TIME DELTA SERIES

ULTRASONIC FLOWMETER <TIME DELTA-C>

DATA SHEET

FSV, FLS/FSG/FSD

This flowmeter is a clamp-on type ultrasonic flow meter based on transit-time measuring method.
Making full use of the latest electronics and digital signal processing technologies, we realized a compact and light-weight design, and improved the accuracy and easiness to use while keeping with anti-bubble performance.
The communication function (MODBUS: Option) is also applicable.

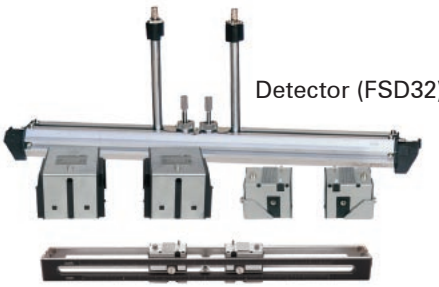
FEATURES

1. Compact and light-weight
   Thanks to the adoption of the latest electronics the flow transmitter size and mass are 1/3 of our traditional instrument.
2. Full variety of sensors
   The flowmeter can be used with various types of sensors applicable for wide range of pipe size (ø13 to ø6000mm) and fluid temperature (-40 to +200°C).
3. High accuracy
   The flowmeter is designed for high accurary (better than ±1.0% of rate) by dynamic correction of fully-developed flow profile. Reynolds Number is calculated and a meter factor (K) is automatically applied for best accuracy at all flow velocities. Further, the adoption of new sound velocity measurement system permits measurements of fluids of unknown sound velocity. Moreover, affection from fluid temperature and pressure is negligible (Auto-Temp./Press. compensation).
4. Excellent resistance against aerated flow
   Fuji's unique ABM feature improves measurement reliability for different flow like slurries, sludge, raw sewage and bubble-contained flow (acceptable up to air bubble of 12% volume at 1m/s velocity).
5. Quick response
   With the use of high-speed micro-processor suited for digital signal processing, the fast response time is realized.
6. Multi-lingual
   The following languages are supported for display: Japanese (Katakana), English, German French, and Spanish.
7. Excellent performance and easy operation
   LCD and function keys are allowing easy configuration and trouble shooting.
   - LCD with back light
   - Easy mounting of sensor
   - Trouble shooting
   - Easy operation with keypad on the front surface of the flow transmitter (FSV···S)

Flow transmitter (FSV···S)

Detector (FLSE12) (FLSE22)

Detector (FSD22)



Detector (FSD32)

Detector (FSG)

SPECIFICATIONS

Operational specifications

System configuration:
Single-path system of a flow transmitter (Model FSV) and a detector (Model FLS/FSG/FSD)

Applicable fluid: Homogenous liquid where the ultrasonic signal can be transmitted
Bubble quantity: 0 to 12vol% (for pipe size 50A, water, velocity 1m/s)
Fluid turbidity: 10000mg/L max.
Type of flow: Fully-developed turbulent or laminar flow in a full-filled pipe

Flow velocity range:
0 to ±0.3 ... ±32m/s

Power supply: 100 to 240V AC +10%/-15%, 50/60Hz; or 20 to 30V DC

Signal cable (between detector and converter):
Coaxial cable (5m standard, 300m (60m for popular detector (FLS)) max.)
Heat resistance: 80°C

Installation environment:
Non-explosive area without direct sunlight, corrosive gas and heat radiation.

Ambient temperature:
Flow transmitter: -20 to +55°C
Detector: -20 to +60°C
-20 to +80°C
(for FLSE□2□2-A only)

Ambient humidity:
95%RH max.

Grounding: Class D (100 Ω)

Arrester: Provided as standard at output and power supply

Applicable piping and fluid temperature:

Detector		Pipe size (inner diameter)	Applicable pipe material	Mounting method	Fluid temperature range (Note 3)
Popular type	FLSE12	ø25 to ø100 mm	Plastic (PVC, etc.) (Note 1)	V method	9th digit in code symbol Y... -20 to +100°C A... 0 to +120°C (Note 4) Heat shock resistance 150°C, 30min
		ø50 to ø100 mm	Metal pipe (SS, steel pipe, copper pipe, aluminum pipe, etc.) (Note 2)		
	FLSE22	ø50 to ø225 mm	Plastic (PVC, etc.) (Note 1) Metal pipe (SS, steel pipe, copper pipe, aluminum pipe, etc.) (Note 2)		
Common type	FSD22	ø13 to ø100 mm	Plastic (PVC, etc.) (Note 1) Metal pipe (SS, steel pipe, copper pipe, aluminum pipe, etc.) (Note 2)	V method	-40 to 100°C
	FSGS3	ø50 to ø300 mm			-40 to 80°C
	FSGS41	ø200 to ø1200 mm		V or Z method	
	FSGS5	ø200 to ø6000 mm			
	FSD32	ø50 to ø400 mm			-40 to 200°C

Note 1: If the pipe material is PP or PVDF, select FSGS31, FSGS41 or FSGS5.
Note that the wall thickness is 15mm or less for PP, and 9mm or less for PVDF.

Note 2: For cast iron pipe, lining pipe, old steel pipe or others through which the ultrasonic signal could not be transmitted easily, select FSGS31,FSGS41 or FSGS50.
Lining material: Tar epoxy, mortar, rubber, etc.
* In case the lining is not glued to a pipe, the measurement may be impossible.
Straight pipe length: Typically 10D for upstream and 5D for dowstream.
(D: Pipe inner diameter)
Refer to conditions on straight pipe for details
(Japan Electric Measuring Instruments Manufacturers' Association Standard JEMIS-032).

Note 3: If silicone-free grease is used as acoustic coupler, the fluid temperature range is 0 to 60°C regardless of the detector.

Note 4: When the 9th digit in the code symbol is "A", the applicable piping diameter is up to 150mm.

