

TIV TECHNICAL GUIDANCE

NEW GENERATION OF TORQUE TUBE

INTELLIGENT
FST-3000 series

UP-GRADED!

TORQUE TUBE, DISPLACE TYPE
LEVEL INDICATOR / TRANSMITTER

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 upto minus 196°C of liquefied gases.

Intrinsically safe version is newly added.

STANDARD SPECIFICATION

Detection Method : Torque Tube Type Displacer

Measuring Range : Min. 0 ~ 300mm
Max. 0 ~ 3000mm

Other measuring ranges on request. Consult factory for details.

Liquid density :

1) For level measurement 0.2 ~ 1.5

2) For interface measurement

Difference of density of 2 liquids : To be more than 0.1

3) Density measurement : Min. density span 0.2

Other density range on request. Consult factory for details.

Available Pressure class :

ANSI#150, #300, #600, #1500 and #2500 class

Fluid Temp. Range : -196 ~ +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. : For Weather proof (W) and Pressure tight ex-proof (E)
-20 ~ +80°C

For intrinsically safe (S1 and S2)

-20 ~ +60°C

Available Material :

- 1) Torque tube SUS316L, Hastelloy C-276, Inconel
- 2) Bonnet SCPH2, SCS13A, SCS14A, SCS16A, Titanium
- 3) Chamber Carbon steel, SUS304, SUS316, SUS316L
Titanium, Hastelloy C-276, Monel, PVC
- 4) Displacer SUS304, SUS316, SUS316L Titanium,
Hastelloy C-276, 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

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

1) FST-3□□□W and FST-3□□□E

UB=DC 12.2 ~ 40V

Ra=46.3UB - 565 (Ω)

ex. at UB=24V, Ra=546Ω



at UB=40V, Ra=1287Ω

2) FST-3□□□S1

UB=DC13.5 ~ 26V, Ra=1kΩ (ISOLATION BARRIER)

3) 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 250V, 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. (For level measurement)
(Including Linearity and Repeatability)

Enclosure :

1) Weather Proof (IP65 equ.)

2) Pressure Tight Explosion Proof (ExdIICT6)

3) Intrinsically Safe (Ex ia IIC T4)

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 :

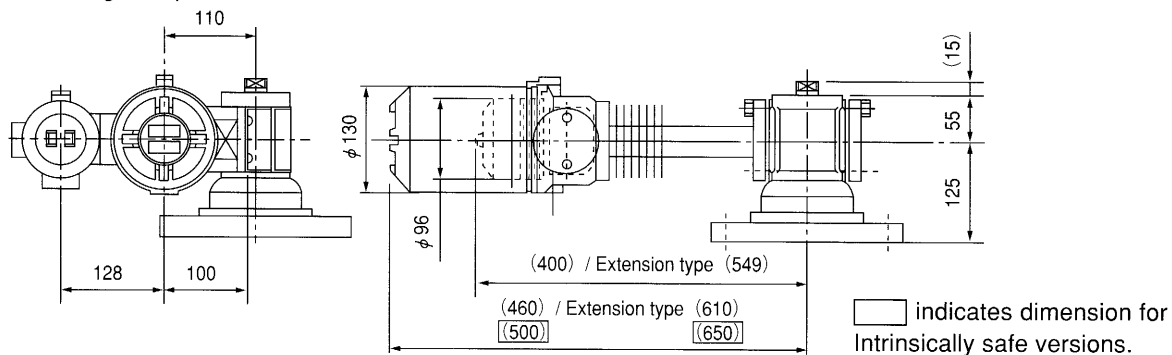
Burn-out setting, Density, Alarm point (Max. 4 points), Alarm reset span, Alarm action, Analog output direction, Indication unit (mm, % or density), Analog output test, Indication test, others

