

General

FST-3000 is a torque tube, displacement type level indicator / transmitter with intelligent data processing function. Adding to all features of existing torque tube type level transmitters, highly advanced signal processing unit offers high function and high accuracy as well as function of field adjustment of density, range etc. The measured data is indicated on LCD display and output by DC4 to 20mA signal. Also, remote control, function check and monitoring etc. can be done by HART digital communication.

Several different material selection is ready to meet various applications such as high temperature application of boilers as well as low temperature applications up to minus 196°C of liquefied gases. Intrinsically safe version is also available.

Standard Specification

Detection Method : Torque Tube Type Displacer
Measuring Range : Min. 0 to 300mm
: Max. 0 to 3000mm

Other measuring ranges on request. Consult factory for details.

Available Pressure Class : ANSI#150/#300, JIS10K/20K

Fluid Temp. Range : -196 to +400°C

Installation : Tank Top or Tank Side Installation

Connection Size : External chamber – 1-1/2" or 2" flange

Amb. Temperature : Weather Proof -20 to +60°C
Pressure tight Ex-proof -20 to +55°C
Intrinsically safe (S+H) -20 to +40°C

Available Material :
1) Torque Tube SUS316L, Inconel
2) Bonnet SCPH2, SCS13A, SCS14A
3) Chamber Carbon Steel, SUS304, SUS316
4) Displacer SUS316
5) Indicator AC2A

Note: Other material shall be inquired to Manufacture.

Location Indication : By 2 line LCD indication (Height 12.7mm)
Line 1: Function Indication (4 digit)
Line 2: Data Indication (4 digit)

Output : DC 4 to 20mA, 2 wire

Digital signal : Superimposed to 4 to 20mADC output signal

Supply Voltage (UB) and max. load (Ra)

1) FST-3□□□W and FST-3□□□E

UB = DC 12.2 to 40.0V

Ra = 46.3 UB – 565 (Ω)

Example:

at UB = 24V, Ra = 546 (Ω)

at UB = 40V, Ra = 1287 (Ω)

2) FST-3□□□S+H

UB = DC 11.0 to 26.0V

Ra = 650 (Ω) for Isolation Barrier

Ra = (UB – 11) / 22 [kΩ] for Zenner Barrier

Example: at UB = 24V, Ra = 591 (Ω)



Communication

Protocol : HART™

Transmission : FKC (Frequently irregular system)

* Communication needs the load resistance beyond 250 (Ω)

<HART is a registered trademark of the HART Communication Foundation.>

Accuracy : ±0.5% F.S. (For Level measurement)
(Including Linearity and repeatability)

Enclosure :

1) Weather Proof

2) Pressure Tight Explosion Proof

3) intrinsically Safe

Cable Entry : Std. 1 x G1/2

Option 1 x 1/2NPT

Intelligent Data Setting Function :

Ex-proof Built-in Key Board provided for data setting (Data setting can be conducted in Hazardous area during operation.)

Setting items :

Burn-out setting, Density, Analog output direction, Indication unit (mm, % or density), Analog output test, indication test, Others

Model Code

FST-3											Description	
Measuring Span	1											Upto 300mm
	2											301 – 500mm
	3											501 – 700mm
	4											701 – 1000mm
	5											1001 – 1500mm
	6											1501 – 2000mm
	7											2001 – 2500mm
	8											2501 – 3000mm
	9											Special
Connection	1											Side to Side
	2											Bottom to Side
	9											Special
Material Bonnet/Displacer/ Chamber)	9											Carbon Steel/SUS316/Carbon Steel
	9											SCS13A/SUS316/SUS304
	3											SCS14A/SUS316/SUS316
	9											Special – Specify each material
Enclosure (Note *3)	W											Weather Proof (IP65 equiv.)
	E											Pressure Tight Ex-proof Exd IIC T6
	W+H											Weather proof + HART (IP65 equiv.)
	E+H											Exd + HART (Exd IIC T6)
	S+H											Ex ia + HART (Ex ia IIC T4) (Note *3)
Alarm contact		-	0									Not Provided
Pressure Rating	1											ANSI#150
	2											ANSI#300
	4											JIS10K
	9											JIS20K
	9											Special – Specify Pressure Rating
Connection Size	1											1-1/2" Flange
	2											2" Flange
	9											Special
Liquid Temperature Range	1											0°C ≤ t ≤ 100°C (Standard type + No fin)
	2											-30°C ≤ t ≤ 150°C (Standard type + Single fin)
	3											-196°C ≤ t ≤ 200°C (Extension type + Single fin)
	4											200°C ≤ t ≤ 300°C (Extension type + Double fin)
	5											300°C ≤ t ≤ 400°C (Extension type + Triple fin)
	9											Special
Torque Tube Material	1											SUS316L (-196°C ≤ t ≤ 200°C)
	2											INCONEL (-196°C ≤ t ≤ 400°C)
	9											Special
Cable Entry	-	1										G 1/2 (F) (Note *1)
	-	2										NPT 1/2" (F)
	-	9										Special
Rotation Angle (Note *2)	L1 – L8										Left Hand Side	
	R1 – R8										Right Hand Side	