Performance specifications

Rated accuracy:

Detector		Pipe size (diameter)	Applicable pipe material	Flow velocity	Accuracy
Popular type	FLSE12	ø25 to ø50 mm	Plastic	2 to 32m/s	±2.0% of rate
				0 to 2m/s	±0.04m/s
		ø50 to ø100 mm		2 to 32m/s	±1.0% of rate
				0 to 2m/s	±0.02m/s
		ø50 to ø100 mm	Metal pipe	2 to 32m/s	±2.0% of rate
				0 to 2m/s	±0.04m/s
	FLSE22	ø50 to ø225 mm	Plastic	2 to 32m/s	±1.0% of rate
				0 to 2m/s	±0.02m/s
		ø50 to ø225 mm	Metal pipe	2 to 32m/s	±2.0% of rate
				0 to 2m/s	±0.04m/s
Common type	FSD22	ø13 to ø50 mm	Plastic, metal pipe	2 to 32m/s	±1.5% of rate
				0 to 2m/s	±0.03 to ±0.05m/s
		ø50 to ø100 mm		2 to 32m/s	±1.5% of rate
				0 to 2m/s	±0.03m/s
	FSGS32 FSD32 FSGS51	ø50 to below ø300		2 to 32m/s	±1.0% of rate
				0 to 2m/s	±0.02m/s
		ø300 to ø6000 mm		0.75 to 32m/s	±1.0% of rate
				0 to 0.75m/s	±0.0075m/s
	FSGS31 FSGS41 FSGS50	ø50 to below ø300		2 to 32m/s	±1.5% of rate
				0 to 2m/s	±0.03m/s
		ø300 to ø6000 mm		0.75 to 32m/s	±1.5% of rate
				0 to 0.75m/s	±0.0113m/s

Response time: 0.5s (standard mode)
0.2s as selected (quick response mode)

Power consumption:
15VA max. (AC power supply)
6W max. (DC power supply)

Functional specifications

Analog signal: 4 to 20mA DC (1 point)
Load resistance: 1 kΩ max.

Digital output: Forward total, reverse total, alarm, acting range, flow switch, total switch assignable arbitrarily

(1) Mechanical relay contact (isolated, socket provided, arrester incorporated)
- Output: 1 point
- Normal: Open/Close selectable
- Contact capacity: 240V AC, 30V DC, 1A
- Output frequency: 1P/s max. (pulse width: 50, 100, 200ms)

(2) Transistor contact (isolated, open collector, arrester incorporated)
- Outputs: 2 points
- Normal: ON/OFF selectable
- Contact capacity: 30V DC, 0.1A
- Output frequency: 1000P/s max. (pulse width: 5, 10, 50, 100, 200ms)

Digital input: 1 point (no-voltage contact) (option)/ Set zero, Preset total assignable

Serial communication (option):
RS-232C equivalent or RS-485, isolated, arrester incorporated
Connectable quantity: 1 unit (RS-232C)/up to 31 units (RS-485: MODBUS)
Baud rate: 9600, 19200, 38400bps
Parity: None/Odd/Even selectable
Stop bits: 1 or 2 bits selectable

Cable length: 15m max. (RS-232C)/1km max. (RS-485)
Data: Flow velocity, flow rate, forward total, reverse total, status, etc.

Display device: 2-color LED (Normal: green, Extraordinary: red)
LCD with 2 lines of 16 characters and back light

Indication language:
Japanese (Katakana)/English/French/German/Spanish (changeable)

Flow velocity/flow rate indication:
Instantaneous flow velocity, instantaneous flow rate indication (minus indication for reverse flow)
Numerals: 8 digits (decimal point is counted as 1 digit)
Unit: Metric/Inch system selectable

	Metric system	Inch system
Velocity	m/s	ft/s
Flow rate	L/s, L/min, L/h, L/d, kL/d, ML/d, m^3/s, m^3/min, m^3/d, km^3/d, Mm^3/d, BBL/s, BBL/min, BBL/h, BBL/d, kBBL/d, MBBL/d	gal/s, gal/min, gal/h, gal/d, kgal/d, Mgal/d, ft^3/s, ft^3/min, ft^3/d, Kft^3/d, Mft^3/d, BBL/s, BBL/min, BBL/h, BBL/d, kBBL/d, MBBL/d

Note: The "gal" means USgal.

Total indication: Forward or reverse total value indication (negative indication for reverse direction)
Numerals: 8 digits (decimal point is counted as 1 digit)
Unit: Metric/Inch system selectable

	Metric system	Inch system
Total	mL, L, m^3, km^3, Mm^3, mBBL, BBL, KBBL	gal, kgal, ft^3, kft^3, Mft^3, mBBL, BBL, kBBL, ACRE-ft

Configuration: Fully configurable from the 4-key pad (ESC, △, ▷, ENT)

Zero adjustment: Set zero/Clear available

External zero adjustment:
Set zero available upon digital input setting

Damping: 0 to 100s (every 0.1s) for analog output and flow velocity/flow rate indication

Low flow rate cutoff:
0 to 5m/s in terms of flow velocity

Alarm: Digital output available for Hardware fault or Process fault

Burnout: Analog output: Hold/Overscale/Underscale/Zero selectable
Flow rate total: Hold/Count selectable
Burnout timer: 0 to 100s (every 1s)

Bi-directional range:
Forward and reverse ranges configurable independently.
Hysteresis: 0 to 10% of working range
Working range applicable to digital output

Auto-2 range: 2 forward ranges configurable independently
Hysteresis: 0 to 10% of working range
Working range applicable to digital output

Flow switch: Lower limit, upper limit configurable independently
Digital output available for status at actuated point

Total switch: Forward total switching point configurable
Digital output available when actuated

External total preset:
Preset total settable upon contact input setting

Physical specifications

Type of enclosure:
Flow transmitter: FSV···S: IP66
FSV···H: IP67 (With large LCD)
Detector:
FLS (popular type):
IP65 (When waterproot BNC connector is provided)
FSG (common type):
IP67 (Silicone compound is filled on the terminal part when wiring)
FSG (submersible type):
IP68 (submersible in water for 5 days)
FSD (small diameter and high temperature type): IP52

Mounting method:
Flow transmitter: Mounted on wall or by 2B pipe
Detector: Clamped on pipe surface

Acoustic coupler:
Silicone rubber, silicone grease or silicone-free grease
Note: The acoustic coupler is a medium that eliminates a gap between detector and pipe

Type of acoustic coupler:

Type	Silicone rubber (KE-348W)	Silicone grease (G40M)	Silicone-free grease (HIGH Z)	Grease for high temperature (KS62M)
Fluid temperature	-40 to +150°C	-30 to +150°C	0 to +60°C	-30 to +250°C
Teflon piping	×	○	○	○

In case of Teflon piping, use grease.
Procure silicone grease (G40M), if necessary, as an optional accessory.

