/Cooling fin		
5	Sudden temp. change (120°C and lower)		
6	Low temp. (–30°C and over and below –10°C) Max. temp. 60°C w/Heating tube		
⑩	Major material		
C	SCS14 (SUS316)		
S	SCS16 (SUS316L)		
Z	Special		
⑪	⑫	Process connection	
J	1	JIS10K RF	
J	B	JIS16K RF	
J	2	JIS20K RF	
J	3	JIS30K RF	
A	1	ASME150 RF	
A	3	ASME300 RF	
P	1	JPI150 RF	
P	3	JPI300 RF	
D	1	DIN10 RF	
D	B	DIN16 RF	
D	3	DIN25 RF	
Z	9	Special	
⑬	—		
⑭	Explosion-proof		
0	Non-explosionproof		
4	TIIS		
5	ATEX	※1	
6	FM	※1	
7	NEPSI		
8	KOSHA	※1	
T	ITRI	※2	
⑮	Ex-proof temp. class		
0	Non-explosionproof		
3	T3		
4	T4		

※1: When register code ⑮ is "A", selectable.

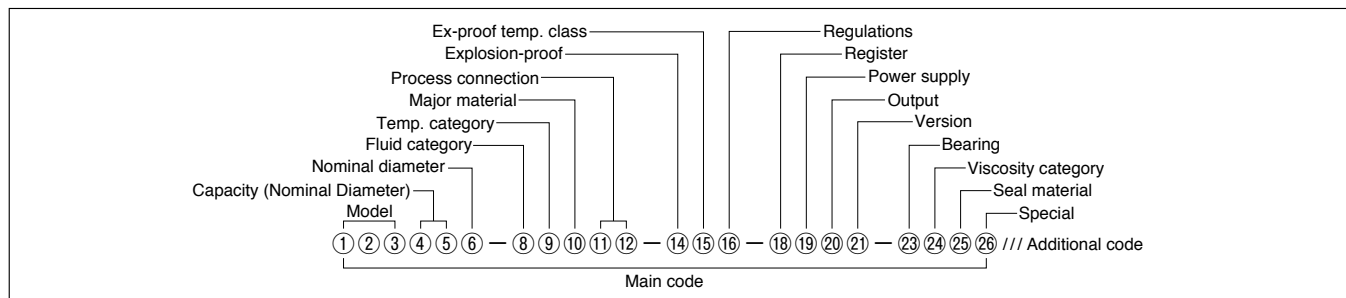
※2: When register code ⑮ is "A, B", selectable.

※3: See General Specification Sheet No. GBC201 for detail.

※4: When register code ⑮ is "B", selectable.

⑯	Regulations	
0	Standard	
G	High Pressure Gas Safety Act (Approved product)	※ w/Material test certificate
H	High Pressure Gas Safety Act (Individual test)	※ w/Material test certificate (Designed on PO issued)
J	High Pressure Gas Safety Act (Completion inspection)	※ w/Material test certificate
L	Gas Business Act (Approved product)	※ w/Material test certificate (Designed on PO issued)
M	Gas Business Act	※ w/Material test certificate
Q	Electricity Business Act (Certificate required)	※ w/Material test certificate (Designed on PO issued)
R	Electricity Business Act	※ w/Material test certificate
T	Fire Service Act	※ w/Material test certificate
A	Nuclear power	※ w/Material test certificate (Designed on PO issued)
F	w/Material test certificate	
Z	Special	
⑰	—	
⑱	Register	
A	Standard ULTRA register	
B	Batch controller equipped ULTRA register (LW74E/LW76E) ※3	
⑲	Power supply	
0	External power supply (standard)	
V	Battery drive	
⑳	Output	
G	Standard output (open collector pulse output)	
A	Analog	
D	Current pulse	
B	Voltage pulse	
T	Current pulse + analog	
N	No output	
1	Pneumatic 1 step open and close (V4) (LW74E) ※4	
2	Pneumatic 2 step open and close (LW76E) ※4	
3	Pneumatic 1 step open and close (V3) (LW74E) ※4	
Z	Special	
㉑	Version	
A	Version A	
㉒	—	
㉓	Bearing	
0	Standard (carbon bearing)	
2	Standard (strong alkali carbon)	
8	Polymerizing liquid (carbon bearing)	
5	Highly corrosive liquid (ceramic bearing)	
6	Hydrogen peroxide solution (ceramic bearing)	
7	Highly corrosive polymerizing liquid (ceramic bearing)	
㉔	Viscosity category	
2	Below 1000mPa·s	R3 sintered rotor
3	1000mPa·s and over	R3 special cut sintered rotor
5	Below 200mPa·s (sintered rotors inapplicable)	Cut rotor
6	200mPa·s and over (sintered rotors inapplicable)	Special cut cut rotor
7	Below 1000mPa·s (sintered rotors inapplicable)	R3 cut rotor
8	1000mPa·s and over (sintered rotors inapplicable)	R3 special cut cut rotor
㉕	Seal material	
F	O-ring (FPM), gasket (T#1120)	
C	O-ring (IIR), gasket (T#1120)	
T	O-ring (PTFE), gasket (V7020)	
P	O-ring (PTFE), gasket (V7035)	
Z	Special	
㉖	Special	
0	Standard	
Z	Special	

