

# ST3000 Series 900 Smart Transmitter

## Differential Pressure Transmitters with FOUNDATION™ fieldbus

Model STD910/STD920/STD930/STD960/STD921/STD931/STD961

### **OVERVIEW**

The ST3000 Series 900 with FOUNDATION™ fieldbus is an accurate, stable, and reliable pressure / differential pressure transmitter, which fully complies with the 31.25 kbps voltage mode FOUNDATION™ fieldbus. Its built-in AI function blocks provide process variables to devices on the Fieldbus and its PID control function block enables process control in the field.

Since the ST3000 Series 900 is FOUNDATION™ registered, it can operate seamlessly with other registered field devices as well as host systems in a wide range of control applications.

### **FEATURES**

#### **Excellent stability and high performance**

- Long-term stability is proven in 500,000 installations worldwide.
- Unique characterization and composite semiconductor sensors realize excellent temperature and static pressure characteristics.

#### **Wide measuring range (rangeability)**

A wide measuring range is available from a single model. This feature is highly effective in taking measurements over a wide range and reducing the need for reserve units.

- The measuring range of the model STD920, for example, is 0.75 to 100 kPa (rangeability = 1:135)

#### **A diverse lineup**

- A wide range of models is available to meet user requirements. They include micro-differential pressure, standard differential pressure, high differential pressure, standard differential pressure / high static pressure, and high differential pressure / high static pressure models.
- A wide variety of corrosion-resistant materials for wetted parts is also available.

FOUNDATION™ is a registered trademark of the Fieldbus Foundation.



### **APPLICATION**

#### **Petroleum / Petrochemical / Chemical**

- For strict flow control in combination with orifice plates.
- For measuring pressures and liquid levels in pipes and tanks.

#### **Electric power / City gas / Other utilities**

For measurement applications that require high degrees of stability and accuracy.

#### **Draft range applications such as semiconductor equipment manufacturing / Clean rooms**

For applications that require highly stable, accurate measurement.

#### **Pulp and paper**

For lines that need transmitters resistant to fluid such as chemical liquids and corrosive fluids.

#### **Iron and steel / Nonferrous metal / Ceramics**

- For highly stable, accurate measurements such as furnace pressure measurement.
- For lines that require stable measurement under strictly controlled (temperature, humidity, vibration, etc.) conditions.

#### **Machinery / Shipbuilding**

For lines that require stable measurement under strictly controlled (temperature, humidity, etc.) conditions.



**Operative limit**

- 50 to 93°C for general purpose models
- 40 to 70°C for general purpose model (model STD910)
- 40 to 80°C for oxygen and chlorine models
- 30 to 80°C for models with digital indicators

**Transportation and storage conditions**

- 50 to 85°C for general purpose models
- 15 to 65°C for general purpose model (model STD910)

**Temperature ranges of wetted parts****Normal operating range**

- 40 to 110°C for general purpose models
- 15 to 65°C for general purpose model (model STD910)
- 10 to 75°C for oxygen and chlorine models

**Operative limits**

- 50 to 115°C for general purpose models
- 40 to 70°C for general purpose model (model STD910)
- 40 to 80°C for oxygen and chlorine models

**Ambient humidity limits**

5 to 100% RH

**Stability against supply voltage change**

± 0.005% FS/V

**Lightning protection**

Peak value of voltage surge: 12 kV

Peak value of current surge: 1000 A

**Optional specifications****Built-in indicating meter**

The digital LCD indicator (optional) indicates engineering units and can be set freely between -19999 and 19999 (4.5 digits).

**Bolts and nuts materials (for fastening meter body cover)**

Carbon steel (SNB7), SUS304, SUS630

(Pressure rating 7000 kPa {70 kgf/cm<sup>2</sup>} or flange rating)

Baked acrylic paint.

**Corrosion-resistant finish****Standard**

Corrosion-resistant paint (baked acrylic paint)

**Corrosion-resistant finish**

Corrosion-resistant paint (baked acrylic paint), fungus-proof finish.

**Corrosion-proof finish**

Corrosion-proof paint (baked epoxy paint), fungus-proof finish.

**Corrosion-resistant finish (silver paint)**

Transmitter case is coated with silver paint in addition to the above corrosion-resistant finish.

**Oil free finish**

The transmitter is shipped with oil-free wetted parts. (The vent drain plug is coated with a small amount of fluorine oil to prevent galling.)

**Long vent / Drain plugs**

A longer (58 mm) drain than the standard (24 mm) can be used for maintenance, process, and safety reasons.

**Adapters for anticorrosion materials**

These are adaptor flanges to connect 82 mm pipes made of anticorrosion materials (excluding Hastelloy C) to 54 mm general-purpose pipes.

**Elbow**

This is an adaptor for changing the electrical conduit connection port from the horizontal to the vertical direction, if required by wiring conditions in the field. One or two elbows may be used as needed.

**Conformance to SI units**

We deliver transmitters set to any SI units as specified.

**PHYSICAL SPECIFICATIONS****Materials****Fill fluid**

Silicone oil for general purpose and models  
Fluorine oil for oxygen and chlorine models

**Center body**

SUS316

**Transmitter case**

Aluminum alloy

**For Wetted parts****Meter body cover**

SCS14A (Equivalent to SUS316) or SUSF316, PVC

**Adapter flange (option)**

SCS14A (Equivalent to SUS316), PVC

**Center body**

SUS316 (Diaphragm SUS316L)  
Hastelloy C, Tantalum, SUS316L

**Vents and plugs**

SUS316, PVC

**Gaskets**

FEP

**Finish**

Housing light beige (Munsell 4Y7.2/1.3)

Cap dark beige (Munsell 10YR4.7/0.5)

**Weight**

Approx. 4.4 kg (model STD920)

**INSTALLATION****Electrical connection**

1/2NPT internal thread

**Grounding**

Resistance 100 Ω max.

**Mounting**

Can be installed on a 2 inch horizontal or vertical pipe (Can be directly mounted on a process pipe)

**Process connection**

Rc1/2, 1/2NPT internal thread and Rc1/4, 1/4NPT internal thread.

**PERFORMANCE SPECIFICATIONS**

**Accuracy**

Shown for each item is the percentage ratio for  $\chi$  (kPa), which is the greatest value of either XD\_SCALE\_EU\_100 (\*1), XD\_SCALE\_EU\_0 (\*2), or the span.