Material: Flow transmitter: Aluminum alloy
Detector:

Detector	Sensor housing	Sensor cover	Guide rail
FLSE1	PBT	–	SUS304
FLSE2	PBT	–	SUS304
FSD22	PBT	–	Aluminum alloy + plastic
FSGS3	PBT	SUS304	SUS304 + plastic
FSGS41 FSGS5	PBT	SUS304	–
FSD32	SUS304	–	SUS304 + aluminum alloy

Signal cable: FLY3 (applicable detector: FLS)
- Structure: Heat-resisting high-frequency coaxial cable (3D2V)
- Sheath: Flame-resisting PVC
- Outer diameter: ø5mm
- Termination: M3 amp terminal (flow transmitter side) and BNC connector (sensor side)

FLY8, FLY9 (applicable detector: FSG, FSD)
- Structure: High frequency coaxial cable (double shield)
- Sheath: Black flame-resisting PVC
- Outer diameter: ø7.3mm
- Termination: M3 amp terminal (flow transmitter side) and M4 amp terminal (FLY8).Note, however, that the detecter side of FSD22 and FSD32 is provided with BNC connector (FLY9).
- Mass: Approx. 90g/m

Dimensions: Flow transmitter FSV···S (IP66):
H170×W142×D70mm
Flow transmitter FSV···H (IP67):
H277×W244×D95mm
Detector: H50×W228×D34mm (FLSE1)
H50×W348×D34mm (FLSE2)
H90×W320×D53mm (FSD22)
H46×W410×D50mm (FSGS3)
H46×W54×D37mm (FSGS41)
H67×W78×D84mm (FSGS5)
H205×W530×D52mm (FSD32)

Mass: Flow transmitter (indoor type):
1.5kg
Flow transmitter (outdoor type):
4.5kg
Detector: 0.3kg (FLSE1)
0.4kg (FLSE2)
0.6kg (FSD22)
0.6kg (FSGS3)
0.3kg (FSGS4)
1.2kg (FSGS5)
1.6kg (FSD32)

■PC Loader software

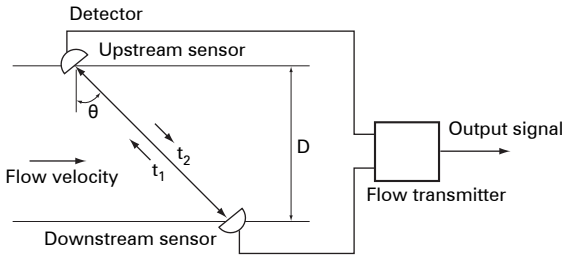
Provided as standard
- Compatible model is PC/AT compatible instrument.
- Operation is undefined for PC98 series (NEC).
- Main functions: Software for Main unit parameter setting/change on PC
- OS: Windows 2000/XP
- Memory requirement: 125MB min.
- Disk unit: CD-ROM drive compatible with Windows 2000/XP
- Hard disk capacity: Minimum vacant capacity of 52MB or more

Note: Optional communication board (specified at the 5th digit of code symbols) and loader cable (Model ZZP*TK4J1236) are additionally necessary for RS232C serial communication.

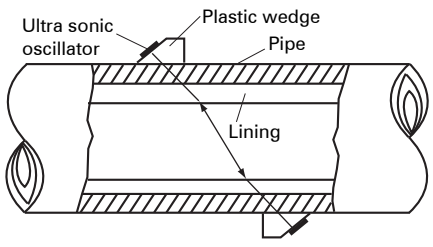
Note: USB-RS232C converter
For PC that does not support RS-232C serial interface, a converter is necessary for connecting the PC and main unit.
USB-RS232C converter should be combined with the above loader cable.
<Recommendation>
USB-CVRS9 (manufactured by Sanwa Supply)

MEASURING PRINCIPLE

With ultrasonic pulses propagated diagonally between the upstream and downstream sensors, flow rate is measured by detecting the time difference obtained by the flow of fluid.

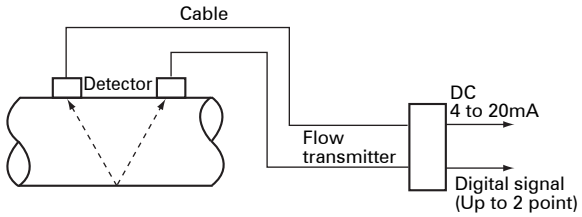


MOUNTING OF DETECTOR

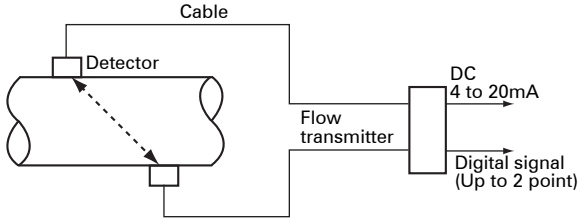


CONFIGURATION DIAGRAM

(1) Single-path system (V method)



(2) Single path system (Z method)



DETECTOR SELECTION GUIDE

Type	Fluid temperature [°C]	Mounting method	Inner diameter of piping ø (mm) 13 25 50 100 200 250 300 400 1000 3000 6000
FLSE12□2-Y	-20 to 100	V	25 P 100
FLSE12□2-A	0 to 120	V	50 M 100
FLSE22□2-Y	-20 to 100	V	50 P, M 225
FLSE22□2-A	0 to 120	V	50 P, M 150
FSGS32 Note) FSGS31	-40 to 80	V	50 Px, P, M 300
FSGS41	-40 to 80	V	200 Px, P, M 600
FSGS41	-40 to 80	Z	200 Px, P, M 1200
FSGS51 Note) FSGS50	-40 to 80	V	200 Px, P, M 3000
FSGS51 Note) FSGS50	-40 to 80	Z	200 Px, P, M 6000
FSD22	-40 to 100	V	13 Px, P, M 100
FSD32	-40 to 200	V	50 Px, P, M 250
FSD32	-40 to 200	Z	150 Px, P, M 400

Classification of piping materials
- Px : PP, PVDF
- P : Plastic (PVC, etc.)
- M : Msetallic piping (steel pipe, copper pipe, aluminum, etc.)

Note: The ultrasonic signal cannot be transmitted easily when the classification of piping material is Px or the turbidity is high. In such a case, a preliminary check by a portable ultrasonic flowmeter is recommended.

