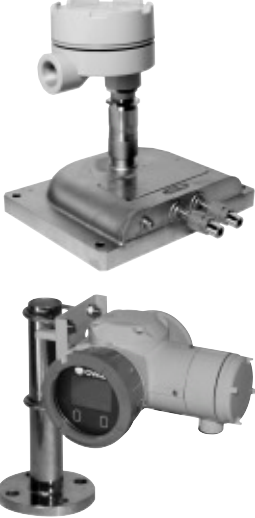







High Performance Coriolis Flowmeters

ALTI_{mass} Type UGENERAL SPECIFICATION
GS.No.GBN120E-3

Extra low flow Liquid Gas	Standard Liquid Gas	High pressure service Liquid Gas	Large sized Liquid
			

■ GENERAL

Equipped with a sophisticated transmitter (self diagnosis feature, large size display, and field reconfiguration capability using a touch panel), “ALTI_{mass} Type U” is an all round high performance Coriolis flowmeter capable of direct mass flow measurement at a high degree of accuracy. Particularly worth noting are its functionality in applications where measurement of extra low flows, short-duration filling process, etc. besides routine flowrate measurement.

■ FEATURES

1. Increased self-diagnostic capabilities: checking for cable faults, pipeline vibration, and monitoring transmitter temperatures, to name a few.
2. You can reconfigure transmitter parameters using a finger touch on the touch panel (also through communication).
3. Improved zero stability. (CA015 to CA080)
4. Accurate liquid density: ± 0.0005 g/mL (CA003 to CA080)
5. Fast response: One digit improved from conventional models.
6. Two alarm indicators provided
7. Increased output signals
Pulse output (dual outputs), current output (dual outputs), and status output (single output)
8. Enhanced maintenance functions
Error logging, storing factory shipping data, and downloading programs
9. Readily expandable for additional applications
(Improved communication capability, comprehensive maintenance capability, and enhanced expandable functions)

OVAL Corporation

<http://www.oval.co.jp>

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■ GENERAL SPECIFICATIONS

1. Sensor unit

● CA00A and CA001

Item		Description	
Model		CA00A	CA001
Nominal size		1/4"	
Materials	Wetted parts	SUS316L	
	Housing	SUS304	
	O-rings	Fluorine rubber (std. : FKM), PTFE (option)	
Process connection		R 1/4	
Applicable fluid		Liquid and gas	
Density range		0 to 2.0 g/mL	
Temperature range		-200 to +200°C	
Max. operating pressure	Liquid	15MPa at 20°C	
	Gas	0.98MPa	
Flow direction		Bidirectional	
Explosionproof configuration		Non-explosionproof (explosionproof applied for).	
Enclosure protection class		IP66	

※ : Compliance with high pressure gas regulations is not applicable.

※ : Remotely located transmitter only.

● CA003 to CA080

Item		Description							
Model		CA003(※1)	CA006	CA010	CA015	CA025	CA040	CA050	CA080
Nominal size		10mm or 3/8" (※2)		15mm or 1/2"		25mm or 1"	40mm or 1 1/2"	50mm or 2"	80mm or 3"
Materials	Wetted parts	SUS316L, SUS316L +Alloy C, Alloy C							
	Housing	SUS304							
Process connection		JIS 10, 20, 30, 40, 63K RF, ASME/JPI 150, 300, 600RF, IDF ferrule (※3), Screw							
Applicable fluids		Liquids and gas							
Density range		0 to 2.0 g/mL							
Temperature range		Integrally mounted : -20 to +90°C, Separately mounted : -200 to +200°C							
Tube withstand (at 20°C)		9.4MPa							
Max. operating pressure		Max. 9.4 MPa (Depends on flange rating)							
Sensor housing withstand (MPa)(※4)		7.2	3.8	3.0	2.2	1.6	1.8		1.4
Flow direction		Bidirectional							
Explosionproof configuration		Non-explosionproof (explosionproof applied for).							
Enclosure protection class		IP66							

※1 : Transmitter compatible with CA003 is remote mount type.

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

※3 : For IDF ferrule connection, there are no CE Mark compliant products available.

※4 : This pressure does not represent the maximum working pressure in the pressure vessel ratings. It represents, based upon comparison between the results of breakdown test conducted at the OVAL (distorted enclosures are permissible) and the breakdown pressure in the FEM analysis, the one quarter (1/4) of the pressure obtained, whichever is lower (safer).

※ : For products conforming to the high pressure gas safety regulations and CE marking, consult our representative.

● CA100 and CA150

Item		Description	
Model		CA100	CA150
Nominal size		100mm or 4"	150mm or 6"
Materials	Wetted parts	SUS316L	
	Housing	SUS304	
Process connection		JIS 10, 20, 30K RF / ASME (JPI) 150, 300, 600RF	
Applicable fluids		Liquids	
Density range		0.3 to 2.0 g/mL	
Viscosity range		Max. 1000mPa·s	
Temperature range		-200 to +200°C	
Tube withstand (at 20°C)		13.56MPa (For reference : 9.39MPa at 200°C)	
Max. operating pressure		Depends on flange rating	
Flow direction		Bidirectional	
Explosionproof configuration		Non-explosionproof (explosionproof applied for).	
Enclosure protection class		IP66	

※ : Compliance with high pressure gas regulations is not applicable.

※ : Remotely located transmitter only.

● High pressure service (CA010 and CA015)

Item		Description	
Model		CA010 (High pressure service)	CA015 (High pressure service)
Materials	Wetted parts	Alloy C	
	Housing	SUS304	
Process connection		Screw Rc3/8	Screw Rc3/4
Applicable fluids		Liquids and gas	
Density range		0 to 2.0 g/mL	
Temperature range		Integrally mounted : -20 to $+90^{\circ}\text{C}$, Separately mounted : -200 to $+200^{\circ}\text{C}$	
Max. operating pressure		36MPa at room temperature	43MPa at room temperature
Sensor housing withstands (MPa) (※5)		3.0MPa	2.2MPa
Flow direction		Bidirectional	
Explosionproof configuration		Non-explosionproof (explosionproof applied for)	
Enclosure protection class		IP66	

※5 : This pressure does not represent the maximum working pressure in the pressure vessel ratings. It represents, based upon comparison between the results of breakdown test conducted at the OVAL (distorted enclosures are permissible) and the breakdown pressure in the FEM analysis, the one quarter (1/4) of the pressure obtained, whichever is lower (safer).

※ : Compliance with high pressure gas regulations is not applicable.

2. Transmitter specifications

Item	Description
Model	PA0K
Power supply	85 to 264VAC 50/60Hz or 20 to 30VDC
Power consumption	Max. 15W
Ambient temperature	-40 to $+55^{\circ}\text{C}$ (※6)
Transmission length (separate type)	Max. 200m (Dedicated cable used) (※7)
Applicable EU directive	EMC Directive : 2004/108/EC
Applicable EN standards	EMC : EN55011 : 1998/A1 : 1999/A2 : 2002 Group 1, Class B EN61000-6-2 : 2001/EN061326-1 : 2006
Explosionproof enclosure	Non-explosionproof (explosionproof applied for)
Dust and waterproof configuration	IP66
Transmitter configuration	Integral or separate mounted (CA00A, CA001, CA003, CA100, CA150 or if process fluid temp. exceeds 90°C , remotely mounted type only acceptable.)
Finish	Sensor: Munsell 10B8/4, Covers (front and rear): 2.5PB4/10
Display	LCD display provided (128×64 dots), backlit (white, orange) Infrared light sensors: 2, LED: 2 (green, red)
Weight	Integrally mounted model 3.6kg approx., Remotely mounted model 5.0kg approx.
Communication interface	Bell 202 (under HART protocol) (※8)
Operation	Additional damping: flow 0.8sec, density 4sec, temperature 2.5sec. Low flow cutoff (default) : 0.6% or less of max. service flowrate
Pulse output	Open collector output (10V min. to 30Vmax., 50mA DC) , or Voltage pulse ("Low Level": 1.5V max. "High Level": 15V min., Output impedance 2.2k Ω), Setting range: 0.1 to 10000Hz (max. output 11000Hz)
Analog output	4 to 20mADC (max. load 600 Ω) Select two outputs from instant flowrate (mass or volume) temperature, and density.
Status output	Open collector output (Max.30V, 50mADC) Select one output from error (※9), flow direction, or high/low alarm (default is error)
Status input	Contact-closure input (Form "a" contact) Short: 200 Ω max., Open: 100k Ω min. Select one output from remote zero, total reset, 0% signal lock, or function off (default is function off).

※6 : Below -20°C , the display and infrared optical sensor may exhibit a slow response.

※7 : If it exceeds 200 meters, consult the factory.

※8 : Analog output 1 is compatible only with Bell202 specification.

※9 : Of error outputs, "auto zero in progress" status output can be set up.

