

■ GENERAL

Based on the Coriolis technologies accumulated over many years, the OVAL has broadened its current general purpose coriolis meter lineup by adding accurate, ultralow flowmetering products. The latest addition meets the expanding market needs for explosionproof products characterized by "improved performance, user friendliness, and increased operating safety."

■ FEATURES

1. World's smallest Coriolis flowmeters to measure extremely low flows from 0.2 g/min (0.4g/min).
2. Measures density at the same time (option).
3. Operates under pressures up to 15MPa. (20°C for liquids).
4. Vibration proof base no longer required; installs directly in the piping.

**■ GENERAL SPECIFICATIONS****Sensor unit**

Item		Description
Model		CN00AK-SS-200R CN001K-SS-200R
Nominal size		1/4"
Materials	Wetted parts	SUS316L
	Casing	SUS304
	O-rings	Fluorine rubber (Viton)
Process connection		R1/4
Applicable fluid		Liquid and Gases
Density range		0 to 2.0 g/mL
Temperature ratings	Temperature ratings	-200 to +200°C
	Ex. temp. class T3	-20 to +120°C
	Ex. temp. class T4	-20 to +55°C
Max. operating pressure	Liquid	15MPa at 20°C
	Gas	0.98MPa
Flow directions		Forward and reverse (option)
Flameproof enclosure		TIIS (Exib II BT3, Exib II BT4)

(※) Compliance with high pressure gas regulations is not applicable.

Transmitter (CT9401)

Item	Description
Power supply	85 to 264VAC (50/60Hz) or 20 to 30VDC
Power consumption	25VA max. or 10W max.
Ambient temperature	-20 to +50°C (Non condensing)
Transmission length	200 meters max. (using the exclusive cable)
Applicable EU Directive	EMC Directive : 89/336/EEC, 92/31/EEC, 93/68/EEC
Applicable EN standard	EMC : EN55011 : 1998/A1 : 1999 Group 1 Class B EN6100-6-2 : 1999
Explosionproof configuration	Combined explosionproof Exd (ib) IIBT4
Dustproof, waterproof construction	IP66
Installation	Separately mounted
Display	LCD display (7-segment 8-digit)
Mass	5.8kg approx.
Status input	Contact-closure input (Form "a" contact input), Close : 200Ω or less; Open : 100Ω or over Select one from function OFF (default), remote zero, total reset, or 0% signal lock.
Pulse output	Open collector output (10V to 30V, 50mA max.), FS: 0.1 to 10000Hz or voltage pulse (option) 「0」: 1.5V max., 「1」: 15V min., output impedance 2.2kΩ
Analog output	4 to 20mA max. load 600Ω Select two from instantaneous flowrate (mass or volume), temperature, or density. Damping (std) : flow 1 sec; density 4sec; temp. 2.5sec.
Status output	Open collector output Normal: ON, Error: OFF (30V, 50mA max.) Select one from error (default), flow direction, or Hi/Low alarm.

■ GENERAL PERFORMANCE

Item		Description		
Model		CN00A	CN001	
Flowrate	Max. service range, g/min	0 to 40	0 to 150	
	Max. allowable range, g/min	0 to 60	0 to 225	
	Min. range, g/min	0 to 2	0 to 7.5	
	Lower limit rate, g/min	0.4	1.5	
	Factory calibration accuracy	Liquid	[±0.2%±zero stability error] of reading	
		Gas	[±0.5%±zero stability error] of reading	
	Repeatability	Liquid	[±0.05%±1/2 zero stability error] of reading	
Gas		[±0.25%±1/2 zero stability error] of reading		
Zero stability, g/min		0.006	0.0225	
Density (liquid)	Measuring range	0.3~2g/mL		
	Factory calibration accuracy (option)	±0.003g/mL		
Analog accuracy		Accuracy±0.1% of full scale		