TG-L545-4E

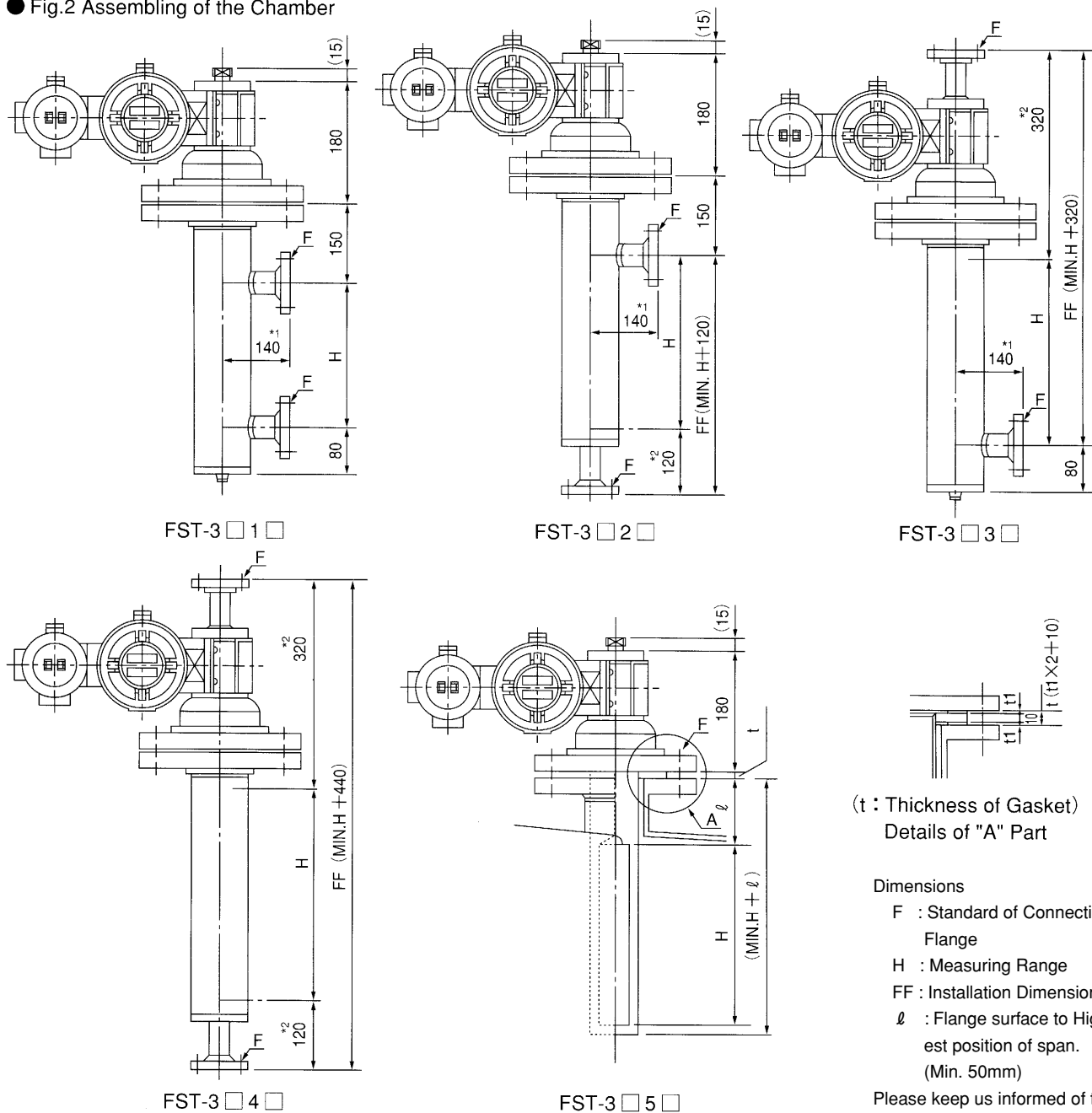
DIMENSIONS

(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



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

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

MATERIAL OF GASKET, BOLT & NUT

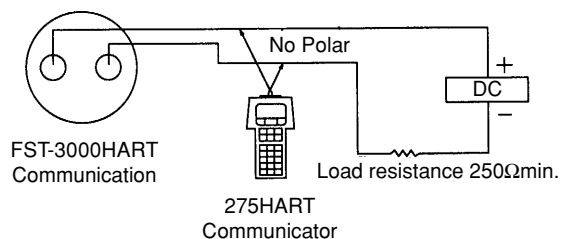
The following material of Gasket and Bolt & Nut are available.