**Model STD910**

(Material of wetted parts: Diaphragm; SUS316L, Others; SUS316)

Accuracy	Linear output:	$\pm\left(0.15 + 0.15 \times \frac{1.0}{\chi}\right) \%$ When output is 50 to 100%: same as linear output
	Square-root output:	When output is 7.1 to 50%: linear output $\times \frac{50}{\text{square-root} \cdot \text{output}} \%$ When output is less than 7.1%: dropout
Temperature characteristics (Shift from the set range) Change of 30°C	Zero shift:	$\pm\left(0.15 + 0.35 \times \frac{1.0}{\chi}\right) \%$
	Combined shift: (including zero and span shifts)	$\pm\left(0.2 + 0.6 \times \frac{1.0}{\chi}\right) \%$
Static pressure effect (Shift with respect to Setting range) Change of 70 kPa {0.7 kgf/cm <sup>2</sup> }	Zero shift:	$\pm\left(0.03 + 0.4 \times \frac{1}{\chi}\right) \%$
	Combined shift: (including zero and span shifts)	$\pm\left(0.03 + 0.45 \times \frac{1}{\chi}\right) \%$

**Model STD920 / 921**

(Material of wetted parts: Diaphragm; SUS316L, Others; SUS316)

Accuracy (*3)	Linear output:	$\pm 0.075\%$ (For $\chi \geq 50.0kPa$ {5000 mmH <sub>2</sub> O}) $\pm 0.1\%$ (For $50.0kPa$ {5000 mmH <sub>2</sub> O} > $\chi \geq 5.0kPa$ {500 mmH <sub>2</sub> O}) $\pm\left(0.025 + 0.075 \times \frac{5.0}{\chi}\right) \%$ (For $\chi < 5.0kPa$ {500 mmH <sub>2</sub> O})
	Square-root output:	When output is 50 to 100%: same as the linear output When output is 7.1 to 50%: linear output $\times \frac{50}{\text{square-root} \cdot \text{output}} \%$ When output is less than 7.1%: dropout
Temperature characteristics (Shift from the set range) (*3) Change of 55°C	Zero shift:	$\pm\left(0.25 + 0.3 \times \frac{12.5}{\chi}\right) \%$
	Combined shift: (including zero and span shifts)	$\pm 0.8\%$ (For $\chi \geq 12.5kPa$ {1250 mmH <sub>2</sub> O}) $\pm\left(0.35 + 0.45 \times \frac{12.5}{\chi}\right) \%$ (For $\chi \leq 12.5kPa$ {1250 mmH <sub>2</sub> O})
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	Zero shift:	$\pm\left(0.03 + 0.17 \times \frac{20}{\chi}\right) \%$
	Combined shift: (including zero and span shifts)	$\pm 0.4\%$ (For $\chi \geq 20.0kPa$ {2000 mmH <sub>2</sub> O}) $\pm\left(0.03 + 0.37 \times \frac{20}{\chi}\right) \%$ (For $\chi < 20.0kPa$ {2000 mmH <sub>2</sub> O})

Note (\*1): XD\_SCALE\_EU\_100 denotes the upper limit of the calibration range.

(\*2): XD\_SCALE\_EU\_0 denotes the lower limit of the calibration range.

(\*3): Within a range of XD\_SCALE\_EU\_100  $\geq 0$  and XD\_SCALE\_EU\_0  $\geq 0$ .

**Model STD930 / 931**

(Material of wetted parts: Diaphragm; SUS316L, Others; SUS316)

Accuracy (*3)	<p>Linear output: <math>\pm 0.1\%</math> (For <math>\chi \geq 140kPa</math> {1.4 kgf/cm<sup>2</sup>})  <math>\pm \left(0.025 + 0.075 \times \frac{140}{\chi}\right) \%</math> (For <math>\chi &lt; 140kPa</math> {1.4 kgf/cm<sup>2</sup>})</p> <p>Square-root output: When output is 50 to 100%: same as the linear output  When output is 7.1 to 50%: linear output <math>\times \frac{50}{\text{square-root} \cdot \text{output}} \%</math>  When output is less than 7.1%: dropout</p>
Temperature characteristics (Shift from the set range) (*3) Change of 55°C	<p>Zero shift: <math>\pm \left(0.25 + 0.3 \times \frac{210}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm 0.8\%</math> (For <math>\chi \geq 210kPa</math> {2.1 kgf/cm<sup>2</sup>})  <math>\pm \left(0.35 + 0.45 \times \frac{210}{\chi}\right) \%</math> (For <math>\chi &lt; 210kPa</math> {2.1 kgf/cm<sup>2</sup>})</p>
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	<p>Zero shift: <math>\pm \left(0.03 + 0.17 \times \frac{700}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm \left(0.03 + 0.37 \times \frac{700}{\chi}\right) \%</math></p>

**Model STD960 / 961**

(Material of wetted parts: Diaphragm; SUS316L, Others; SUS316)

Accuracy (*3)	<p>Linear output: <math>\pm 0.15\%</math> (For <math>\chi \geq 3.5MPa</math> {35 kgf/cm<sup>2</sup>})  <math>\pm \left(0.1 + 0.05 \times \frac{3.5}{\chi}\right) \%</math> (For <math>\chi &lt; 3.5MPa</math> {35 kgf/cm<sup>2</sup>})</p> <p>Square-root output: When output is 50 to 100%: same as the linear output  When output is 7.1 to 50%: linear output <math>\times \frac{50}{\text{square-root} \cdot \text{output}} \%</math>  When output is less than 7.1%: dropout</p>
Temperature characteristics (Shift from the set range) Change of 55°C (*3) (Range from -5 to 55°C)	<p>Zero shift: <math>\pm \left(0.25 + 0.3 \times \frac{3.5}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm 0.8\%</math> (For <math>\chi \geq 3.5MPa</math> {35 kgf/cm<sup>2</sup>})  <math>\pm \left(0.35 + 0.45 \times \frac{3.5}{\chi}\right) \%</math> (<math>\chi &lt; 3.5MPa</math> {35 kgf/cm<sup>2</sup>})</p>
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	<p>Zero shift: <math>\pm \left(0.03 + 0.17 \times \frac{7}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm 0.4\%</math> (For <math>\chi \geq 7MPa</math> {70 kgf/cm<sup>2</sup>})  <math>\pm \left(0.03 + 0.37 \times \frac{7}{\chi}\right) \%</math> (For <math>\chi &lt; 7MPa</math> {70 kgf/cm<sup>2</sup>})</p>

Note) (\*3): Within a range of  $XD\_SCALE\_EU100 \geq 0$  and  $XD\_SCALE\_EU_0 \geq 0$ .

**Model STD920**

(Material of wetted parts: Diaphragm; Hastelloy C, Tantalum, SUS316L Others; Hastelloy C, Tantalum, SUS316L)

Accuracy (*3)	Linear output: $\pm 0.3\%$ (For $\chi \geq 5.0kPa$ {500 mmH <sub>2</sub> O}) $\pm \left( 0.225 + 0.075 \times \frac{5.0}{\chi} \right) \%$ (For $\chi < 5.0kPa$ {500 mmH <sub>2</sub> O}) Square-root output: When output is 50 to 100%: same as the linear output When output is 7.1 to 50%: linear output $\times \frac{50}{\text{square-root} \cdot \text{output}} \%$ When output is less than 7.1%: dropout
Temperature characteristics (Shift from the set range) Change of 30°C (*3) (Range from -5 to 55°C)	Zero shift: $\pm \left( 0.15 + 0.6 \times \frac{20.0}{\chi} \right) \%$ Combined shift: (including zero and span shifts) $\pm \left( 0.55 + 0.65 \times \frac{20.0}{\chi} \right) \%$
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	Zero shift: $\pm \left( 0.03 + 0.62 \times \frac{20.0}{\chi} \right) \%$ Combined shift: (including zero and span shifts) $\pm \left( 0.55 + 0.45 \times \frac{20.0}{\chi} \right) \%$ ( $\chi \geq 20.0kPa$ {2000 mmH <sub>2</sub> O}) $\pm \left( 0.18 + 0.82 \times \frac{20.0}{\chi} \right) \%$ ( $\chi < 20.0kPa$ {2000 mmH <sub>2</sub> O})

**Model STD930**

(Material of wetted parts: Diaphragm; Hastelloy C, Tantalum, SUS316L Others; Hastelloy C, Tantalum, SUS316L)

