ST3000 ACE Smart Transmitter

JTD Series of Differential Pressure Transmitters

Model JTD910A/920A/930A/960A/921A/931A/961A

OVERVIEW

The ST3000 ACE Smart Transmitter is a microprocessor-based smart transmitter that features high performance and excellent stability. Capable of measuring gas, liquid, and vapor flow rates, pressures, and liquid levels, it transmits 4 to 20 mA DC analog and digital signals according to the measured differential pressure.
It can also execute two-way communications between the SFC (Smart Field Communicator), and, via DE protocol, with the TDCS3000 or 3000^{X} and a database, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment.

FEATURES

Excellent stability and high performance

- Long-term stability has been 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 JTD920A, 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.

Multiprotocol communication

- Either analog output (4 to 20 mA DC), analog FSK output (4 to 20 mA DC) or digital output (DE protocol) is possible.
- Two-way communication using digital output facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.

Full after-sales service program

- A wide variety of specialized replacement kits is provided to meet customers' needs when replacing Yamatake transmitters or transmitters from other companies.
- From product delivery to replacement, we will service all your needs. Our nationwide service network provides all the backup you require, including trial operation support and regular maintenance.

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 semi-conductor equipment manufacturing / Clean rooms
- For applications that require highly stable, accurate measurement

Pulp and paper
- For lines that need transmitters resistant to chemical liquids, corrosive fluids and the like

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, etc.) conditions

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

SPECIFICATIONS

Measuring span / Setting range / Working pressure range
See Table 1.

Output / Communication
Analog output (4 to 20 mA DC)
Analog FSK output (4 to 20 mA DC)
(Frequency shift keying signal transmission system)
Digital output (DE protocol)

Supply voltage and load resistance
10.8 to 45V DC. A load resistance of 250 Ω or more is necessary between loops. (See Figure 1)

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

Ambient temperature range

Normal operating range
-40 to 85°C for general purpose models
-15 to 65°C for general purpose model (JTD910A)
-10 to 75°C for oxygen and chlorine models
-20 to 70°C for models with digital indicators

Operative limits
-50 to 93°C for general purpose models
-40 to 70°C for general purpose model (JTD910A)
-40 to 80°C for oxygen and chlorine models
-30 to 80°C for models with digital indicators

JIS special explosion-proof models: -20 to 60°C
JIS intrinsically safe models: -10 to 60°C

Temperature ranges of wetted parts

Normal operating range
-40 to 110°C for general purpose models
-10 to 75°C for oxygen and chlorine models

Operative limits:
-50 to 115°C for general purpose models
-40 to 80°C for oxygen and chlorine models

JIS special explosion-proof models: -20 to 110°C
JIS intrinsically safe models: -10 to 100°C

Ambient humidity range
5 to 100% RH

Stability against supply voltage change
± 0.005% F.S./V

Lightning protection
Peak value of voltage surge: 100 kV
Peak value of current surge: 1000A

Dead time
Approximately 0.4 sec.

Damping time constant
Selectable from 0 to 32 sec. in ten stages

Waterproof / Dustproof structure
JIS C0920 watertight: NEMA3 and 4X
JIS F8001 class 2 watertight: IEC IP67

Explosion-proof structure
JIS special explosion-proof models: (Exd II CT4X)
JIS intrinsically safe models: (i3aG4)

Table 1 Measuring span, setting range, and working pressure range

(for negative pressure in the working pressure range, see Figure2, Figure 3, Figure 4 and Figure 5.)

Model	Measuring span	Setting span	Working pressure range
JTD910A	0.1 to 2 kPa {10 to 200 mmH_2O}	-1 to 1 kPa {-100 to 100 mmH_2O}	-70 to 210 kPaG {-0.7 to 2.1 kgf/cm^2}
JTD920A	0.75 to 100 kPa {75 to 10160 mm H_2O}	-100 to 100 kPa {-10160 to 10160 mmH_2O}	2.0 kPa abs. to 14 MPa *1 *2 {15 mmHg abs. to 140 kgf/cm^2}
JTD930A	35 to 700 kPa {0.35 to 7 kgf/cm^2}	-100 to 700 kPa {-1 to 7 kgf/cm^2}	
JTD960A	0.25 to 14 MPa {2.5 to 140 kgf/cm^2}	-100 to 14 MPa {-1 to 140 kgf/cm^2}	2.0 kPa abs. to 14 MPa *2 {15 mmHg abs. to 140 kgf/cm^2}
JTD921A	2.5 to 100 kPa {250 to 10160 mmH_2O}	-100 to 100 kPa {-10160 to 10160 mmH_2O}	2.0 kPa abs. to 42 Mpa *3 {15 mmHg abs. to 420 kg/cm^2}
JTD931A	35 to 700 kPa {0.35 to 7 kgf/cm^2}	-100 to 700 kPa {-1 to 7 kgf/cm^2}	
JTD961A	0.25 to 14 MPa {0.25 to 140 kgf/cm^2}	-0.1 to 14 MPa {-1 to 140 kgf/cm^2}	

*Note) *1: With PVC wetted parts, the maximum working pressure is 1.5 MPa {15 kgf/cm^2}*
**2: With SUS304 bolts and nuts, the maximum working pressure is 7 MPa {70 kgf/cm^2}*
**3: With SUS304 bolts and nuts, the maximum working pressure is 23 MPa {230 kgf/cm^2}*

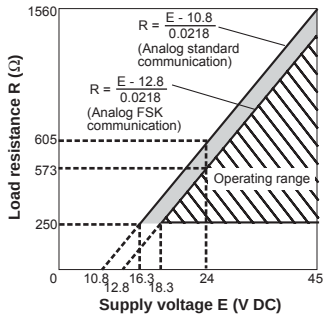


Figure 1 Supply voltage vs. load resistance characteristics

Note)For communication with SFC, a load resistance of 250Ω or more is necessary

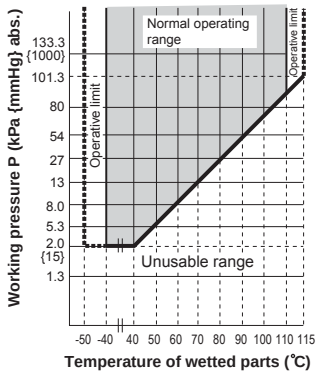


Figure 2 Working pressure and temperature of wetted parts section

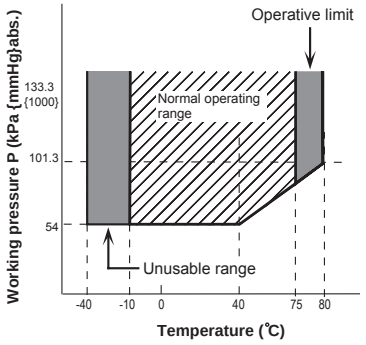


Figure 3 Working pressure and temperature of wetted parts section for oxygen and chlorine service