Note

*1: For Exd version (Enclosure type E or E+H), only G 1/2(F) is available. Please select this code.

*2: Refer to following figures for installation. Ex. L1.

*3: Recommended Safety Barrier

Zenner Barriers

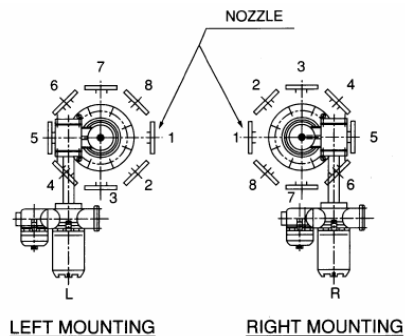
MTL728+ (MTL)

Z728, Z928 (P&F)

Voltage/Current/Wattage = 28V/104mA/728mV

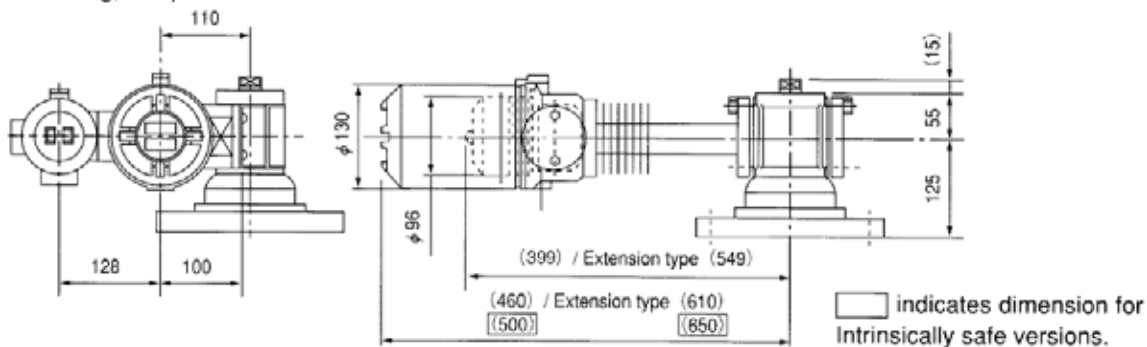
Internal inductance : Insignificant

Internal capacitance : less than 0.005µF

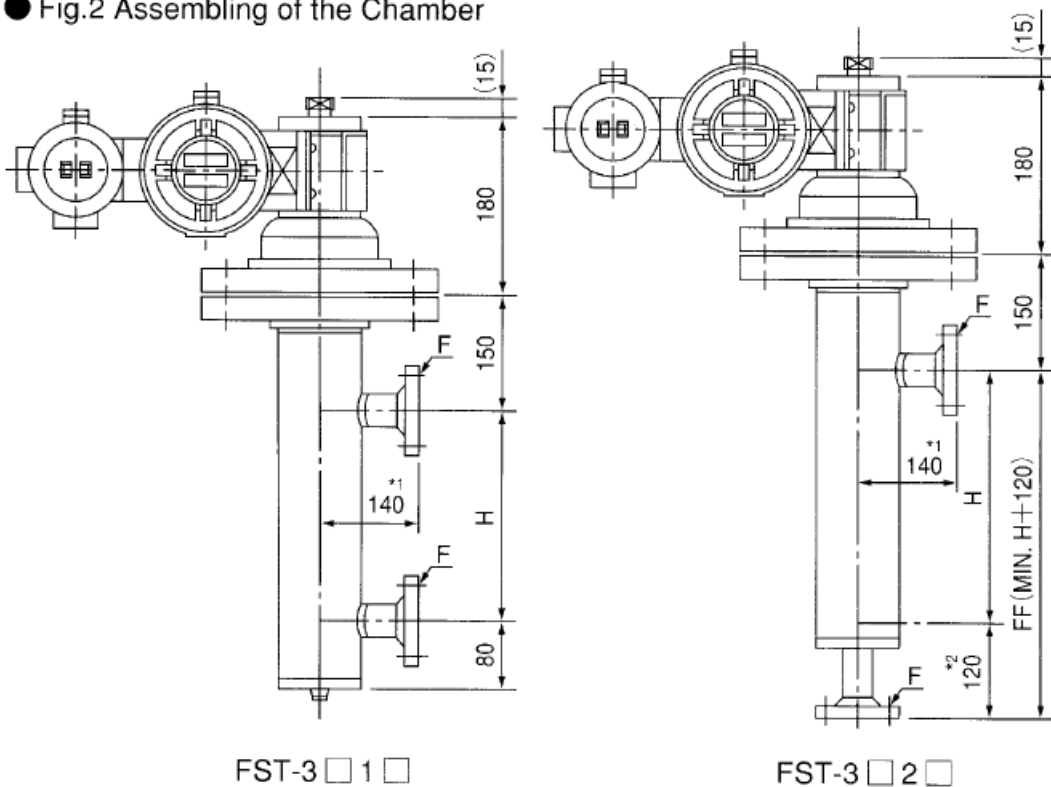


Dimensions

● Fig. 1 Electric housing, Torque Tube & Bonnet



● Fig.2 Assembling of the Chamber



Dimensions
 F: Standard of Connection Flange
 H: Measuring Range
 FF: Installation Dimension

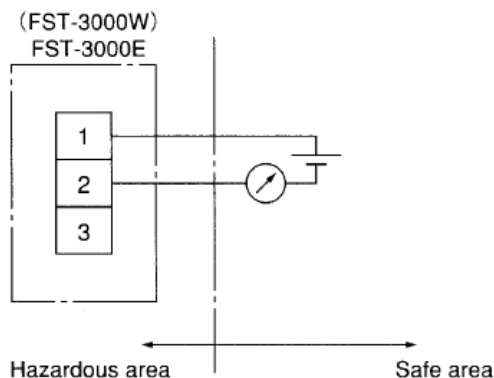
Material of Gasket, Bolt & Nut

The following material of Gasket and Bolt & Nut are available.

Code	Gasket	Code	Bolt & Nut	Remarks