Accuracy (*3)	Linear output: $\pm 0.3\%$ ( $\chi \geq 140kPa$ {1.4 kgf/cm <sup>2</sup> }) $\pm \left( 0.025 + 0.075 \times \frac{140}{\chi} \right) \%$ (For $\chi < 140kPa$ {1.4 kgf/cm <sup>2</sup> }) Square-root output: When output is 50 to 100%: same as the linear output When output is 7.1 to 50%: linear output $\times \frac{50}{\text{square-root} \cdot \text{output}} \%$ When output is less than 7.1%: dropout
Temperature characteristics (Shift from the set range) Change of 30°C (*3) (Range from -5 to 55°C)	Zero shift: $\pm \left( 0.15 + 0.6 \times \frac{210}{\chi} \right) \%$ Combined shift: (including zero and span shifts) $\pm 1.20\%$ ( $\chi \geq 210kPa$ {2.1 kgf/cm <sup>2</sup> }) $\pm \left( 0.55 + 0.65 \times \frac{210}{\chi} \right) \%$ (For $\chi < 210kPa$ {2.1 kgf/cm <sup>2</sup> })
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	Zero shift: $\pm \left( 0.03 + 0.62 \times \frac{700}{\chi} \right) \%$ Combined shift: (including zero and span shifts) $\pm \left( 0.03 + 0.50 \times \frac{700}{\chi} \right) \%$

Note) (\*3): Within a range of  $XD\_SCALE\_EU\_100 \geq 0$  and  $XD\_SCALE\_EU\_0 \geq 0$ .

**Model STD960**

(Material of wetted parts: Diaphragm; SUS316L, Others; SUS316L)

Accuracy (*3)	<p>Linear output: <math>\pm 0.3\%</math> (For <math>\chi \geq 3.5MPa</math> {35 kgf/cm<sup>2</sup>})  <math>\pm \left(0.25 + 0.05 \times \frac{3.5}{\chi}\right) \%</math> (For <math>\chi &lt; 3.5MPa</math> {35 kgf/cm<sup>2</sup>})</p> <p>Square-root output: When output is 50 to 100%: same as the linear output  When output is 7.1 to 50%: linear output <math>\times \frac{50}{\text{square-root} \cdot \text{output}} \%</math>  When output is less than 7.1%: dropout</p>
Temperature characteristics (Shift from the set range) Change of 30°C(*3) (Range from -5 to 55°C)	<p>Zero shift: <math>\pm \left(0.15 + 0.6 \times \frac{3.5}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm 1.20\%</math> (For <math>\chi \geq 3.5MPa</math> {35 kgf/cm<sup>2</sup>})  <math>\pm \left(0.55 + 0.65 \times \frac{3.5}{\chi}\right) \%</math> (For <math>\chi &lt; 3.5MPa</math> {35 kgf/cm<sup>2</sup>})</p>
Static pressure effect (Shift with respect to Setting range) (*3) Change of 7 MPa {70 kgf/cm <sup>2</sup> }	<p>Zero shift: <math>\pm \left(0.03 + 0.295 \times \frac{7}{\chi}\right) \%</math></p> <p>Combined shift: (including zero and span shifts) <math>\pm \left(0.45 + 0.125 \times \frac{7}{\chi}\right) \%</math> (For <math>\chi \geq 7MPa</math> {70 kgf/cm<sup>2</sup>})  <math>\pm \left(0.08 + 0.495 \times \frac{7}{\chi}\right) \%</math> (For <math>\chi &lt; 7MPa</math> {70 kgf/cm<sup>2</sup>})</p>

Note) (\*3): Within a range of  $XD\_SCALE\_EU\_100 \geq 0$  and  $XD\_SCALE\_EU\_0 \geq 0$ .

**FIELDBUS SPECIFICATIONS****Block supported by the S900**

Name of block	Number of block	Description	Max. execution time msec.
Resource block	1	The Resource Block (RB) maintains overall resources of the S900.	-
Transducer block	1	The Transducer Block (XB) interfaces with the sensing element of the S900, converts the measured value into specified engineering unit, and sends it to the AI Function Block.	-
AI Function Block	2	The AI Function Block (AI FB) accepts an analog input signal from the XB, scales it, detects alarm conditions, and provides it in a uniform format on the Fieldbus network.	75
Diagnostics Block	1	The Diagnostics Block (DB) is Yamatake proprietary block which provides the result of self-diagnostics of the S900.	-
PID Function Block	1	The PID Function Block (PID FB) accepts a process variable (PV) from an AI Function Block on the Fieldbus network, calculates the valve position using the PID algorithm, and sends a new valve output signal to the AO Function Block.	125

**VCR structure**

The S900 has 16 VCRs (Virtual Communication Relationships), of which the first one is dedicated to the SMIB / NMIB as defined by Foundation Fieldbus specifications. The rest of the VCRs are fully configurable. Their default configurations are shown below:

VCR No.	Configuration	VCR No.	Configuration
1	QUB (Server) for NIMIB/SMIB	9	QUU (Source)
2	BNU (Subscriber)	10	QUU (Source)
3	BNU (Subscriber)	11	QUU (Source)
4	BNU (Subscriber)	12	QUB (Server)
5	BNU (Subscriber)	13	QUB (Server)
6	BNU (Publisher)	14	QUB (Server)
7	BNU (Publisher)	15	QUB (Server)
8	QUU (Source)	16	QUB (Server)

**Network parameters**

The following table lists the key parameter values that affect the inter operability of the Fieldbus devices. The LAS must be configured to satisfy these parameters. If other devices on the same Fieldbus network require a greater number for them, the greater number must be used. This however will degrade network performance.

Symbol	Parameter name	Range of value
V (ST)	Slot Time	4 to 100
V (MID)	Minimum Interframe Gap	10 to $(V (MRD) - 1) \times V (ST)$ , less than 120 inclusive.
V (MRD)	Maximum Response Delay	$V (MRD) \times V (ST)$ shall be greater than 20 and $V (MRD)$ shall be less than 11, inclusive.
T1	SM step timer	96000 (3 seconds)
T2	SM set address sequence timer	1920000 (60 seconds)
T3	SM set address wait timer	480000 (15 seconds)

Note) • An LAS requires parameters other than those listed here for operation. Please refer to the user's manual that is provided with your LAS device.

• The T3 must be set between 15 seconds and 60 seconds.

**MODEL SELECTION****ST3000 series 900 electric differential pressure transmitter  
Model STD910 (Standard type for lowest differential pressure)**

Model No.: STD910 - I II III - 00000 - Option I - Option II

Basic Model No.

