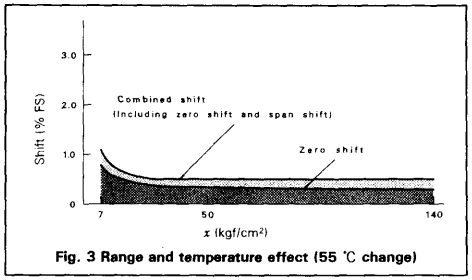


Fig. 3 Range and temperature effect (55 °C change)

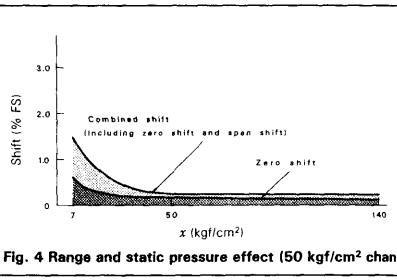
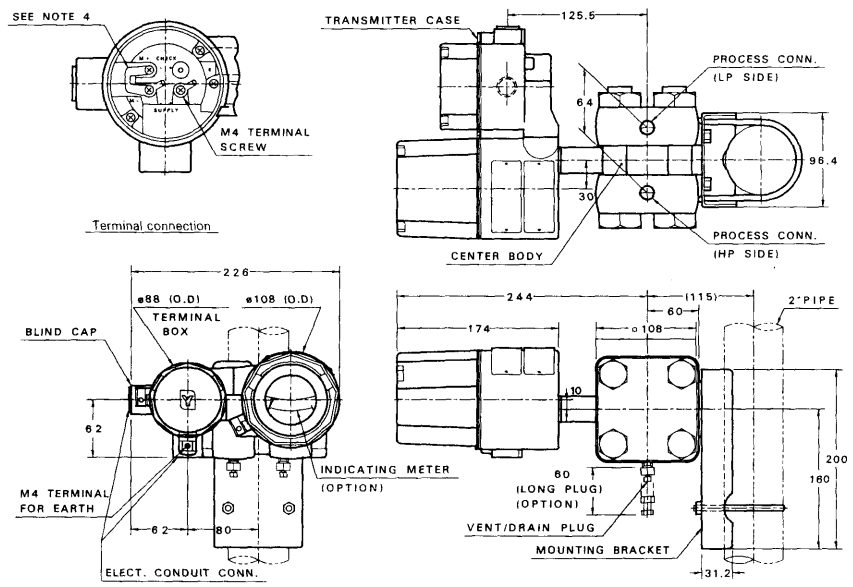


Fig. 4 Range and static pressure effect (50 kgf/cm² change)

(Unit: mm)



Notes: 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 leadwires of the external indicating meter.
5) For process connection, it means:
a) High pressure (H) side ..... relatively higher pressure applied to sensor.
b) Low pressure (L) side ..... relatively lower pressure applied to sensor.
Therefore, if suppression amount > (adjustable span)/2, actual "H" and "L" sides become reversal to those indicated.

Fig. 5 Dimension drawing

*Specifications are subject to change without notice.

Yamatake-Honeywell **Specification**

ST 3000 Smart Transmitter
Electronic Differential Pressure Transmitter

Model JTF226 (Flange Type for Open and Closed Tank Lead Pipe Gas Sealing)
Model JTF228 (Flange Type for Closed Tank Lead Pipe Liquid Sealing)
Measuring Span: 250 to 10000mmH$_2$O

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 parameters and settings (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 Communicator). The Flange Type Differential Pressure Transmitter is installed on the side of an open or closed tank to detect the top level, boundary level, or the specific-gravity of the liquid in the tank.

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Standard Specifications

Item	Specifications
Measuring span (Continuously adjustable)	250 to 10000mmH$_2$O
Setting range	$-10000 \leqq URV^{(*1)} \leqq 10000mmH_2O$, $-10000 \leqq URV^{(*2)} \leqq 10000mmH_2O$
Output	Analog output (4 to 20mA DC) / Digital output
Accuracy(*3)	Percentage with respect to x (mmH$_2$O) that represents the URV or LRV of the calibrated range, or the span – whichever is greatest. Linear output: ±0.1% ..... When x is 1250mmH$_2$O or greater. $\pm[0.05+(0.05\times\frac{1250}{x})]\%$ ..... When x is less than 1250mmH$_2$O. (with damping effected)
Supply voltage and load resistance	10.8 to 45V DC (See Figure 1.)
Working pressure rating	Up to flange pressure rating (For vacuum pressures, see Figure 2.)
Operating temperature range	Ambient temperature: Normal operating conditions; −30 to + 75°C Operative limits (for short period); −50 to + 80°C Transportation and storage conditions; −50 to + 85°C Meter body (Process fluid) temperature: Normal operation 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 (mmH$_2$O) that represents the URV or LRV of the setting range, or the span – whichever is greatest. Zero shift: $\pm[0.25+(0.1\times\frac{1250}{x})]\%$/55°C change Combined shift (Including zero and span shifts): ±0.5%/55°C change ..... When x is 1250mmH$_2$O or greater. $\pm[0.35+(0.15\times\frac{1250}{x})]\%$/55°C change ..... When x is less than 1250mmH$_2$O.