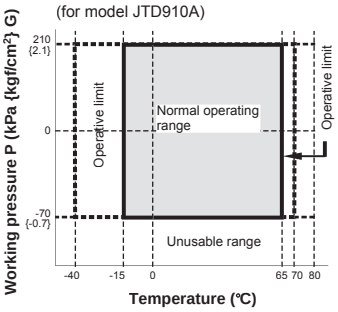


Figure 4 Working pressure and temperature of wetted parts section

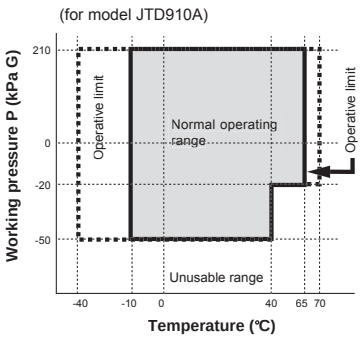


Figure 5 Working pressure and temperature of wetted parts section for oxygen and chlorine service

Process pipe connection
Rc1/2, 1/2NPT internal thread and Rc1/4, 1/4NPT internal thread

Electrical conduit connection
G1/2 internal thread and 1/2NPT internal thread

Materials
Center body: SUS316
Transmitter case: Aluminum alloy

Wetted parts materials
Meter body cover
Carbon steel (SF440A), galvanized
Carbon steel (SF440A), nickel plated
SUSF316, PVC

Wetted parts of center body
SUS316 (Diaphragm: SUS316L)
Hastelloy C, tantalum, etc.

Vents and plugs
SUS316, PVC

Gaskets for wetted parts
FEP (Teflon)

Bolts and nuts material (for fastening meter body cover)
Carbon steel (SNB7), SUS304, SUS630

Finish
Housing: light beige (Munsell 4Y7.2/1.3)
Cap: dark beige (Munsell 10YR4.7/0.5)

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 silver-coated in addition to the above corrosion-resistant finish.

Built-in indicating meter
The digital LCD indicator (optional) indicates actual flow rates (in SI units) and can be set freely between -19999 and 19999 (4.5 digits). For actual calibration, specify the following items when placing your order:
- Actual calibration range
- Actual calibration unit
- Proportional representation and instructions about square-root extraction

Various kinds of data can be set using the SFC smart communicator (Ver. 7.1 or newer).

Burnout feature
Choice of three states at abnormal condition:
Burnout of output values: none
upper limit
lower limit

Grounding
Grounding resistance 100Ω max.

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

Weight
Approx. 4.4 kg (Model JTD920A)

OPTIONAL SPECIFICATIONS

Adaptors 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.

External zero adjustment function
The transmitter can be easily zero-adjusted in the field with a flat-blade screwdriver.

Additional lightning protection
It is possible to achieve a lightning protection performance of 200 kV, 2000A, twice the standard performance (100 kV, 1000A). This is advisable when the transmitter is to be used in lightning-prone areas such as mountains, hills or wherever high-performance lightning protection is required.

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

Steam block
A block with steam piping can be attached to the initial process section of the transmitter to deal with process fluids or steam that tend to coagulate or condense at low temperatures.

Working pressure (Steam block)
5 MPa {50 kgf/cm^2} max.
(Must not exceed the working pressure range)

Working temperature (Steam block)
250°C max.
(The temperature of the wetted parts of the transmitter must not exceed the temperature range of the wetted parts.)

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.

Water free treatment (including oil free treatment)
The transmitter is shipped with dry and oil-free wetted parts.

Oil free treatment
The transmitter is shipped with oil-free wetted parts.

Electric power specification
This specification applies to where stringent quality control is required, such as in the electrical power and city gas industries.

Special burnout (3.2 mA)
The burnout output value (in the lower-limit direction) under abnormal conditions shall be 3.2 mA (-5%) or less.

Test report
The test report indicates the results of appearance, I/O characteristics, insulation resistance, and breakdown voltage tests.

Material certificate
The material certificate shows the chemical composition, heat-treatment conditions, and mechanical properties of the materials used for the wetted parts. The transmitter can be easily zero-adjusted in the field with a flat-blade screwdriver.

Strength calculation sheet
The strength calculation sheet indicates the strength of the meter body cover, flanges, bolts, etc.

Withstand pressure and air tight test (for general purposes)
The withstand pressure and air tight test result sheet shows the results of a pressure resistance test (under water pressure for 10 minutes) and a gas-tightness test (using N_2 gas for 10 minutes) performed on the wetted parts.

Traceability certificate
This certificate consists of three parts: the transmitter's measurement control system configuration diagram, a calibration certificate, and a test report.

Conformance to non-SI units
We deliver transmitters set to any non-SI unit you specify.

Transmitter handling notes

To make the most of the performance this transmitter can offer, please use it properly noting the points mentioned below. Before using it, please read the Instruction Manual.

Transmitter installation notes

⚠ WARNING

- When installing the transmitter, ensure that gaskets do not protrude from connecting points into the process (such as adapter flange connection points and connecting pipes and flanges). Gasket protrusion may result in leaks and output errors.
- Do not use the transmitter outside its defined pressure, temperature, and connection specifications. A serious accident may otherwise occur due to damage and leaks.
- When performing wiring work in explosion-proof areas, follow the work method specified in the explosion-proof guidelines. In addition, when the wiring for an explosionproof product is a pull-in pressure-resistant packing-cable, be sure to use a pressure-resistant packing-cable adapter certified by Yamatake Corporation.
- Be sure to use the cable which allowable temperature is more than 65°C.

⚠ CAUTION

- After installing the transmitter, do not stand on it. Using it as a foothold could cause it to collapse and cause physical injury.
- Be careful not to hit the glass indicator with tools etc. This could break the glass and cause injury.
- The transmitter is heavy. Wear safety shoes and take care when installing it.

Wiring notes

⚠ WARNING

- To avoid shocks, do not perform electrical wiring work with wet hands or with live wires.

⚠ CAUTION

- Do wiring work properly in conformance with the specifications. Wiring mistakes may result in malfunction or irreperable damage to the instrument.
- Use a power supply that conforms to the specifications. Use of an improper power supply may result in malfunction or irreperable damage to the instrument.

PERFORMANCE

Shown for each item are the upper limit (URV)*1 and the lower limit (LRV)*2 of the calibration range or the percentage ratio of the maximum value of the span to χ (kPa).