## ■ PRODUCT CODE EXPLANATION



### ● Additional code

Category of High Pressure Gas			
H	P	0	Other than High Pressure Gas
H	P	1	Toxic gas and flammable gas
H	P	2	Toxic gas
H	P	3	Flammable gas
H	P	4	Other than toxic or flammable gas
Accuracy			
R	0	5	±0.50% ACCURACY
L	0	1	±0.15% LINEARITY ※Only for export
L	0	3	±0.35% LINEARITY ※Only for export
R	0	2	±0.20% ACCURACY
R	9	9	Special
Operating condition			
F	C	0	Continuous
F	M	0	Intermittent
Special test (instrumental error)			
A	1	0	Taxed custody transfer
A	2	0	By certified measurer
A	6	0	Standard oil meter According to JMIF standard (Bore size 80mm and over)
A	7	0	Std. fuel oil meter, std. water meter
A	8	0	Std. fuel oil meter, std. water meter
A	9	9	Designation of instrumental error test method Addition of one (1) test point, etc.
Flow direction			
F	R	0	R → L
F	L	0	L → R
F	U	0	T → B: Electric conduit at the bottom
F	D	0	B → T: Electric conduit at the bottom
Designated special paint on body			
B	C	0	Corrosion proof
B	A	0	Salinity and acid tolerance 120°C and lower
B	X	0	Customer designation
Designated special paint on transmitter			
S	F	0	Corrosion proof Special treatment
S	D	0	Salinity tolerance
S	E	0	Acid tolerance Special treatment
S	X	0	Customer designated paint Special treatment
Cleansing			
T	W	0	Non-oil and non-water treatment
T	W	1	Non-oil and non-water treatment equivalent
T	F	0	Food cleansing
T	A	0	Nuclear cleansing
T	C	0	CIP Choose countermeasure to sudden temp. change
Label			
N	P	J	Label (Japanese)
N	P	E	Label (English)

Document			
D	S	J	DWG and specifications for approval (Japanese)
D	S	E	DWG and specifications for approval (English)
D	R	0	Re-submission of DWG with specifications
D	C	J	Final DWG (Japanese)
D	C	E	Final DWG (English)
D	P	J	Calculation sheet (Japanese)
D	P	E	Calculation sheet (English)
S	E	J	Instrumental error test report (Japanese)
S	E	E	Instrumental error test report (English)
S	T	J	Pressure test report (Japanese)
S	T	E	Pressure test report (English)
S	A	J	Airtight test report (Japanese)
S	A	E	Airtight test report (English)
D	D	J	Dimensional check record (Japanese)
D	D	E	Dimensional check record (English)
S	P	J	Penetrant test report (Japanese) Welded part of pressure resistant vessel
S	P	E	Penetrant test report (English) Welded part of pressure resistant vessel
S	M	J	Magnetic particle inspection (Japanese) Welded part of pressure resistant vessel
S	M	E	Magnetic particle inspection (English) Welded part of pressure resistant vessel
S	R	J	Radiographic inspection (Japanese) Welded part of pressure resistant vessel
S	R	E	Radiographic inspection (English) Welded part of pressure resistant vessel
S	U	J	Ultrasonic inspection (Japanese) Welded part of pressure resistant vessel
S	U	E	Ultrasonic inspection (English) Welded part of pressure resistant vessel
S	X	J	PMI test report (Japanese)
S	X	E	PMI test report (English)
S	S	J	Impact test report (Japanese)
S	S	E	Impact test report (English)
D	Y	J	WPS/PQR (Japanese)
D	Y	E	WPS/PQR (English)
D	9	J	Photo (Japanese)
D	9	E	Photo (English)
D	T	J	Inspection procedure (Japanese)
D	T	E	Inspection procedure (English)
C	A	J	Inspection certificate: A set Only Japanese
C	B	J	Inspection certificate: B set Only Japanese
C	C	J	Inspection certificate: C set Only Japanese
C	D	J	Inspection certificate: D set Only Japanese
Witnessed by customer			
V	1	0	Required

## ■ ORDERING INFORMATION

Please complete the following form when making inquiries.

<b>1. Model</b>	L_____ <input type="checkbox"/> Standard <input type="checkbox"/> High temp. <input type="checkbox"/> Low temp. <input type="checkbox"/> Jacketed
<b>2. Fluid to be measured</b>	Name_____ Viscosity_____ mPa · s Specific gravity_____
<b>3. Flowrate (L/h, m³/h)</b>	Maximum_____ Normal_____ Minimum_____
<b>4. Fluid temperature (°C)</b>	Maximum_____ Normal_____ Minimum_____
<b>5. Ambient temperature (°C)</b>	Maximum_____ Normal_____ Minimum_____
<b>6. Pressure (MPa)</b>	Maximum_____ Normal_____ Minimum_____
<b>7. Flow direction</b>	Right ⇌ Left, Bottom ⇌ Top
<b>8. Flange connection</b>	Nominal size_____ mm, Flange rating_____
<b>9. Required linearity</b>	±_____ %
<b>10. Explosionproof configuration</b>	<input type="checkbox"/> Non-explosionproof <input type="checkbox"/> TIIS <input type="checkbox"/> ATEX <input type="checkbox"/> FM <input type="checkbox"/> NEPSI Pressure-resistant packing (selectable only for ATEX or FM) <input type="checkbox"/> Required <input type="checkbox"/> Not required
<b>11. Accessories</b>	<input type="checkbox"/> Strainer, <input type="checkbox"/> Air eliminator, <input type="checkbox"/> Companion flange
<b>12. Quantity</b>	Including accessories_____
<b>13. Application</b>	_____(dosing, sampling, blending process, etc.) <input type="checkbox"/> Flow integration, <input type="checkbox"/> Flow indication, <input type="checkbox"/> Record, <input type="checkbox"/> Flow control, <input type="checkbox"/> Batch control, <input type="checkbox"/> CPU interface, <input type="checkbox"/> Others
<b>14. Receiving instrument</b>	Type, manufacturer, model, specifications (input, output, power supply, etc.)
<b>15. Distance between flow meter and receiving instrument</b>	_____m