

ST 3000 Smart Transmitter Series 900 Flange Mounted Liquid Level Models

STF924	0 to 400 inH ₂ O	0 to 1000 mbar
STF932	0 to 100 psi	0 to 7 bar
STF92F	0 to 400 inH ₂ O	0 to 1000 mbar
STF93F	0 to 100 psi	0 to 7 bar

Specification and Model Selection Guide

Introduction

In 1983, Honeywell introduced the first Smart Pressure Transmitter—the ST 3000®. In 1989, Honeywell launched the first all digital, bi-directional protocol for smart field devices. Today, its ST 3000 Series 900 Flange-mount Pressure Transmitters continue to bring proven “smart” technology to a wide spectrum of pressure measurement applications. Flange-mount transmitters are offered with a variety of tank connections including ANSI flanges. Applications include gauge pressure measurement in pressure vessels in the chemical industry as well as level applications in both the chemical and hydrocarbon processing industries with either wet or dry legs on the low side. Versatility is made possible through compound characterization of the meter body as well as the ability to measure a broad range of differential pressures.

All ST 3000 transmitters can provide a 4-20 mA output, Honeywell Digitally Enhanced (DE) output, HART* output, or FOUNDATION™ Fieldbus output. When digitally integrated with Honeywell’s Process Knowledge System™, EXPERION PKS™, ST 3000 instruments provide a more accurate process variable as well as advanced diagnostics.

Honeywell’s cost-effective ST 3000 S900 transmitters lead the industry in reliability and stability:

- Stability = ±0.01% per year
- Reliability = 470 years MTBF



Figure 1—Series 900 Flange Mounted Pressure Transmitters feature proven piezoresistive sensor technology.

The devices provide comprehensive self-diagnostics to help users maintain high uptime, meet regulatory requirements, and attain high quality standards. S900 transmitters allow smart performance at analog prices. Accurate, reliable and stable, Series 900 transmitters offer greater turndown ratio than conventional transmitters.

"Honeywell transmitters operating in the digital mode using Honeywell's Digitally Enhanced (DE) protocol make diagnostics available right at the control system's human interface. Equally important, transmitter status information is continuously displayed to alert the operator immediately of a fault condition. Because the process variable (PV) status transmission precedes the PV value, we are guaranteed that a bad PV is not used in a control algorithm. In addition, bi-directional communication provides for remote transmitter configuration directly from the human interface, enabling management of the complete loop."

Maureen Atchison, DuPont
Site Electrical & Instrumentation Leader

Description

The ST 3000 transmitter can replace any 4 to 20 mA output transmitter in use today and operates over a standard two-wire system.

The measuring means is a piezoresistive sensor, which actually contains three sensors in one. It contains a differential pressure sensor, a temperature sensor, and a static pressure sensor.

Microprocessor-based electronics provide higher span-turndown ratio, improved temperature and pressure compensation, and improved accuracy.

The transmitter's meter body and electronics housing resist shock, vibration, corrosion, and moisture. The electronics housing contains a compartment for the single-board electronics, which is isolated from an integral junction box. The single-board electronics is replaceable and interchangeable with any other ST 3000 Series 100 or Series 900 model transmitter.

Like other Honeywell transmitters, the ST 3000 features two-way communication and configuration capability between the operator and the transmitter through several Honeywell field-rated portable configuration devices, including the Smart Field Communicator (SFC) and the Multiple Communication Configurator (MC ToolKit). While both are made for in-field use, the MC Toolkit also can be ordered for use in intrinsically safe environments.

The SCT 3000 Smartline® Configuration Toolkit provides an easy way to configure instruments using a personal computer. The toolkit enables configuration of devices before shipping or installation. The SCT 3000 can operate in the offline mode to configure an unlimited number of devices. The database can then be loaded down-line during commissioning.