※ : Due to the incorporation of a circuit protection device conforming to EMC requirements, insulation resistance and dielectric strength tests are unacceptable.

■ GENERAL PERFORMANCE

● CA00A and CA001

Item		Description		
Model		CA00A	CA001	
Flow rate	Normal flow range (g/min)	0 to 40	0 to 150	
	Allowable flow range (g/min)	0 to 60	0 to 225	
	Min. range (g/min)	0 to 2	0 to 7.5	
	Min. measurable rate (g/min)	0.4	1.5	
	Accuracy in factory calibration	Liquids	[±0.2% ± zero stability error] of RD	
		Gases	[±0.5% ± zero stability error] of RD	
	Repeatability	Liquids	[±0.05% ± 1/2 zero stability error] of RD	
Gases		[±0.25% ± 1/2 zero stability error] of RD		
Zero stability (g/min)		0.006	0.0225	
Density (Liquid)	Measuring range	0.3 to 2g/mL		
	Accuracy in factory calibration (option)	±0.003g/mL		
Analog accuracy		±0.1% of FS added to each accuracy		

● CA003 thru CA150

Item		Description										
Model		CA003	CA006	CA010	CA015	CA025	CA040	CA050	CA080	CA100	CA150	
Flow rate	Normal flow range (kg/h)	0 to 72	0 to 360	0 to 1200	0 to 3600	0 to 10800	0 to 39000	0 to 120000	0 to 342000	0 to 1026000	0 to 3078000	
	Allowable flow range (kg/h)	0 to 144	0 to 720	0 to 2400	0 to 7200	0 to 21600	0 to 78000	0 to 240000	0 to 720000	0 to 2160000	0 to 6480000	
	Min. range (kg/h)	0 to 3.6	0 to 18	0 to 60	0 to 180	0 to 540	0 to 1950	0 to 6000	0 to 17100	0 to 51300	0 to 153900	
	Min. measurable rate (kg/h)	0.72	3.6	12	36	108	390	1200	3600	10800	32400	
	Accuracy in factory calibration	Liquids	[±0.1% ± zero stability error] of RD									
		Gases	[±0.5% ± zero stability error] of RD									
	Repeatability	Liquids	[±0.05% ± 1/2 zero stability error] of RD									
Gases		[±0.25% ± 1/2 zero stability error] of RD										
Zero stability (kg/h)		0.0072	0.036	0.12	0.18	0.54	1.95	6	18	54	162	
Density (Liquid)	Measuring range	0.3 to 2g/mL										
	Accuracy in factory calibration (option)	±0.0005g/mL									±0.001g/mL	
Analog accuracy		±0.1% of FS added to each accuracy										

● High pressure service (CA010 and CA015)

Item		Description		
Model		CA010 (High press. type)	CA015 (High press. type)	
Flow rate	Normal flow range (kg/h)	0 to 840	0 to 2550	
	Allowable flow range (kg/h)	0 to 1680	0 to 5100	
	Min. range (kg/h)	0 to 120	0 to 390	
	Min. measurable rate (kg/h)	24	78	
	Accuracy in factory calibration	Liquids	[±0.2% ± zero stability error] of RD	
		Gases	Normal flowrate over [±0.3% ± zero stability error] of RD	
	Repeatability	Liquids	[±0.1% ± 1/2 zero stability error] of RD	
Gases		[±0.25% ± 1/2 zero stability error] of RD		
Zero stability (kg/h)		0.21	0.636	
Density (Liquids)	Measuring range	0.3 to 2g/mL		
	Accuracy in factory calibration (option)	±0.004g/mL		
Analog accuracy		±0.1% of FS added to each accuracy		

$$\text{Zero stability error} = \frac{\text{Zero stability}}{\text{Flow rate at the moment}} \times 100\%$$

※ Zero stability and flowrate during the test should read in the same measurement unit.

※ : For volume flowrate measurement in custom or custody transfer application, contact us.

※ : In gas measurement, the max. permissible flow velocity varies with the type of gas and some may be beyond the bounds of measurement. If such is the case, seek our technical assistance.

■ DISPLAY

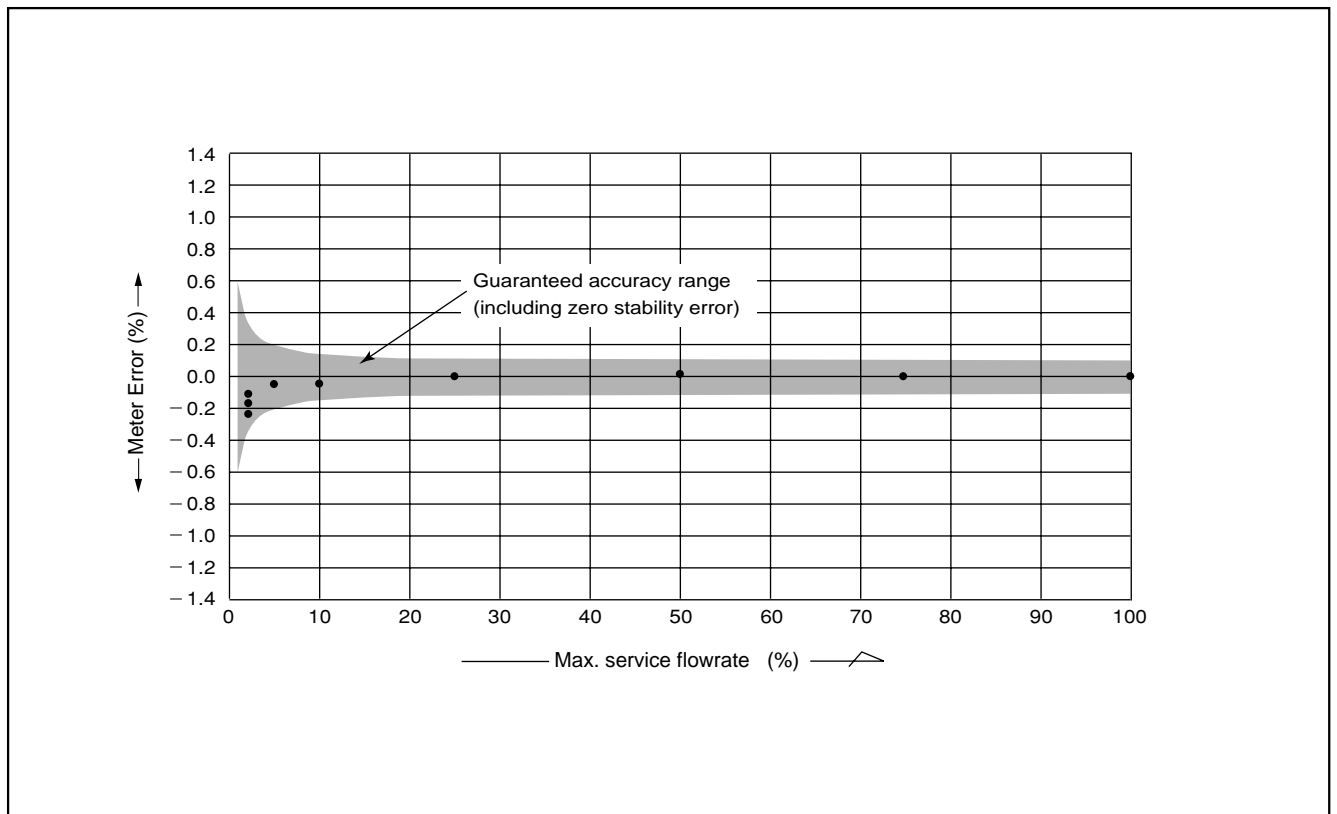
Available display modes

- ① Instantaneous mass flow rate
- ② Instantaneous volume flow rate
- ③ Density
- ④ Temperature
- ⑤ Totalized flow 1 (mass or volume) (no unit)
- ⑥ Totalized flow 2 (mass or volume) (no unit)
- ⑦ Totalized flow 1 (mass or volume) (has units)
- ⑧ Totalized flow 2 (mass or volume) (has units)
- ⑨ Analog output 1 (% instant flowrate)
- ⑩ Analog output 2 (% instant flowrate)
- ⑪ Status information
- ⑫ Mode select (param. setting)