CODE SYMBOL

<Flow transmitter>

1 2 3 4 5 6 7 8	9 10 11 12 13	14	Description
F S V			(Destination) (4th digit)
E			Standard (English)
			(Communication) (5th digit)
Y			None
A			RS232C+DI
B			RS485+DI
			(Use) (6th digit)
Y			Single measuring path
			(Power supply) (7th digit)
1			AC100 to 240V 50/60Hz
4			DC20 to 30V
			(Case structure) (9th digit)
S			IP66
H			IP67
			(Wire connection port) (10th digit)
Y			Weatherproof gland provided [G1/2 and G3/8 (internal threads)]
A			Union (for pilica) with gland [G1/2 female screw] (when "H" is specified 9th digit)
			(Combination with explosion-proof detector) (11th digit)
Y			None
			(Parameter setting) (12th digit)
Y			None
A			Setting provided
B			Setting provided + tag
C			Tag
			(Mounting method) (13th digit)
A			Pipe mount (if the 9th digit is S)
B			Wall mount
C			Pipe mount (if the 9th digit is H)
			(Area) (14th digit)
		N	America
		E	Europe, Middle East, Africa
		A	Asia

<Detector, small diameter/high temperature type>

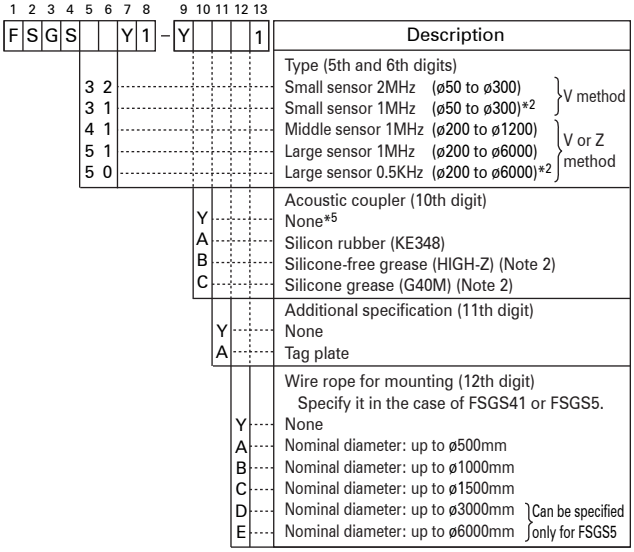
1 2 3 4 5 6 7 8	Description
F S D 2 2 0 S 1	Small diameter sensor (ø13 to ø100) V method
F S D 3 2 0 Y 1	High-temperature sensor *1 (ø50 to ø400) V or Z method

*1: For turbid fluid or old pipe, cast iron pipe, mortar lining pipe or others through which the ultrasonic signal could not be transmitted easily, use an optional guide rail (TK4C6164C1), and carry out mounting by Z method.
Applicable diameter range
V method: ø50 to ø250 Z method: ø150 to ø400

Note: As standard acoustic coupler, silicone rubber (KE-348W) is provided for small diameter sensor, or grease for high temperature (KS62M) for high-temperature sensor.

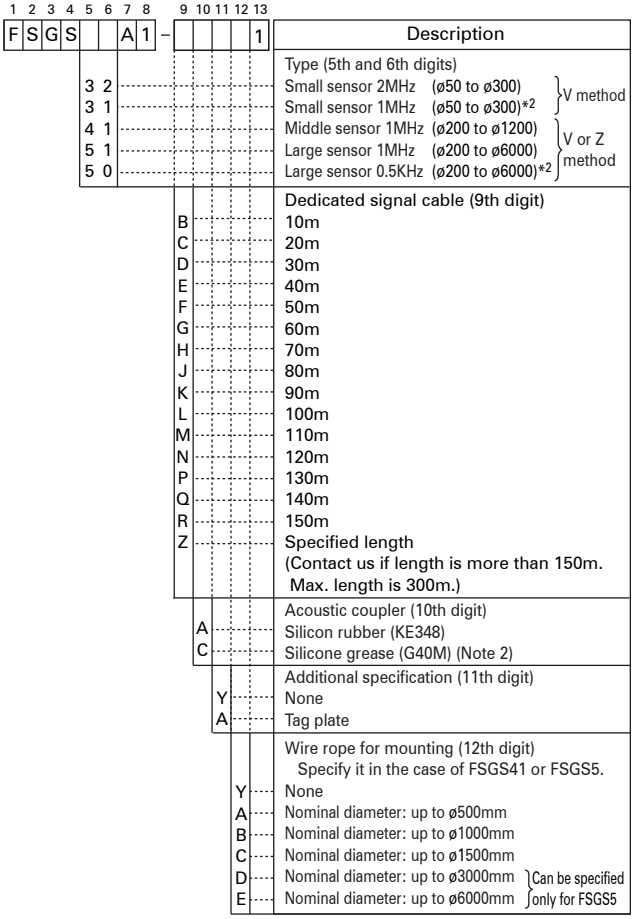
CODE SYMBOL

<Detector, common type>



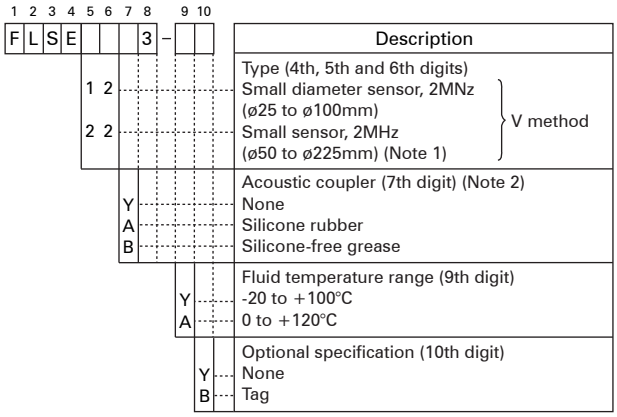
*2: For aging pipes, cast iron pipes or mortar-lined pipes that interrupts the propagation of ultrasonic signals, select FSGS31 or FSGS50.
*3: Procure type FLY for the signal cable.
*5: Silicone rubber (KE-348W) is provided as a standard accessory to fill the wiring mold. (It can also be used as an acoustic coupler.)
If an additional acoustic coupler is required, select one among A, B and C.

<Detector, submersible type>



*2: For aging pipes, cast iron pipes or mortar-lined pipes that interrupts the propagation of ultrasonic signals, select FSGS31 or FSGS50.

<Detector, popular type>



Note 1: When the 9th digit in the code symbol is "A", the applicable piping diameter is up to 150mm.

Note 2: Normally select silicone rubber as acoustic coupler. Silicone rubber in tube (100g) is furnished. If you place an order for several units, 1 tube may suffice for every 5 units.
Select silicone-free grease for semiconductor manufacturing equipment or the like that is vulnerable to silicone. The silicone-free grease is water-soluble and, therefore, cannot be used in environment exposed to water or on piping subjected to a condensation. Since the grease does not set, a periodic maintenance (cleaning, refilling every about 6 months at normal temperature) is necessary.