Features

- Choice of linear or square root output conformity is a simple configuration selection.
- Direct digital integration with Experion PKS and other control systems provides local measurement accuracy to the system level without adding typical A/D and D/A converter inaccuracies.
- Unique piezoresistive sensor automatically compensates input for temperature and static pressure. Added "smart" features include configuring lower and upper range values, simulating accurate analog output, and selecting preprogrammed engineering units for display.
- Smart transmitter capabilities with local or remote interfacing means significant manpower efficiency improvements in commissioning, start-up, and ongoing maintenance functions.

Specifications

Operating Conditions – All Models

Parameter	Reference Condition (at zero static)		Rated Condition		Operative Limits		Transportation and Storage	
	°C	°F	°C	°F	°C	°F	°C	°F
Ambient Temperature	25 ±1	77 ±2	-40 to 85	-40 to 158	-40 to 85	-40 to 185	-55 to 125	-67 to 257
Meter Body Temperature	25 ±1	77 ±2	-40 to 110*	-40 to 230*	-40 to 125	-40 to 257	-55 to 125	-67 to 257
Process Interface Temp. STF924, STF932 only	25 ±1	77 ±2	-40 to 110**	-40 to 230**	-40 to 175†	-40 to 350†	-55 to 125	-67 to 257
Humidity %RH	10 to 55		0 to 100		0 to 100		0 to 100	
Minimum Pressure mmHg absolute inH ₂ O absolute	atmospheric atmospheric		25 13		2 (short term ††) 1 (short term ††)			
Supply Voltage, Current, and Load Resistance	Voltage Range: 10.8 to 42.4 Vdc at terminals Current Range: 3.0 to 21.8 mA Load Resistance: 0 to 1440 ohms (as shown in Figure 2)							

* For model STF932 with CTFE fill fluid, the rating is -15 to 110°C (5 to 230°F); for models STF92F and STF93F with CTFE fill fluid, the rating is -15 to 70°C (5 to 158°F).

** For model STF932 with CTFE fill fluid, the rating is -15 to 110°C (5 to 230°F).

† For CTFE fill fluid, the maximum temperature rating is 150°C (300°F).

†† Short term equals 2 hours at 70°C (158°F)

Maximum Allowable Working Pressure (MAWP)

STF 924, STF 932	Flange Material	Ambient Temperature -29 to 38 C [-20 to 100 F]	Maximum Meterbody Temperature 125 C [257 F]	Process Interface Temperature 175 C [350 F]
ANSI Class 150 psi [bar]	Carbon Steel	285 [19.6]	245 [16.9]	215 [14.8]
	304 S.S.	275 [19.0]	218 [15.0]	198 [13.7]
	316 S.S.	275 [19.0]	225 [15.5]	205 [14.1]
ANSI Class 300 psi [bar]	Carbon Steel	740 [51.0]	668 [46.0]	645 [44.5]
	304 S.S.	720 [49.6]	570 [39.3]	518 [35.7]
	316 S.S.	720 [49.6]	590 [40.7]	538 [37.1]
DN PN40 psi [bar]	Carbon Steel	580 [40.0] (1)	574 [39.6]	559 [38.5]
	304 S.S.	534 [36.8] (1)	419 [28.9]	385 [26.5]
	316 S.S.	534 [36.8] (1)	434 [29.9]	399 [27.5]
STF92F, STF93F ANSI Class 150 psi [bar]	316L Stainless Steel	230 [15.9]	185 [12.8]	No rating at this temp

(1) Ambient Temperature for DN PN40 is -10 to 50 C [14 to 122 F]