(*1): URV denotes the value for 100% (20mA DC) output.
(*2): LRV denotes the value for 0% (4mA DC) output.
(*3): Within a range of URV≧0 and LRV≧0 for JTF226.
Within a range of URV≦0 and LRV≦0 for JTF228.
(*4): Refer to the temperature effect diagram (Figure 3).
(*5): For the performance and external dimensions of corrosion-resistant type, refer to the specification sheet for corrosion-resistant application.

Item	Specifications
Static pressure effect[*3] (at 25°C) (Shift with respect to setting range)	Percentage with respect to x (mmH_2O) that represents the URV or LRV of the setting range, or the span – whichever is greatest (P: Static pressure value) Zero shift: $\pm[0.03+(0.07\times\frac{P}{70})\times\frac{2500}{x}]\%$ Combined shift (Including zero and span shifts) $\pm[0.03+(0.2\times\frac{P}{70})]\%$ ..... When x is 2500mmH_2O or greater. $\pm[0.03+(0.2\times\frac{P}{70})\times\frac{2500}{x}]\%$ ..... When x is less than 2500mmH_2O.
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	Measured pressure (Liquid level) side: Flange: Flush diaphragm type — JIS 10K, 30K – 80mm (RF) equivalent; ANSI 150, 300 – 3" (RF) equivalent; JPI 150, 300 – 3" (RF) equivalent Flange: Extended Diaphragm type — JIS 10K, 30K – 100mm (RF) equivalent; ANSI 150, 300 – 4" (RF) equivalent; JPI 150, 300 – 4" (RF) equivalent Reference pressure side: Rc½, ½NPT internal thread, Rc¼, ¼NPT internal thread
Electric conduit connection	G½ internal thread
Structure	Water-proof and dust-proof structure JIS C0920 water-tight, JIS F8001 Class2 water-tight, NEMA 3 and 4X, IEC IP67
Materials	Center body: SUS316 Wetted parts of flange side and those of center body: SUS316 (Diaphragm: SUS316L) Meter body cover: Reference (Low pressure) side; Carbon steel (SF45A), SUSF316 Measuring (High pressure) side; Carbon steel (SF45A), SUSF304 Flange: Carbon steel (SF45A), SUS304 Gasket: Teflon Transmitter case: Aluminium alloy
Finish	Baked acryl paint, light beige (Munsell 4Y7.2/1.3)
Burnout feature	Lower limit of output value at abnormal condition.
Installation	Direct mount on process flange.
Weight	Approx. 12.5kg (with JIS 10K – 80mm flange)

Selectable Standard Specifications

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

Item		Specifications
Material	When model number of meter body material is B or F.	Flush diaphragm
Fill fluid	For oxygen or chlorine service Meter body cover: Other than carbon steel. For chlorine service, H and P only are available as model numbers for meter body material. (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

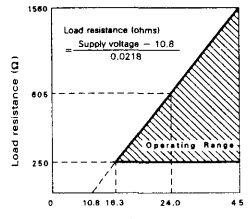
(The items other than the following are identical with those of the Standard Specifications.)

Item	Specifications
Built-in indicating meter (Class 2.5)	Ambient temperature: Normal operating conditions; – 10 to + 60°C Operative limits (for short period) ; – 40 to + 80°C Transportation and storage conditions; – 40 to + 85°C
SUS304 bolts and nuts	Pressure rating: 70kgf/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 flange 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 flange are made of carbon steel)
Corrosion-resistant finish (Silver paint)	Transmitter case is silver-painted in addition to the above corrosion-resistant finish.
Flame-proof packing type cable connecting adaptor	For electrical connection by the leading-in method of flame-proof packing type for special flame-proof structure.
Teflon covered diaphragm	For flange rating model [A] Meterbody (Pressure fluid) temperature: – 15 to + 110°C
Explosion-proof structure	JIS C0903 ds2G4 special flame-proof structure (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
No oil finish	Excluding meter body cover made of carbon steel