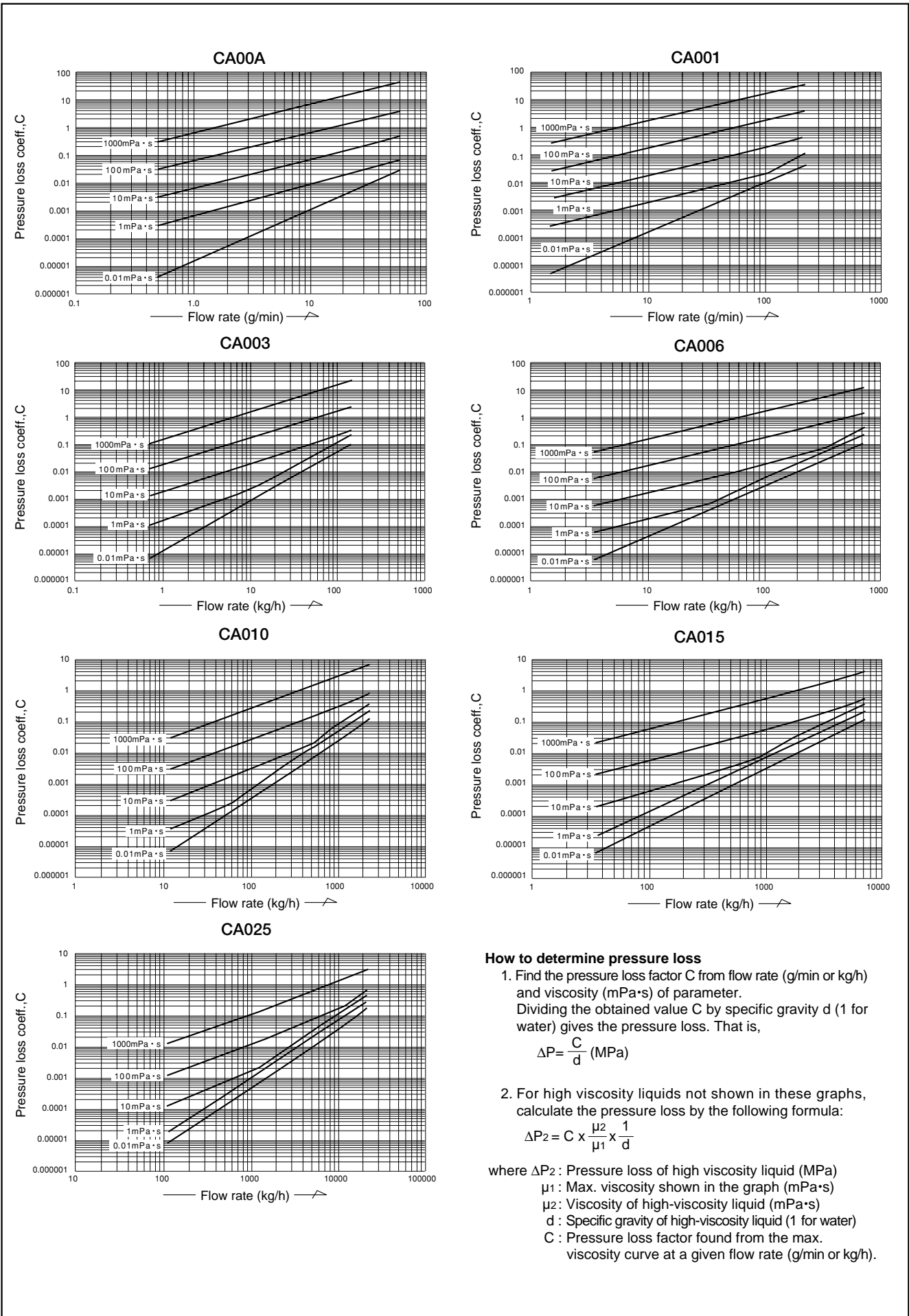
A tap of a finger on this glass faceplate area (infrared light sensor) selects the desired display modes.

※LCD backlight in two colors: white and orange.
Changes according to flowmeter status.
Backlight goes out automatically when the optical sensor does not respond at all for a set time period.

■ METER ERROR



■ PRESSURE LOSSES



How to determine pressure loss

1. Find the pressure loss factor C from flow rate (g/min or kg/h) and viscosity (mPa·s) of parameter. Dividing the obtained value C by specific gravity d (1 for water) gives the pressure loss. That is,

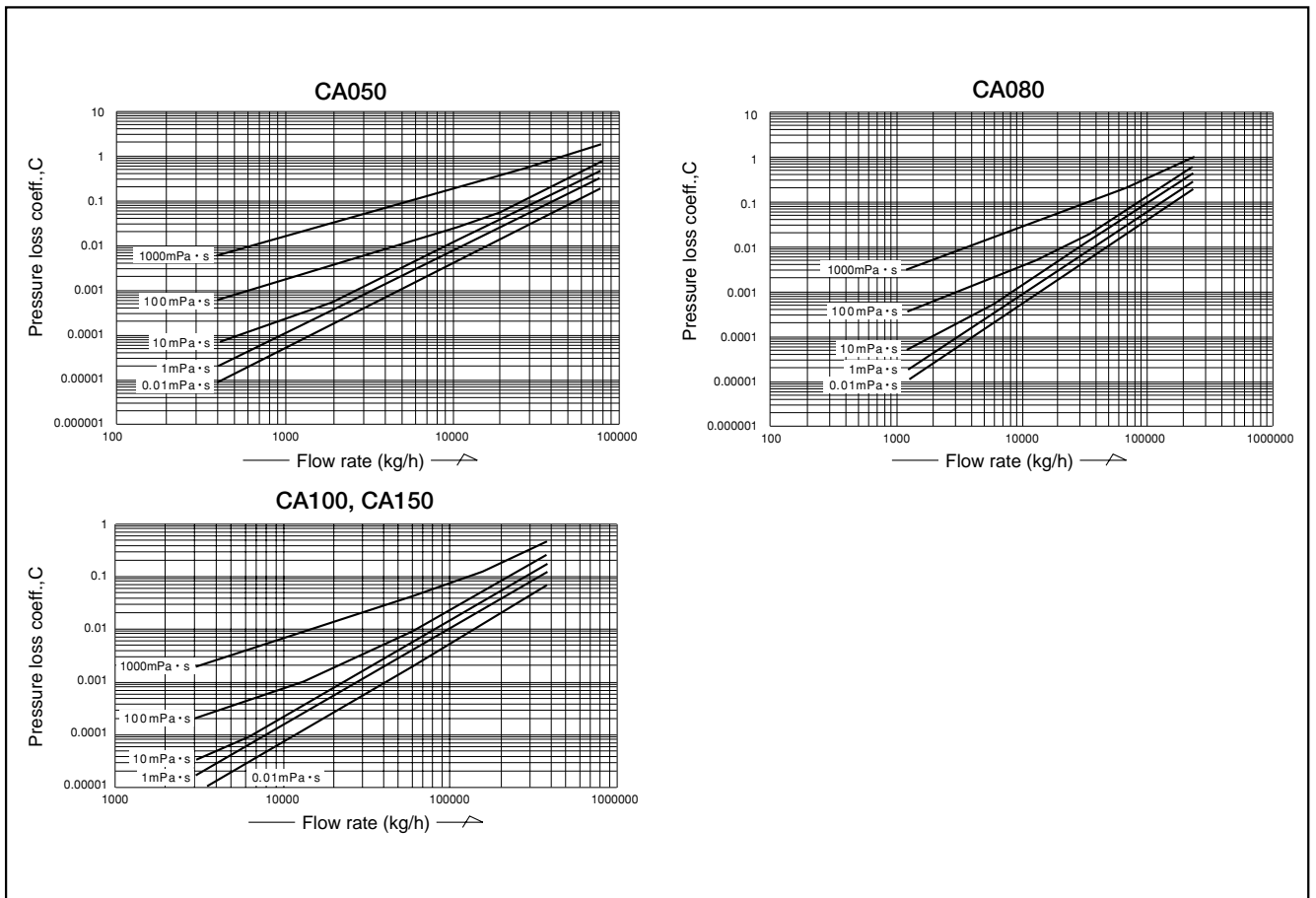
$$\Delta P = \frac{C}{d} \text{ (MPa)}$$