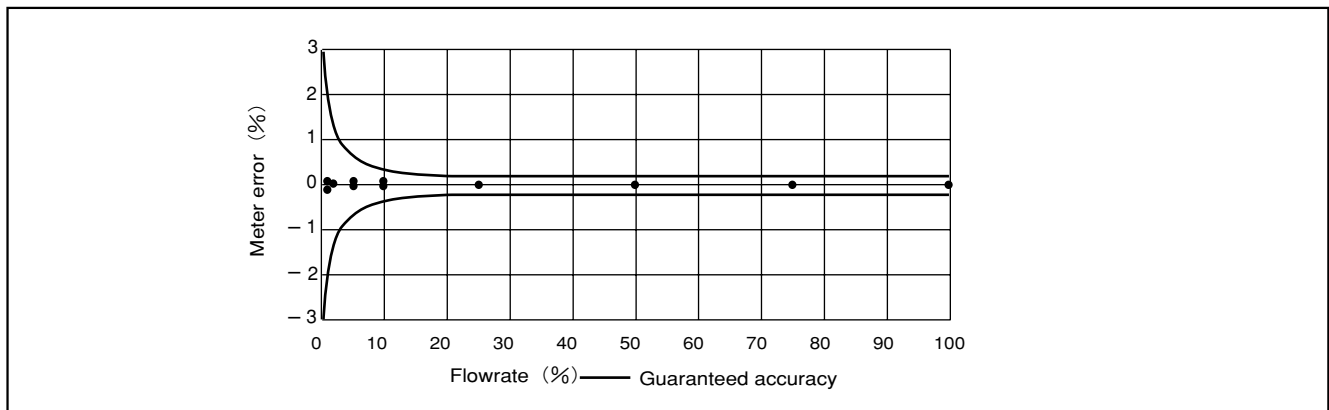
(※) In gas measurement, the maximum allowable flowrate varies with the kind of gas and operating pressure. Consult the factory for confirmation.

$$\text{Zero stability error} = \frac{\text{Zero stability (g/min)}}{\text{Flow rate at that time (g/min)}} \times 100\%$$

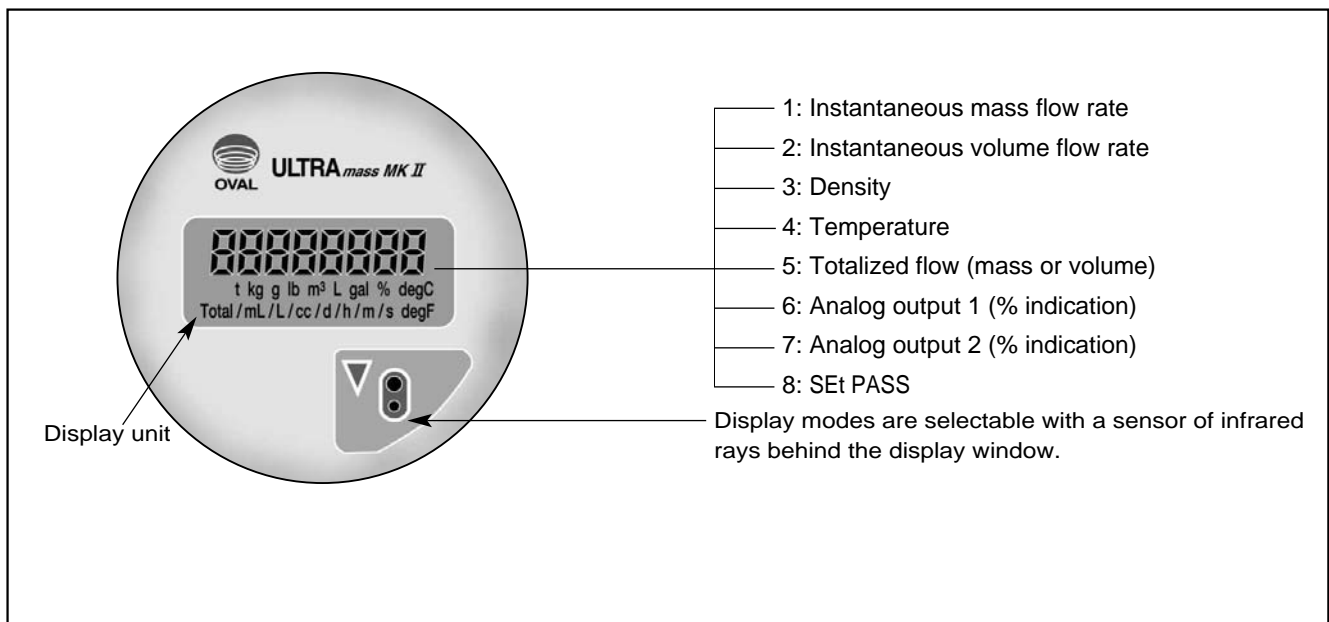
■ TEMPERATURE-PRESSURE RATINGS

Temperature, °C		-200	0	40	75	100	125	150	175	200
Allowable press.	Liquid	15.0	15.0	15.0	13.2	12.3	11.8	11.2	10.8	10.4
	Gas	0.98								