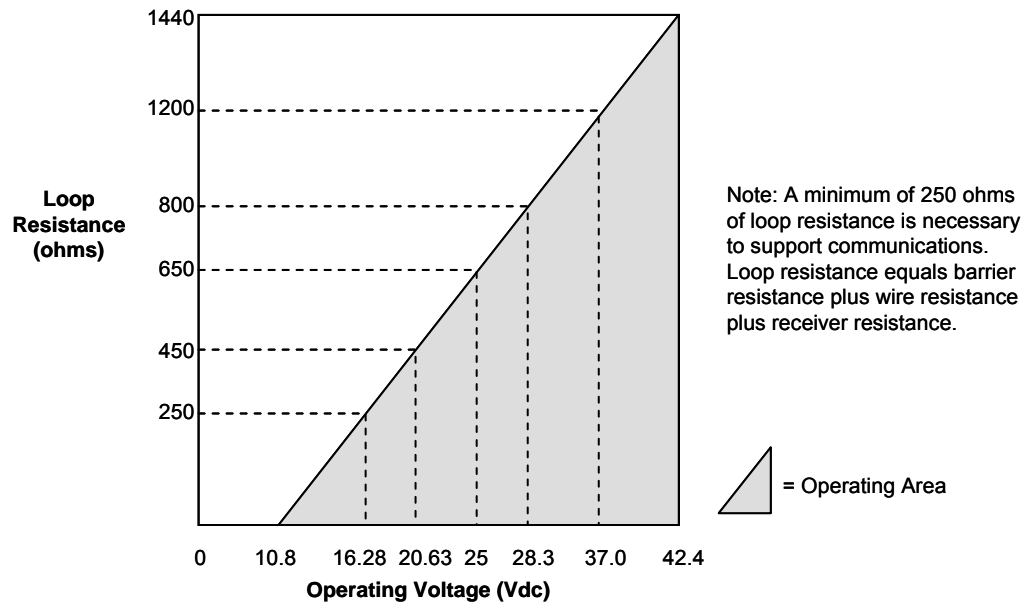


Figure 2 -
Supply voltage and
loop resistance chart.

Performance Under Rated Conditions* - Model STF924 (0 to 400 inH₂O/1000 mbar)

Parameter		Description
Upper Range Limit	inH₂O mbar	400 (39.2°F/4°C is standard reference temperature for inH ₂ O range.) 1000
Minimum Span	inH₂O mbar	25 62.5
Turndown Ratio		16 to 1
Zero Elevation and Suppression		No limit except minimum span within ±100% URL. Specifications valid from –100% to + 100% URL.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) <ul style="list-style-type: none"> • Accuracy includes residual error after averaging successive readings. • For FOUNDATION Fieldbus use Digital Mode specifications. For HART use Analog Mode specifications. 	<p>In Analog Mode: ±0.10% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (25 inH₂O), accuracy equals: $\pm 0.05 + 0.05 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.05 + 0.05 \left(\frac{62.5 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p> <p>In Digital Mode: ±0.075% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (25 inH₂O), accuracy equals: $\pm 0.025 + 0.05 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.025 + 0.05 \left(\frac{62.5 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p>	
Zero Temperature Effect per 28°C (50°F)		<p>In Analog Mode: ±0.2625% of span. For URV below reference point (50 inH₂O), effect equals: $\pm 0.0125 + 0.25 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.0125 + 0.25 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p> <p>In Digital Mode: ±0.25% of span. For span below reference point (50 inH₂O), effect equals: $\pm 0.25 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.25 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p>
Combined Zero and Span Temperature Effect per 28°C (50°F)		<p>In Analog Mode: ±0.50% of span. For URV below reference point (50 inH₂O), effect equals: $\pm 0.25 + 0.25 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.25 + 0.25 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p> <p>In Digital Mode: ±0.475% of span. For span below reference point (50 inH₂O), effect equals: $\pm 0.225 + 0.25 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.225 + 0.25 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$</p>
Zero Static Pressure Effect per 300 psi (20 bar)		±0.2125% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.0125 + 0.20 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.0125 + 0.20 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$
Combined Zero and Span Static Pressure Effect per 300 psi (20 bar)		±0.40% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.20 + 0.20 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right) \text{ or } \pm 0.20 + 0.20 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right) \text{ in } \% \text{ of span}$
Stability		±0.015% of URL per year

* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316L Stainless Steel barrier diaphragm.

