

TIV

TECHNICAL GUIDANCE

NEW GENERATION OF TORQUE TUBE INTELLIGENT FST-3000 Series TORQUE TUBE, DISPLACE TYPE

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 ~ 20mA signal. 4 point level alarm contact is optionally available. 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 newly added.

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.
Liquid density	:
1) For level measurement	: 0.2 to 1.5g/cm ³
2) For interface measurement	: Difference of density of 2 liquids : To be more than 0.1g/cm ³
3) Density measurement	: Min. density span 0.2g/cm ³
	Other density range on request. Consult factory for details.
Available Pressure class	: ANSI#150, #300, #600, #1500 and #2500 class
Fluid Temp. Range	: -196 to +400°C
Installation	: Tank Top Installation or Tank Side Installation
Connection Size	: External chamber type: 1 1/2" or 2" flange Internal chamber type: 4" flange
Amb. Temp.	: Weather Proof -20 to 60°C Pressure Tight Ex-proof -20 to 55°C Intrinsically safe (S2) -20 to 60°C Intrinsically safe (S+H) -20 to 40°C
Available Material	:
1) Torque tube	: SUS316L, NW0276 (Hastelloy C-276® equivalent), Inconel
2) Bonnet	: SCPH2, SCS13A, SCS14A, SCS16A, Titanium
3) Chamber	: Carbon steel, SUS304, SUS316, SUS316L Titanium, NW0276 (Hastelloy C-276® equivalent), Monel, PVC
4) Displacer	: SUS304, SUS316, SUS316L Titanium, NW0276 (Hastelloy C-276® equivalent), Monel, PVC
5) Indicator	: AC2A
Local Indication	: By 2 line LCD indication (Height 12.7mm) Line 1: Function Indication (4 digit) Line 2: Data Indication (4 digit)
Output	: DC4 ~ 20mA, 2 wire
Digital signal	: Superimposed to 4 to 20mA DC output signal Supply Voltage (UB) and max. load (Ra) 1) FST-3□□□W and FST-3□□□E UB=DC 12.2 ~ 40V



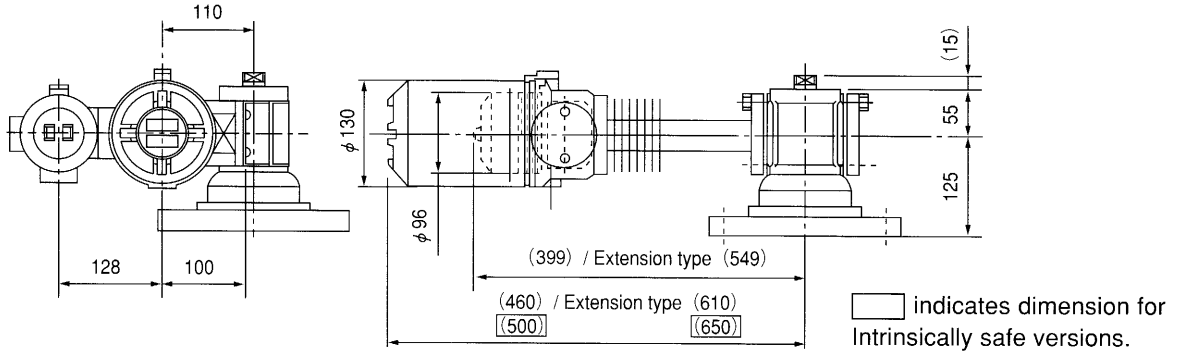
ATEX INTRINSIC SAFETY EXPLOSION-
PROOF TYPE AVAILABLE

Ra=46.3UB - 565 (Ω) ex. at UB=24V, Ra=546Ω at UB=40V, Ra=1287Ω
2) FST-3□□□S2 UB=DC11.0 ~ 26V Ra=650Ω (FOR ISOLATION BARRIER) Ra=(UB-11)/ 22 [kΩ] (FOR ZENNER BARRIER) ex. at UB=24V Ra=591Ω
Communication Protocol : HART™ Transmission : FKC (Frequently irregular system) •Communication needs the load resistance beyond 250Ω
Alarm Contact (Option) : SPST relay contact, Max. 4 points Capacity AC 125V, 3A DC 30V, 3A •Optionally available only for Weather proof version (FST-3□□□W) and Pressure tight ex-proof version (FST-3□□□E). NOT available for intrinsically safe version and HART communication Foundation. •Separate power supply of DC24V is additionally required than signal line. One cable entry will be added. Alarm action to be specified (Hi or Lo).
Accuracy : ±0.5% F.S. (Based on the mass conversion correction at the time of delivery from factory)
Enclosure :
1) Weather Proof 2) Pressure Tight Explosion Proof 3) Intrinsically Safe
Cable Entry : Std. 1 x G1/2 Option 1 x 1/2NPT For alarm contact version, 1 cable entry (Max. G3/4 or 3/4NPT) will additionally be provided.
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, Alarm point (Max. 4 points), Alarm reset span, Alarm action, Analog output direction, Indication unit (mm, % or density), Analog output test, Indication test, others

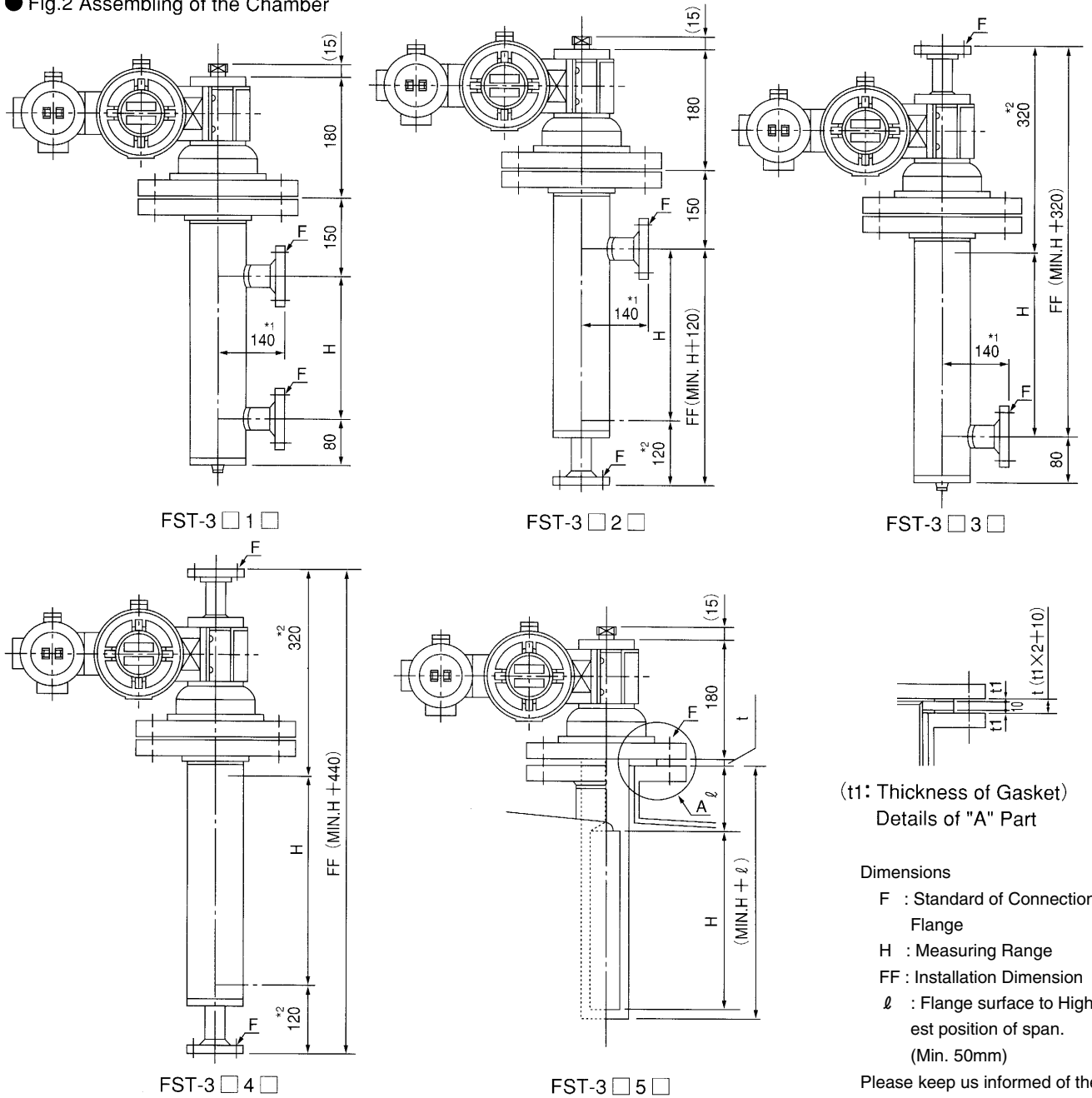
DIMENSIONS

(Dimensions are for #150 and #300 class. They will be different for #600 and above.)

● Fig. 1 Electric housing, Torque Tube & Bonnet



● Fig.2 Assembling of the Chamber



(t1: Thickness of Gasket)
Details of "A" Part

Dimensions

- F : Standard of Connection Flange
- H : Measuring Range
- FF : Installation Dimension
- ℓ : Flange surface to Highest position of span.
(Min. 50mm)

Please keep us informed of the above Dimensions

Remarks : *1 : They may change for High Pressure Gas Regulation certified products.

*2 : *2 indicate 5 minimum possible dimensions. Consult factory in case different dimensions are required.

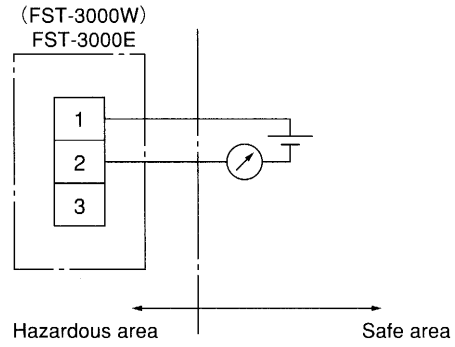
MATERIAL OF GASKET, BOLT & NUT

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	

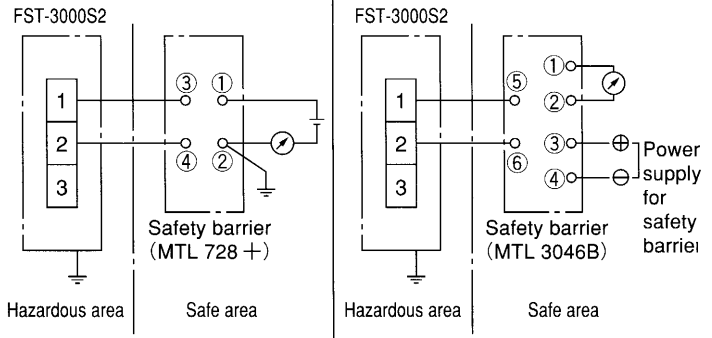
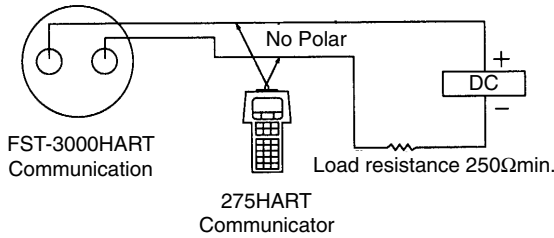
WIRING

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



2) Intrinsically safe version (FST-3□□□S2)

Connection



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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