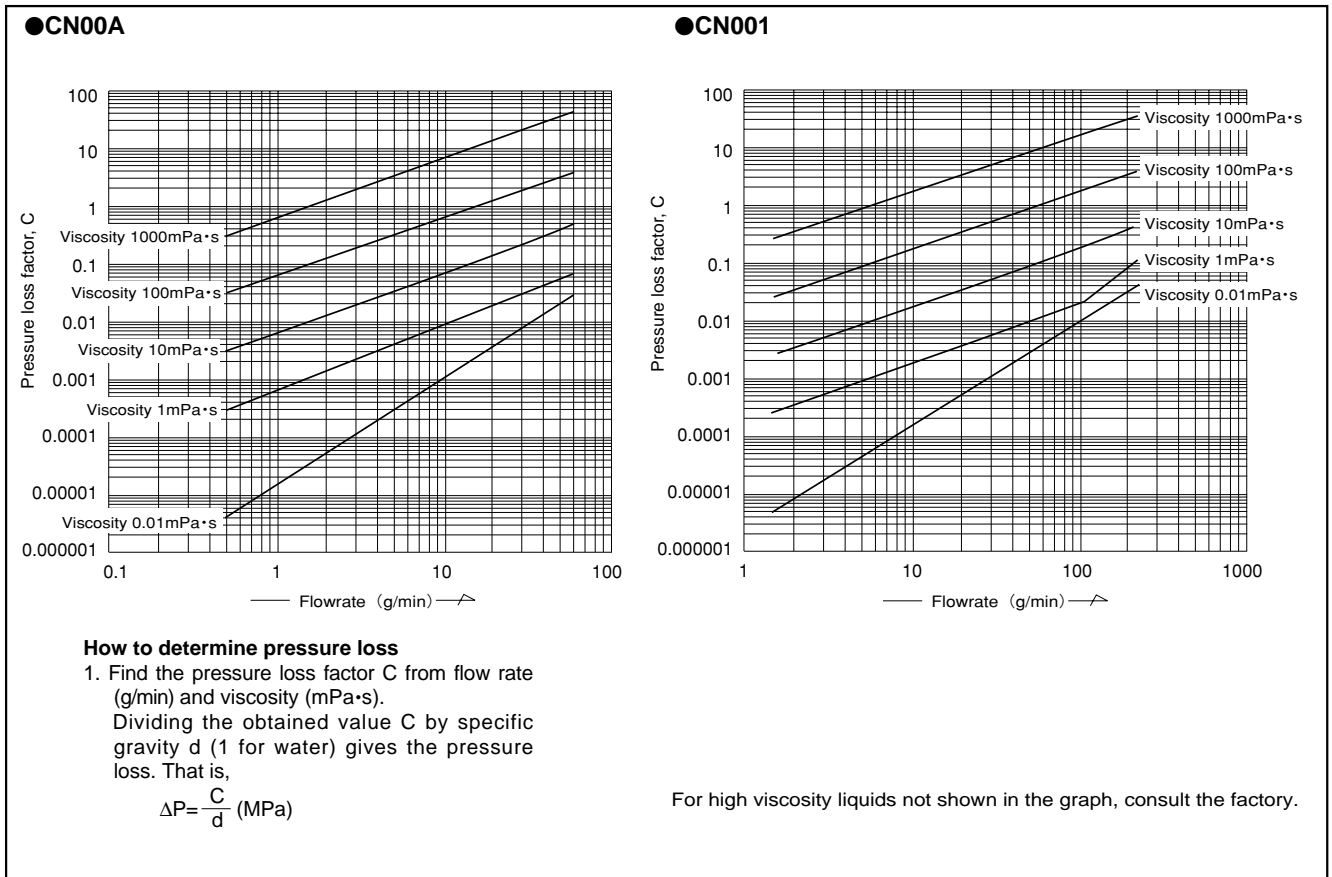
■ METER ERROR Temperature, °C Allowable pressure, MPa