Performance Under Rated Conditions* - Model STF932 (0 to 100 psi/7 bar)

Parameter	Description
Upper Range Limit psi bar	100 7
Minimum Span psi bar	5 0.35
Turndown Ratio	20 to 1
Zero Elevation and Suppression	No limit except minimum span within $\pm 100\%$ URL. Specifications valid from -100% to $+100\%$ URL.
<p>Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability)</p> <ul style="list-style-type: none"> • Accuracy includes residual error after averaging successive readings. • For FOUNDATION Fieldbus use Digital Mode specifications. For HART use Analog Mode specifications. 	<p>In Analog Mode: $\pm 0.10\%$ of calibrated span or upper range value (URV), whichever is greater, terminal based.</p> <p>For URV below reference point (20 psi), accuracy equals:</p> $\pm 0.05 + 0.05 \left(\frac{20 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.05 + 0.05 \left(\frac{1.4 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$ <p>In Digital Mode: $\pm 0.075\%$ of calibrated span or upper range value (URV), whichever is greater, terminal based.</p> <p>For URV below reference point (20 psi), accuracy equals:</p> $\pm 0.025 + 0.05 \left(\frac{20 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.025 + 0.05 \left(\frac{1.4 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$
Zero Temperature Effect per 28°C (50°F)	<p>In Analog Mode: $\pm 0.2625\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.0125 + 0.25 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.0125 + 0.25 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$ <p>In Digital Mode: $\pm 0.25\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.25 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.25 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$
Combined Zero and Span Temperature Effect per 28°C (50°F)	<p>In Analog Mode: $\pm 0.50\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.25 + 0.25 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.25 + 0.25 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$ <p>In Digital Mode: $\pm 0.475\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.225 + 0.25 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.225 + 0.25 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$
Zero Static Pressure Effect per 300 psi (20 bar)	<p>$\pm 0.2125\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.0125 + 0.20 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.0125 + 0.20 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$
Span Static Pressure Effect per 300 psi (20 bar)	<p>$\pm 0.40\%$ of span.</p> <p>For URV below reference point (30 psi), effect equals:</p> $\pm 0.20 + 0.20 \left(\frac{30 \text{ psi}}{\text{span psi}} \right) \text{ or } \pm 0.20 + 0.20 \left(\frac{2 \text{ bar}}{\text{span bar}} \right) \text{ in } \% \text{ of span}$
Stability	$\pm 0.04\%$ of URL per year

* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316L Stainless Steel barrier diaphragm.

Performance Under Rated Conditions* - Model STF92F (0 to 400 inH₂O/25 mbar)

Parameter	Description
Upper Range Limit inH ₂ O mbar	400 (39.2°F/4°C is standard reference temperature for inH ₂ O range.) 25
Minimum Span inH ₂ O mbar	25 62
Turndown Ratio	16 to 1
Zero Elevation and Suppression	-5 to +100% URL
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) <ul style="list-style-type: none"> • Accuracy includes residual error after averaging successive readings. • For FOUNDATION Fieldbus use Digital Mode specifications. For HART use Analog Mode specifications. 	In Analog Mode: ±0.10% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (25 inH ₂ O), accuracy equals: $\pm 0.05 + 0.05 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.05 + 0.05 \left(\frac{62.5 \text{ mbar}}{\text{span mbar}} \right)$ in % of span In Digital Mode: ±0.075% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (25 inH ₂ O), accuracy equals: $\pm 0.025 + 0.05 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.025 + 0.05 \left(\frac{62.5 \text{ mbar}}{\text{span mbar}} \right)$ in % of span
Zero Temperature Effect per 28°C (50°F)	In Analog Mode: ±0.1625% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.0125 + 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.0125 + 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span In Digital Mode: ±0.15% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span
Combined Zero and Span Temperature Effect per 28°C (50°F)	In Analog Mode: ±0.25% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.10 + 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.10 + 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span In Digital Mode: ±0.225% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.075 + 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.075 + 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span
Zero Static Pressure Effect per 1000 psi (70 bar)	±0.1625% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.0125 + 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.0125 + 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span
Combined Zero and Span Static Pressure Effect per 1000 psi (70 bar)*	±0.30% of span. For URV below reference point (50 inH ₂ O), effect equals: $\pm 0.15 + 0.15 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}} \right)$ or $\pm 0.15 + 0.15 \left(\frac{125 \text{ mbar}}{\text{span mbar}} \right)$ in % of span
Stability	±0.015% of URL per year

* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316L Stainless Steel barrier diaphragm.

Performance Under Rated Conditions* - Model STF93F (0 to 100 psi/7 bar)

Parameter	Description
Upper Range Limit psi bar	100 7
Minimum Span psi bar	5 0.35
Turndown Ratio	20 to 1
Zero Elevation and Suppression	-5 to +100% URL
<p>Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability)</p> <ul style="list-style-type: none"> Accuracy includes residual error after averaging successive readings. For FOUNDATION Fieldbus use Digital Mode specifications. For HART use Analog Mode specifications. 	<p>In Analog Mode: ±0.10% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (20 psi), accuracy equals: $\pm 0.05 + 0.05 \left(\frac{20 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.05 + 0.05 \left(\frac{1.4 \text{ bar}}{\text{span bar}} \right)$ in % of span</p> <p>In Digital Mode: ±0.075% of calibrated span or upper range value (URV), whichever is greater, terminal based. For URV below reference point (20 psi), accuracy equals: $\pm 0.025 + 0.05 \left(\frac{20 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.025 + 0.05 \left(\frac{1.4 \text{ bar}}{\text{span bar}} \right)$ in % of span</p>
Zero Temperature Effect per 28°C (50°F)	<p>In Analog Mode: ±0.1625% of span. For URV below reference point (30 psi), effect equals: $\pm 0.0125 + 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.0125 + 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p> <p>In Digital Mode: ±0.15% of span. For URV below reference point (30 psi), effect equals: $\pm 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p>
Combined Zero and Span Temperature Effect per 28°C (50°F)	<p>In Analog Mode: ±0.25% of span. For URV below reference point (30 psi), effect equals: $\pm 0.10 + 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.10 + 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p> <p>In Digital Mode: ±0.225% of span. For URV below reference point (30 psi), effect equals: $\pm 0.075 + 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.075 + 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p>
Zero Static Pressure Effect per 1000 psi (70 bar)	<p>±0.1625% of span. For URV below reference point (30 psi), effect equals: $\pm 0.0125 + 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.0125 + 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p>
Combined Zero and Span Static Pressure Effect per 1000 psi (70 bar)	<p>±0.30% of span. For URV below reference point (30 psi), effect equals: $\pm 0.15 + 0.15 \left(\frac{30 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.15 + 0.15 \left(\frac{2 \text{ bar}}{\text{span bar}} \right)$ in % of span</p>
Stability	±0.04% of URL per year

* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316L Stainless Steel barrier diaphragm.

Performance Under Rated Conditions - General for all Models

Parameter	Description
Output (two-wire)	Analog 4 to 20 mA or DE digital communications mode. Options available for FOUNDATION Fieldbus and HART protocol.
Supply Voltage Effect	0.005% of span per volt.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.
CE Conformity (Europe)	89/336/EEC, Electromagnetic Compatibility (EMC) Directive.
NAMUR NE 43 Compliance Option	Transmitter failure information is generated when the measuring information is invalid or no longer present. Failure information is transmitted as a current signal but outside the normal 4-20 mA measurement signal level. Transmitter failure values are: ≤ 3.6 mA and ≥ 21.0 mA. The normal signal range is ≥ 3.8 mA and ≤ 20.5 mA.
SIL 2/3 Compliance	SIL certified to IEC 61508 for non-redundant use in SIL 2 related Safety Systems (single use) and for redundant (multiple) use in SIL 3 Safety Systems through TÜV Nord Sys Tec GmbH & Co. KG under the following standards: IEC61508-1: 1998; IEC 61508-2: 2000; IEC61508-3: 1998.
Lightning Protection Option (Code "LP")	Leakage Current: 10 microamps max. @ 42.4 VDC, 93°C Impulse Rating: 10/20 μ sec. 5,000 Amps (50 strikes) 10,000 Amps (20 strikes) (rise/decay) 10/1000 μ sec. 250 Amps (1000 strikes) 500 Amps (400 strikes)

Physical and Approval Bodies

Parameter	Description
Barrier Diaphragms Material (Wetted)	316L SS, Hastelloy C-276
Gasket Ring Material (Wetted)	316/316L SS, Hastelloy C-276*
Extension Tube Material (Wetted)	316 SS
Process Head and Adapter Flange Material	316 SS, Carbon Steel (zinc-plated), Hastelloy C-276*
Process Head Gaskets	Teflon is standard.
Meter Body Bolting	Carbon Steel or 316 SS (NACE) bolts.
Mounting Flange STF924, STF932 STF92F, STF93F	Flush or Extended Diaphragm: Zinc Chromate plated Carbon Steel, 304 SS, or 316 SS. 316L SS (NOTE: Mounting Flange is process wetted.)
Fill Fluid	Silicone oil or CTFE (Chlorotrifluoroethylene)
Electronic Housing	Epoxy-Polyester hybrid paint. Low Copper-Aluminum. Meets NEMA 4X (watertight) and NEMA 7 (explosion proof). Stainless steel optional.
Process Connections All Models STF924, STF932 STF92F, STF93F	Process Head: 1/4-inch NPT; 1/2-inch NPT with adapter, standard option. Flange: 2, 3 or 4-inch Class 150 or 300 ANSI; DN50-PN40, DN80-PN40 or DN100-PN40 DIN flange. Extended Diaphragm: 2, 4, or 6 inches (50, 101, 152 mm) long. 3-inch, Class 150 ANSI flange.
Wiring	Accepts up to 16 AWG (1.5 mm diameter).
Mounting	See Figure 3 for typical flange mounting arrangement.
Dimensions	See Figures 4, 5, and 6
Net Weight STF924, STF932 STF92F, STF93F	Flush or Extended Model: 15.5 to 35.0 pounds (7 to 16 kg) depending on flange size 14.2 to 18.4 pounds (6.5 to 9 kg) depending on flange size

Table continued on next page ⇒

Physical and Approval Bodies, *continued*

Parameter	Description
Approval Bodies	
Factory Mutual	<p>Explosion Proof: Approved as Explosion Proof for Class I, Division 1, Groups A, B, C, D locations, Dust Ignition Proof: Approved as Dust Ignition Proof for Class II, III, Division 1, Groups E, F, G locations, Intrinsically Safe: Approved as Intrinsically Safe for for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G locations. Nonincendive: Approved as Nonincendive for Class I, Division 2, Groups A, B, C, D locations.</p>
CSA	<p>Explosion Proof: Approved as Explosion Proof for Class I, Division 1, Groups B, C, D locations, Dust Ignition Proof: Approved as Dust Ignition Proof for Class II, III, Division 1, Groups E, F, G locations, Intrinsically Safe: Approved as Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G locations.</p>
Canadian Registration Number (CRN)	All ST 3000 model designs, except SATG19L, STG99L, STG170 and STG180 have been registered in all provinces and territories in Canada and are marked CRN:0F8914.5c.
ATEX	<p>Intrinsically Safe, Zone 0/1: EEx ia IIC T4, T5, T6 Flameproof/Zone 1: EEx d IIC T5, T6 (enclosure IP 66/67) Non-Sparking, Zone 2: EEx nA, IIC T6 (enclosure IP 66/67) Multiple Markings: - Ex II 1 G: EEx ia IIC T4, T5, T6, <u>Ex II 2 G:</u> EExd IIC T5, T6 <u>Ex II 3 G:</u> EEx nA, IIC T6 (Honeywell) (enclosure IP 66/67)</p>
SA (Australian)	<p>Intrinsically Safe: EX ia IIC T4 Non-Sparking: Ex n IIC T6 (T4 with SM option)</p>
INMETRO (Brazil)	Flame-Proof, Zone 1: EX d IIC T5
Pressure Equipment Directive (97/23/EC)	The ST 3000 pressure transmitters listed in this Specification have no pressurized internal volume or have a pressurized internal volume rated less than 1,000 bar (14,500 psig) and/or have a maximum volume of less than 0.1 liter. Therefore, these transmitters are either; not subject to the essential requirements of the directive 97/23/EC (PED, Annex 1) and shall not have the CE mark, or the manufacturer has the free choice of a module when the CE mark is required for pressures > 200 bar (2,900 psig).