CODE SYMBOL

<Signal cable>

• For detector FLS

1 2 3 4 5 6 7 8	Description
F L Y 3	Type of sensor (4th digit code) (for FLS)
	Cable length (5, 6 and 7th digit)
0 0 5	5 m
0 1 0	10 m
0 1 5	15 m
0 2 0	20 m
0 2 5	25 m
0 3 0	30 m
0 4 0	40 m
0 5 0	50 m
0 6 0	60 m
Z Z Z	Others (contact us)

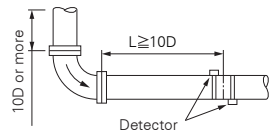
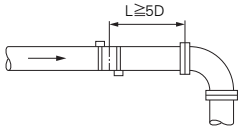
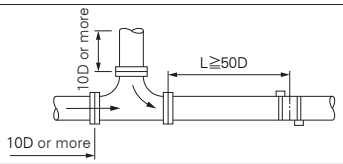
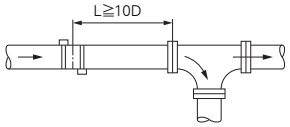
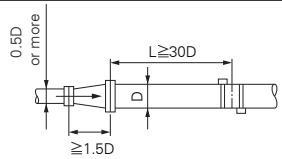
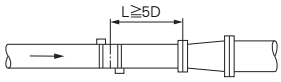
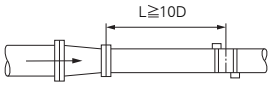
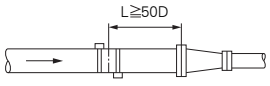
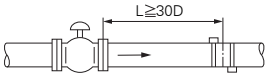
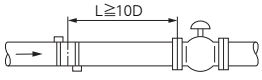
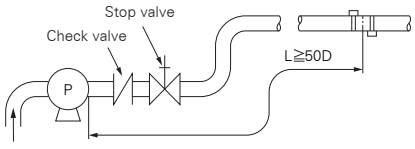
• For detector FSG and FSD

1 2 3 4 5 6 7 8	Description
F L Y 8	Type of sensor (4th digit) Small and large sensor (for FSG)
9	Small dia and hight temp sensor (for FSD)
	Cable length (5,6 and 7th digit)
0 0 5	5 m
0 1 0	10 m
0 1 5	15 m
0 2 0	20 m
0 2 5	25 m
0 3 0	30 m
0 3 5	35 m
0 4 0	40 m
0 4 5	45 m
0 5 0	50 m
0 5 5	55 m
0 6 0	60 m
0 6 5	65 m
0 7 0	70 m
0 7 5	75 m
0 8 0	80 m
0 8 5	85 m
0 9 0	90 m
0 9 5	95 m
1 0 0	100 m
1 1 0	110 m
1 2 0	120 m
1 3 0	130 m
1 4 0	140 m
1 5 0	150 m
Z Z Z	Others (contact us)

Note: Must be procured unless the sensor is a submersible type.

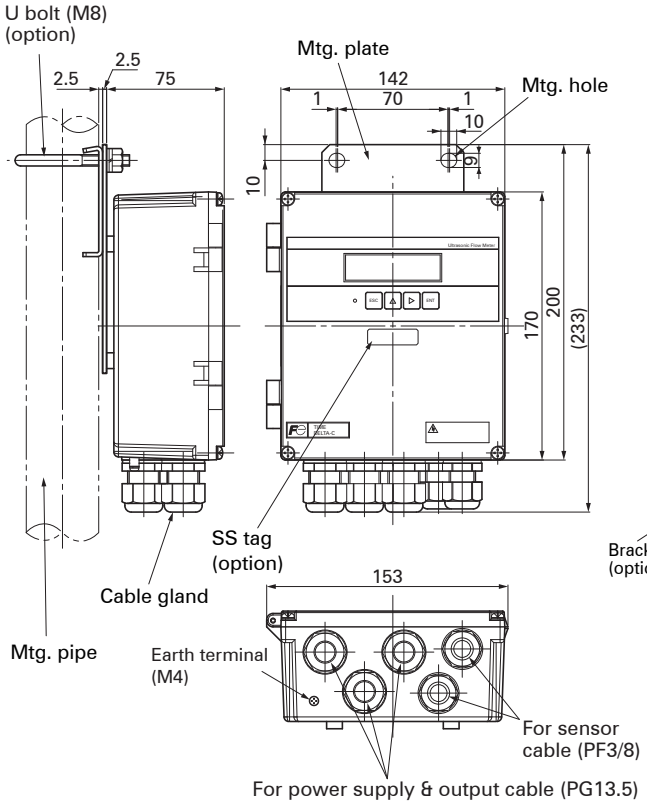
Conditions on straight pipe

(D : Inside diameter of pipe)

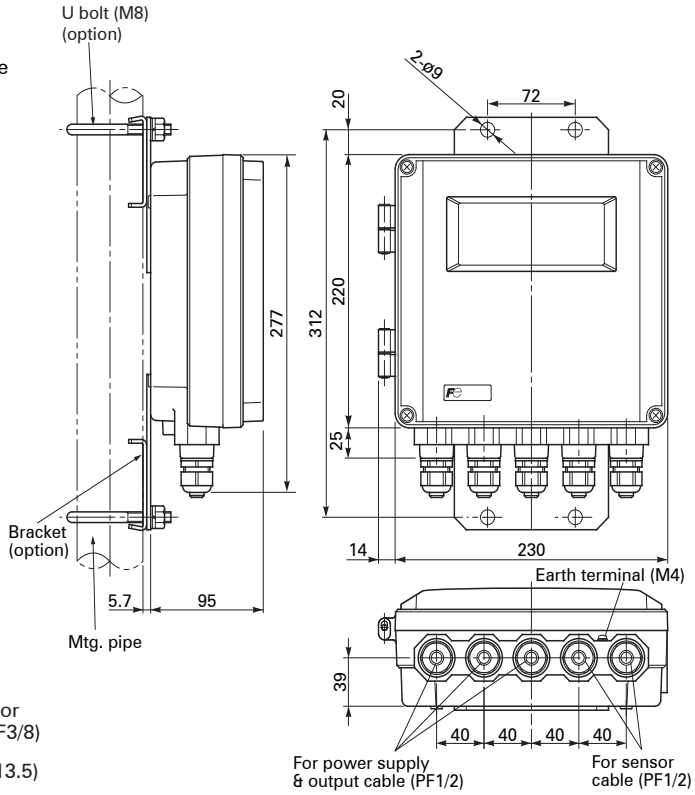
Classification	Upstream side	Downstream side
90 bend		
Tee		
Diffuser		
Reducer		
Various Valve	 In case that flow control valve exists on upstream side.	 In case that flow control valve exists on downstream side.
Pump		