	Measuring Span	0.1 to 2.0 kPa (10 to 20 0mmH <sub>2</sub> O)	STD910
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Selection I			Code	Material code	
I	Material	Meter body cover		E	
		Adapter flange			
		SCS14A *1	SUS316	E	
II	Fill fluid	Regular type (Silicone oil)	1	✓	
		For oxygen service (Fluorine oil) *3	2	✓	
III	Process connection	Front connection	Rc1/2 with adapter flange	J	✓
			1/2NPT internal thread with adapter flange	H	✓
			Rc1/4 with adapter flange	M	✓
			1/4NPT internal thread with adapter flange	N	✓
			1/4NPT internal thread on head	P	✓
			-		
			00000		
			-		
Options I	Built-in indicating smart meter (0 to 100% liner scales)		P	✓	
	Built-in indicating smart meter (engineering unit scales)		R	✓	
	SUS304 bolt and nuts material *4		W	✓	
	SUS630 bolt and nuts material *4		U	✓	
	Corrosion-resistant finish		A	✓	
	Corrosion-proof finish		B	✓	
	Corrosion-resistant finish, silver paint		D	✓	
	Oil free finish		K	✓	
	Long vent/drain plugs		J	✓	
	FM Explosionproof		3	✓	
	ATEX Flameproof		6	✓	
			-		
Options II	No options		XX	✓	
	Water free finish (with oil free finish)		A7	✓	
	NEPSI Flameproof		C1	✓	
	Custom calibration		C7	✓	
	FOUNDATION™ fieldbus *33		D6	✓	
	One elbow		E1	✓	
	Two elbows		E2	✓	
	Mounting bracket		E9	✓	
	Side vent/drain top		F1	✓	
	Side vent/drain bottom		F2	✓	
	Material certificate		H2	✓	
	Fieldbus communication stack BASIC class (used with option D6) *33		L1	✓	
	SI unit		U1	✓	

Note) \*1 SCS14A (equivalent SUS316) or SUSF316

\*3 In case "for oxygen or chlorine (fluorine oil) service" is used, "oil free finish - code K" must be selected.

\*4 Notes of "order entry": "W" or "U" must be selected.

\*33 "FOUNDATION™ fieldbus - code D6" and "Fieldbus communication stack BASIC class - code L1" must be selected.

**ST3000 series 900 electric differential pressure transmitter  
Model STD920 (Standard type for medium differential pressure)**

Model No.: STD920 - **I II III** - 00000 - Option I - Option II

Basic Model No.

Measuring span	0.75 to 100 kPa (75 to 10,160 mmH <sub>2</sub> O)	STD920
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Selection I						Code	Material code					
I	Material	Meter body cover	Adapter flange	Vent/drain plugs	Wetted parts of center body		E	F	H	U	M	P
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316	E						
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Hastelloy C Others: Hastelloy C	F						
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Tantalum Others: Tantalum	H						
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316L	U						
		PVC	PVC	PVC	Diaphragm: Hastelloy C Others: Hastelloy C *8	M						
		PVC	PVC	PVC	Diaphragm: Tantalum Others: Tantalum *8	P						
II	Fill fluid	Regular type (Silicone oil)				1	✓	✓	✓	✓	✓	✓
		For oxygen service (Fluorine oil) *3				2	✓	✓	✓	✓	✓	✓
		For chlorine service (Fluorine oil) *3				5			✓			✓
III	Process connection	Front connection	Rc1/2 with adapter flange			J	✓	✓				
			1/2NPT internal thread with adapter flange			H	✓	✓				
			Rc1/4 with adapter flange			M	✓	✓				
			1/4NPT internal thread with adapter flange			N	✓	✓				
			1/4NPT internal thread on head			P	✓	✓				
		Top or bottom connection	Rc1/2 with adapter flange *7			Q			✓	✓	✓	✓
			1/2NPT internal thread with adapter flange *7			R			✓	✓	✓	✓
			Rc1/4 with adapter flange *7			S			✓	✓		
			1/4NPT internal thread with adapter flange *7			T			✓	✓		
			1/4NPT internal thread on head *7			U			✓	✓		

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Model No.: STD920 - I II III - 00000 - **Option I - Option II**

		Code	Material code					
			E	F	H	U	M	P
Options I	No options	X	✓	✓	✓	✓	✓	✓
	Built-in indicating smart meter (0 to 100% liner scales)	P	✓	✓	✓	✓	✓	✓
	Built-in indicating smart meter (engineering unit scales)	R	✓	✓	✓	✓	✓	✓
	SUS304 bolt and nuts material	W	✓	✓	✓	✓	✓	✓
	SUS630 bolt and nuts material	U	✓	✓	✓	✓		
	Corrosion-resistant finish	A	✓	✓	✓	✓	✓	✓
	Corrosion-proof finish	B	✓	✓	✓	✓	✓	✓
	Corrosion-resistant finish, silver paint	D	✓	✓	✓	✓	✓	✓
	Oil free finish	K	✓	✓	✓	✓	✓	✓
	Long vent/drain plugs	J	✓	✓	✓	✓		
	FM Explosionproof	3	✓	✓	✓	✓	✓	✓
	ATEX Flameproof	6	✓	✓	✓	✓	✓	✓
		-						
Options II	No option	XX	✓	✓	✓	✓	✓	✓
	Adapter flange for corrosion -resistant application *6	A1			✓	✓		✓
	Water free finish (with oil free finish)	A7	✓	✓	✓	✓	✓	✓
	NEPSI Flameproof	C1	✓	✓	✓	✓	✓	✓
	Custom calibration	C7	✓	✓	✓	✓	✓	✓
	FOUNDATION™ fieldbus *33	D6	✓	✓	✓	✓	✓	✓
	One elbow	E1	✓	✓	✓	✓	✓	✓
	Two elbows	E2	✓	✓	✓	✓	✓	✓
	Mounting bracket	E9	✓	✓	✓	✓	✓	✓
	Side vent/drain top	F1	✓	✓				
	Side vent/drain bottom	F2	✓	✓				
	PED (97/23/EC) conformity *34 *35	H1	✓	✓	✓	✓		
	Material certificate	H2	✓	✓	✓	✓	✓	✓
	Max. working pressure 20 MPa *35 *37	H3	✓	✓	✓	✓		
	Fieldbus communication stack BASIC class (used with option D6) *33	L1	✓	✓	✓	✓	✓	✓
	SI unit	U1	✓	✓	✓	✓	✓	✓

- Note) \*1 SCS14A (equivalent SUS316) or SUSF316  
 \*3 In case “for oxygen or chlorine (fluorine oil) service” is used, “oil free finish - code K” must be selected.  
 \*6 In case manifold valve is used and in case code D, H, U or P is used, please select code A1 of Option II  
 \*7 Applicable for wetted parts of center body material; Tantalum, SUS316L  
 \*8 SUS304 bolts and nuts material (-W) must be selected when PVC meterbody cover is selected (-M or -P). The max.working pressure is 1.5 MPa.  
 \*33 “FOUNDATION™ fieldbus - code D6” and “fieldbus communication stack BASIC class - code L1” must be selected.  
 \*34 “PED conformity” is not applicable for the combination with FM, CSA or NEPSI approvals.  
 \*35 Not applicable for the combination with “SUS304 bolts/nuts”.  
 \*37 Not applicable for the combination with “PED conformity”.

**ST3000 series 900 electric differential pressure transmitter  
Model STD930 (Standard type for high differential pressure)**

Model No.: STD930 - **I II III** - 00000 - Option I - Option II

Basic Model No.