Model JTD910A (material for wetted parts: SUS316)

Accuracy	Linear output:	$\pm\left(0.15 + 0.15 \times \frac{1.0}{\chi}\right)$ %	
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		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 shift)	$\pm\left(0.2 + 0.6 \times \frac{1.0}{\chi}\right)$ %	
Static pressure effect (Shift with respect to setting range) Chabge of 70 kPa {0.7 kgf/cm^2}	Zero shift:	± 0.45%	($\chi \geq 1.0$ kPa {100 mmH$_2$O})
		$\pm\left(0.45 \times \frac{1.0}{\chi}\right)$ %	($\chi < 1.0$ kPa {100 mmH$_2$O})
	Combined shift: (including zero and span shift)	± 0.5%	($\chi \geq 1.0$ kPa {100 mmH$_2$O})
		$\pm\left(0.5 \times \frac{1.0}{\chi}\right)$ %	($\chi < 1.0$ kPa {100 mmH$_2$O})

Model JTD920A / 921A (material for wetted parts: SUS316)

Accuracy *3	Linear output:	± 0.1%	($\chi \geq 5.0$ kPa {500 mmH$_2$O})
		$\pm\left(0.025 + 0.075 \times \frac{5.0}{\chi}\right)$ %	($\chi < 5.0$ kPa {500 mmH$_2$O})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		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 shift)	± 0.8%	($\chi \geq 12.5$ kPa {1250 mmH$_2$O})
		$\pm\left(0.35 + 0.45 \times \frac{12.5}{\chi}\right)$ %	($\chi < 12.5$ kPa {1250 mmH$_2$O})
Static pressure effect (Shift with respect to setting range)*3 Change of 7 MPa {70 kgf/cm^2}	Zero shift:	±0.18 %	($\chi \geq 20.0$ kPa {2000 mmH$_2$O})
		$\pm\left(0.18 \times \frac{20.0}{\chi}\right)$%	($\chi < 20.0$ kPa {2000 mmH$_2$O})
	Combined shift: (including zero and span shift)	±0.33 %	($\chi \geq 20.0$ kPa {2000 mmH$_2$O})
		$\pm\left(0.33 \times \frac{20.0}{\chi}\right)$ %	($\chi < 20.0$ kPa {2000 mmH$_2$O})

Model JTD930A / 931A (material for wetted parts: SUS316)

Accuracy *3	Linear output:	± 0.1%	($\chi \geq 140$ kPa {1.4 kgf/cm^2})
		$\pm\left(0.025 + 0.075 \times \frac{140}{\chi}\right)$%	($\chi < 140$ kPa {1.4 kgf/cm^2})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		When output is less than 7.1%: dropout	
Temperature characteristics (Shift from the set range)*3 Change of 55°C	Zero shift:	$\pm\left(0.25 + 0.3 \times \frac{210}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	± 0.8%	($\chi \geq 210$ kPa {2.1 kgf/cm^2})
		$\pm\left(0.35 + 0.45 \times \frac{210}{\chi}\right)$ %	($\chi < 210$ kPa {2.1 kgf/cm^2})
Static pressure effect (Shift with respect to setting range)*3 Change of 7 MPa {70 kgf/cm^2}	Zero shift:	$\pm\left(0.18 \times \frac{700}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	$\pm\left(0.33 \times \frac{700}{\chi}\right)$ %	

Model JTD960A / 961A (material for wetted parts: SUS316)

Accuracy *3	Linear output:	± 0.15 %	($\chi \geq 3.5$ MPa {35 kgf/cm^2})
		$\pm\left(0.1 + 0.05 \times \frac{3.5}{\chi}\right)$ %	($\chi < 3.5$ MPa {35 kgf/cm^2})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		When output is less than 7.1%: dropout	
Temperature characteristics (Shift from the set range) *3 **Change of 55°C**	Zero shift:	$\pm\left(0.25 + 0.3 \times \frac{3.5}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	± 0.8 %	($\chi \geq 3.5$ MPa {35 kgf/cm^2})
		$\pm\left(0.35 + 0.45 \times \frac{3.5}{\chi}\right)$ %	($\chi < 3.5$ MPa {35 kgf/cm^2})
Static pressure effect (Shift with respect to setting range) *3 **Change of 7 MPa {70 kgf/cm^2}**	Zero shift:	$\pm\left(0.03 + 0.17 \times \frac{7}{\chi}\right)$ %	($\chi > 7$ MPa {70 kgf/cm^2})
	Combined shift: (including zero and span shift)	± 0.4 %	
		$\pm\left(0.03 + 0.37 \times \frac{7}{\chi}\right)$ %	($\chi \leq 7$ MPa {70 kgf/cm^2})
			T: Ambient temperature (°C)

Model JTD920A (material for wetted parts: Hastelloy C, Tantalum)

Accuracy *3	Linear output:	± 0.3%	($\chi \geq 5.0$ kPa {500 mmH$_2$O})
		$\pm\left(0.225 + 0.075 \times \frac{5.0}{\chi}\right)$ %	($\chi < 5.0$ kPa {500 mmH$_2$O})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		When output is less than 7.1%: dropout	
Temperature characteristics (Shift from the set range) *3 **Change of 30°C (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 shift)	$\pm\left(0.55 + 0.65 \times \frac{20.0}{\chi}\right)$ %	
Static pressure effect (Shift with respect to setting range) *3 **Change of 7 MPa {70 kgf/cm^2}**	Zero shift:	±0.66 %	($\chi \geq 20.0$ kPa {2000 mmH$_2$O})
		$\pm\left(0.66 \times \frac{20.0}{\chi}\right)$ %	($\chi < 20.0$ kPa {2000 mmH$_2$O})
	Combined shift: (including zero and span shift)	±1.0 %	($\chi \geq 20.0$ kPa {2000 mmH$_2$O})
		$\pm\left(1.0 \times \frac{20.0}{\chi}\right)$ %	($\chi < 20.0$ kPa {2000 mmH$_2$O})

Note) **1: URV denotes the value for 100% (20 mA DC) output.*
**2: LRV denotes value for 0% (4 mA DC) output*
**3: Within a range of URV $\geq$ 0 and LRV $\geq$ 0*

Model JTD930A (material for wetted parts: Hastelloy C, Tantalum, SUS316L)

Accuracy *3	Linear output:	± 0.2 %	(For $\chi \geq 140$ kPa {1.4 kgf/cm^2})
		$\pm\left(0.125 + 0.075 \times \frac{140}{\chi}\right)$ %	(For $\chi < 140$ kPa {1.4 kgf/cm^2})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		When output is less than 7.1%: dropout	
Temperature characteristics (Shift from the set range) *3 **Change of 30°C (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 shift)	± 1.2 %	(For $\chi \geq 210$ kPa {2.1 kgf/cm^2})
		$\pm\left(0.55 + 0.65 \times \frac{210}{x}\right)$ %	(For $\chi < 210$ kPa {2.1 kgf/cm^2})
Static pressure effect (Shift with respect to setting range) *3 **Change of 7 MPa {70 kgf/cm^2}**	Zero shift:	$\pm\left(0.03 + 0.295 \times \frac{700}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	$\pm\left(0.03 + 0.495 \times \frac{700}{\chi}\right)$ %	

Model JTD960A (material for wetted parts: Hastelloy C, Tantalum, SUS316L)

Accuracy *3	Linear output:	± 0.3 %	(For $\chi \geq 3.5$ MPa {35 kgf/cm^2})
		$\pm\left(0.25 + 0.05 \times \frac{3.5}{\chi}\right)$ %	(For $\chi < 3.5$ MPa {35 kgf/cm^2})
	Square-root output:	When output is 50 to 100%: same as linear output	
		When output is 7.1 to 50%: linear output × $\frac{50}{square-root\ output}$ %	
		When output is less than 7.1%: dropout	
Temperature characteristics (Shift from the set range) *3 **Change of 30°C (Range from -5 to 55°C)**	Zero shift:	$\pm\left(0.15 + 0.6 \times \frac{3.5}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	± 1.2 %	(For $\chi \geq 3.5$ MPa {35 kgf/cm^2})
		$\pm\left(0.55 + 0.65 \times \frac{3.5}{x}\right)$ %	(For $\chi < 3.5$ MPa {35 kgf/cm^2})
Static pressure effect (Shift with respect to setting range) *3 **Change of 7 MPa {70 kgf/cm^2}**	Zero shift:	$\pm\left(0.03 + 0.295 \times \frac{7}{\chi}\right)$ %	
	Combined shift: (including zero and span shift)	± 0.525 %	(For $\chi \geq 7$ MPa {70 kgf/cm^2})
		$\pm\left(0.03 + 0.495 \times \frac{7}{\chi}\right)$ %	(For $\chi < 7$ MPa {70 kgf/cm^2})

*Note) *1: URV denotes the value for 100% (20 mA DC) output.*
**2: LRV denotes value for 0% (4 mA DC) output*
**3: Within a range of URV ≥ 0 and LRV ≥ 0*

MODEL SELECTIONS

Model JTD910A - Lowest differential pressure - Regular service

Basic model no. - Selections (I II III IV V) - Options 1 (VI VII VIII IX X) - Options 2 (Options 2: Refer to page 16)

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD910A	0.1 to 2 kPa (10 to 200 mmH_2O)	Lowest differential pressure	Regular service (Silicon oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4

			Basic model no.	Selections					Options 1				
	Measuring span	0.1 to 2.0 kPa (10 to 200 mmH_2O)	JTD910A	-					-				
I	Output	4 to 20 mA			1								
		4 to 20 mA (Analog FSK communication)			2								
		Digital output (DE protocol) *2			3								
II	Material	Meterbody cover	Vent / drain plugs	Wetted parts of center body									
		SUSF316	SUS316	SUS316	E								
III	Fill fluid	Regular type (Silicon oil)				1							
IV	Process connection	Rc1/2, top connection					A						
		Rc1/2, bottom connection					B						
		1/2NPT internal thread, top connection					F						
		1/2NPT internal thread, bottom connection					G						
		Rc1/4, top connection					L						
		Rc1/4, bottom connection					M						
		1/4NPT internal thread, top connection					R						
		1/4NPT internal thread, bottom connection					S						
V	Bolt / nut	SUS304						2					
Option 1									-				
VI	Electrical connection / explosion-proof	G1/2, watertight								X			
		G1/2, JIS Flameproof with 1 pc. of cable gland attached								2			
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached								3			
		G1/2, Intrinsically safe *3								6			
		1/2NPT, watertight								A			
VII	Built-in indicating smart meter	None									X		
		0 to 100% linear scales *1									1		
		Engineering unit scales *1									2		
VIII	Finish	Standard										X	
		Corrosion-resistant										A	
		Corrosion-proof										B	
		Corrosion-resistant (Silver coating)										D	
IX	Burnout feature	None *2											X
		Upper limit of output at abnormal condition											U
		Lower limit of output at abnormal condition											D
X	Mounting bracket	None											X
		Carbon steel											1
		SUS304											2

Note 1 Range should be informed to IBQ/Factory at purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK communication can not be combined with JIS intrinsically safe.

Model JTD920A / JTD930A / JTD960A - Regular service

Basic model no.		Selections						Options 1						Options 2 (Options 2: Refer to page 16)
	-	I	II	III	IV	V	-	VI	VII	VIII	IX	X	-	

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD920A	0.75 to 100 kPa (75 to 10160 mmH_2O)	Medium differential pressure	Regular service (Silicon oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4
JTD930A	35 to 700 kPa (0.35 to 7 kgf/cm^2)	High differential pressure		
JTD960A	0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	Super high differential pressure		

			Basic model no.	Selections					-	Options-1				
									-					
	Measuring span	0.75 to 100 kPa (75 to 10160 mmH_2O)	JTD920A											
		35 to 700 kPa (0.35 to 7 kgf/cm^2)	JTD930A											
		0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	JTD960A											
I	Output	4 to 20 mA		1										
		4 to 20 mA (Analog FSK communication) *3		2										
		Digital output (DE protocol) *2		3										
II	Material	Meterbody cover	Vent / drain plugs	Wetted parts of center body										
	*9	Carbon steel Zn plating	SUS316	SUS316	A									
	*9	Carbon steel Zn plating	SUS316	Hastelloy C	B									
	*5, 9	Carbon steel Zn plating	SUS316	Tantalum	D									
		SCS14A *32	SUS316	SUS316	E									
		SCS14A *32	SUS316	Hastelloy C	F									
	*5	SUSF316	SUS316	Tantalum	H									
	*5	SUSF316	SUS316	SUS316L	K									
	*4, 5, 6, 10	PVC	PVC	Tantalum	P									
III	Fill fluid	Regular type (Silicon oil)				1								
IV	Process connection	Rc1/2, top connection					A							
		Rc1/2, bottom connection					B							
		1/2NPT internal thread, top connection					F							
		1/2NPT internal thread, bottom connection					G							
		Rc1/4, top connection					L							
		Rc1/4, bottom connection					M							
		1/4NPT internal thread, top connection					R							
		1/4NPT internal thread, bottom connection					S							
		Δ Probe bottom connection					W							
V	Bolt / nut	Carbon steel						1						
		SUS304						2						
		SUS630						3						
Option 1									-					
VI	Electrical connection / explosion-proof	G1/2, watertight								X				
		G1/2, JIS Flameproof with 1 pc. of cable gland attached								2				
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached								3				
		G1/2, Intrinsically safe *3								6				
		1/2NPT, watertight								A				
VII	Built-in indicating smart meter	None									X			
		0 to 100% linear scales *1									1			
		Engineering unit scales *1									2			
VIII	Finish	Standard										X		
		Corrosion-resistant										A		
		Corrosion-proof										B		
		Corrosion-resistant (Silver coating)										D		
IX	Burnout feature	None *2											X	
		Upper limit of output at abnormal condition											U	
		Lower limit of output at abnormal condition											D	
X	Mounting bracket	None												X
		Carbon steel												1
		SUS304												2

Note 1 Range should be informed to IBQ/Factory at purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK Communication can not be combined with JIS intrinsically safe.

4 JTD960A is not available for meterbody cover material PVC.

5 The pitch is 82mm. To change the pitch to 54mm (standard pitch), should be selected adapter flange ("A1" of Option 2).

6 When meterbody cover material is PVC, option 2 should be selected "V" as bolt/nut SUS304.

9 This can be selected for the meterbody cover if the process fluid contains hydro-carbon or H2S which used for Refinery/Petrochemical. When you selected this, contact to IBQ/Factory.

10 When meterbody cover material is PVC, manifold valve (model MVG) and/or Integral orifice (model KEE) can not be combined with.

32 SCS14A (equivalent to SUS316) or SUSF316

Model JTD921A / JTD931A / JTD961A - Regular service

Basic model no.		Selections						Options 1						Options 2 (Options 2: Refer to page 16)
	-	I	II	III	IV	V	-	VI	VII	VIII	IX	X	-	

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD921A	0.75 to 100 kPa (75 to 10160 mmH_2O)	High static pressure for medium differential pressure	Regular service (Silicon oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4
JTD931A	35 to 700 kPa (0.35 to 7 kgf/cm^2)	High static pressure for high differential pressure		
JTD961A	0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	High static pressure for super high differential pressure		

				Basic model no.	Selections					Options 1				
					-					-				
	Measuring span	0.75 to 100 kPa (75 to 10160 mmH_2O)	JTD921A											
		35 to 700 kPa (0.35 to 7 kgf/cm^2)	JTD931A											
		0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	JTD961A											
I	Output	4 to 20 mA			1									
		4 to 20 mA (Analog FSK communication)			2									
		Digital output (DE protocol) *2			3									
II	Material	Meterbody cover	Vent / drain plugs	Wetted parts of center body										
		Carbon steel Zn plating	SUS316	SUS316		A								
		SUSF316	SUS316	SUS316		E								
III	Fill fluid	Regular type (Silicon oil)					1							
IV	Process connection	Rc1/2, top connection *40						A						
		Rc1/2, bottom connection *40						B						
		1/2NPT internal thread, top connection *40						F						
		1/2NPT internal thread, bottom connection *40						G						
		Rc1/4, top connection						L						
		Rc1/4, bottom connection						M						
		1/4NPT internal thread, top connection						R						
		1/4NPT internal thread, bottom connection						S						
V	Bolt / nut	Carbon steel							1					
		SUS304							2					
		SUS630							3					
Option 1										-				
VI	Electrical connection / explosion-proof	G1/2, watertight									X			
		G1/2, JIS Flameproof with 1 pc. of cable gland attached									2			
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached									3			
		G1/2, Intrinsically safe *3									6			
		1/2NPT, watertight									A			
VII	Built-in indicating smart meter	None										X		
		0 to 100% linear scales *1										1		
		Engineering unit scales *1										2		
VIII	Finish	Standard											X	
		Corrosion-resistant											A	
		Corrosion-proof											B	
		Corrosion-resistant (Silver coating)											D	
IX	Burnout feature	None *2												X
		Upper limit of output at abnormal condition												U
		Lower limit of output at abnormal condition												D
X	Mounting bracket	None												X
		Carbon steel												1
		SUS304												2

Note1 Range should be informed to IBQ/Factory at purchase order.Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK Communication can not be combined with JIS intrinsically safe.

40 Not available with NZ16 high pressure manifold valve.

Model JTD910A - Oxygen service

Basic model no.		Selections						Options 1						Options 2 (Options 2: Refer to page 16)
	-	I	II	III	IV	V	-	VI	VII	VIII	IX	X	-	

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD910A	0.1 to 2.0 kPa (10 to 200 mmH_2O)	Lowest differential pressure	Oxygen service (Fluorine oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4

			Basic model no.	Selections					Options-1				
				-					-				
	Measuring span	0.1 to 2.0 kPa (10 to 200 mmH_2O)	JTD910A										
I	Output	4 to 20 mA		1									
		4 to 20 mA (Analog FSK communication)		2									
		Digital output (DE protocol) *2		3									
II	Material	Meterbody cover / Vent/drain plugs / Wetted parts of centerbody											
		SUSF316 / SUS316 / SUS316			E								
III	Fill fluid	For oxygen service (Fluorine oil)				2							
IV	Process connection	Rc1/2, top connection					A						
		Rc1/2, bottom connection					B						
		1/2NPT internal thread, top connection					F						
		1/2NPT internal thread, bottom connection					G						
		Rc1/4, top connection					L						
		Rc1/4, bottom connection					M						
		1/4NPT internal thread, top connection					R						
		1/4NPT internal thread, bottom connection					S						
		Δ Probe bottom connection					W						
V	Bolt / nut	SUS304						2					
Option 1									-				
VI	Electrical connection / explosion-proof	G1/2, watertight								X			
		G1/2, JIS Flameproof with 1 pc. of cable gland attached								2			
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached								3			
		G1/2, Intrinsically safe *3								6			
		1/2NPT, watertight								A			
VII	Built-in indicating smart meter	None									X		
		0 to 100% linear scales *1									1		
		Engineering unit scales *1									2		
VIII	Finish	Standard										X	
		Corrosion-resistant										A	
		Corrosion-proof										B	
		Corrosion-resistant (Silver coating)										D	
IX	Burnout feature	None *2											X
		Upper limit of output at abnormal condition											U
		Lower limit of output at abnormal condition											D
X	Mounting bracket	None											X
		Carbon steel											1
		SUS304											2

Note1 Range should be informed to IBQ/Factory at purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK communication can not be combined with JIS intrinsically safe.

Model JTD920A / JTD930A / JTD960A - Oxygen service

Basic model no. Selections Options 1 Options 2 (Options 2: Refer to page 16)

[ ] - [I][II][III][IV][V] - [VI][VII][VIII][IX][X] - [ ]

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD920A	0.75 to 100 kPa (75 to 10160 mmH_2O)	Medium differential pressure	Oxygen service (Fluorine oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4
JTD930A	35 to 700 kPa (0.35 to 7 kgf/cm^2)	High differential pressure		
JTD960A	0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	Super high differential pressure		

			Basic model no.	Selections	Options-1
	Measuring span	0.75 to 100 kPa (75 to 10160 mmH_2O)	JTD920A		
		35 to 700 kPa (0.35 to 7 kgf/cm^2)	JTD930A		
		0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	JTD960A		
I	Output	4 to 20 mA		1	
		4 to 20 mA (Analog FSK communication)		2	
		Digital output (DE protocol) *2		3	
II	Material	Meterbody cover / Vent/drain plugs / Wetted parts of centerbody			
		SCS14A *32 / SUS316 / SUS316		E	
		SCS14A *32 / SUS316 / Hastelloy C		F	
	*5	SUSF316 / SUS316 / Tantalum		H	
	*5	SUSF316 / SUS316 / SUS316L		K	
	*4, 5, 6, 10	PVC / PVC / Tantalum		P	
III	Fill fluid	For oxygen service (Fluorine oil)		2	
IV	Process connection	Rc1/2, top connection		A	
		Rc1/2, bottom connection		B	
		1/2NPT internal thread, top connection		F	
		1/2NPT internal thread, bottom connection		G	
		Rc1/4, top connection		L	
		Rc1/4, bottom connection		M	
		1/4NPT internal thread, top connection		R	
		1/4NPT internal thread, bottom connection		S	
		Δ Probe bottom connection		W	
V	Bolt / nut	Carbon steel			1
		SUS304			2
		SUS630			3
Option 1					-
VI	Electrical connection / explosion-proof	G1/2, watertight			X
		G1/2, JIS Flameproof with 1 pc. of cable gland attached			2
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached			3
		G1/2, Intrinsically safe *3			6
		1/2NPT, watertight			A
VII	Built-in indicating smart meter	None			X
		0 to 100% linear scales *1			1
		Engineering unit scales *1			2
VIII	Finish	Standard			X
		Corrosion-resistant			A
		Corrosion-proof			B
		Corrosion-resistant (Silver coating)			D
IX	Burnout feature	None *2			X
		Upper limit of output at abnormal condition			U
		Lower limit of output at abnormal condition			D
X	Mounting bracket	None			X
		Carbon steel			1
		SUS304			2

Note 1 Range should be informed to IBQ/Factory at purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.
2 Digital output (DE protocol) can not be combined with an external zero adjustment function.
3 Analog FSK Communication can not be combined with JIS intrinsically safe.
4 Model JTD960A is not available for meterbody cover material PVC.
5 The pitch is 82 mm. To change the pitch to 54 mm (standard pitch), should be selected adapter flange ("A1" of option 2).
6 When meterbody cover material is PVC, option 2 should be selected "V" as bolt/nut SUS304.
9 This can be selected for the meterbody cover if the process fluid contains hydro-carbon or H2S which used for refinery/Petrochemical. When you selected this, contact to IBQ/Factory.
10 When meterbody cover material is PVC, manifold valve (model MVG) and/or integral orifice (model KEE) can not be combined with.
32 SCS14A (equivalent to SUS316) or SUSF316

Model JTD921A / JTD931A / JTD961A - Oxygen service

Basic model no.		Selections						Options 1						Options 2 (Options 2: Refer to page 16)
	-	I	II	III	IV	V	-	VI	VII	VIII	IX	X	-	

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD921A	0.75 to 100 kPa (75 to 10160 mmH_2O)	High static pressure for medium differential pressure	Oxygen service (Fluorine oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4
JTD931A	35 to 700 kPa (0.35 to 7 kgf/cm^2)	High static pressure for high differential pressure		
JTD961A	0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	High static pressure for super high differential pressure		

				Basic model no.	Selections					Options-1				
					-					-				
	Measuring span	0.75 to 100 kPa (75 to 10160 mmH_2O)	JTD921A											
		35 to 700 kPa (0.35 to 7 kgf/cm^2)	JTD931A											
		0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	JTD961A											
I	Output	4 to 20 mA			1									
		4 to 20 mA (Analog FSK communication)			2									
		Digital output (DE protocol) *2			3									
II	Material	Meterbody cover	Vent/drain plugs	Wetted parts of centerbody										
		SUSF316	SUS316	SUS316		E								
III	Fill fluid	For oxygen service (Fluorine oil)					2							
IV	Process connection	Rc1/2, top connection *40						A						
		Rc1/2, bottom connection *40						B						
		1/2NPT internal thread, top connection *40						F						
		1/2NPT internal thread, bottom connection *40						G						
		Rc1/4, top connection						L						
		Rc1/4, bottom connection						M						
		1/4NPT internal thread, top connection						R						
		1/4NPT internal thread, bottom connection						S						
V	Bolt / nut	Carbon steel							1					
		SUS304							2					
		SUS630							3					
Option 1										-				
VI	Electrical connection / explosion-proof	G1/2, watertight								X				
		G1/2, JIS Flameproof with 1 pc. of cable gland attached								2				
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached								3				
		G1/2, Intrinsically safe *3								6				
		1/2NPT, watertight								A				
VII	Built-in indicating smart meter	None									X			
		0 to 100% linear scales *1									1			
		Engineering unit scales *1									2			
VIII	Finish	Standard										X		
		Corrosion-resistant										A		
		Corrosion-proof										B		
		Corrosion-resistant (Silver coating)										D		
IX	Burnout feature	None *2											X	
		Upper limit of output at abnormal condition											U	
		Lower limit of output at abnormal condition											D	
X	Mounting bracket	None												X
		Carbon steel												1
		SUS304												2

Note1 Range should be informed to IBQ/Factory at purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK Communication can not be combined with JIS intrinsically safe.

40 Not available with NZ16 high pressure manifold valve.

Model JTD920A / JTD930A / JTD960A - Chlorine service

Basic model no.		Selections						Options 1						Options 2 (Options 2: Refer to page 16)
	-	I	II	III	IV	V	-	VI	VII	VIII	IX	X	-	

Model	Pressure range / style		Service (Fill fluid)	Process connection
JTD920A	0.75 to 100 kPa (75 to 10160 mmH_2O)	Medium differential pressure	Chlorine service (Fluorine oil)	Rc1/2, 1/2NPT, Rc1/4, NPT1/4
JTD930A	35 to 700 kPa (0.35 to 7 kgf/cm^2)	High differential pressure		
JTD960A	0.25 to 14 MPa (2.5 to 140 kgf/cm^2)	Super high differential pressure		

				Basic model no.	Selections					Options 1					
					-					-					
	Measuring span	0.75 to 100 kPa (75 to 10160 mmH_2O)		JTD920A											
		35 to 700 kPa (0.35 to 7 kgf/cm^2)		JTD930A											
		0.25 to 14 MPa (2.5 to 140 kgf/cm^2)		JTD960A											
I	Output	4 to 20 mA			1										
		4 to 20 mA (Analog FSK communication)			2										
		Digital output (DE protocol) *2			3										
II	Material	Meterbody cover	Vent/drain plugs	Wetted parts of centerbody											
	*5	SUSF316	SUS316	Tantalum		H									
	*4, 5, 6, 10	PVC *3	PVC	Tantalum		P									
III	Fill fluid	For chlorine service (Fluorine oil)					5								
IV	Process connection	Rc1/2, top connection						A							
		Rc1/2, bottom connection						B							
		1/2NPT internal thread, top connection						F							
		1/2NPT internal thread, bottom connection						G							
		Rc1/4, top connection						L							
		Rc1/4, bottom connection						M							
		1/4NPT internal thread, top connection						R							
		1/4NPT internal thread, bottom connection						S							
		Δ Probe bottom connection						W							
V	Bolt / nut	Carbon steel							1						
		SUS304							2						
		SUS630							3						
Option 1										-					
VI	Electrical connection / explosion-proof	G1/2, watertight									X				
		G1/2, JIS Flameproof with 1 pc. of cable gland attached									2				
		G1/2, JIS Flameproof with 2 pcs. of cable gland attached									3				
		G1/2, Intrinsically safe *3									6				
		1/2NPT, watertight									A				
VII	Built-in indicating smart meter	None										X			
		0 to 100% linear scales *1										1			
		Engineering unit scales *1										2			
VIII	Finish	Standard											X		
		Corrosion-resistant											A		
		Corrosion-proof											B		
		Corrosion-resistant (Silver coating)											D		
IX	Burnout feature	None *2												X	
		Upper limit of output at abnormal condition												U	
		Lower limit of output at abnormal condition												D	
X	Mounting bracket	None													X
		Carbon steel													1
		SUS304													2

Note 1 Range should be informed to IBQ/Factory at Purchase order. Digital output (DE protocol) should be selected with upper/lower direction of burn out feature.

2 Digital output (DE protocol) can not be combined with an external zero adjustment function.

3 Analog FSK Communication can not be combined with JIS intrinsically safe.

4 Model JTD960A is not available for meterbody cover material PVC.

5 The pitch is 82 mm. To change the pitch to 54 mm (standard pitch), should be selected adapter flange ("A1" of option 2).

6 When meterbody cover material is PVC, option 2 should be selected "V" as bolt/nut SUS304.

10 When meterbody cover material is PVC, manifold valve (model MVG) and/or integral orifice (model KEE) can not be combined with.

Option 2

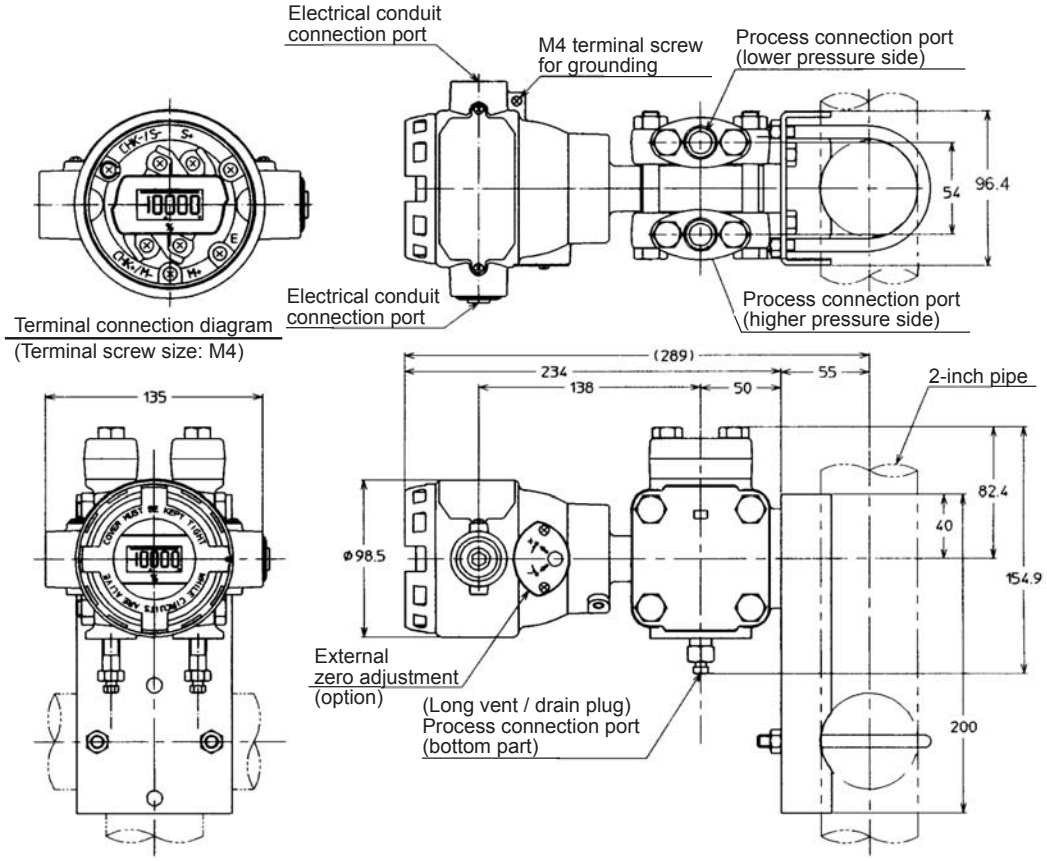
Options 2	XX	No options
	A1	Adapter flange for corrosion-resistant application (SUS316L or Tantalum for the wetted parts of centerbody)
	A2	External Zero adjustment *2
	A4	Lightning arrestor
	A5	Long vent/drain plugs
	B2	Steam block
	B7	For mounting a high load resistance smart meter *23
	C1	Color : Red (Munsell 5R4/13)
	C2	Color : Yellow (Munsell 2.5Y8/16))
	C3	Color : Blue (Munsell 7.5BG7/2)
	C7	Process connection ; reverse
	D1	Water free finish (included oil free finish) *16, *17
	D2	Oil free finish *16, *17
	G1	One elbow (left)
	G2	One elbow (right)
	G3	2 elbows
	J8	Special burn-out feature (3.2mA) *18
	T1	Test report
	T2	Material certificate *19
	T5	Strength calculation sheet *33
	T6	Withstand pressure and Airtight test *34
	T8	Traceability certificate
	U2	Non-SI unit conformance

Note 2 Digital output (DE protocol) can not be combined with an External zero adjustment function.
16 When the fill fluid is for oxygen or chroline service, there is no need to select.
17 The carbon steel for meterbody cover material is not available for this option.
18 "Lower limit of output at abnormal condition" - code D must be selected for options 1 "V", Burnout feature.
19 Available only for material of wetted part.
20 When order-entry, designed pressure and designed temperature are required.
21 When ordering, resistant pressure and gas-tightness test pressure are required.
22 Steam block is not available for model JTD921/931/961.
23 When this transmitter connected with NW35, NWS300, this option must be selected.
33 Specify design pressure and design temperature.
34 Specify required test pressures (up to the max. working pressure).

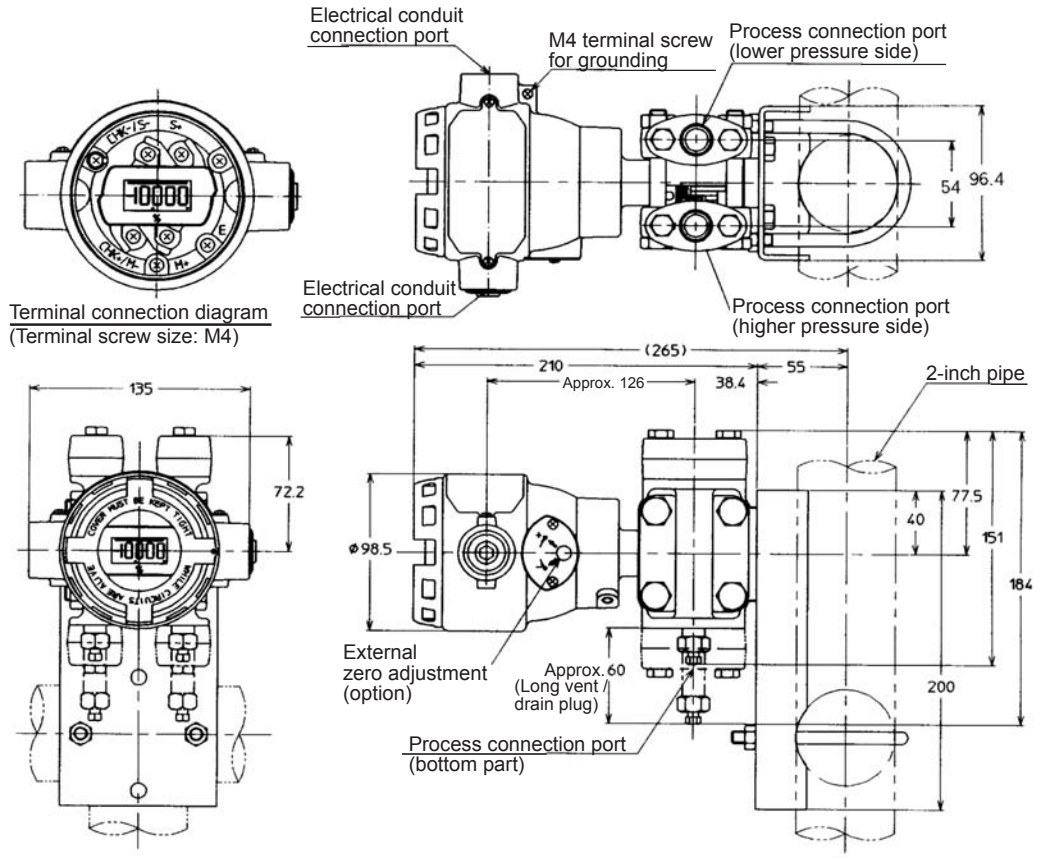
DIMENSIONS

Model JTD910A / JTD960A

[Unit: mm]

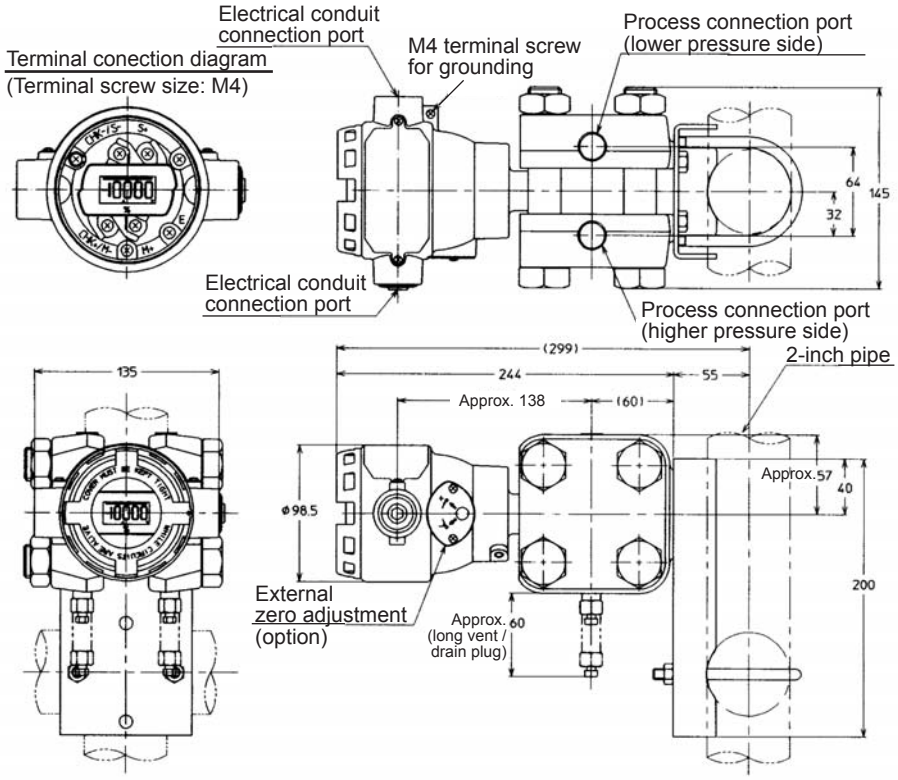


Model JTD920A / JTD930A

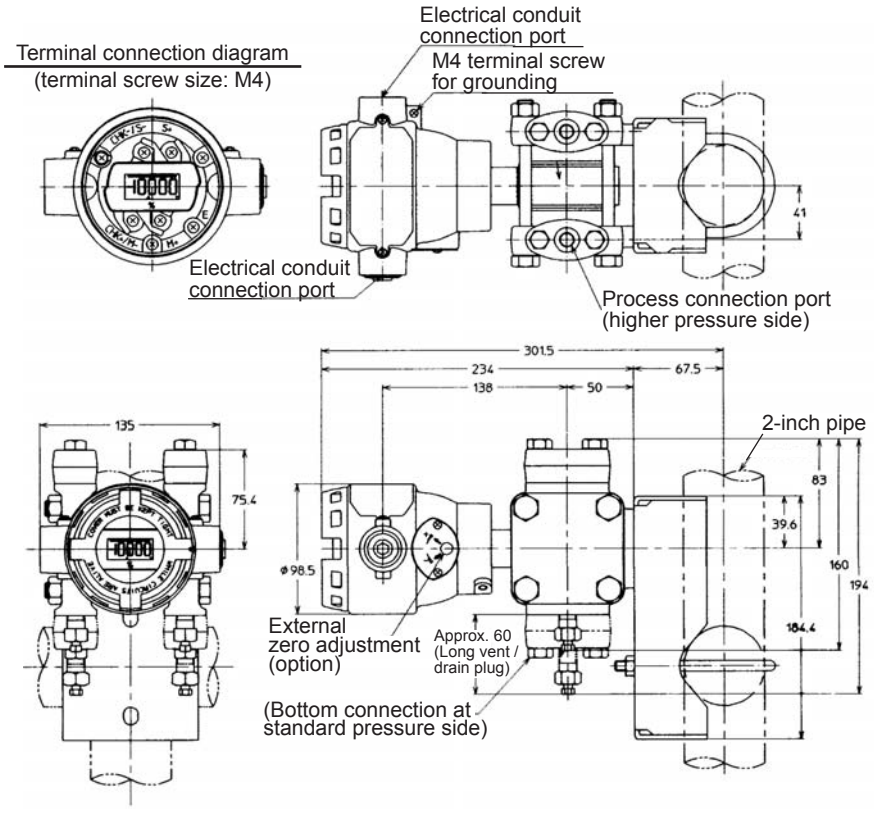


Model JTD921A / JTD931A / JTD961A

[Unit: mm]



Model JTD920A (Wetted parts material: Tantalum)



Note

YAMATAKE

Savemation

Saving through Automation

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