

### GENERAL

FST4000 is a torque tube displacement type level indicating transmitter with intelligent data processing function. Through 18 years of field proven experiences accumulated by the existing model FST-3000, FST4000 has intensified its reliability by adding such features as SIL2 compatible functional safety, ATEX flameproof and field bus communication of FOUNDATION Fieldbus.

Varieties of materials and wide range of pressure ratings are available to meet various applications such as high pressure and temperature boilers as well as low temperature down to minus 196°C of liquefied gases.

### STANDARD SPECIFICATION

- 1) Detection method : Torque tube type displacer
- 2) Measuring range : Min. 0 to 300 mm, Max. 0 to 3000 mm
- 3) Liquid density
  - ① Level measurement : 0.2 to 1.5 g/cm<sup>3</sup>
  - ② Interface measurement : Density difference between 2 liquids is more than 0.1 g/cm<sup>3</sup>
  - ③ Density measurement : Min. density span is 0.2 g/cm<sup>3</sup>  
Consult TOKYO KEISO Co. Ltd. for the services not mentioned above.
- 4) Available pressure class : ASME class 150, 300, 600, 1500 and 2500
- 5) Fluid temperature range : -196 to +450 °C
- 6) Installation : Tank top or tank side installation
- 7) Connection size : External chamber type : 1-1/2 or 2 inch flange Internal chamber type : 3 or 4 inch flange See Fig.2 and Fig.3.
- 8) Ambient temperature : -40 to +70 °C during operation  
Allowable temperature is subject to the applicable explosionproof standards.  
: -45 to +80 °C during storage
- 9) Ambient humidity : 0 to 95 % R.H. during operation  
: 0 to 85 %R.H. during storage
- 10) Available material
  - ① Torque tube : SUS316L, NW0276, NCF600, MONEL
  - ② Bonnet : SCPH2, SCS13A, SCS14A, SCS16A, NW0276
  - ③ Chamber : Carbon steel, SUS304, SUS316, SUS316L, NW0276
  - ④ Displacer : SUS304, SUS316, SUS316L, NW0276, MONEL, PVC, Others
  - ⑤ Transmitter housing : ADC12
- 11) Local indication : LCD display  
Line 1 Function indication in 4 digits  
Line 2 Data indication in 4 digits  
Line 3 Bar graph in percent
- 12) Output, Power supply, Communication
  - Output 4 to 20 mA DC, 2 wire system with HART (version 6)
  - Supply voltage (UB) and Max. Load (Ra)  
UB : 8 to 40 VDC  
Max. load (Ra) : Ra = (UB - 8 V)/0.0248 A (Ω)  
4 to 20 mA DC signal : conforms to NAMUR NE43  
Operating range : 3.9 to 20.5 mA DC  
Burn-out : The output is selectable from "less than 3.5 mA" or "more than 21.6 mA" or "remain stationary"