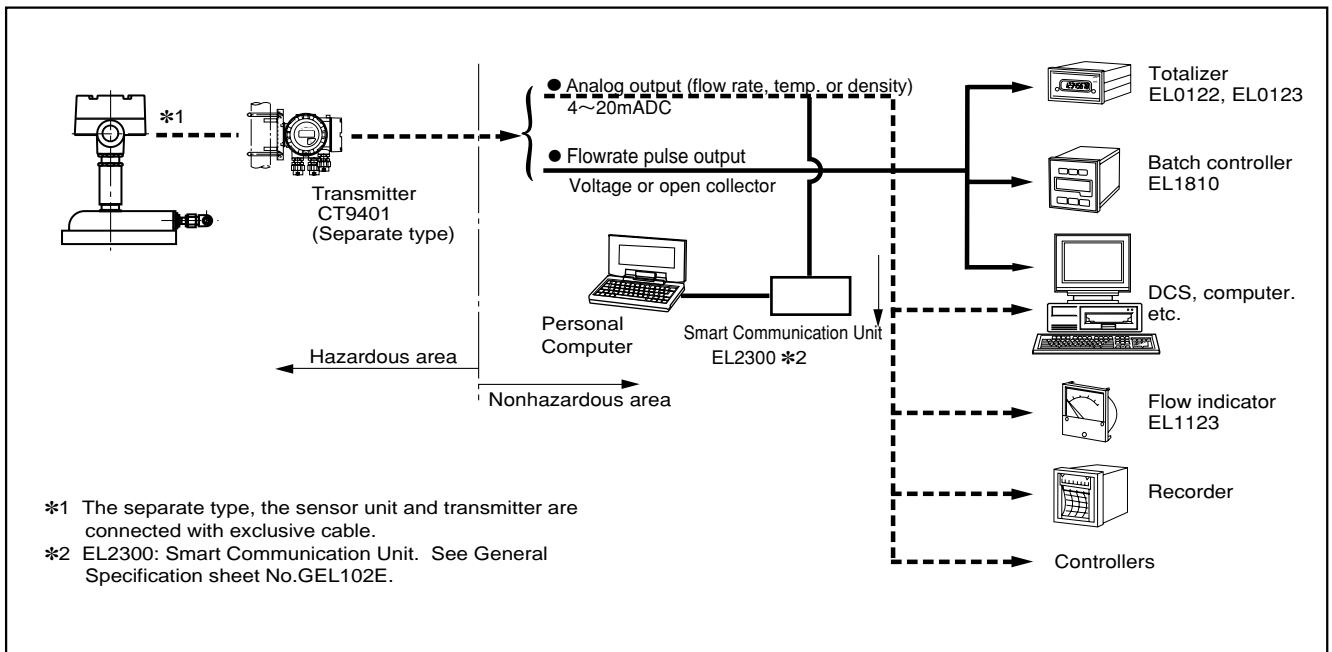
■ DISPLAY



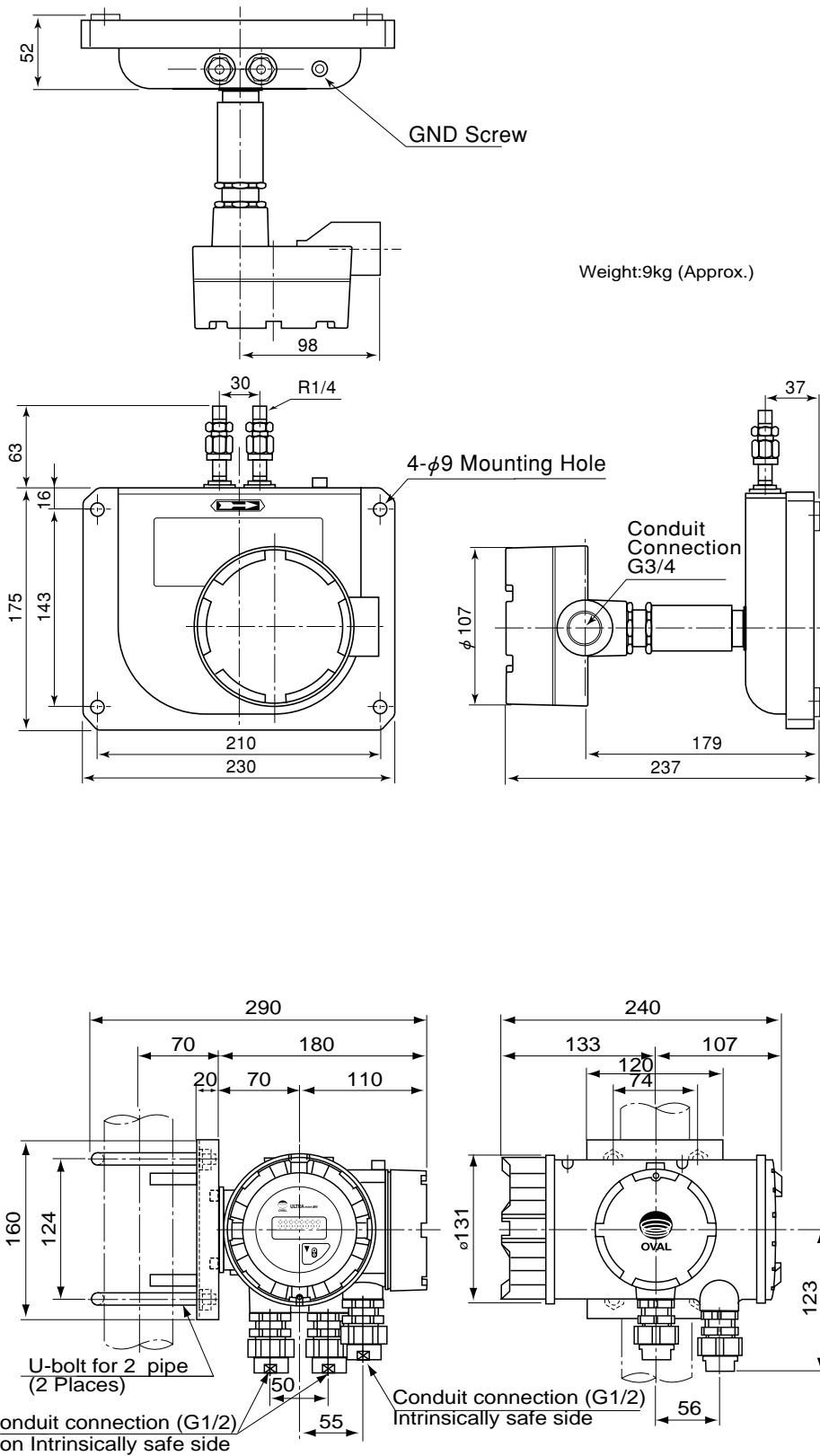
■ PRESSURE LOSS



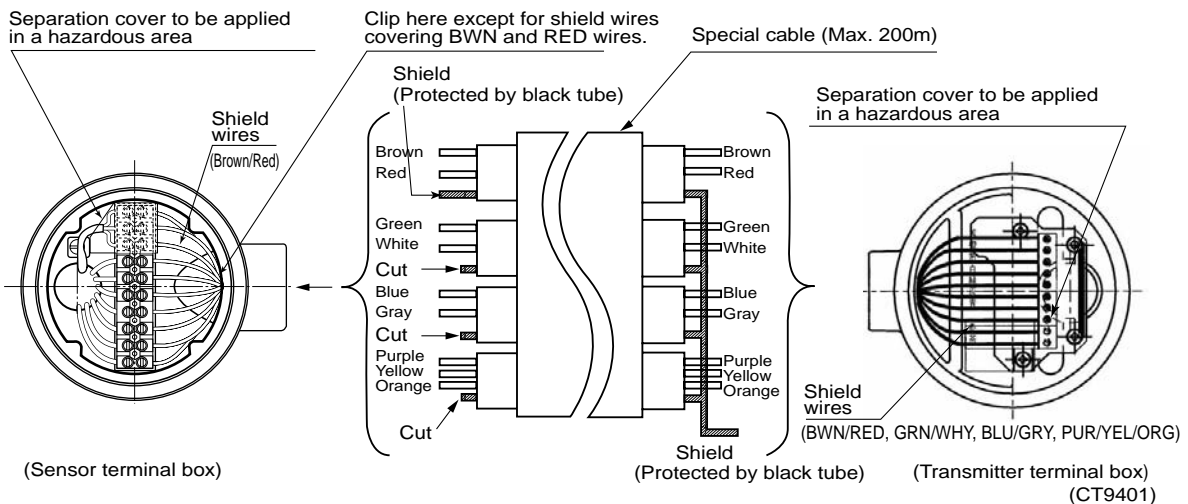
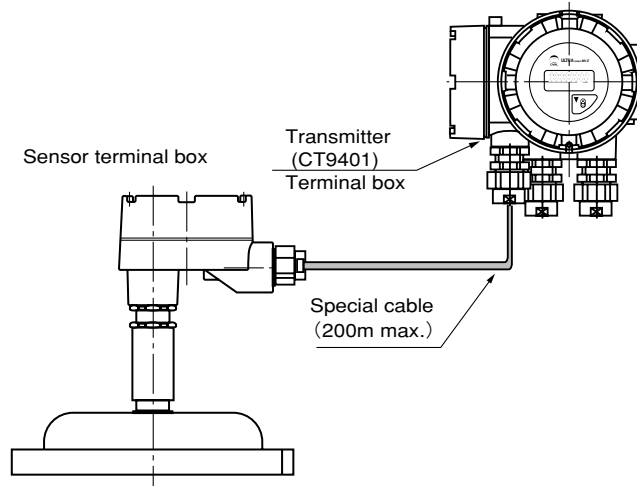
■ TELEMETERING HOOK-UP



■ DIMENSIONS [Unit in mm]



■ WIRING CONNECTIONS-1 (CT9401)



NOTE 1. Do not fail to use special cable.

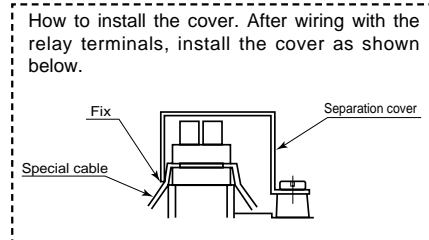
2. Shield wire preparation

(1) Transmitter end:

Bundle the shield wires corresponding with brown/red, green/white, blue/grey, purple/yellow/orange and slip the black sleeve over them as shown in the figure, exercising care to avoid potential contact with the housing and other conductive parts.

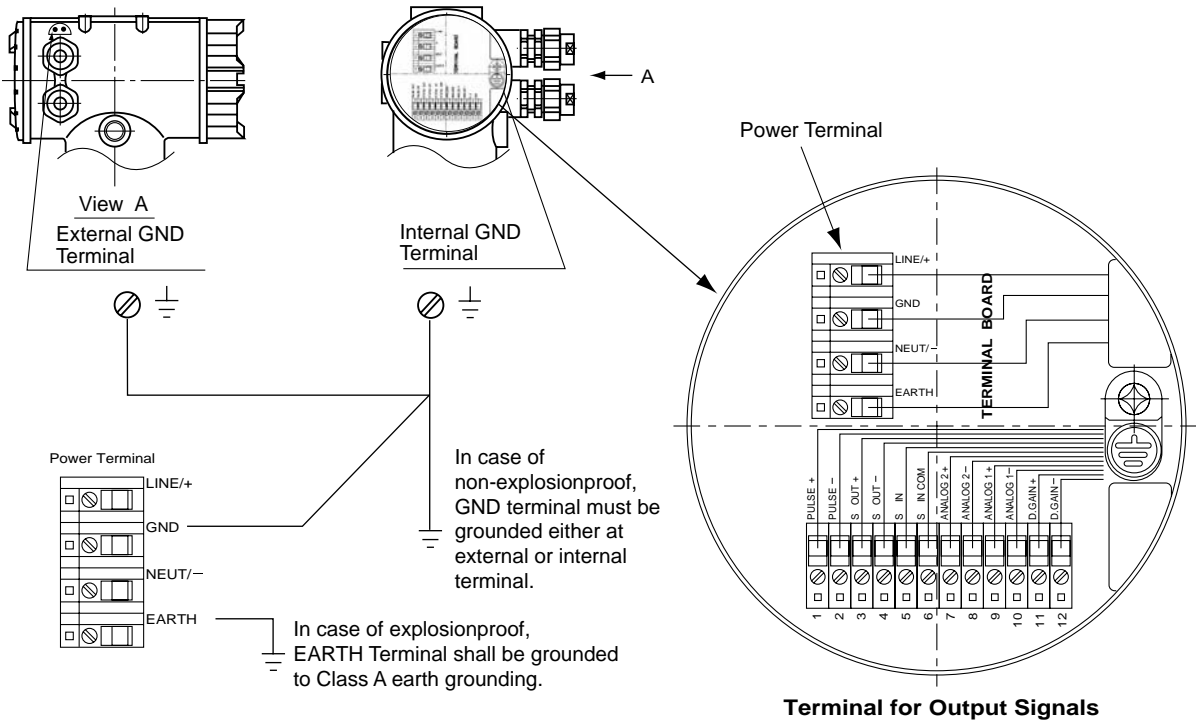
(2) Sensor end:

Slip the 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.



■ WIRING-2 CT9401

● Transmitter



● Remote Output Signal Connection Terminals

Item	Terminal No.	Label	Description	Remarks		
Output signal	1	PULSE +	Pulse output	1. Use shielded twisted pairs AWG24-16 for output wiring. 2. Max. load resistance is 600Ω for analog output 1 and 2. 3. Pulse output (voltage pulse) transmission length is Max. 10m (at 10kHz) Max. 100m (at 1kHz) Max. 1km (at 100Hz)		
	2	PULSE -				
	3	S OUT +	Status output, open collector output			
	4	S OUT -	Normal: ON; Abnormal: OFF			
	5	S IN	Status input (Form "a" contact input)			
	6	S IN COM				
	7	ANALOG2+	Analogue output 2			
	8	ANALOG2-	Analogue output 1			
	9	ANALOG1+				
	10	ANALOG1-				
	Power		LINE/+		Power (with DC power: +)	Be sure to earth ground at GND or EARTH terminal.
			GND		Earth ground	
		NEUT/-	Power (with DC power: -)			
		EARTH	Class "A" earth ground work			

● Terminal identification between separate type sensor unit and transmitter

Item	Terminal No. (Cable color)	Label	Description	Remarks
Sensor to transmitter	Black	SHIELD	Bundle BWN/RED, GRN/WHY, BLU/GRY, ORG/PUR/YEL shield wires.	Exclusive cable shall be used. Transmission length 200 meters max.
	Brown	(+) DRIVE	Flow tube drive output	
	Red	(-) DRIVE		
	Orange	TEMP B	Temperature input	
	Yellow	TEMP b	Temperature input	
	Green	(+) LPO	Left position pickoff input	
	Blue	(+) RPO	Right position pickoff input	
	Purple	TEMP A	Temperature input	
	Grey	(-) RPO	Left position pickoff input	
White	(-) LPO	Right position pickoff input		

■ PRODUCT CODE EXPLANATION

● Sensor unit

Item	Code No.												Description		
	①	②	③	④	⑤	⑥	—	⑦	⑧	—	⑨	⑩		⑪	⑫
Model	C	N													ULTRA mass MK II
Nominal size			0	0	A										1/4" Accuracy guarantee flow ranre : 0.4 to 60 g/min
			0	0	1										1/4" Accuracy guarantee flow ranre : 1.5 to 225 g/min
Configuration						K	—								MassFlex Series
Material							S	S	—						SUS316L
Connection type										2					Screw connection
Flange ratibg (Coupling shape)										0					Straight type (standard)
											1				Elbow type (option)
Pressure rating										0					Other than flanged connection
Transmitter mounting construction													R	Separately-mounted type CT9401	

● Local mount transmitter (CT9401)

Item	Code No.												Description	
	①	②	③	④	⑤	⑥	—	⑦	⑧	⑨	⑩	⑪		⑫
Model	C	T	9	4	0	1	—							Local mount transmitter (CT9401)
Construction							T							Applies to separately-mounted type CN001
Power supply								6						20 to 30VDC
								7						85 to 264VAC 50/60Hz
Analog output (NOTE 1)								M	M					Mass flow rate Analog 2 output
								M	D					Mass flow + Density
								M	T					Mass flow + Temperature
								M	V					Mass flow + Volume flow
								D	T					Density + Temperature
								V	D					Volume flow + Density
								V	T					Volume flow + Temperature
								M	X					Mass flow rate 1 output (Voltage pulse output)
Pulse output								D	X					Density 1 output (Voltage pulse output)
								V	X					Volume flow 1 output (Voltage pulse output)
										1				Mass flow voltage pulse (option)
										2				Volume flow voltage pulse (option)
Explosion-proof										3				Mass flow open collector pulse
										4				Volume flow open collector pulse
										0				Non-explosionproof
										1				TIIS (domestic explosionproof) (Temp. grade:Sensor T3, Transmitter T4)
										3				TIIS (domestic explosionproof) (Temp. grade:Sensor T4, Transmitter T4)

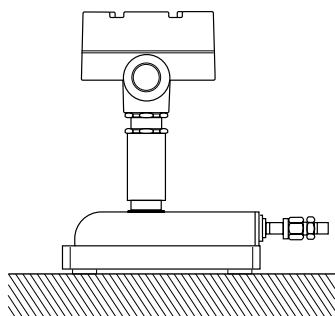
NOTE 1. If voltage pulse output is chosen for pulse output, the analog output 2 is not available; select "X" in model code place⑩.

■ INSTALLATION

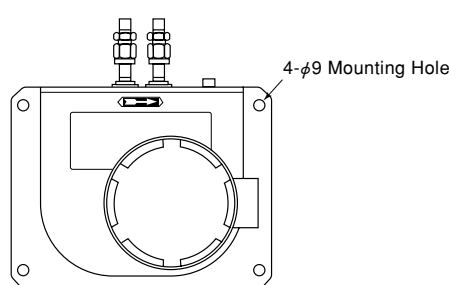
The instrument can be installed either on the bench or on the wall. The following physical orientation is suggested.

(In wall mounting, secure the instrument with bolts, using the mounting holes provided for the sensor unit.)

◆ Bench mount



◆ Wall mount



■ PLEASE SUPPLY THE FOLLOWING INFORMATION WHEN YOU INQUIRE

1. Process fluid ※1	Name _____ SP. gr. _____ Viscosity _____ Slurry content in a slug flow _____ %
2. Flow range	Max. _____ Normal _____ Full scale _____ <input type="checkbox"/> kg/min <input type="checkbox"/> kg/h
3. Fluid temperature	Max. _____ °C Normal _____ °C Min. _____ °C
4. Operating pressure	Max. _____ MPa Normal _____ MPa Min. _____ MPa
5. Ambient temperature	Max. _____ °C Min. _____ °C
6. Fluid flow direction	<input type="checkbox"/> Left → Right <input type="checkbox"/> Right → Left <input type="checkbox"/> Bottom → Top (<input type="checkbox"/> Top → Bottom)
7. Nominal size	
8. Required accuracy	± _____ % of reading ± _____ % of full scale
9. Process connection	
10. CE marking	<input type="checkbox"/> Not required <input type="checkbox"/> Required *3
11. Explosionproof	<input type="checkbox"/> Not required <input type="checkbox"/> TIIS <input type="checkbox"/> ATEX
12. Power supply	Power _____ V <input type="checkbox"/> AC <input type="checkbox"/> DC
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
	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"/> Computer <input type="checkbox"/> Others
15. Transmission length	Sensor unit (<input type="text"/>) m Transmitter (<input type="text"/>) m Receiving instrument
16. Exclusive cable length	In case of separate mounted type _____ m (Max. 200m)
17. In case of a separated type transmitter	<input type="checkbox"/> Stand on type w/bracket and 2" U bolts
18. In case of ATEX	Cable gland ※2
	<input type="checkbox"/> Not required <input type="checkbox"/> Required
PED certificate of conformity ※2, 3	<input type="checkbox"/> Not required <input type="checkbox"/> Third-party agency <input type="checkbox"/> Generated by OVAL
19. No. of units required	
20. Application	
21. Other considerations	

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

※2 : Option

※3 : In determining compliance with the PED, items 1, 3, 4, 7, and 9 are essential. Describe them as precisely as possible.
In certain cases, categorizing may possibly reveal failure to comply.

The specification as of June, 2008 is stated in this GS Sheet. Specifications and design are subject to change without notice.