	Measuring span	35 to 700 kPa (0.35 to 7 kgf/cm <sup>2</sup> )	STD930
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Selection I					Code		Material Code						
I	Material	Meter body cover	Adapter flange	Vent/drain plugs	Wetted parts of center body	-	E	F	H	U	M	P	
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316	E							
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Hastelloy C Others: Hastelloy C	F							
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Tantalum Others: Tantalum	H							
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316L	U							
		PVC	PVC	PVC	Diaphragm: Hastelloy C Others: Hastelloy C *8	M							
		PVC	PVC	PVC	Diaphragm: Tantalum Others: Tantalum *8	P							
II	Fill fluid	Regular type (Silicone oil)			1	✓	✓	✓	✓	✓	✓		
		For oxygen service (Fluorine oil) *3			2	✓	✓	✓	✓	✓	✓		
		For chlorine service (Fluorine oil) *3			5			✓				✓	
III	Process connection	Front connection	Rc1/2 with adapter flange		J	✓	✓						
			1/2NPT internal thread with adapter flange		H	✓	✓						
			Rc1/4 with adapter flange		M	✓	✓						
			1/4NPT internal thread with adapter flange		N	✓	✓						
			1/4NPT internal thread on head		P	✓	✓						
		Top or bottom connection	Rc1/2 with adapter flange *7		Q			✓	✓	✓	✓		
			1/2NPT internal thread with adapter flange *7		R			✓	✓	✓	✓		
			Rc1/4 with adapter flange *7		S			✓	✓				
			1/4NPT internal thread with adapter flange *7		T			✓	✓				
			1/4NPT internal thread on head *7		U			✓	✓				

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Model No.: STD930 - I II III - 00000 - **Option I - Option II**

		Code	Material Code					
		-	E	F	H	U	M	P
Options I	No options	X	✓	✓	✓	✓	✓	✓
	Built-in indicating smart meter (0 to 100% liner scales)	P	✓	✓	✓	✓	✓	✓
	Built-in indicating smart meter (engineering unit scales)	R	✓	✓	✓	✓	✓	✓
	SUS304 bolt and nuts material	W	✓	✓	✓	✓	✓	✓
	SUS630 bolt and nuts material	U	✓	✓	✓	✓		
	Corrosion-resistant finish	A	✓	✓	✓	✓	✓	✓
	Corrosion-proof finish	B	✓	✓	✓	✓	✓	✓
	Corrosion-resistant finish, silver paint	D	✓	✓	✓	✓	✓	✓
	Oil free finish	K	✓	✓	✓	✓	✓	✓
	Long vent/drain plugs	J	✓	✓	✓	✓		
	FM Explosionproof	3	✓	✓	✓	✓	✓	✓
	ATEX Flameproof	6	✓	✓	✓	✓	✓	✓
	-							
Options II	No option	XX	✓	✓	✓	✓	✓	✓
	Adapter flange for corrosion -resistant application *6	A1			✓	✓		✓
	Water free finish (with oil free finish)	A7	✓	✓	✓	✓	✓	✓
	NEPSI Flameproof	C1	✓	✓	✓	✓	✓	✓
	Custom calibration	C7	✓	✓	✓	✓	✓	✓
	FOUNDATION™ fieldbus *33	D6	✓	✓	✓	✓	✓	✓
	One elbow	E1	✓	✓	✓	✓	✓	✓
	Two elbows	E2	✓	✓	✓	✓	✓	✓
	Mounting bracket	E9	✓	✓	✓	✓	✓	✓
	Side vent/drain top	F1	✓	✓				
	Side vent/drain bottom	F2	✓	✓				
	PED (97/23/EC) conformity *34 *35	H1	✓	✓	✓	✓		
	Material certificate	H2	✓	✓	✓	✓	✓	✓
	Max. working pressure 20 MPa *35 *37	H3	✓	✓	✓	✓		
	Fieldbus communication stack BASIC class (used with option D6) *33	L1	✓	✓	✓	✓	✓	✓
	SI unit	U1	✓	✓	✓	✓	✓	✓

Note) \*1 SCS14A (equivalent SUS316) or SUSF316

\*3 In case "for oxygen or chlorine (fluorine oil) service" is used, "oil free finish - code K" must be selected.

\*6 In case manifold valve is used and in case code D, H, U or P is used, please select code A1 of Option II

\*7 Applicable for wetted parts of center body material; Tantalum, SUS316L

\*8 SUS304 bolts and nuts material (-W) must be selected when PVC meterbody cover is selected (-M or -P). The max. working pressure is 1.5 MPa.

\*33 "FOUNDATION™ fieldbus - code D6" and "fieldbus communication stack BASIC class - code L1" must be selected.

\*34 "PED conformity" is not applicable for the combination with FM, CSA or NEPSI approvals.

\*35 Not applicable for the combination with "SUS304 bolts/nuts".

\*37 Not applicable for the combination with "PED conformity".

**ST3000 series 900 electric differential pressure transmitter  
Model STD960 (Standard type for super-high differential pressure**

Model No.: STD960 - **I II III** - 00000 - Option I - Option II

Basic Model No.

	Measuring Span	0.25 to 14MPa (2.5 to 140kgf/cm <sup>2</sup> )	STD960
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Selection I						Code	Material code			
I	Material	Meter body cover	Adapter flange	Vent/drain plugs	Wetted parts of center body	-	E	F	H	U
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316	E				
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Hastelloy C Others: Hastelloy C	F				
		SCS14A*1	SCS14A*1	SUS316	Diaphragm: Tantalum Others: Tantalum	H				
		SCS14A*1	SCS14A*1	SUS316	Diaphragm:SUS316L Others: SUS316L	U				
II	Fill fluid	Regular type (Silicone oil)				1	✓	✓	✓	✓
		For oxygen service (Fluorine oil) *3				2	✓	✓	✓	✓
		For chlorine service (Fluorine oil) *3				5			✓	
III	Process connection	Front connection	Rc1/2 with adapter flange			J	✓			
			1/2NPT internal thread with adapter flange			H	✓			
			Rc1/4 with adapter flange			M	✓			
			1/4NPT internal thread with adapter flange			N	✓			
			1/4NPT internal thread on head			P	✓			
		Top or bottom connection	Rc1/2 with adapter flange *9			Q		✓	✓	✓
			1/2NPT internal thread with adapter flange *9			R		✓	✓	✓
			Rc1/4 with adapter flange *9			S		✓	✓	✓
			1/4NPT internal thread with adapter flange *9			T		✓	✓	✓
			1/4NPT internal thread on head *9			U		✓	✓	✓

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Model No.: STD960 - I II III - 00000 - **Option I - Option II**

		Code	Material code			
		-	E	F	H	U
Options I	No options	X	✓	✓	✓	✓
	Built-in indicating smart meter (0 to 100% liner scales)	P	✓	✓	✓	✓
	Built-in indicating smart meter (engineering unit scales)	R	✓	✓	✓	✓
	SUS304 bolt and nuts material	W	✓	✓	✓	✓
	SUS630 bolt and nuts material	U	✓	✓	✓	✓
	Corrosion-resistant finish	A	✓	✓	✓	✓
	Corrosion-proof finish	B	✓	✓	✓	✓
	Corrosion-resistant finish, silver paint	D	✓	✓	✓	✓
	Oil free finish	K	✓	✓	✓	✓
	Long vent/drain plugs	J	✓	✓	✓	✓
	FM Explosionproof	3	✓	✓	✓	✓
	ATEX Flameproof	6	✓	✓	✓	✓
		-				
Options II	No option	XX	✓	✓	✓	✓
	Adapter flange for corrosion-resistant application *6	A1		✓	✓	✓
	Water free finish (with oil free finish)	A7	✓	✓	✓	✓
	NEPSI Flameproof	C1	✓	✓	✓	✓
	Custom calibration	C7	✓	✓	✓	✓
	FOUNDATION™ fieldbus *33	D6	✓	✓	✓	✓
	One elbow	E1	✓	✓	✓	✓
	Two elbows	E2	✓	✓	✓	✓
	Mounting bracket	E9	✓	✓	✓	✓
	Side vent/drain top	F1	✓			
	Side vent/drain bottom	F2	✓			
	PED (97/23/EC) conformity *34 *35	H1	✓	✓	✓	✓
	Material certificate	H2	✓	✓	✓	✓
	Max. working pressure 20 MPa *35 *37	H3	✓	✓	✓	✓
	Fieldbus communication stack BASIC class (used with option D6) *33	L1	✓	✓	✓	✓
	SI unit	U1	✓	✓	✓	✓

Note) \*1 SCS14A (equivalent SUS316) or SUSF316

\*3 In case "for oxygen or chlorine (fluorine oil) service" is used, "oil free finish - code K" must be selected.