(Note) The source : JEMIS-032

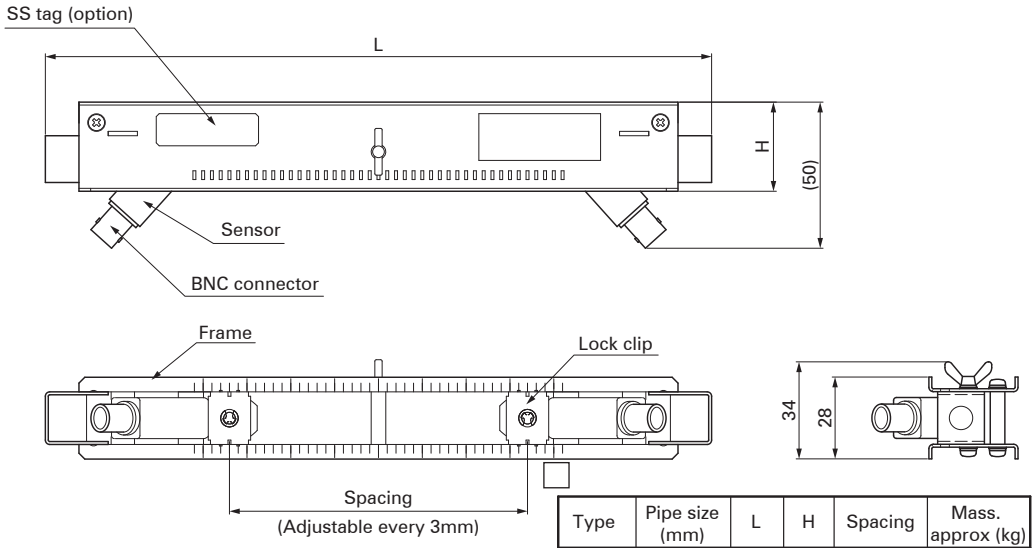
OUTLINE DIAGRAM (Unit:mm)



Flow transmitter : FSV···S (IP66)



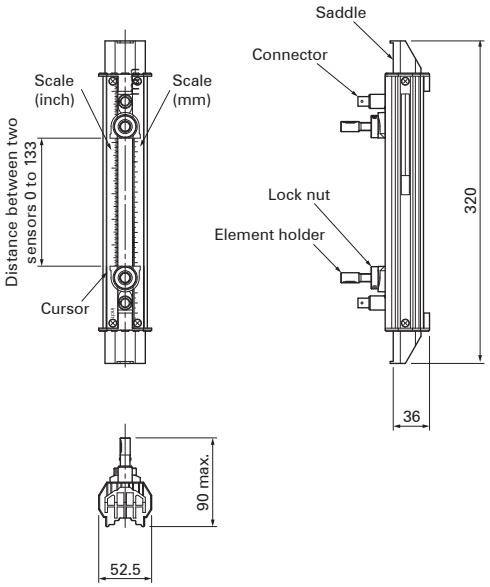
Flow transmitter : FSV···H (IP67)



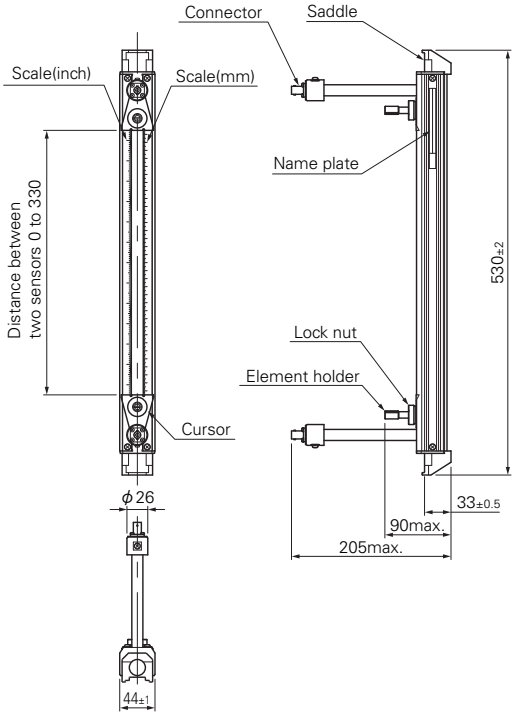
Type	Pipe size (mm)	L	H	Spacing	Mass. approx (kg)
FLSE12	25 to 100	228	31	21 to 120	0.3
FLSE22	50 to 225	348	30	21 to 240	0.4

Detecter (type : FLSE 2) (popular type)

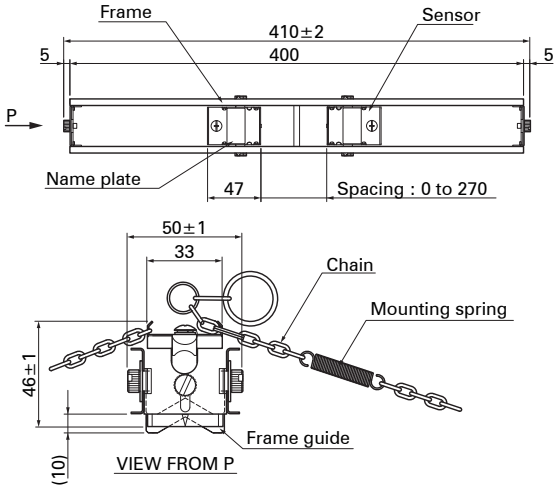
OUTLINE DIAGRAM (Unit:mm)



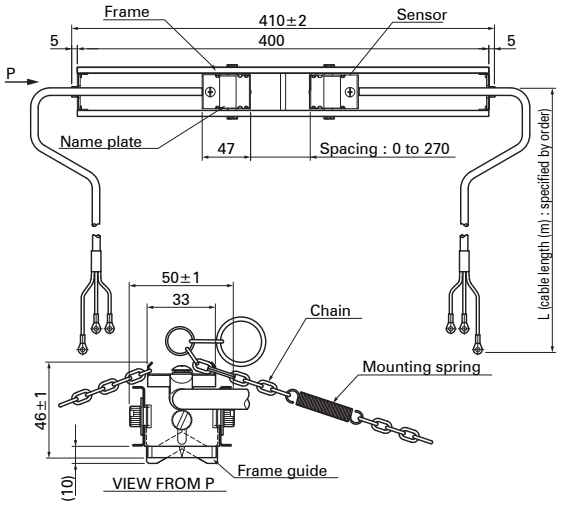
Detector FSD22 (Small diameter sensor)



Detector FSD32 (High-temperature sensor)