2. For high viscosity liquids not shown in these graphs, calculate the pressure loss by the following formula:

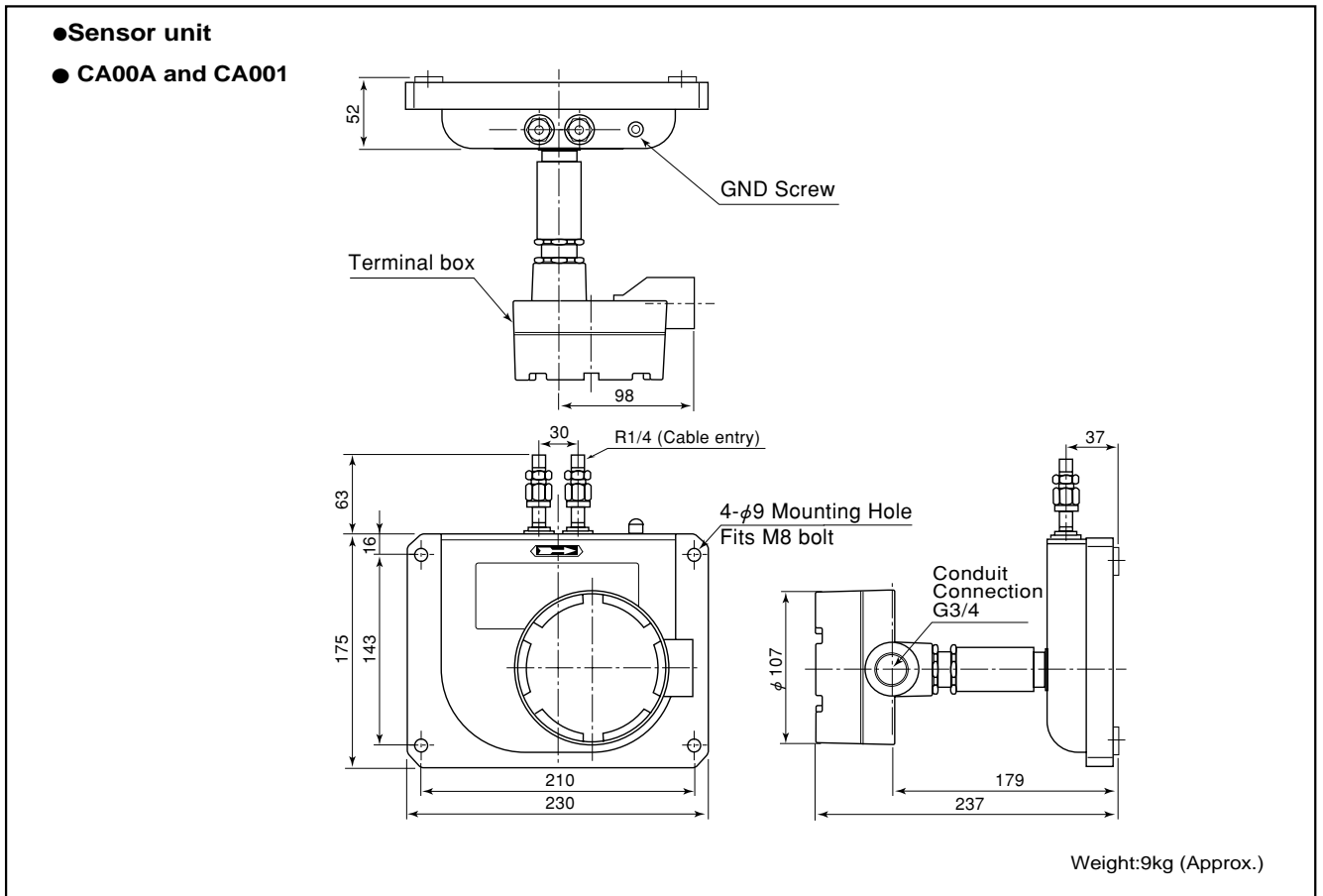
$$\Delta P_2 = C \times \frac{\mu_2}{\mu_1} \times \frac{1}{d}$$

where ΔP_2 : Pressure loss of high viscosity liquid (MPa)
 μ_1 : Max. viscosity shown in the graph (mPa·s)
 μ_2 : Viscosity of high-viscosity liquid (mPa·s)
 d : Specific gravity of high-viscosity liquid (1 for water)
 C : Pressure loss factor found from the max. viscosity curve at a given flow rate (g/min or kg/h).

■ PRESSURE LOSSES

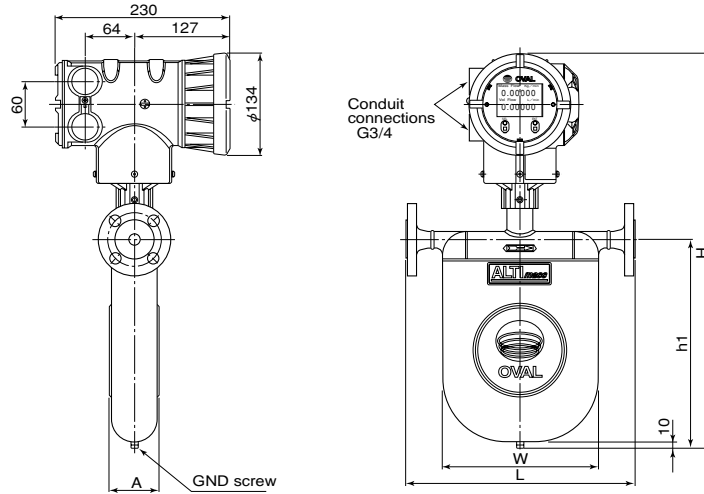


■ DIMENSIONS [Unit in mm]



■ DIMENSIONS [Unit in mm]

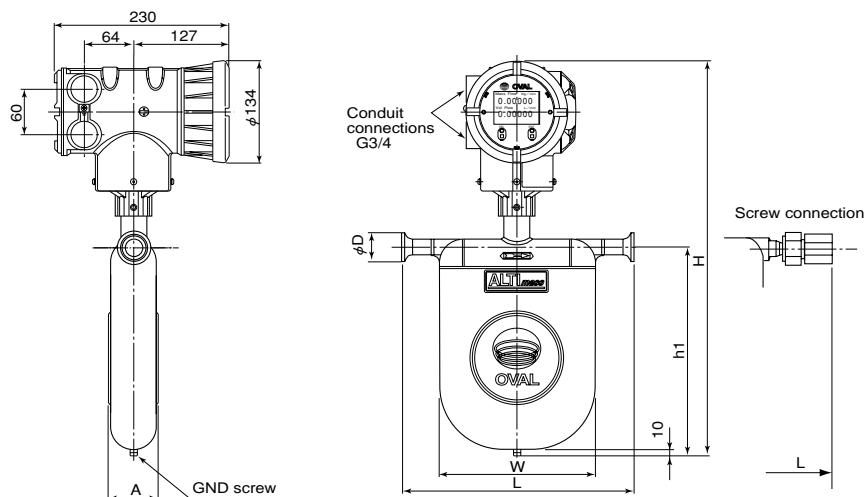
● Transmitter integrally mounted / flange connection type



Model	Nominal size	JIS					ASME JPI			H	h1	A	W	Approx. Weight kg (JIS10K)
		10K	20K	30K	40K	63K	150	300	600					
CA006	10(3/8")	242	242	260	260	280	268	277	289	434	180	53	148	7.8
CA010	15(1/2")	256	256	276	276	294	282	291	303	472	218	53	163	7.8
CA015	15(1/2")	299	299	319	319	343	325	334	347	522	268	65	205	8.8
CA025	25(1")	380	380	400	400	422	411	424	437	589	329	83	262	13.3
CA040	40(1 1/2")	513	513	541	541	585	547	560	575	720	452	121	385	25.8
CA050	50(2")	513	523	561	561	595	550	563	582					25.8
CA080	80(3")	657	675	725	725	771	699	717	737	889	602	174	510	48.8

※ : This table is applied to material code SS, SH. In case of code HY, please consult our representative.
 ※ : Flange size for model CA006 is 1/2" in case of ASME or JPI.
 ※ : CA003 Transmitter separately mounted type.
 ※ : As long as flange O.D. and bolt holes remain the same while flange rating may differ, the flange thickness with the higher rating is chosen in the above.

● Transmitter integrally mounted / ferrule or screw connection type

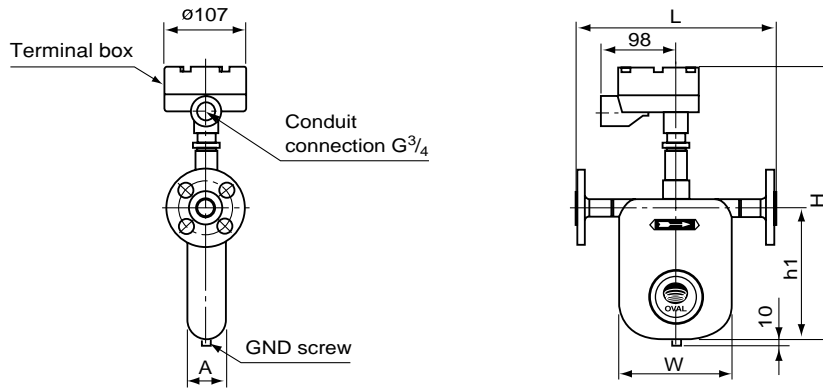


Model	Ferrule Connection		L	H	h1	A	W	øD	Approx. Weight (kg)	Model	Screw	L	Approx. Weight (kg)
	Nom. size												
CA006	10	Ferrule 10A	231.5	434	180	53	148	34	5.7	CA006	Rc 3/8	296	5.7
CA010	15	Ferrule 15A	246	472	218	53	163	34	6.3	CA010	Rc 3/8	312	6.3
CA015	15	Ferrule 15A	289	522	268	65	205	34	7.1	CA015	Rc 3/4	382	7.1
CA025	25	Ferrule 25 (ISO), IDF 1S	370	589	329	83	262	50.5	10.7				
CA040	40	Ferrule 38 (ISO), IDF 1.5S	493	720	452	121	385	50.5	19.2				
CA050	50	Ferrule 51 (ISO), IDF 2S						64					
CA080	80	Ferrule 76.1 (ISO), IDF 3S	658.5	889	602	174	510	91	50.8				

※ : CA003 Transmitter separately mounted type.