\*6 In case manifold valve is used and in case code D, H, U or P is used, please select code A1 of Option II

\*9 Applicable for wetted parts of center body material; Hastelloy C or Tantalum.

\*33 "FOUNDATION™ fieldbus - code D6" and "fieldbus communication stack BASIC class - code L1" must be selected.

\*34 "PED conformity" is not applicable for the combination with FM, CSA or NEPSI approvals.

\*35 Not applicable for the combination with "SUS304 bolts/nuts".

\*37 Not applicable for the combination with "PED conformity".

**ST3000 series 900 electric differential pressure transmitter**  
**Model STD921 (High static pressure type for medium differential pressure)**  
**Model STD931 (High static pressure type for high differential pressure)**

Model No.: STD921 - I II III - 00000 - Option I - Option II

Model No.: STD931 - I II III - 00000 - Option I - Option II

Basic Model No.

	Measuring Span	2.5 to 100 kPa (250 to 10,160 mmH <sub>2</sub> O)	STD921
		35 to 700 kPa (0.35 to 7 kgf/cm <sup>2</sup> )	STD931

Selection I			Code	Material code	
I	Material	Meter body cover	-	E	
		Vent/drain plugs	-		
		Wetted parts of center body	-		
		SCS14A*1	E		
		SUS316			
		Diaphragm:SUS316L Others: SUS316			
II	Fill fluid	Regular type (Silicone oil)	1	✓	
		For oxygen service (Fluorine oil) *3	2	✓	
III	Process connection	Top or bottom connection	Rc1/2	Q	✓
			1/2NPT internal thread	R	✓
			Rc1/4	S	✓
			1/4NPT internal thread	T	✓
			-		
			00000		
			-		
Options I		No options	X	✓	
		Built-in indicating smart meter (0 to 100% liner scales)	P	✓	
		Built-in indicating smart meter (engineering unit scales)	R	✓	
		SUS304 bolt and nuts material *12	W	✓	
		SUS630 bolt and nuts material	U	✓	
		Corrosion-resistant finish	A	✓	
		Corrosion-proof finish	B	✓	
		Corrosion-resistant finish, silver paint	D	✓	
		Oil free finish	K	✓	
		Long Vent/drain plugs	J	✓	
		FM Explosionproof	3	✓	
		ATEX Flameproof	6	✓	
			-		
Options II		No option	XX	✓	
		Water free finish (with oil free finish)	A7	✓	
		NEPSI Flameproof	C1	✓	
		Custom calibration	C7	✓	
		FOUNDATION™ fieldbus *33	D6	✓	
		One elbow	E1	✓	
		Two elbows	E2	✓	
		Mounting bracket	E9	✓	
		PED (97/23/EC) conformity *34	H1	✓	
		Material certificate	H2	✓	
		Max. working pressure 20 MPa *37	H3	✓	
		Fieldbus communication stack BASIC class (used with option D6) *33	L1	✓	
		SI unit	U1	✓	

Note) \*1 SCS14A (equivalent SUS316) or SUS316

\*3 In case “for oxygen or chlorine (fluorine oil) service” is used, “oil free finish - code K” must be selected.

\*12 When SUS304 bolt/nut is selected, max working pressure rating is 23 MPa (230 kgf/cm<sup>2</sup>)

\*33 “FOUNDATION™ fieldbus - code D6” and “fieldbus communication stack BASIC class - code L1” must be selected.

\*34 “PED conformity” is not applicable for the combination with FM, CSA or NEPSI approvals.

\*37 Not applicable for the combination with “PED conformity”.

**ST3000 series 900 electric differential pressure transmitter**  
**Model STD961 (High static pressure type for super-high differential pressure)**

Model No.: STD961 - I II III - 00000 - Option I - Option II

Basic Model No.

	Measuring Span	0.25 to 14MPa (2.5 to 140kgf/cm <sup>2</sup> )	STD961
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Selection I			Code	Material code		
I	Material	Meter body cover	Vent/drain plugs	Wetted parts of center body	-	E
		SCS14A*1	SUS316	Diaphragm: SUS316L Others: SUS316	E	
II	Fill fluid	Regular type (Silicone oil)			1	✓
		For oxygen service (Fluorine oil) *3			2	✓
III	Process connection	Top or Bottom Connection	Rc1/2		Q	✓
			1/2NPT internal thread		R	✓
			Rc1/4		S	✓
			1/4NPT internal thread		T	✓
			-			
			00000			
			-			
Options I	No options			X	✓	
	Built-in indicating smart meter (0 to 100% liner scales)			P	✓	
	Built-in indicating smart meter (engineering unit scales)			R	✓	
	SUS304 bolt and nuts material			W	✓	
	SUS630 bolt and nuts material			U	✓	
	Corrosion-resistant finish			A	✓	
	Corrosion-proof finish			B	✓	
	Corrosion-resistant finish, silver paint			D	✓	
	Oil free finish			K	✓	
	Long vent/drain plugs			J	✓	
	FM Explosionproof			3	✓	
ATEX Flameproof			6	✓		
			-			
Options II	No option			XX	✓	
	Water free finish (with oil free finish)			A7	✓	
	NEPSI Flameproof			C1	✓	
	Custom calibration			C7	✓	
	FOUNDATION™ fieldbus *33			D6	✓	
	One elbow			E1	✓	
	Two elbows			E2	✓	
	Mounting bracket			E9	✓	
	PED (97/23/EC) conformity *34			H1	✓	
	Material certificate			H2	✓	
	Max. working pressure 20 MPa *37			H3	✓	
	Fieldbus communication stack BASIC class (used with option D6) *33			L1	✓	
	SI unit			U1	✓	

Note) \*1 SCS14A (equivalent SUS316) or SUSF316

\*3 In case "for oxygen or chlorine (fluorine oil) service" is used, "oil free finish - code K" must be selected.

\*33 "FOUNDATION™ fieldbus - code D6" and "fieldbus communication stack BASIC class - code L1" must be selected.

\*34 "PED conformity" is not applicable for the combination with FM, CSA or NEPSI approvals.