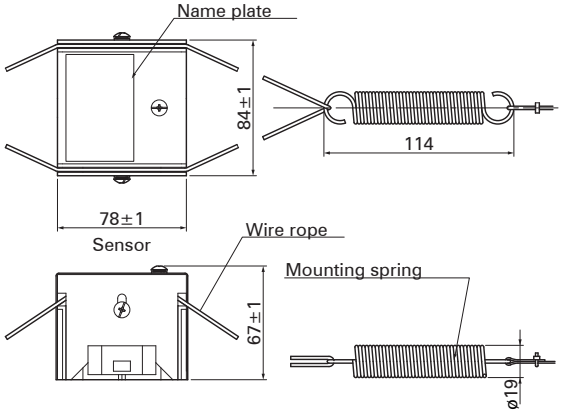


(Common type)

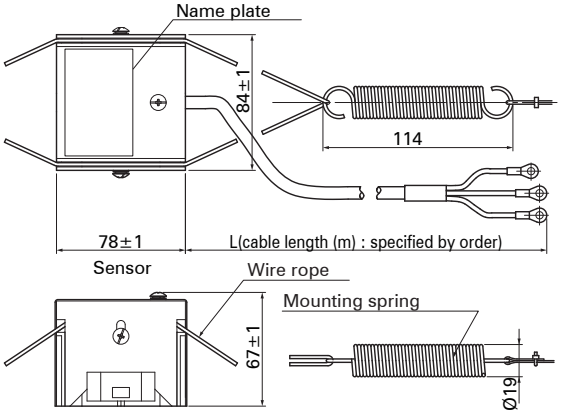


(Submersible type)

Detector FSGS3 (Small sensor)



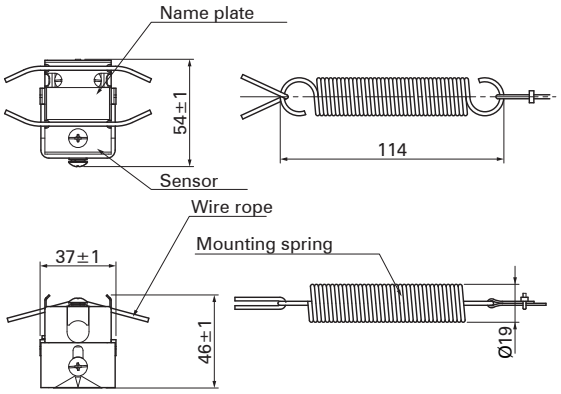
(Common type)



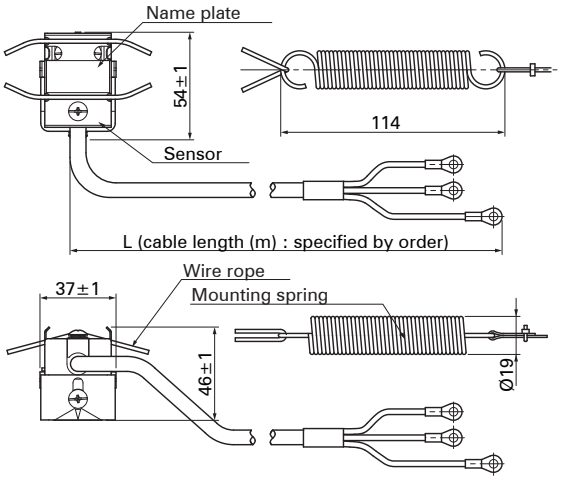
(Submersible type)

Detector FSGS5 (Large sensor)

OUTLINE DIAGRAM (Unit:mm)



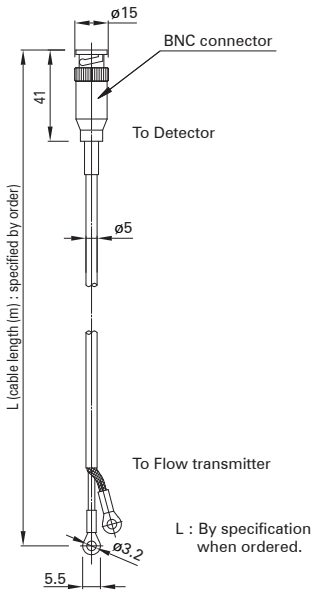
(Common type)



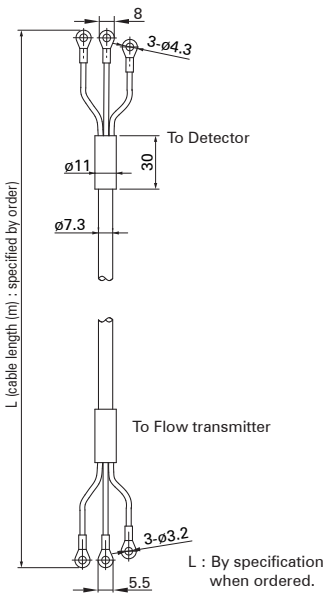
(Submersible type)

Detector FSGS41 (Middle sensor)

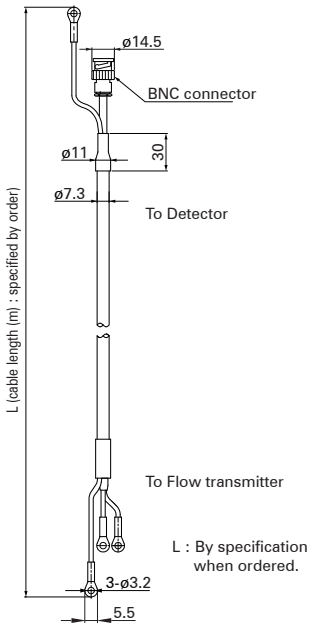
Signal cable : FLY3 (For FLS)



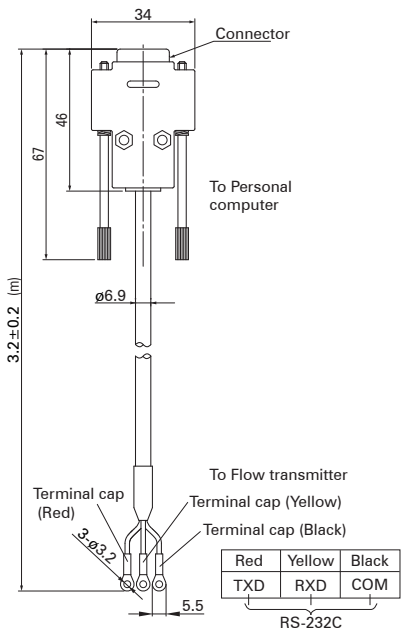
Signal cable : FLY8 (For FSG)