■ DIMENSIONS [Unit in mm]

● Transmitter separately mounted / flange connection type



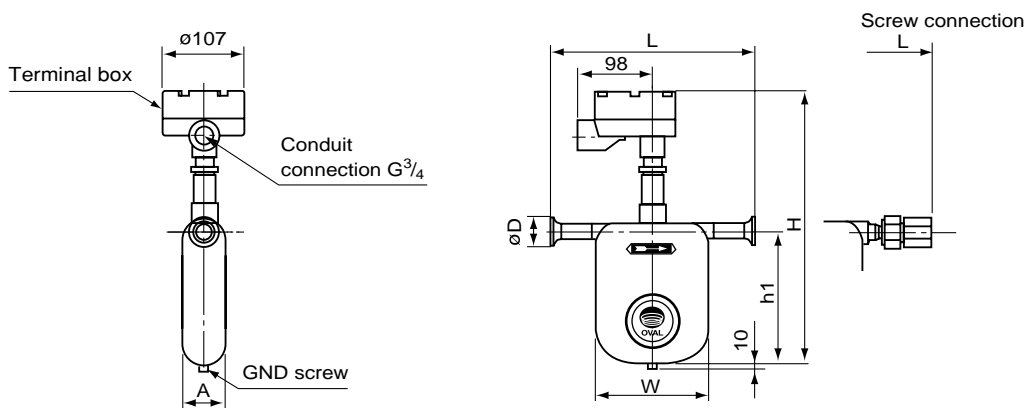
Model	Nominal size	JIS					ASME, JPI			H	h1	A	W	Approx. Weight kg (JIS10K)
		10K	20K	30K	40K	63K	150	300	600					
CA003	10(3/8")	275	275	293	293	313	301	310	322	388	186	49	179	5.3
CA006	10(3/8")	242	242	260	260	280	268	277	289	368	180	53	148	4.0
CA010	15(1/2")	256	256	276	276	294	282	291	303	406	218	53	163	4.7
CA015	15(1/2")	299	299	319	319	343	325	334	347	456	268	65	205	5.6
CA025	25(1")	380	380	400	400	422	411	424	437	524	329	83	262	10.4
CA040	40(1 1/2")	513	513	541	541	585	547	560	575	654	452	121	385	19.8
CA050	50(2")	513	523	561	561	595	550	563	582					20.2
CA080	80(3")	657	675	725	725	771	699	717	737	824	602	174	510	53.6

※ : This table is applied to material code SS, SH. In case of code HY, please consult our representative.

※ : Flange size for model CA003 or CA006 is 1/2" in case of ASME or JPI.

※ : As long as flange O.D. and bolt holes remain the same while flange rating may differ, the flange thickness with the higher rating is chosen in the above.

● Transmitter separately mounted / ferrule or screw connection type



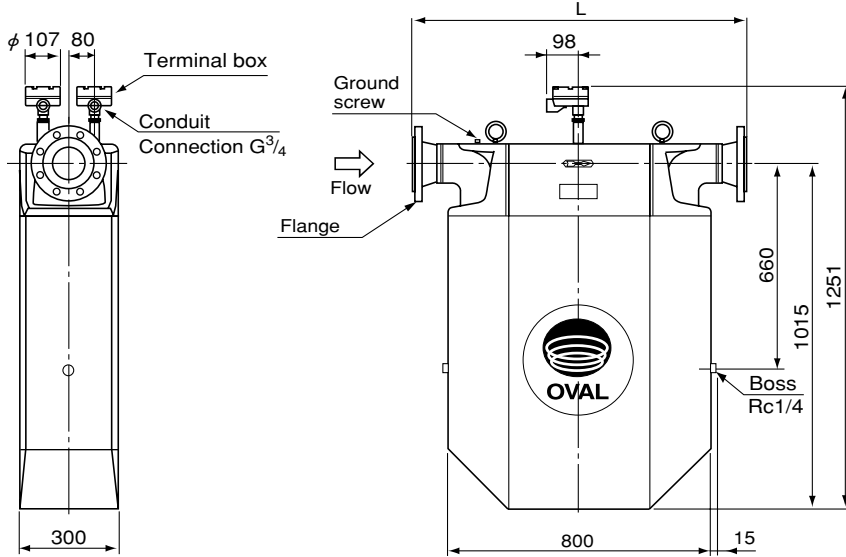
Model	Ferrule Connection		L	H	h1	A	W	10D	Approx. Weight (kg)
	Nom. size								
CA003	10	Ferrule 10A	265	388	186	49	179	34	4.1
CA006	10	Ferrule 10A	231.5	368	180	53	148	34	2.8
CA010	15	Ferrule 15A	246	406	218	53	163	34	3.4
CA015	15	Ferrule 15A	289	456	268	65	205	34	4.2
CA025	25	Ferrule 25 (ISO), IDF 1S	370	524	329	83	262	50.5	7.8
CA040	40	Ferrule 38 (ISO), IDF 1.5S	493	654	452	121	385	50.5	16.3
CA050	50	Ferrule 51 (ISO), IDF 2S						64	
CA080	80	Ferrule 76.1 (ISO), IDF 3S	658.5	824	602	174	510	91	47.9

Model	Screw	L	Approx. Weight (kg)
CA003	Rc 3/8	332	4.1
CA006	Rc 3/8	296	2.8
CA010	Rc 3/8	312	3.4
CA015	Rc 3/4	382	4.2

■ DIMENSIONS [Unit in mm]

● Sensor unit

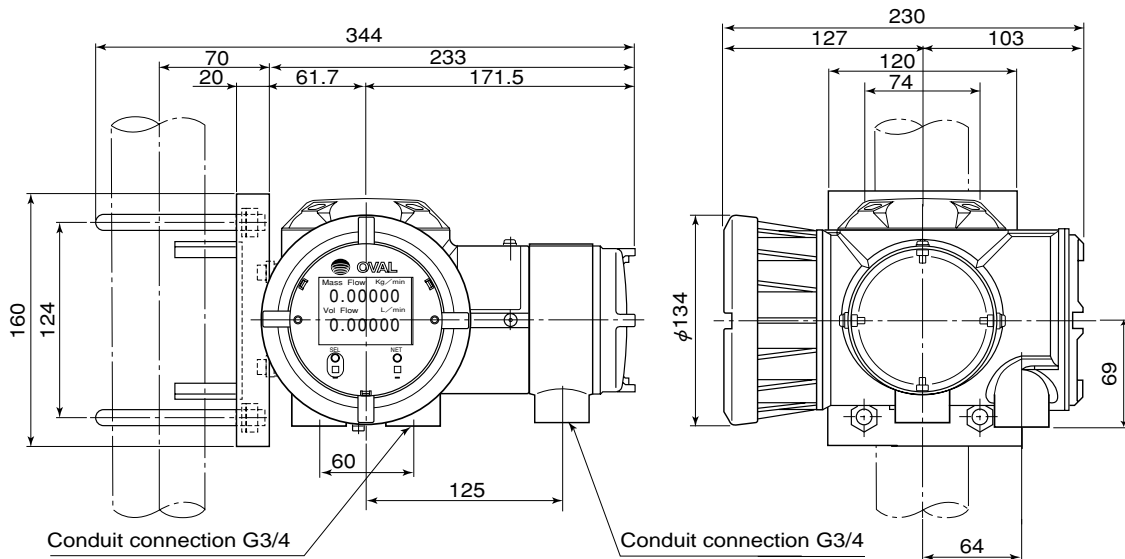
● CA100 and CA150



Model	Flange		L	Approx. weight kg
	Nom. size	Ratings		
CA100	100mm	JIS 10K	992	231
		JIS 20K	1006	235
		JIS 30K	1016	241
	4"	ASME, JPI 150	1018	237
		ASME, JPI 300	1036	245
		ASME, JPI 600	1082	255
CA150	150mm	JIS 10K	1300	246
		JIS 20K	1320	253
		JIS 30K	1330	265
	6"	ASME, JPI 150	1318	248
		ASME, JPI 300	1338	265
		ASME, JPI 600	1388	292