**ATEX  
SIL2**

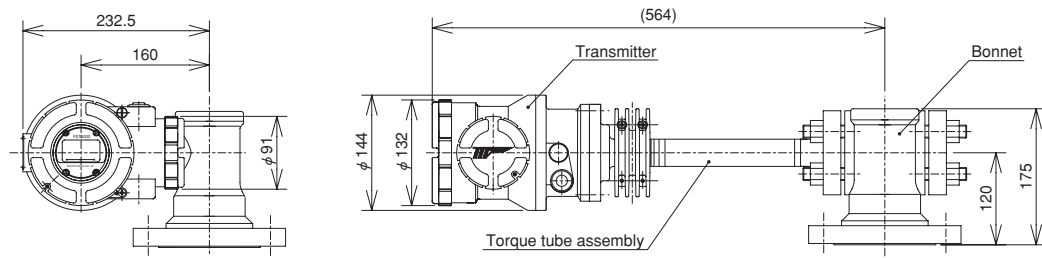
**HART, FOUNDATION Fieldbus**

- |  |   |   |
|--|---|---|
| Communication  | : |   |
| HART   | : | Version 6 single drop or multi drop (Ra shall be Ra ≥ 250 Ω)  |
| • FOUNDATION Fieldbus  | : |   |
| Supply voltage   | : | 9 to 32 VDC * 1   |
| Base Current   | : | 18 mA DC or less  |
| Input and output signals   | : | conform to IEC61158-2   |
| Communication protocol   | : | FOUNDATION Fieldbus H1  |
| H1 Profile Class   | : | 31PS, 32L   |
| H1 Device class  | : | Link Master   |
| Function block   | : | 1-RB2, 1-AI, 1-TB   |
| * 1 When a safety barrier is used in intrinsically safe circuit, the supply voltage is 9 to 24 VDC. FISCO explosionproof 9 to 17.5 VDC |   |   |
| 13) Accuracy   | : | ± 0.5 %F.S (Based on mass conversion correction at factory calibration)   |
| 14) Protection class   | : | IP67, JIS C0920 equivalent to IEC60529  |
| 15) Explosionproof classification  | : |   |
| ① Flameproof   | : | TIIS Exd II CT6 (under application)<br>ATEX & IECEx Exd II CT6, KOSHA, NEPSI  |
| ② Intrinsically safe   | : | TIIS Ex ia II CT6 (under application)<br>ATEX & IECEx Ex ia II CT6, KOSHA, NEPSI  |
| 16) Cable entry  | : | G1/2, 1/2NPT, M20 x P1.5  |
| 17) Painting   | : | Transmitter Munsell 7.5BG4/1.5<br>Chamber silver<br>No painting on stainless steel components   |
| 18) Related standards referred   | : | ATEX (IEC60079-0, -1, -11)<br>EMC (IEC61000-4-2 to 4-6, IEC61010-1, IEC61326-2-1, EN5501), TIIS, PED  |
| 19) Functional safety  | : | SIL2 compatible with IEC61508   |
| 20) RoHS Directive   | : | Complied with   |
| 21) Product mass   | : | Pressure rating class 150 approx. 30kg<br>Pressure rating class 600 approx. 35kg  |
| 22) Setting  | : | Following operation and settings are available either remotely through HART or locally by the magnet key operation. Zero adjustment, Span adjustment, Output simulation test, Damping adjustment, Setting of burn-out, Density. |