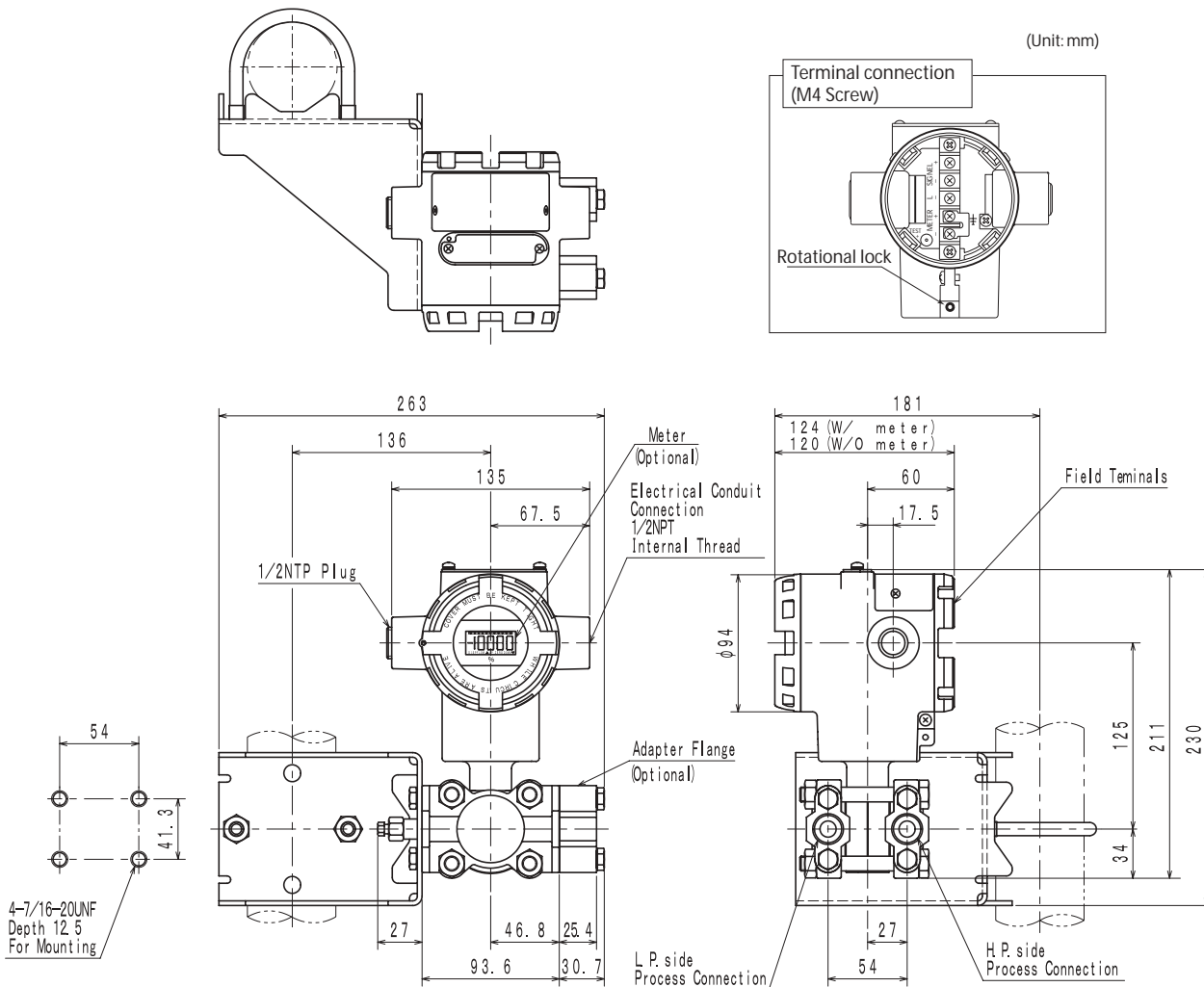
\*37 Not applicable for the combination with "PED conformity".

**DIMENSIONS**

Model STD910 / 920 / 930 (Wetted parts materials: SUS316, Hastelloy C)

STD960 (Wetted parts materials: SUS316)

Process connection: Front side

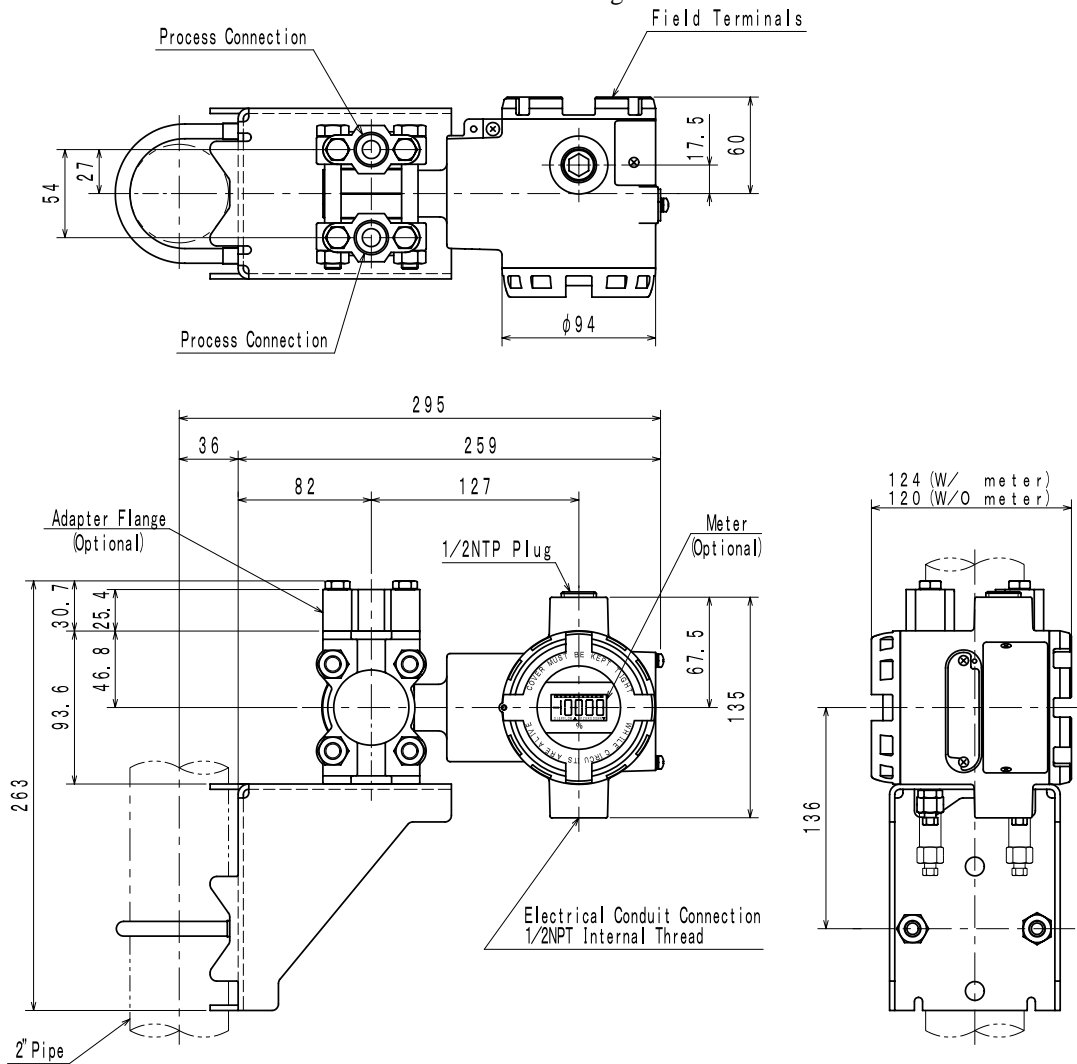


Model STD910 / 920 / 930 (Wetted parts materials: SUS316, Hastelloy C)

STD960 (Wetted parts materials: SUS316)