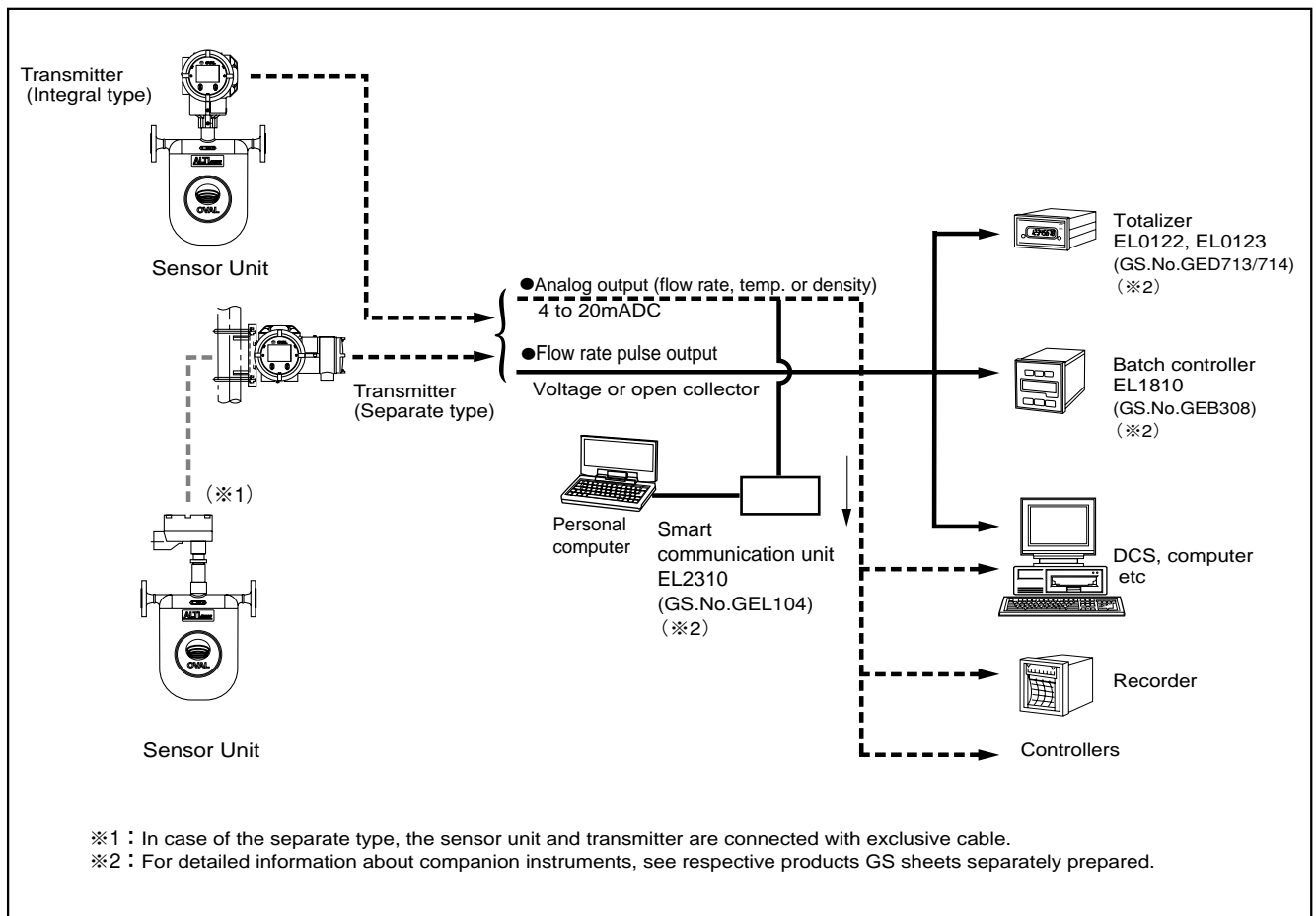
■ DIMENSIONS [Unit in mm]

● Remotely located transmitter



※ : While stanchion mounting hardware are furnished as standard accessories, the customer is to furnish the stanchion.

■ REMOTE MEASURING SYSTEM

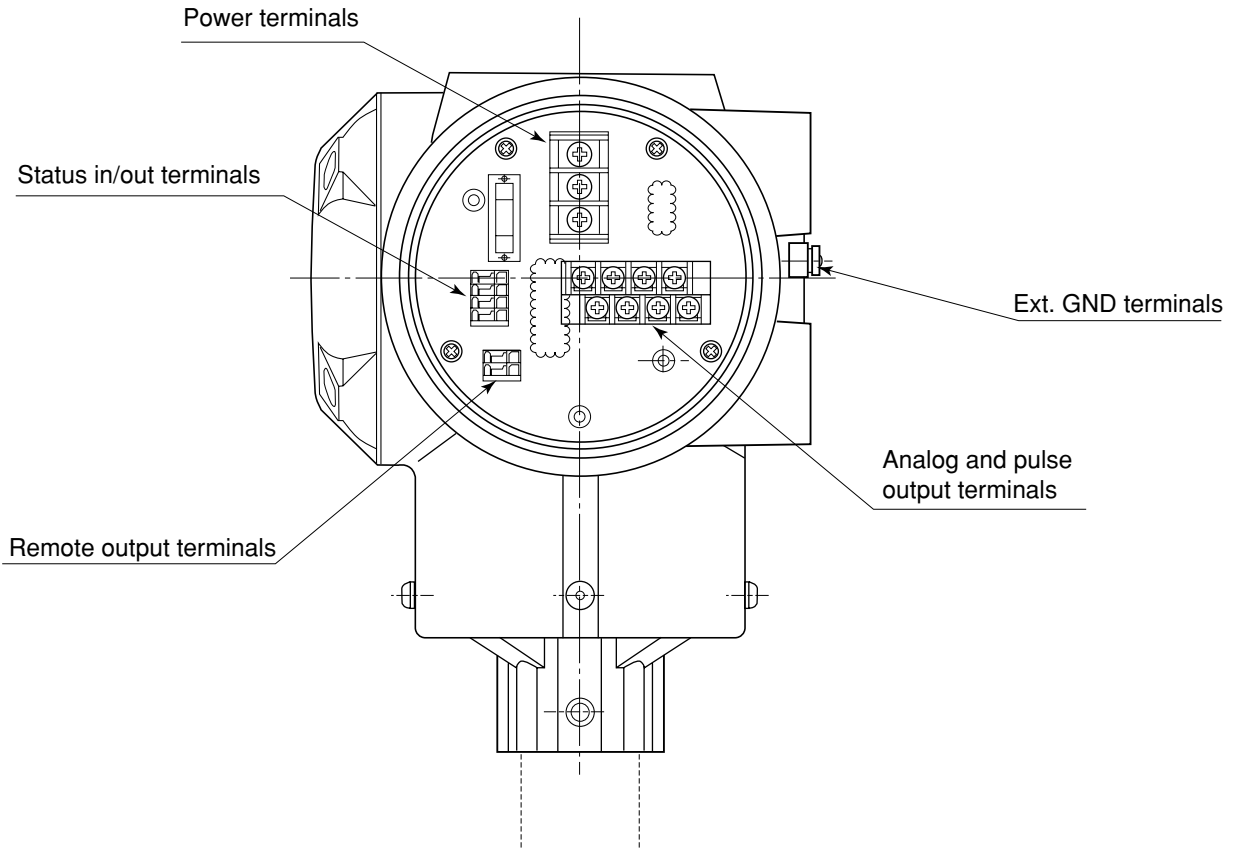


※1 : In case of the separate type, the sensor unit and transmitter are connected with exclusive cable.

※2 : For detailed information about companion instruments, see respective products GS sheets separately prepared.