Model Number Table

Basic Model Number	Meter body: Material	Meter body: Fill Fluid	Meter body: Process Connection	Flange: Standard	Flange: Type and Rating	Flange: Flange Material	Flange: Finish of Gasket Face	Flange: Length of Extended Parts	Options Ⅰ	Options Ⅱ	Description
JTF226											Measuring span: 250 to 10000 mmH_2O
JTF228											Measuring span: 250 to 10000 mmH_2O
	– A										Reference pressure side meter body cover: Vent drain plugs: Wetted parts of flange side and those of center body
											SF45A: SUS316: SUS316 (Diaphragm: SUS316L)
	– B										SF45A: SUS316: Hastelloy C
	– D										SF45A: SUS316: Tantalum
	– E										SUSF316: SUS316: SUS316 (Diaphragm: SUS316L)
	– F										SUSF316: SUS316: Hastelloy C
	– H										SUSF316: SUS316: Tantalum
		1									Regular type (Silicon oil)
		2									For oxygen (Fluorine oil) service
		5									For chlorine (Fluorine oil) service
			Q								Rc½ Top or bottom connection
			R								½NPT internal thread Top or bottom connection
			S								Rc¼ Top or bottom connection
			T								¼NPT internal thread Top or bottom connection
				J							JIS Flange
				A							ANSI Flange
				P							JPI Flange
					A						Flush diaphragm type 10K – 80 mm/150 – 3" (RF) equivalent
					B						Flush diaphragm type 30K – 80 mm/300 – 3" (RF) equivalent
					C						Extended diaphragm type 10K – 100 mm/150 – 4" (RF) equivalent
					D						Extended diaphragm type 30K – 100 mm/300 – 4" (RF) equivalent
						1					Carbon steel
						7					SUS304
							J				Standard
								00			Flush diaphragm
								05			L = 50 mm (Extended diaphragm)
								10			L = 100 mm (Extended diaphragm)
								15			L = 150 mm (Extended diaphragm)
									– X		No option
									– L		Built-in lightning arrester
									– M		Built-in indicating meter (0 to 100% linear scale)
									– W		SUS304 bolts and nuts
									– A		Corrosion-resistant finish
									– B		Corrosion-proof finish
									– D		Corrosion-resistant finish, silver paint
									– N		½NPT internal-thread electrical conduit connection
									– T		Teflon covered diaphragm
									– K		No oil finish
									– P		One cable adaptor with flame-proof packing
									– Q		Two cable adaptors with flame-proof packing
									– R		Specifications for power plant application
									– 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-conduit connection type
										– XX	No options
										– A1	Adaptor flange for corrosion-resistant application
										– 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

Notes:
(1) The items enclosed in the bold-line boxes are for Standard Specifications.
(2) ●Material of meter body cover of high pressure side depends on model number of flange material as follows:
Flange "1" Cover... Carbon steel (SF45A) Flange "7" Cover ... SUSF304
For JTF226, make lower the pressure of the reference pressure side than that of the measured pressure side (flange side).
●For JTF228, make higher the pressure of the reference pressure side than that of the measured pressure side (flange side).



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

Fig. 1 Supply voltage vs load resistance characteristics

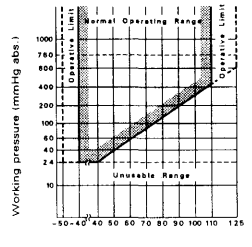


Fig. 2 Working pressure and temperature of wetted parts section

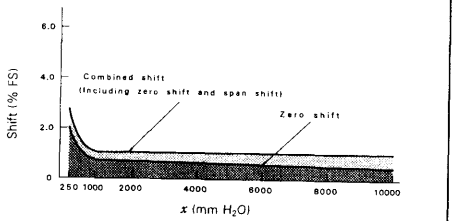
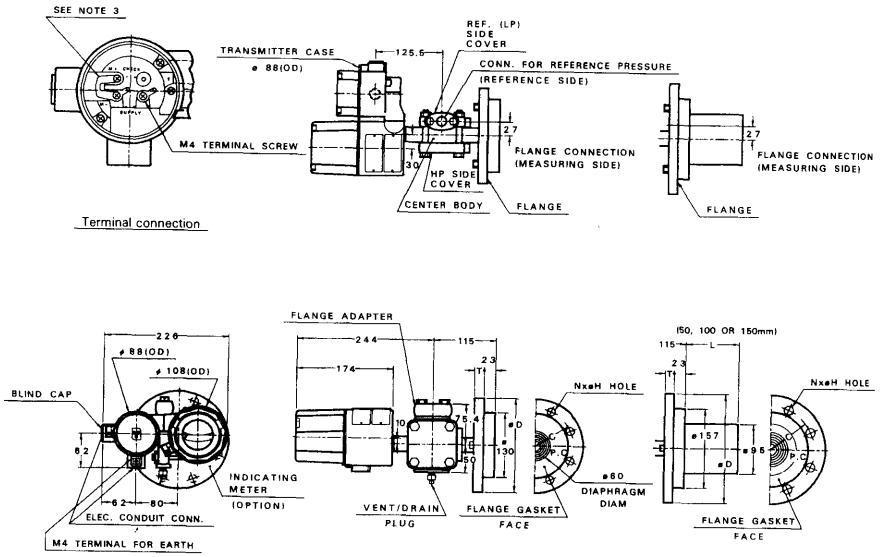


Fig. 3 Range and temperature effect (55 °C change)

(Unit: mm)



Flange Dimensions

Flange Rating	D	T	C	N	H
JIS 10K – 80mm	185	18	150	8	19
JIS 30K – 80mm	210	28	170	8	23
ANSI 150 – 3"	191	24	152.4	4	20
ANSI 300 – 3"	210	29	168.3	8	23
JPI 150 – 3"	191	24	152.4	4	20
JPI 300 – 3"	210	29	168.3	8	23
JIS 10K – 100mm	210	18	175	8	19
JIS 30K – 100mm	240	32	195	8	25
ANSI 150 – 4"	229	24	190.5	8	20
ANSI 300 – 4"	254	32	200	8	23
JPI 150 – 4"	229	24	190.5	8	20
JPI 300 – 4"	254	32	200	8	23

Notes: 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) Mount the transmitter vertically.
3) To use an external indicating meter, disconnect the jumper bar from the M terminals and connect in its place the leadwires of the external indicating meter.

Fig. 4 Dimension drawing

*Specifications are subject to change without notice.

Yamatake-Honeywell **Specification**

ST 3000 Smart Transmitter
Electronic Differential Pressure Transmitter

Model JTF229 (Flange Type for Open Tank and Closed Tank with Lead-in Tube for Sealed Liquid)
Measuring Span: 250 to 10000mmH_2O
(Measuring Range: −10000 to +10000mmH_2O)

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 model JTF229 provides those transmitters model JTF226 (for open tank and closed tank with lead-in tube for sealed gas) and model JTF228 (for closed tank with lead-in tube for sealed liquid). The transmitter is a microprocessor-based instrument, whose parameters and settings (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 Communicator). The flange-type differential pressure transmitter mounted on the side of an open or enclosed tank, detects the liquid level, boundary level, or specific gravity in the tank.

5

Standard Specifications

Item	Specifications
Measuring span (Continuously adjustable)	250 to 10000mmH_2O
Setting range	$-10000 \leqq URV^{(*1)} \leqq 10000mmH_2O$, $-10000 \leqq LRV^{(*2)} \leqq 10000mmH_2O$
Output	Analog output (4 to 20mA DC) / Digital output
Accuracy	*Percentage with respect to x (mmH_2O) that represents the URV or LRV of the calibrated range, or the span – whichever is greatest.* ±0.2% ..... When x is 1250mmH_2O or greater. $\pm[0.05+(0.15\times\frac{1250}{x})]$% ..... When x is less than 1250mmH_2O. (with damping affected)
Supply voltage and load resistance	10.8 to 45V DC (See Figure 1.)
Working pressure rating	Up to flange pressure rating (For vacuum pressures, see Figure 2.)
Operating temperature range	Ambient temperature: Normal operating conditions; −30 to + 75°C Operative limits (for short period); −50 to + 85°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) (Shift with respect to setting range)	Percentage with respect to x (mmH_2O) that represents the URV or LRV of the setting range, or the span – whichever is greatest. Zero shift: $\pm[0.25+(0.35\times\frac{1250}{x})]$/55°C change Combined shift (Including zero and span shifts): ±0.8%/55°C change ..... When x is 1250mmH_2O or greater. $\pm[0.35+(0.45\times\frac{1250}{x})]$%/55°C change ..... When x is less than 1250mmH_2O.
Static pressure effect (at 25°C) (Shift with respect to setting range)	Percentage with respect to x (mmH_2O) that represents the URV or LRV of the setting range, or the span – whichever is greatest (P: Static pressure value) Zero shift: $\pm[0.03\pm(0.28\times\frac{P}{70})\times\frac{2500}{x}]$% Combined shift (Including zero and span shifts) $\pm[0.03+(0.6\times\frac{P}{70})]$% ..... When x is 2500mmH_2O or greater. $\pm[0.03+(0.6\times\frac{P}{70})\times\frac{2500}{x}]$% ..... When x is less than 2500mmH_2O.

(*1): URV denotes the value for 100% (20mA DC) output.
(*2): LRV denotes the value for 0% (4mA DC) output.
(*3): Refer to the temperature effect diagram (Figure 3).
(*4): For the performance and external dimensions of corrosion-resistant type, refer to the specification sheet for corrosion-resistant application.