CODE	GASKET	CODE	BOLT & NUT	Remarks
1	V#1500	1	SS400	Steel
2	V#1500AC	2	SUS304	St.stl, Low temp.
3	V#7020	3	SNB7 / S45C (A193-B7 / A194-2H)	Steel, High temp.
4	V#591V	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	

Available combination of Gasket & Bolt & Nut code is as follows :

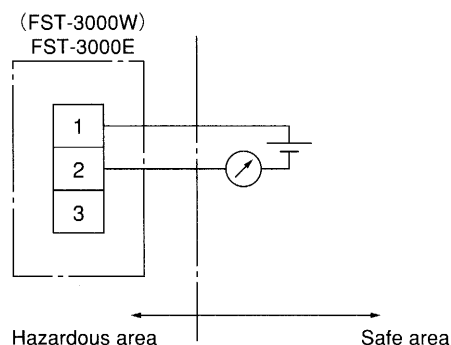
1 1	1 2	1 3	
2 1	2 2	2 3	
3 1	3 2	3 3	
4 3	4 4	4 5	4 6
5 3	5 4	5 5	5 6
6 3	6 4	6 5	6 6
9 9			

Connection

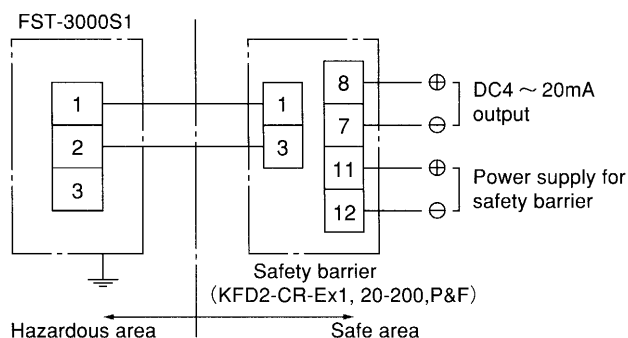


WIRING

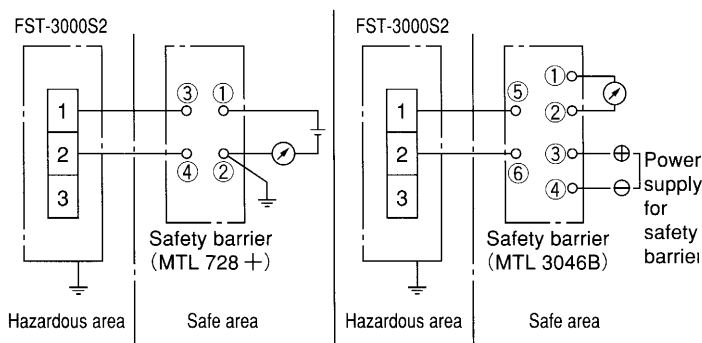
1) Weather proof version (FST-3□□□W) and Pressure tight ex-proof version (FST-3□□□E)



2) Intrinsically safe version (FST-3□□□S1)



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



ORDERING INFORMATION

Specify the following for order / inquiry :

1	MODEL	FST-3□□□□-□□□□□□-□□□
2	LIQUID NAME	
3	Sp. GR.	
4	VISCOSITY	
5	PRESSURE	NOR. MAX. □kg/cm ² G □ ()
6	TEMPERATURE	NOR. MIN. MAX. □°C
7	Gasket, Bolt & Nut Code	□□

* Specification subject to change without notice

TOKYO KEISO CO., LTD.

Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558

Tel : 03-3431-1625 (KEY) ; Fax : 03-3433-4922

e-mail : overseas.sales@tokyokeiso.co.jp ; URL : <http://www.tokyokeiso.co.jp>

