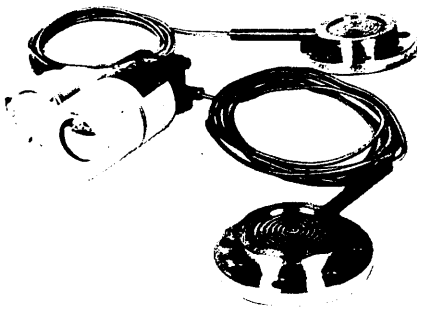
Yamatake-Honeywell **Specification**

ST 3000 Smart Transmitter
Electronic Differential Pressure Transmitter

Model JTR235 (Remote-Sealed Type for High Differential Pressure with Temperature Compensation for Enclosed Fluid in Capillary Tube) Measuring Span: 0.35 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 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). Remote-sealed type differential pressure transmitters also are suited for measurement of differential pressures (flow rate, liquid level, etc.) of process fluids with high corrosion, high density, condensation, metal sludge, etc.



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Standard Specifications

Item	Specifications
Measuring span (Continuously adjustable)	0.35 to 14kgf/cm² (Recommended measuring span: 0.5 to 14kgf/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. ±0.2% ..... When x is 2.1 kgf/cm² or greater. $\pm[0.15+(0.05\times\frac{2.1}{x})]\%$ ..... When x is less than 2.1 kgf/cm². (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 pressure, 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 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: $\pm[0.25+(0.25\times\frac{2.1}{x})]\%/55°C$ change Combined shift (Including zero and span shifts): ±1.3%/55°C change ..... When x is 2.1 kgf/cm² or greater. $\pm[1.0+(0.3\times\frac{2.1}{x})]\%/55°C$ change ..... When x is less than 2.1 kgf/cm².

(*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.
(*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 (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: $\pm[0.03+(0.07\times\frac{P}{70}+0.1\times\frac{P}{70})\times\frac{7}{x}]\%$ Combined shift (Including zero and span shifts): $\pm[0.03+(0.2\times\frac{P}{70}+0.15\times\frac{P}{70})]\%$ ..... When x is 7 kgf/cm² or greater. $\pm[0.03+(0.2\times\frac{P}{70}+0.15\times\frac{P}{70})\times\frac{7}{x}]\%$ ..... 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 0.6 to 32 sec. by 10 steps. (at 25°C)
Process connection	Flange (Both high and low pressure sides) Flush diaphragm type; JIS10K, 30K – 80mm (RF) equivalent ANSI150, 300 – 3″ (RF) equivalent JPI150,300 – 3″ (RF) equivalent Extended diaphragm type; JIS10K, 30K – 100mm (RF) equivalent ANSI150, 300 – 4″ (RF) equivalent JPI150, 300 – 4″ (RF) equivalent
Electrical conduit connection	G½ internal thread
Structure	Water-proof and dust-proof structure: JIS C0920 water-tight, JIS F8001 Class 2 water-tight, NEMA 3 and 4X, IEC IP67
Materials	Center body: SUS316 Meter body cover: SUSF304 Bolts: SNB7 Flange: Carbon steel (SF45A), SUS304 Wetted parts: SUS316 (Diaphragm: SUS316L) Capillary tube: SUS316 Armored tube: SUS304 Transmitter case: Aluminium alloy
Finish	Baked acryl paint, light beige (Munsell 4Y 7.2/1.3)
Burnout feature	Lower limit of output value at abnormal condition
Installation	Direct mounting on a process flange (Transmitter body is mounted on a 2-inch horizontal or vertical pipe)
Length of capillary tube	2, 3, or 5-meters (Specific gravity of the fill fluid is 0.935 at 25°C.)
Weight	Approx. 20.5kg (with JIS10K – 80mm flange and 5-meter capillary tube)

Selectable Standard Specifications

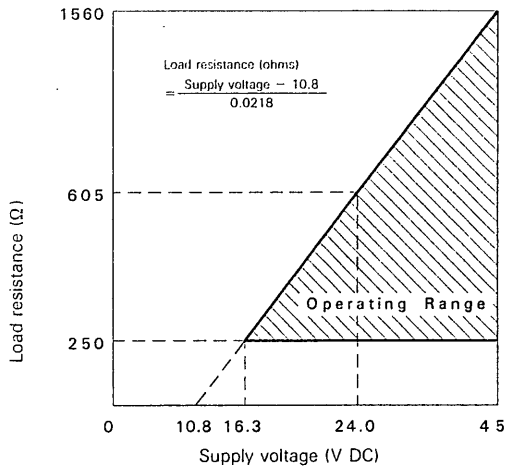
(The items other than the following are identical with those of the Standard Specifications.)