■ WIRING DIAGRAM

● Transmitter power and in/out signal wiring connections

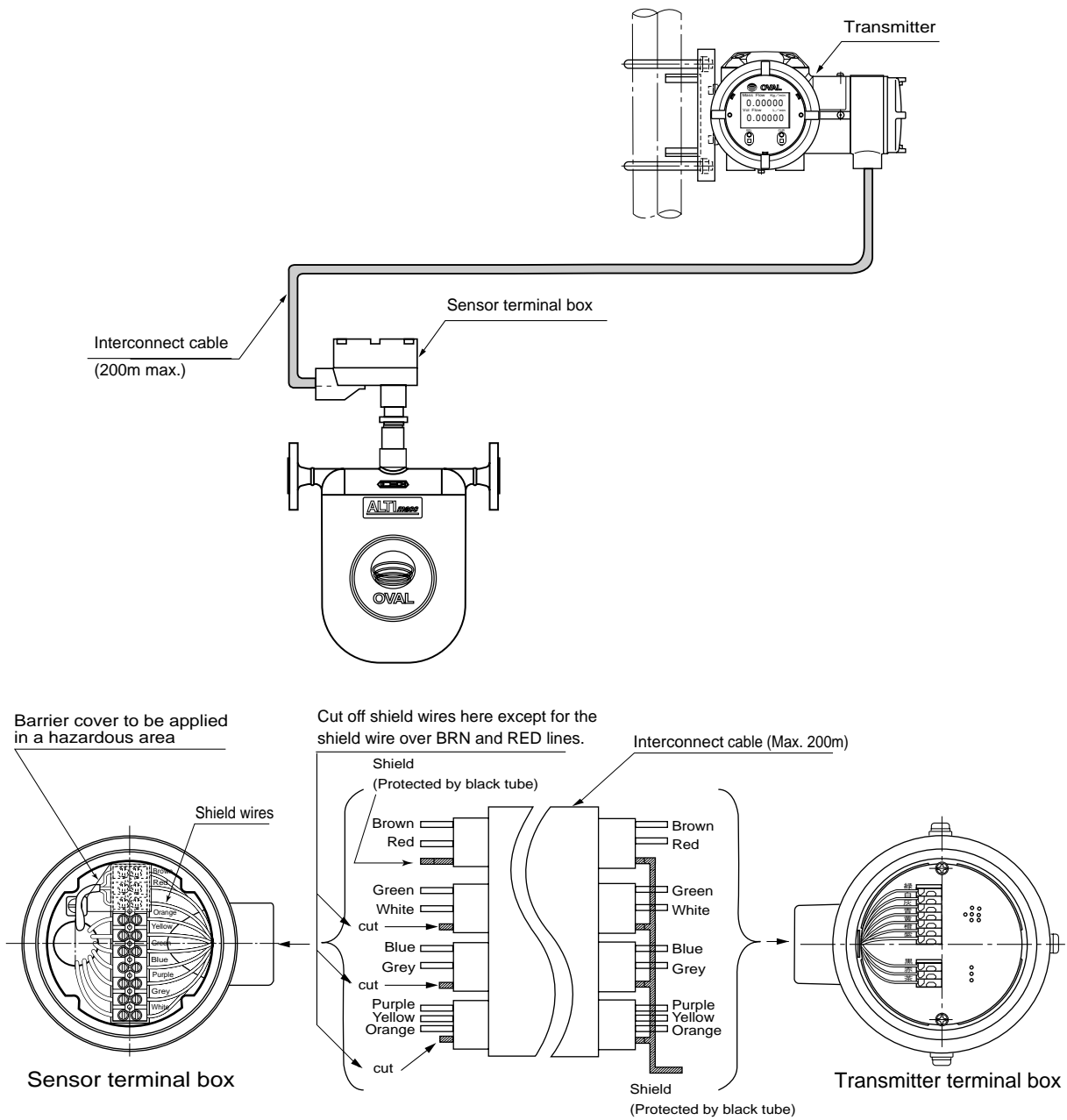


● Terminal identification and description

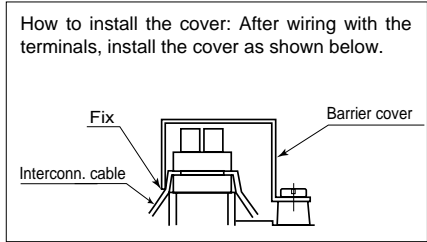
Item	Label	Description	Remarks
Signal	A1 (+)	Analog output 1 (4 to 20mA)	1. Max. load resistance is 600Ω for analog output 1 and 2. 2. Pulse output (voltage pulse) transmission length is Max. 10m (at 10kHz) Max. 100m (at 1kHz) Max. 1km (at 100Hz) finished O.D : 0.75sq
	A1 (-)		
	A2 (+)	Analog output 2 (4 to 20mA)	
	A2 (-)		
	P1 (+)	Pulse output 1 (voltage/open collector output)	
	P1 (-)		
	P2 (+)	Pulse output 2 (voltage/open collector output)	
	P2 (-)		
	S.I. (+)	Status input (contact input)	
	S.I. (-)		
	S.O. (+)	Status output (open collector output)	
	S.O. (-)		
I/O (+)	Expanded in/out (comm., etc.)		
I/O (-)			
Power	L (+)	Power (with DC power: +)	
	FG	Earth ground	
	N (-)	Power (with DC power: -)	

■ WIRING

●Wiring between Sensor Unit and Separately Mounted Transmitter



- NOTE 1. Do not fail to use dedicated interconnect cable.
 2. Shield wire preparation
 (1) Transmitter end:
 Bundle the shield wires corresponding with brown/red, green/white, blue/grey, purple/yellow/orange and slip a black sleeve over them as shown in the figure, exercising care to avoid potential contact with the housing and other conductive parts.
 (2) Sensor end:
 Slip a black sleeve over the shield wires corresponding with brown/red pair cable as shown in the figure, exercising care to avoid potential contact with the housing and other conductive parts. Clip all other shield wires.



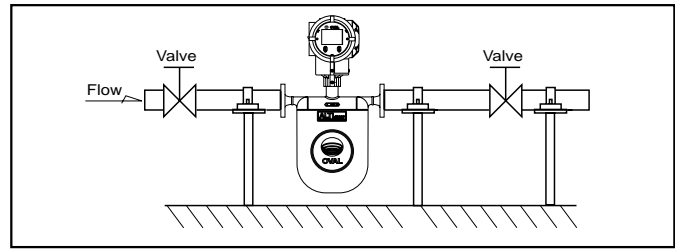
STANDARD INSTALLATION

1. Typical Installation (See figure at right.)

- 1) Avoid pipeline stresses on the meter.
- 2) The meter should be supported near and between connections to the process pipelines.
- 3) Avoid supporting the meter body directly.
- 4) Pipeline should be arranged such that the meter is constantly filled with the process fluid. Avoid, however, installing it in a pocket where slurries may build up.
- 5) Provide a valve downstream of the meter to allow zeroing by obtaining a true zero flow. We recommend to provide another valve upstream of the meter for servicing or maintenance.

2. Precautions at Installation

- 1) Locate the meter at least one meter from large transformers, motors, or other sources of electromagnetic induction. Also avoid installation near the sources of excessive vibration, such as motors and pumps.
- 2) If it is desired to make a measurement of a process fluid requiring heat retention, heat trace may be applied directly to the sensor body. Heat trace should be held below 200°C. Explosionproof models require the temperature to be held below their maximum allowable levels.
- 3) To ensure consistent volume flow and density measurements, heat retention is suggested.
- 4) The sensor unit is of gastight construction. To prevent dew condensation inside in a low temperature application, it is filled with argon gas. For this reason, avoid dropping or giving it impact shocks.
- 5) In a horizontal run, install the sensor unit with the



- transmitter up as shown in the figure.
- 6) A control valve should be located downstream of the meter. In an arrangement where cavitation may possibly take place, locate it at least 5 meters away.
- 7) To ensure consistent and accurate measurement, the Coriolis flowmeter should be placed in an environment where pipeline oscillation is held below 0.3G.

3. Prevention of Cavitation

Cavitation can cause a loss of meter accuracy in measurement. Maintain line pressure that will not cause cavitation upstream and downstream of the meter for this reason. Avoid making such an arrangement as to open the line to the atmosphere immediately downstream of the meter. Care must be taken particularly with high steam pressure liquids. In practice, we recommend to keep the back pressure in the meter (downstream pressure) above the value calculated by the formula below:

$$P_d = 3\Delta P + 1.3P_v \text{ (MPa[absolute])}$$

P_d : Downstream pressure (MPa[absolute])

ΔP : Pressure loss across the meter (MPa)

P_v : Steam pressure of the process fluid at measurement (MPa[absolute])

4. Physical orientation

(1) CA003 thru CA150

Recommended physical orientation varies with the type of process fluid. [No. 2 in the figure below shows representative orientation for liquid service.]

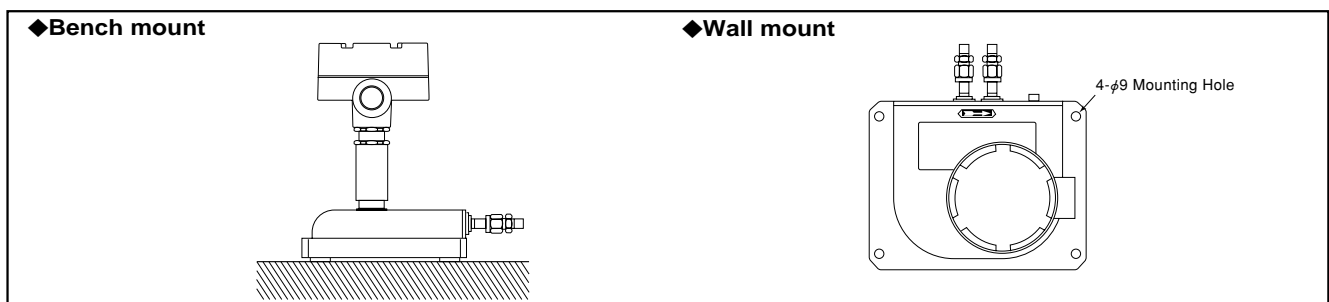
	Horizontal run		Vertical run
	No. 1	No. 2	No. 3
Orientation			
Fluids	<ul style="list-style-type: none"> ● Gases ● Slurries 	<ul style="list-style-type: none"> ● Liquids 	<ul style="list-style-type: none"> ● Slurries (requiring cleaning) ● Liquids ● Gases

※1 : For installation orientation in No. 1, we recommend the separately mounted transmitter. If the integrally mounted transmitter is your option, consult the factory.