Signal cable : FLY9 (For FSD)

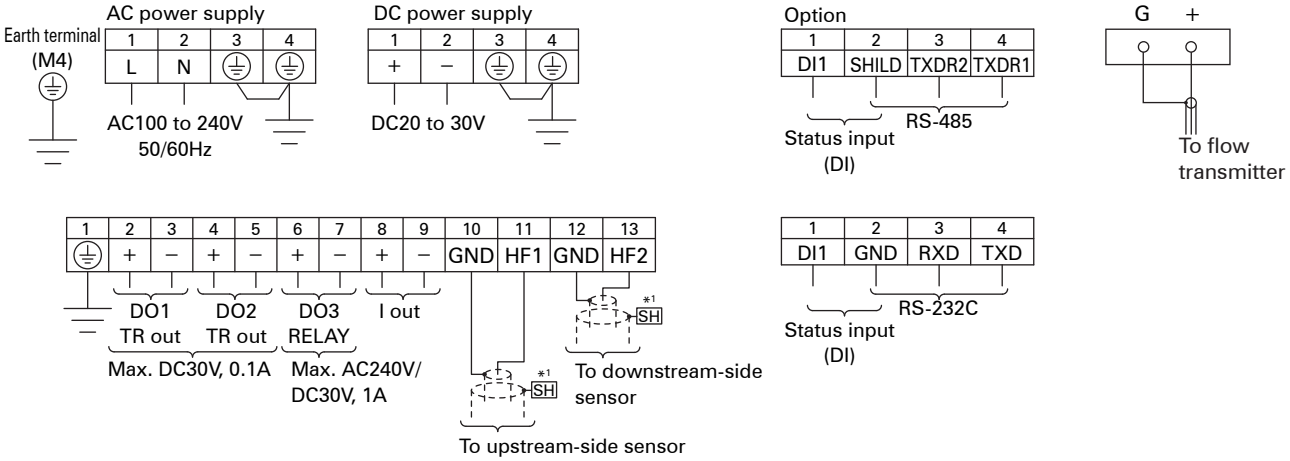


Loader cable : ZZP*TK4J1236



CONNECTION DIAGRAM

<Flow transmitter>



*1) Only for double shield coaxial cable (type FLY8, 9)

SCOPE OF DELIVERY

- Flow transmitter (provided with U-bolt and nuts for pipe mount)
- Detector (provided with mounting fixture and acoustic coupler)

*The acoustic coupler is option for popular type detectors.

- Signal cable
- CD-ROM (contains instruction manual, loader software)

ITEMS DESIGNATED ORDERING

1. Detector code symbols
2. Flow transmitter code symbols
3. Signal cable code symbols
4. For large sensor: Mounting pipe size
5. Tag No. as necessary
6. If parameter setting is specified, send back the attached parameter specification table duly filled.

OPTIONAL ACCESSORIES

	Name	Drawing No.
1	Guide rail for high-temperature sensor	ZZP*TK4C6164C1
2	PC Loader cable	ZZP*TK4J1236C1
3	Silicon grease (G40M)	ZZP*45231N5
4	Silicone rubber (KE 348W)	ZZP*45735N2
5	Silicone-free grease (HIGH Z)	ZZP*TK7M0981P1
6	High-temperature grease (KS62M)	ZZP*TK7G7983C1
7	Fuse for AC power	ZZP*TK7N3827P8
8	Fuse for DC power	ZZP*TK7J1005P1
9	Wire rope for mounting the sensor	
	Spring	ZZP*TK745007P1
	Wire rope	
	Nomal diameter: up to ø500mm	ZZP*TK464686C1
	Nomal diameter: up to ø1000mm	ZZP*TK464686C2
	Nomal diameter: up to ø1500mm	ZZP*TK464686C3
	Nomal diameter: up to ø3000mm	ZZP*TK464686C6
	Nomal diameter: up to ø6000mm	ZZP*TK464686C13

<Parameter specification table>

Setting item			Initial value	Setting value	Setting item			Initial value	Setting value
ID No			0000		Output conditions	Total output	Total mode	Stop	
Language			English				Total rate	0m³	
Measuring conditions	System unit		Metric				Total preset	0m³	
	Flow unit		m³/h				Pulse width	50.0msec	
	Total unit		m³				Burnout (total)	Hold	
	Outer diameter		60.00mm				Burnout timer	10sec	
	Pipe material		PVC pipe			DO1 output type (Note 1)		Not used	
	Wall thickness		4.00mm			DO1 output actuation		ON when actuated	
	Lining material		Without lining			DO2 output type		Not used	
	Lining thickness		–			DO2 output actuation		ON when actuated	
	Kind of fluid		Water			DO3 output type		Not used	
	Viscosity		1.0038×10⁻⁶m²/s			DO3 output actuation		ON when actuated	
	Sensor mount		V metod			DI1 input type		Not used	
	Sensor type		FLS_12			DI1 input actuation		ON when actuated	
	Transmission voltage		80Vpp			Operation mode		Standard	
Output conditions	Damping		5.0sec		Communication	Communication mode		RS-232C	
	Cut off		0.150m³/h			Baud rate		9600bps	
	Display	1st line	Flow velocity (m/s)			Parity		Odd	
		1st line decimal point position	****.***			Stop bit		1 bit	
		2nd line	Flow rate (m³/h)			Station No.		1	
		2nd line decimal point position	****.***						
	Analog output	Range type	Single range						
		Full scale 1	15.000m³/h						
		Full scale 2	0.000m³/h						
		Range HYS.	10.00%						
		Burnout (current)	Hold						
		Burnout timer	10sec						
		Output low limit	–20%						
		Output high limit	120%						
		Rate limit	0.000m³/h						
		Rate limit timer	0sec						

Note1: When total pulse output has been selected for DO1, DO2 or DO3 specify total pulse value and total pulse width so that conditions 1 and 2 shown below are satisfies.

$$\text{Condition 1 : } \frac{\text{Flow span-1*[m}^3\text{/s]}}{\text{total pulse value*[m}^3\text{]}} \leqq \begin{matrix}1000\ \text{[In the case of DO1 and DO2]} \\ 1\ \text{[In the case of DO3]}\end{matrix}$$

$$\text{Condition 2 : } \frac{\text{Flow span-1*[m}^3\text{/s]}}{\text{total pulse value*[m}^3\text{]}} \leqq \frac{1000}{2 \times \text{total pulse width [ms]}}$$

* In the case of 2 ranges, perform calculations using either flow span-1 or flow span-2, whichever is greater.

⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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