Item		Specifications
Fill fluid	For oxygen and chlorine service (Wetted parts section for chlorine service: Tantalum Including no oil finish of wetted parts.)	Fill-fluid specific gravity: 1.870 (at 25°C) Ambient temperature: Normal operating conditions; −10 to +75°C Operative limits (for short period); −40 to +80°C Transportation and storage conditions; −55 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.
Material of wetted parts	Tantalum	Flush diaphragm only
	Hastelloy C	Flush diaphragm only

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
Corrosion-resistant finish	Corrosion-resistant paint (Baked acryl paint), fungus-proof finish. (Silver paint when bolts and flanges are made of carbon steel.)
Corrosion-proof finish	Corrosion-proof paint (Baked epoxy paint), fungus-proof finish. (Silver paint when bolts and flanges are made of carbon steel.)
Corrosion-resistant finish (Silver paint)	Transmitter case is silver-painted in addition to the above corrosion-resistant finish.
Teflon covered diaphragm	For both flange rating model [A] and wetted parts material model [2]. Meterbody (Process fluid) temperature: −15 to +110°C
Flame-proof packing type	For electrical connection by the leading-in method of flame-proof packing type for special cable connecting adaptor flame-proof structure.
Explosion-proof structure	JIS C0903 ds2G4 special flame-proof structure (Ambient temperature: −10 to +70°C, Meter body (Process fluid) temperature: −10 to +110°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 +110°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.



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

Fig.1 Supply voltage vs load resistance characteristics

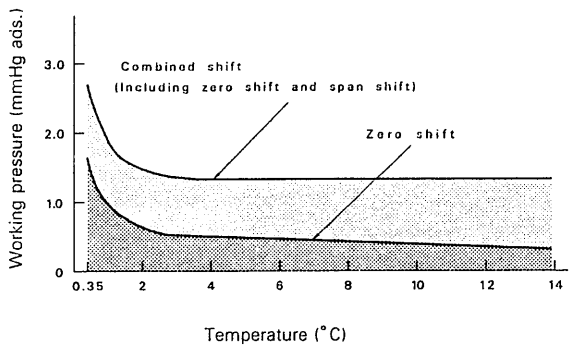


Fig.2 Working pressure and temperature of wetted parts (for hi-temp.)

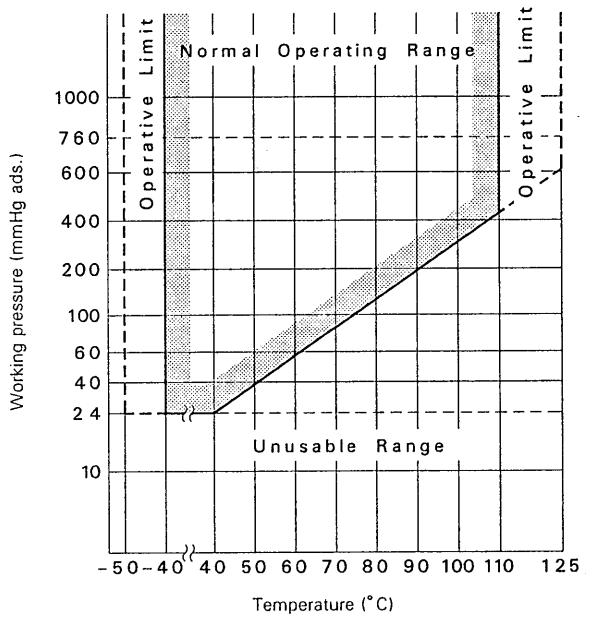
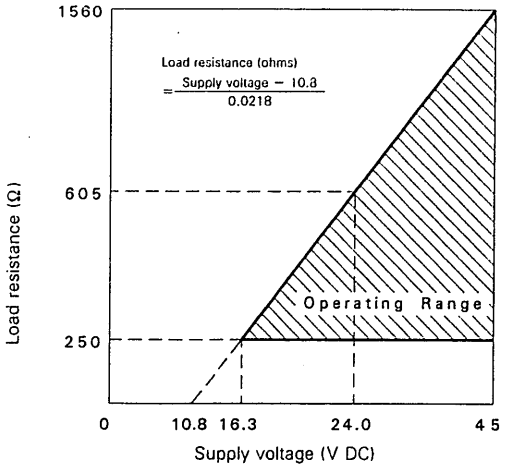


Fig.3 Working pressure and temperature, of wetted parts (for hi-temp. -vacuum)

Model Number Table

Basic Model Number	Fill Fluid	Flange: Standard	Flange: Type and Rating	Flange: Flange Material	Flange: Material of Wetted Parts	Flange: Finish of Gasket Face	Flange: Length of Extended Parts	Flange: Capillary Tube Length	Options I	Options II	Description
JTR235											Measuring span: 0.35 to 14 kgf/cm²
	−1										Regular type (Silicone oil)
	−2										For oxygen (Fluorine oil) service
	−5										For chlorine (Fluorine oil) service
		J									JIS flange
		A									ANSI flange
		P									JPI Flange
			A								Flush diaphragm type 10K – 80mm/150 – 3″ (RF) equivalent
			B								Flush diaphragm type 30K – 80mm/300 – 3″ (RF) equivalent
			C								Extended diaphragm type 10K – 100mm/150 – 4″ (RF) equivalent
			D								Extended diaphragm type 30K – 100mm/300 – 4″ (RF) equivalent
				1							Carbon steel (SF45A)
				7							SUS304
					2						SUS316 (Diaphragm: SUS316L)
					4						Tantalum (Flush diaphragm type)
					9						Hastelloy C (Flush diaphragm type)
						J					Standard
							00				Flush diaphragm
							05				L = 50mm (Extended diaphragm)
							10				L = 100mm (Extended diaphragm)
							15				L = 150mm (Extended diaphragm)
								2			ℓ = 2m
								3			ℓ = 3m
								5			ℓ = 5m
									−X		No option
									−L		Built-in lightning arrester
									−M		Built-in indicating meter (0 to 100% linear and 0 to 10 $\sqrt{\ }$ double scales)
									−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		Specification 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
										−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

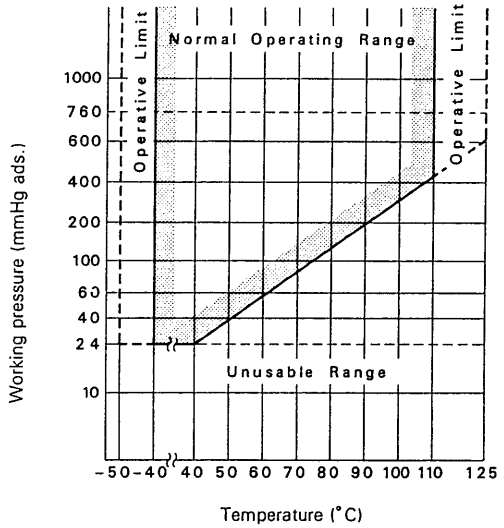


Fig.2 Working pressure and temperature of wetted parts

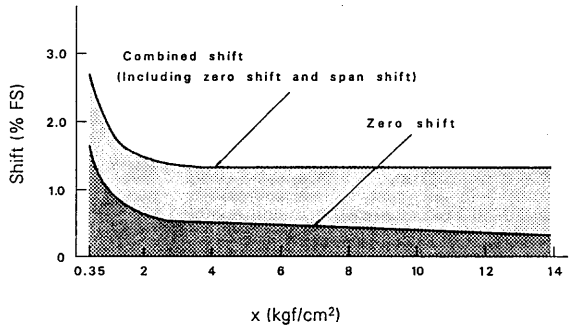


Fig.3 Range and temperature effect (55° C change)