※ : Do not forget to specify the physical orientation when you order.

(2) CA00A and CA001

The instrument can be installed either on the bench or on the wall. The following physical orientation is suggested. (In wall mounting, secure the instrument with bolts, using the mounting holes provided for the sensor unit.)



■ PRODUCT CODE EXPLANATION

Item	Code No.																		Description	Choice division					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱							
Model	C	A																	ALTI $_{mass}$ Type U						
Nominal size	0 0 A																		Connection 1/4"	CA00A, CA001	CA003	CA006	CA010, CA015	CA025, CA040, CA050, CA080	CA100, CA150
	0 0 1																		Connection 1/4"						
	0 0 3																		Connection 10mm (3/8")						
	0 0 6																		Connection 10mm (3/8")						
	0 1 0																		Connection 15mm (1/2")						
	0 1 5																		Connection 15mm (1/2")						
	0 2 5																		Connection 25mm (1")						
	0 4 0																		Connection 40mm (1 1/2")						
	0 5 0																		Connection 50mm (2")						
	0 8 0																		Connection 80mm (3")						
1 0 0																		Connection 100mm (4")							
1 5 0																		Connection 150mm (6")							
Applicable fluid	L																		Liquid	○	○	○	○	○	
	G																		Gas	○	○	○	○	○	
Temperature rating (※1)	1																		Standard (max. 130°C)	○	○	○	○	○	
	2																		High temperature service (Over 130°C and <200°C)	○	○	○	○	○	
Pressure rating	1																		Standard	○	○	○	○	○	
	2																		High pressure service (※2)	×	×	×	×	×	
Material	S																		SUS316L	○	○	○	○	○	
	M																		SUS316L+Alloy C (※3)	×	○	○	○	○	
	H																		Alloy C	×	○	○	○	○	
Process connection	A																		Screw connection	○	○	○	○	×	×
	B																		Ferrule connection	×	○	○	○	○	×
	C																		JIS 10 K	×	○	○	○	○	○
	D																		JIS 20 K	×	○	○	○	○	○
	E																		JIS 30 K	×	○	○	○	○	○
	F																		JIS 40 K	×	○	○	○	○	×
	G																		JIS 63 K	×	○	○	○	○	×
	H																		ASME 150	×	○	○	○	○	○
	J																		ASME 300	×	○	○	○	○	○
	K																		ASME 600	×	○	○	○	○	○
	L																		JPI 150	×	○	○	○	○	○
	M																		JPI 300	×	○	○	○	○	○
	N																		JPI 600	×	○	○	○	○	○
Z																		Others	×	○	○	○	○	○	
Transmitter configuration (※4)	1																		Integrally mounted	×	×	○	○	○	×
	2																		Remotely mounted	○	○	○	○	○	○
Power supply	1																		20 to 30VDC	○	○	○	○	○	○
	2																		85 to 264VAC 50/60Hz						
Analog output	A																		Output 1 : Mass flow, Output 2 : Mass flow						
	B																		Output 1 : Mass flow, Output 2 : Density						
	C																		Output 1 : Mass flow, Output 2 : Temperature						
	D																		Output 1 : Mass flow, Output 2 : Volume flow (true density)						
	E																		Output 1 : Mass flow, Output 2 : Volume flow (fixed density)						
	F																		Output 1 : Density, Output 2 : Temperature						
	G																		Output 1 : Volume flow (true density) , Output 2 : Density (true density)						
	H																		Output 1 : Volume flow (fixed density) , Output 2 : Density						
	J																		Output 1 : Volume flow (true density) , Output 2 : Temperature						
	K																		Output 1 : Volume flow (fixed density) , Output 2 : Temperature						
Pulse output	A																		Output 1 : Mass flow	Single pulse					
	B																		Output 1 : Volume flow (true density)						
	C																		Output 1 : Volume flow (fixed density)						
	D																		Output 1 : Mass flow, Output 2 : Mass flow	Double pulse					
	E																		Output 1 : Mass flow, Output 2 : Volume flow (true density)						
	F																		Output 1 : Mass flow, Output 2 : Volume flow (fixed density)						
	G																		Output 1 : Volume flow (true density) , Output 2 : Volume flow (true density)						
H																		Output 1 : Volume flow (fixed density) , Output 2 : Volume flow (fixed density)							
J																		Output 1 : Volume flow (true density) , Output 2 : Mass flow							
K																		Output 1 : Volume flow (fixed density) , Output 2 : Mass flow							
Pulse output form	1																		Open collector pulse (default)						
	2																		Voltage pulse						
Communication interface	1																		Hybrid communication (Bell 202 under HART protocol)						
Explosionproof specification	0																		Non-explosionproof						
	1																		TIIS	Applied or preparation					
	2																		ATEX						
	7																		NEPSI						
Explosionproof temp. class	0																		Non-explosionproof		Applied or preparation				
	2																		Sensor unit temp. class T2; remote type transmitter only; CA006 thru 150 only						
	3																		Sensor unit temp. class T3; remote type transmitter only						
	4																		Sensor unit temp. class T4						

※1 : With explosionproof specification (applied for), some temperature class related restrictions exist.
 ※2 : If "high pressure service" in pressure category is selected, "screw-in" process connection applies.
 ※3 : Major parts material "A" (Alloy C) applies only to CA003 of screw-in connections and CA006 thru CA080 of flanged (loose) connections.
 ※4 : In applications where process fluid temperature exceeds 90°C, only "remotely mounted" transmitter is selectable.

■ PLEASE SUPPLY THE FOLLOWING INFORMATION WHEN YOU INQUIRE.

(Fill in the form below to the extent possible. Further details will be finalized in later consultation.)

• Fill in the blanks. Tick the boxes that apply.

1. Sensor unit	CA□□□□□□□□□□□□□□□□□□
2. Process fluid (※1)	Name : _____ SP. gr : _____ Viscosity : _____ Concentration : _____%
3. Flow range	Max. _____ Normal _____ Full scale _____ <input type="checkbox"/> kg/h <input type="checkbox"/> Others _____
4. Fluid temperature	Max. _____ °C Normal _____ °C Min. _____ °C
5. Operating pressure	Max. _____ MPa Normal _____ MPa Min. _____ MPa
6. Ambient temperature	Max. _____ °C Min. _____ °C
7. Fluid flow direction	<input type="checkbox"/> Left→Right <input type="checkbox"/> Right→Left <input type="checkbox"/> Bottom→Top(<input type="checkbox"/> Top →Bottom) Orientation : See sketch on page 14.
8. Nominal size	_____ mm or _____ inch
9. Required accuracy	± _____ % of reading ± _____ % of full scale
10. Process connection	<input type="checkbox"/> Flanged connection (Flange rating) <input type="checkbox"/> Ferrule connection <input type="checkbox"/> Screw connection
11. Explosionproof	Non-explosionproof only (explosionproof applied for)
12. Power supply	<input type="checkbox"/> 20 to 30VAC <input type="checkbox"/> 85 to 264VAC (50/60Hz)
13. Output specifications	Pulse output
	<input type="checkbox"/> Volt. pulse: [0]: 1.5V [1]: 15VDC min. Out. impedance: 2.2kΩ
	<input type="checkbox"/> Open collector: Min. 10V to Max. 30VDC, 50mA
	<input type="checkbox"/> Output frequency: Any point from 0.1 to 10000Hz at full scale
	Two outputs from instant flowrate (mass or volume).
	Analog output
4 to 20mA DC Max. load: 600Ω	
2 outputs from instant. flow rate (mass, volume), temp. or density (option)	
Additional damping	0 to 200s. (variable)
Alarm output	Slug flow (※2) High _____ g/mL Low _____ g/mL
14. Companion receiver	<input type="checkbox"/> Totalizer <input type="checkbox"/> Indicator <input type="checkbox"/> Recorder <input type="checkbox"/> Flow controller <input type="checkbox"/> Batch controller
	<input type="checkbox"/> Density computer <input type="checkbox"/> Computer <input type="checkbox"/> Others
15. Transmission length	Sensor unit (_____) m Transmitter (_____) m Receiving instrument
16. Exclusive cable length	In case of separately- mounted type _____ m (Max. 200m)
17. In case of separate type transmitter	<input type="checkbox"/> Stanchion type w/bracket and 2" U bolts
18. No. of units required	
19. Application	
20. Other considerations	

※1 : Special fluids, such as of high viscosity or slurries, should be stated precisely and in detail.

※2 : Option.

The specification as of Nov., 2009 is stated in this GS Sheet. Specifications and design are subject to change without notice.

Sales Representative: