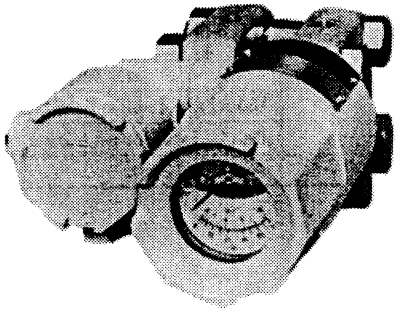
YAMATAKE **Specification**

ST 3000 Smart Transmitter
Electronic Differential Pressure Transmitter
Model JTD236 (High Static Pressure Type For High Differential Pressure)
Measuring Span : 0.5 to 14kgf/cm²

Introduction

The ST 3000 Differential Pressure Transmitter measures a differential pressure and transmits an analog 4 to 20mA DC output or digital output proportional to the measured variable. The transmitter is a microprocessor-based instrument, whose paraments and setting (range, damping time constant, linear or square-root output, constant-current output, and others) can be remote-controlled from the instrument room via the SFC (Smart-Field Communicator). High static pressure type meter body enables application for static pressure of up to 420 kgf/cm².



Standard Specifications

Item	Specifications
Measuring Span (Continuously adjustable)	0.5 to 14 kgf/cm²
Setting Range	$-1 \leqq$ URV(*1) $\leqq$ 14 kgf/cm², $-1 \leqq$ LRV(*2) $\leqq$ 14 kgf/cm²
Output	Analog output (4 to 20mA DC)/Digital output
Accuracy(*3)	Percentage with respect to x (kgf/cm²) that represents the URV or LRV of the calibrated range, or the span—whichever is greatest Linear output: ±0.1% . . . . . When x is 2.1 kgf/cm² or greater $\pm[0.05 + 0.05 \times \frac{2.1}{x})]$ % . . . . . When x is less than 2.1 kgf/cm². (With damping effected) Square-root output: When output is 7.1 to 50% . . . . . Same as that of linear output When output is less than 7.1% . . . Value of linear output $\times \frac{50}{\text{Linear output \%}}$ When output is less than 10% . . . Dropout
Supply Voltage and Load Resistance	DC 10.8 to 45V (See Figure 3.)
Working Pressure Rating	420 kgf/cm² max. (For vacuum pressure, see Figure 4.)
Operating Temperature Range	Ambient temperature: Normal operating conditions; —40 to +85°C Operative limits (for short period); —50 to +93°C Transportation and storage conditions; —50 to +85°C Meter body (process fluid) temperature: Normal operating conditions; —40 to +110°C Operative limits (for short period); —50 to +125°C
Operating Humidity Range	Normal operating conditions: 10 to 90% RH
Temperature Effect(*3, *4) (Shift with respect to setting range)	Percentage with respect to x (kgf/cm²) that represents the URV or LRV of the setting range, or the span—whichever is greatest. Zero shift: $\pm[0.25 + (0.1 \times \frac{2.1}{x})]$ %/55°C change Combined shift (including zero and span shifts): ±0.5%/55°C change . . . . When x is 2.1 kgf/cm² or greater. $\pm[0.35 + (0.15 \times \frac{2.1}{x})]$ %/55°C change . . . . When x is less than 2.1 kgf/cm².

(*1) : URV denotes the value for 100% (20mADC) output.
(*2) : LRV denotes the value for 0% (4mADC) output.
(*3) : Within a range of URV $\geqq$ 0 and LRV $\geqq$ 0.
(*4) : Refer to the temperature effect diagram (Figure 3).
(*5) : Refer to the static pressure effect diagram (Figure 4).

Item	Specifications
Static Pressure Effect (*3, *5) (at 25°C) (Shift with respect to setting range)	Percentage with respect to x (kgf/cm²) that represents the URV or LRV of the setting range, or the span—whichever is greatest (P: Static pressure value) Zero shift: $\pm[0.03 + (0.07 \times \frac{P}{70}) \times \frac{7}{x}]$ % Combined shift (Including zero and span shifts): $\pm[0.03 + (0.2 \times \frac{P}{70})]$ % . . . . . When x is 7 kgf/cm² or greater. $\pm[0.03 + (0.2 \times \frac{P}{70}) \times \frac{7}{x}]$ % . . . . . When x is less than 7 kgf/cm².
Stability Against Supply Voltage Change	0.005%FS/V
Dead Time	Approx. 0.4 sec.
Damping Time Constant	Adjustable within a range of 0.4 to 32 sec. by 10 steps. (at 25°C)
Process Connection	Rc¼, ¼NPT internal thread
Electric Conduit Connection	G½ internal thread
Structure	Waterproof and dustproof structure: JIS C0920 Watertight, JIS F8001 Class 2 Watertight, NEMA 3 and 4X, IEC IP67
Materials	Center body: SUS316 Wetted parts of center body: SUS316 (Diaphragm: SUS316L) Meter body cover (Differential pressure chambers): Carbon steel (SF45A), SUSF316 Bolts: SNB7 Nuts: S45C Gasket: Teflon Transmitter case: Aluminum alloy
Finish	Baked acryl paint, light beige (Munsell 4Y7.2/1.3)
Installation	Can be installed on a 2-inch horizontal or vertical pipe. (Can be directly mounted on a process pipe.)
Weight	Approx. 12kg

Selectable Standard Specifications

(The items other than the following are identical with those of the Standard Specifications.)

Item		Specifications
Fill Fluid	**For oxygen service (Meter body cover: SUSF316 Including no oil finish of wetted parts)**	Ambient temperature: Normal operating conditions; −10 to +75°C Operative limits (For short period); −40 to +80°C Transportation and storage conditions; −50 to +85°C Meter body (Process fluid) temperature: Normal operating conditions; −10 to +75°C Operative limits (For short period); −40 to +80°C Note) For use on vacuum pressures, please consult us.

Optional Specifications

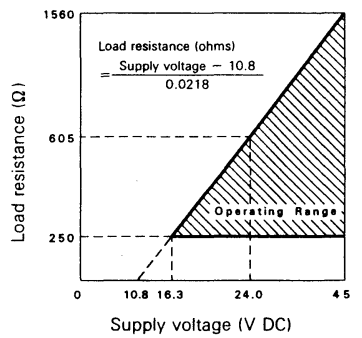
(The items other than the following are identical with those of the Standard Specifications.)

Item	Specifications
Built-in Indicating Meter (Class 2.5)	Ambient temperature: Normal operating conditions; −10 to +60°C Operative limits (For short period) and Transportation and storage conditions; −40 to +85°C
SUS304 Bolts and Nuts	Pressure rating: 230 kgf/cm² max.
Corrosion-resistant Finish	Corrosion-resistant paint (Baked acryl paint), fungus-proof finish. (Silver paint when meter body cover, adaptor flanges, bolts, nuts, and manifold valves are made of carbon steel)
Corrosion-proof Finish	Corrosion-proof paint (Baked epoxy paint), fungus-proof finish. (Silver paint when meter body cover, adaptor flanges, bolts, nuts, and manifold valves are made of carbon steel)
Corrosion-resistant Finish (Silver Paint)	Transmitter case is silver-painted in addition to the above corrosion-resistant finish.
Flameproof-packing-type Cable Connecting Adaptor	For electrical connection by the leading-in method of flame-proof packing type for special flame-proof structure.
Explosion-proof structure	JIS C0903 ds2G4 special flame-proof structue (Ambient temperature: −10 to +70°C, Meter body (Process fluid) temperature: −10 to +100°C) JIS C0903 i3aG4 intrinsic-safety explosion-proof structure, using Zener barrier 8907/51 −24/45 (Approval No. 29911) (Ambient temperature: −10 to +60°C, Meter body (Process fluid) temperature: −10 to +100°C) FM flame-proof structure Explosion-proof Class I (Gas, steam), Division 1, Group B,C,D Dust-ignition Class II (Inflammable dust), Division 1, Group E,F,G Suitable Class III (Inflammable fiber), Division 1 FM intrinsic-safety explosion-proof structure Intrinsically safe Class I, II, III, Division 1, Group A,B,C,D,E,F,G Nonincendive (for Class 2 location) Class I, Division 2, Group A,B,C,D

Model Number Table

Basic Model Number	Selection I: Material	Selection I: Fill Fluid	Selection I: Process Connection	Selection II	Options I	Options II	Description
JTD 236							Measuring span: 0.5 to 14 kgf/cm²
	−A						Meter body cover: Carbon steel; Vent/drain plugs: SUS316; Wetted parts of center body: SUS316 (Diaphragm: SUS316L)
	−E						Meter body cover: SUSF316; Vent/drain plugs: SUS316; Wetted parts of center body: SUS316 (Diaphragm: SUS316L)
		1					Regular type (Silicone oil)
		2					For oxygen (Fluorine oil) service
			S				Rc¼ Top or bottom connection
			T				¼NPT internal thread Top or bottom connection
				−00000			No selection
					−X		No option
					−L		Built-in lightning arrester
					−M		Built-in indicating meter (0 to 100% linear and 0 to 10 √ double scales)
					−W		SUS304 bolts and nuts material
					−A		Corrosion-resistant finish
					−B		Corrosion-proof finish
					−D		Corrosion-resistant finish, silver paint
					−N		½ NPT internal thread electrical conduit connection
					−K		No oil finish
					−P		One cable adaptor with flame-proof packing
					−Q		Two cable adaptors with flame-proof packing
					−R		Specification for power plant application
					−J		Long vent/drain plugs
					−1		JIS special flame-proof structure
					−2		JIS intrinsic-safety explosion-proof structure
					−3		FM flame-proof structure
					−4		FM intrinsic-safety explosion-proof structure
					−9		Vertical pressure-conduit connection, right-side electrical-connection type.
						−XX	No options
						−A2	With external zero adjustment (Unavailable combination with FM explosion-proof structure)
						−A5	Burnout feature (Upper limit of output value at abnormal condition)
						−D1	With DE meter

Note:
The items enclosed in the bold-line boxes are for Standard Specifications.



Note: For communication with SFC, a load resistance of 250 ohms or more is needed.

Fig. 1 Supply voltage vs load resistance characteristics

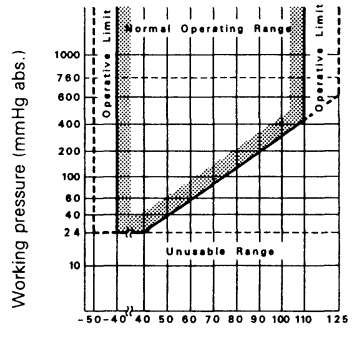


Fig. 2 Working pressure and temperature of wetted parts section

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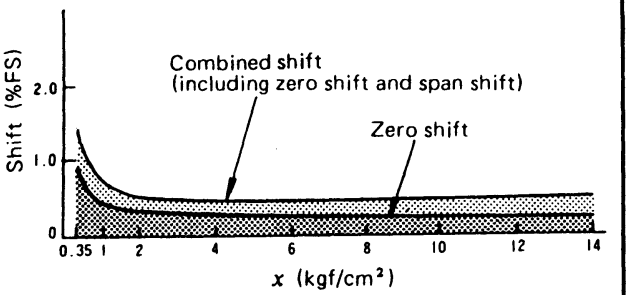


Fig. 3 Range and Temperature Effect (55°C Change)

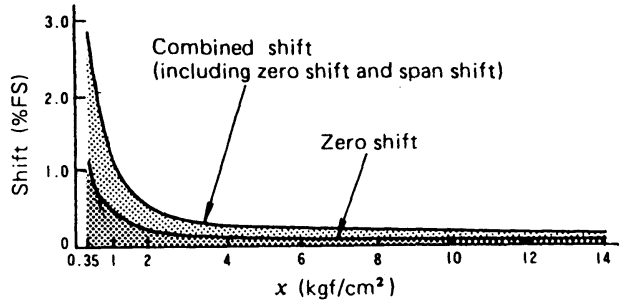
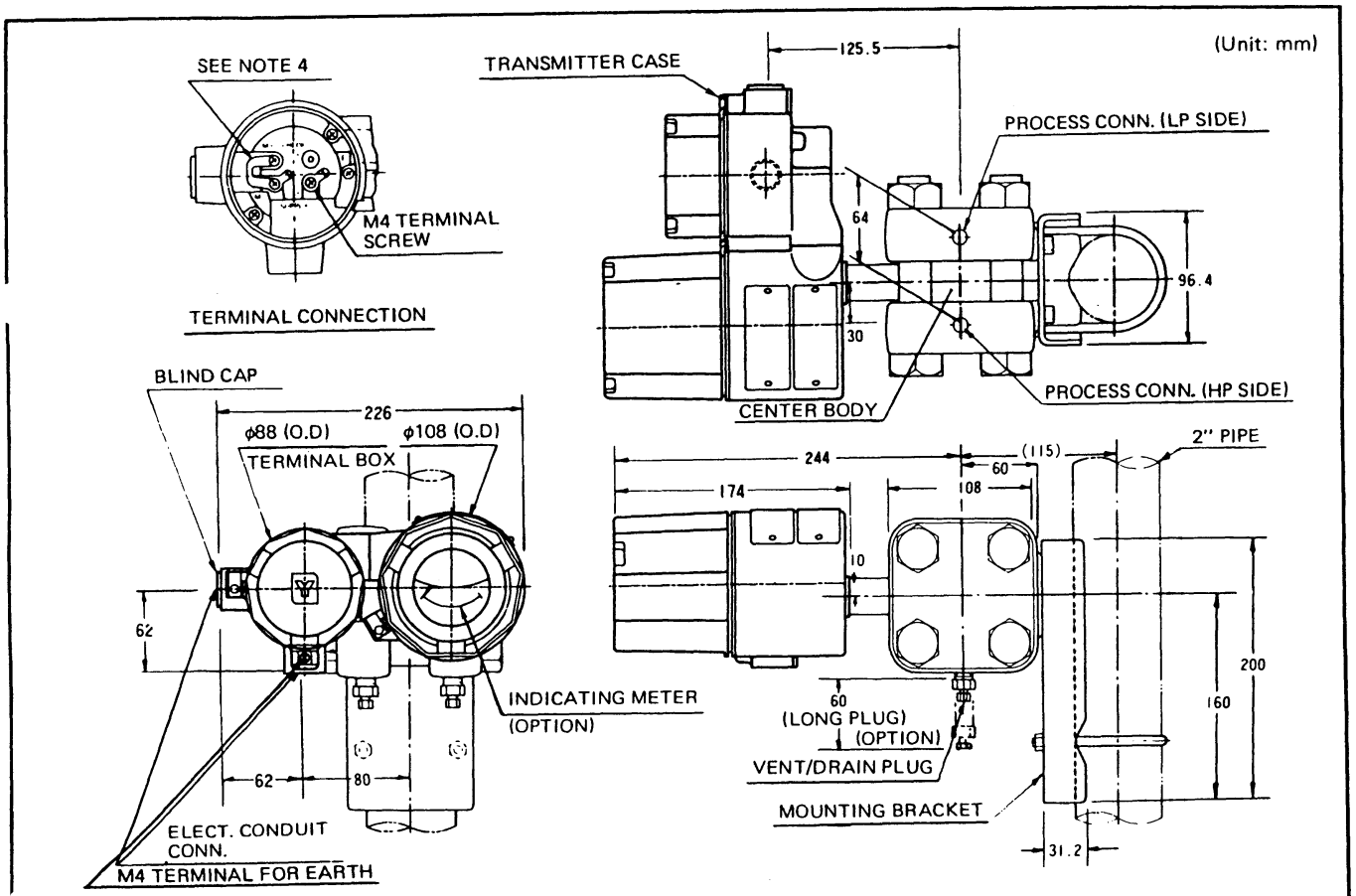


Fig. 4 Range and Static Pressure Effect (70 kgf/cm² Change)



Note: 1) The process connection can be made in any of two positions of top or bottom.
When connection is changed, replace the vent/drain plug.
2) This transmitter can be mounted in various ways using the holes of the mounting bracket.
(The above drawing shows an example of typical mounting.)
3) Mount the transmitter vertically.
4) To use an external indicating meter, disconnect the jumper bar from the M terminals and connect in its place the lead-wires of the external indicating meter.
5) Process connections (including the H and L marks) are inverted when: Suppression amount $> \frac{\text{Adjustable span}}{2}$
Be sure to check the locations of the H and L marks before installation.

Fig. 5 Dimension Drawing

Specifications are subject to change without notice.

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Saving through Automation

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