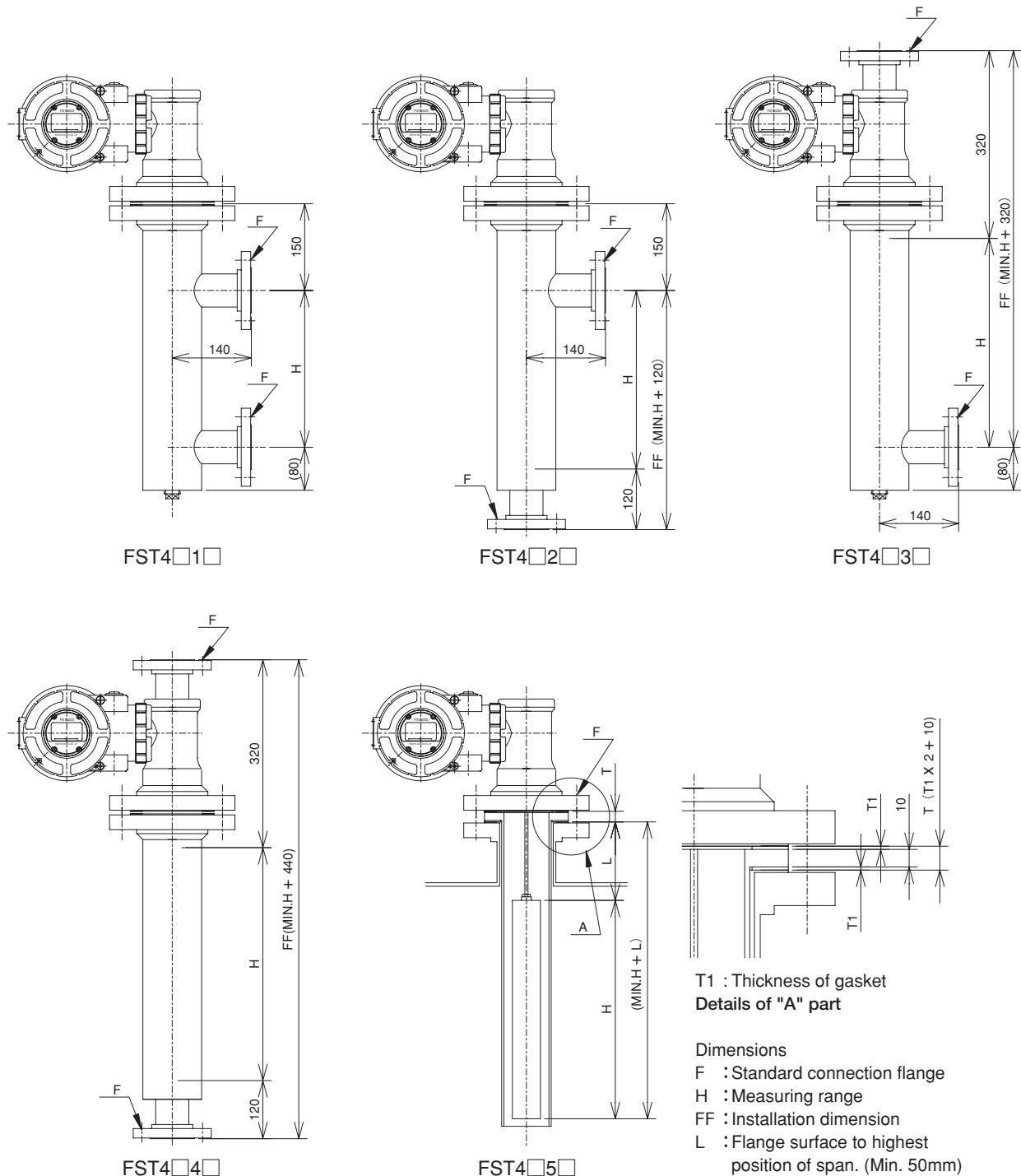


DIMENSIONS

● Fig.1 Transmitter, Torque Tube & Bonnet



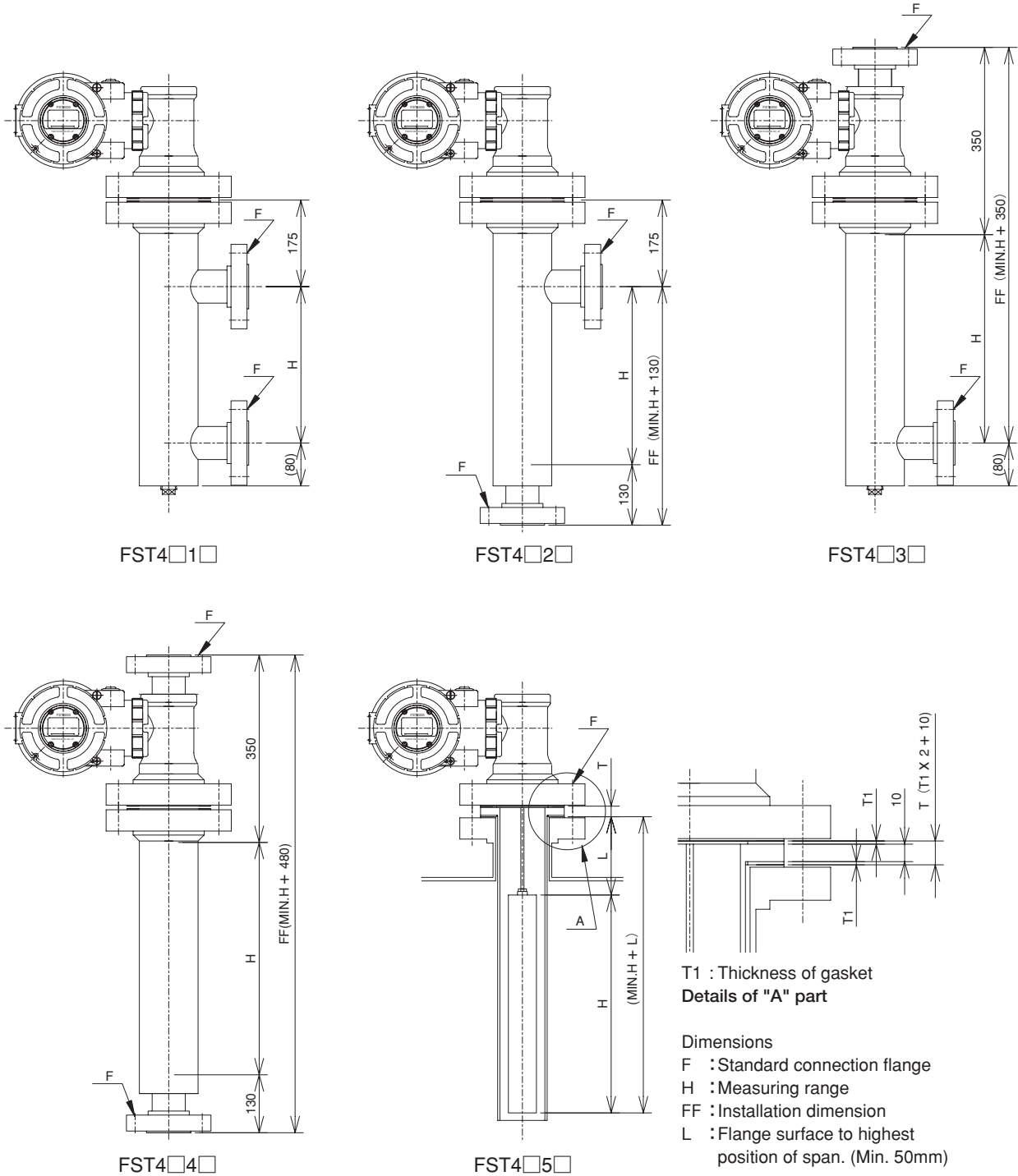
● Fig.2 Assembling of the chamber for class 150 or 300



Please specify above dimensions when ordering.