1	-	1	SS400	Steel
2	-	2	SUS304	St.stl, Low temp
3	V#7020	3	SNB7/S45C (A193-B7/A194-2H)	Steel, High temp
4	V#8591V	4	A320-L7/A194-4	Steel, Low temp.
5	V#6591V	5	A193-B8CL2 /A194-8	St.stl, High temp.
6	V#7591V	6	A320-B8CL2 /A194-8	St.stl, Low temp.
9	Special	9	Special	

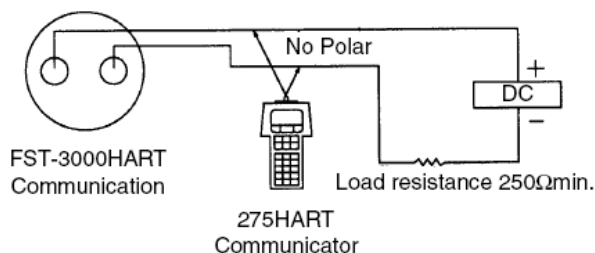
Wiring

- 1) Weather proof version (FST-3□□□W) and Pressure tight ex-proof version (FST-3□□□E)

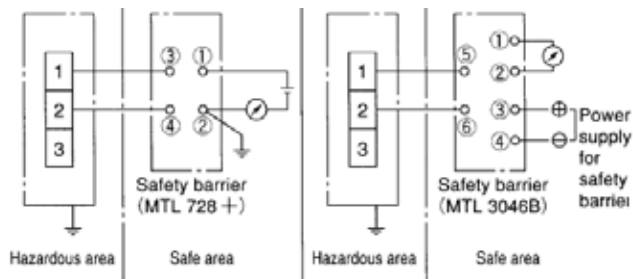


- 3) HART Communication

Connection



- 2) Intrinsically safe version (FST-3□□□S+H)



Ordering Information

Specify the following for order / inquiry :

1	Model	FST-3□□□-□□□□□-□□		
2	Liquid Name			
3	Sp. GR.			
4	Viscosity			
5	Pressure	Nor.	Max.	(MPa)
6	Temperature	Nor.	Min.	Max. (°C)

* Specification is subject to change without notice.

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