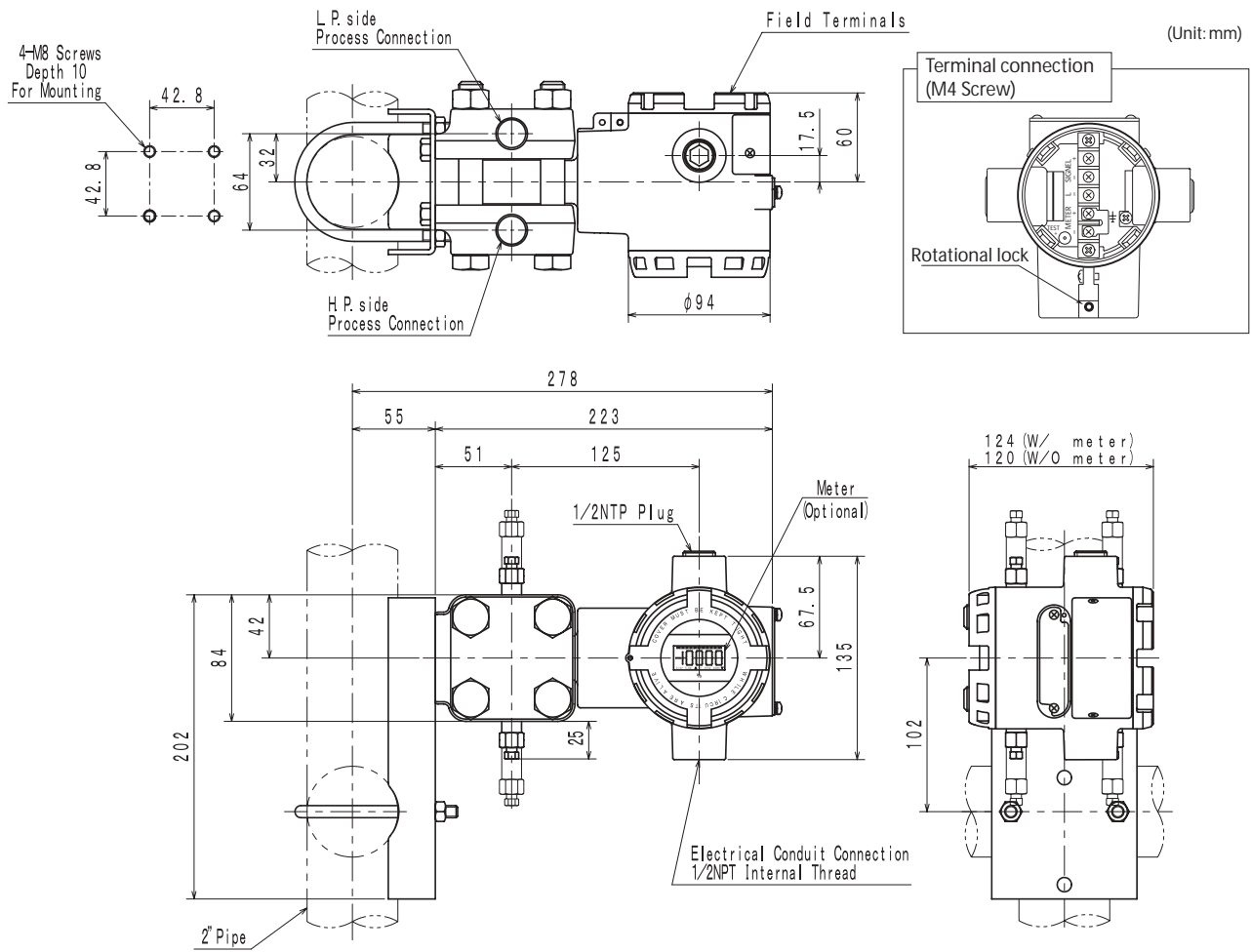
Process connection: Top or bottom side

\*Meter unit inside of transmitter can be rotated for the following installation.



Model STD921 / STD931 / STD961

Process connection: Top or bottom side

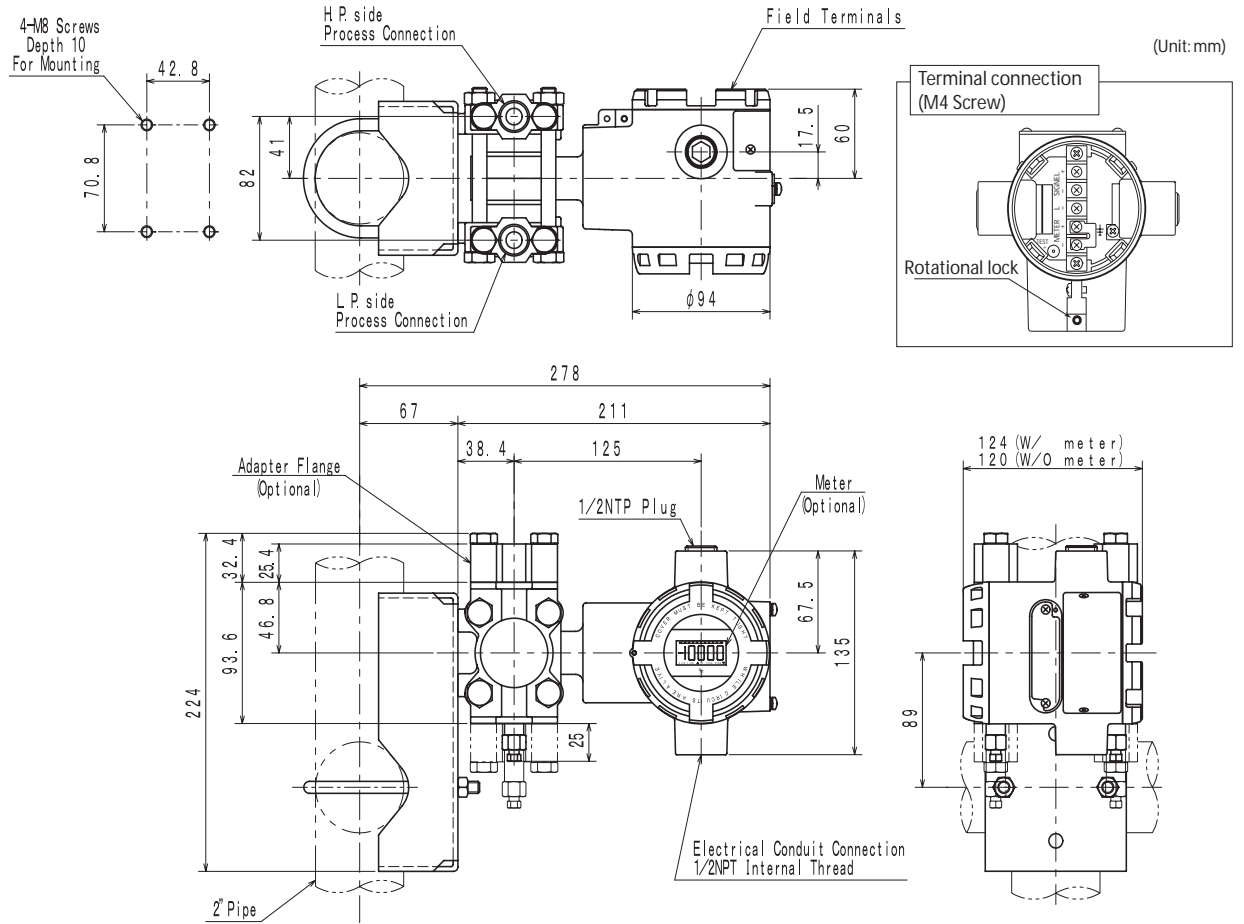


Model STD920 (Wetted parts materials: Tantalum, SUS316L)

Model STD930 (Wetted parts materials: Tantalum, SUS316L)

Model STD960 (Wetted parts materials: Tantalum, Hastelloy C)

Process Connection: Top or bottom side



*Note*

*Note*

**azbil**

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