DIMENSIONS

● Fig.3 Assembling of the chamber for class 600 Assembling and mounting dimensions differ with the class 900 and higher classes.



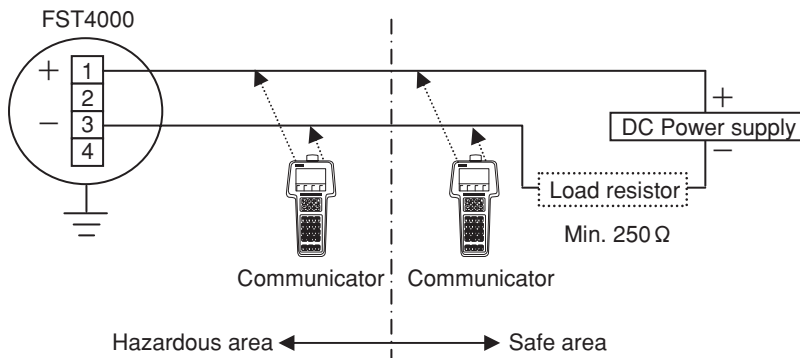
Please specify above dimensions when ordering.

MATERIAL OF GASKET, BOLT & NUT

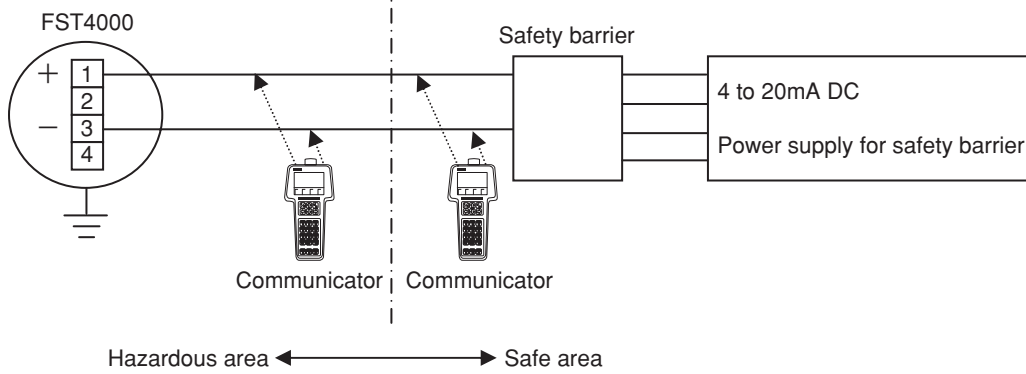
Code	Gasket	Code	Bolt & Nut	Remarks
1	V#7020	1	SS400	Steel
2	V#8591	2	SUS304	Stainless steel
3	V#8596	3	SNB7 / S45C (A193-B7 / A194-2H)	Carbon steel
4	V#6596	4	A320-L7 / A194-4	Carbon steel, For low temperature services
5	V#7596	5	A193-B8CL2 / A194-8	Stainless steel, For high temperature services
		6	A320-B8CL2 / A194-8	Stainless steel for low temperature services
9	Special	9	Special	

WIRING

● Flameproof version



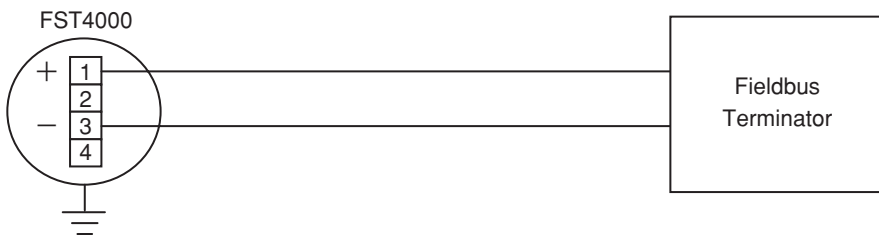
● Intrinsically safe version



Rating values of intrinsic safety

Maximum Voltage	28V
Maximum Current	93mA
Maximum Wattage	651mW
Internal Inductance	100 $\mu$ H
Internal Capacitance	100nF

● FOUNDATION Fieldbus version



ORDERING INFORMATION

Specify the following for order and inquiry:

1. Model	FST4□□□□-□□□□-□□□			
2. Liquid name				
3. Density				
4. Temperature Nor. Max.	NOR.	MIN.	MAX.	□°C
5. Pressure Nor. Max.	NOR.	MAX.	□MPa	□ (            )
6. Connection				
7. Cable entry				
8. Measuring range				
9. Center to center distance				

\* Specification is subject to change without notice.

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