- Flush design only.

NOTE: Pressure transmitters that are part of safety equipment for the protection of piping (systems) or vessel(s) from exceeding allowable pressure limits, (equipment with safety functions in accordance with Pressure Equipment Directive 97/23/EC article 1, 2.1.3), require separate examination.

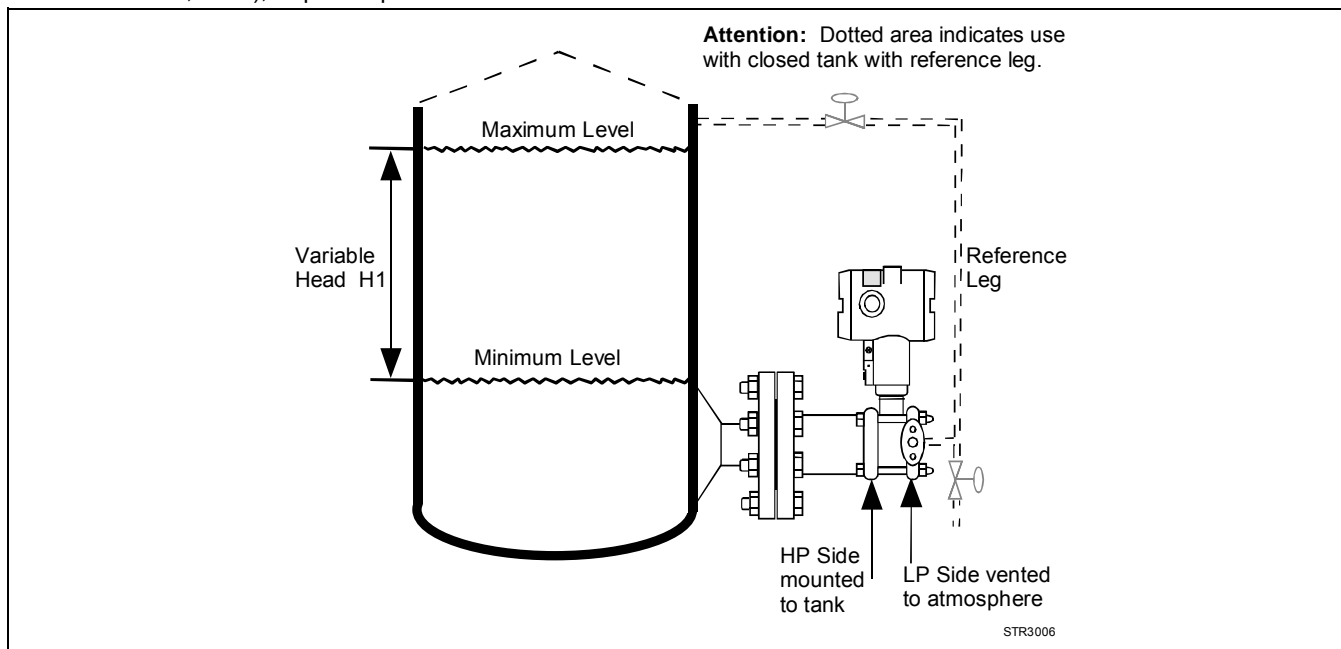


Figure 3—Typical mounting arrangement for flange mounted liquid level transmitter

Reference Dimensions: $\frac{\text{millimeters}}{\text{inches}}$

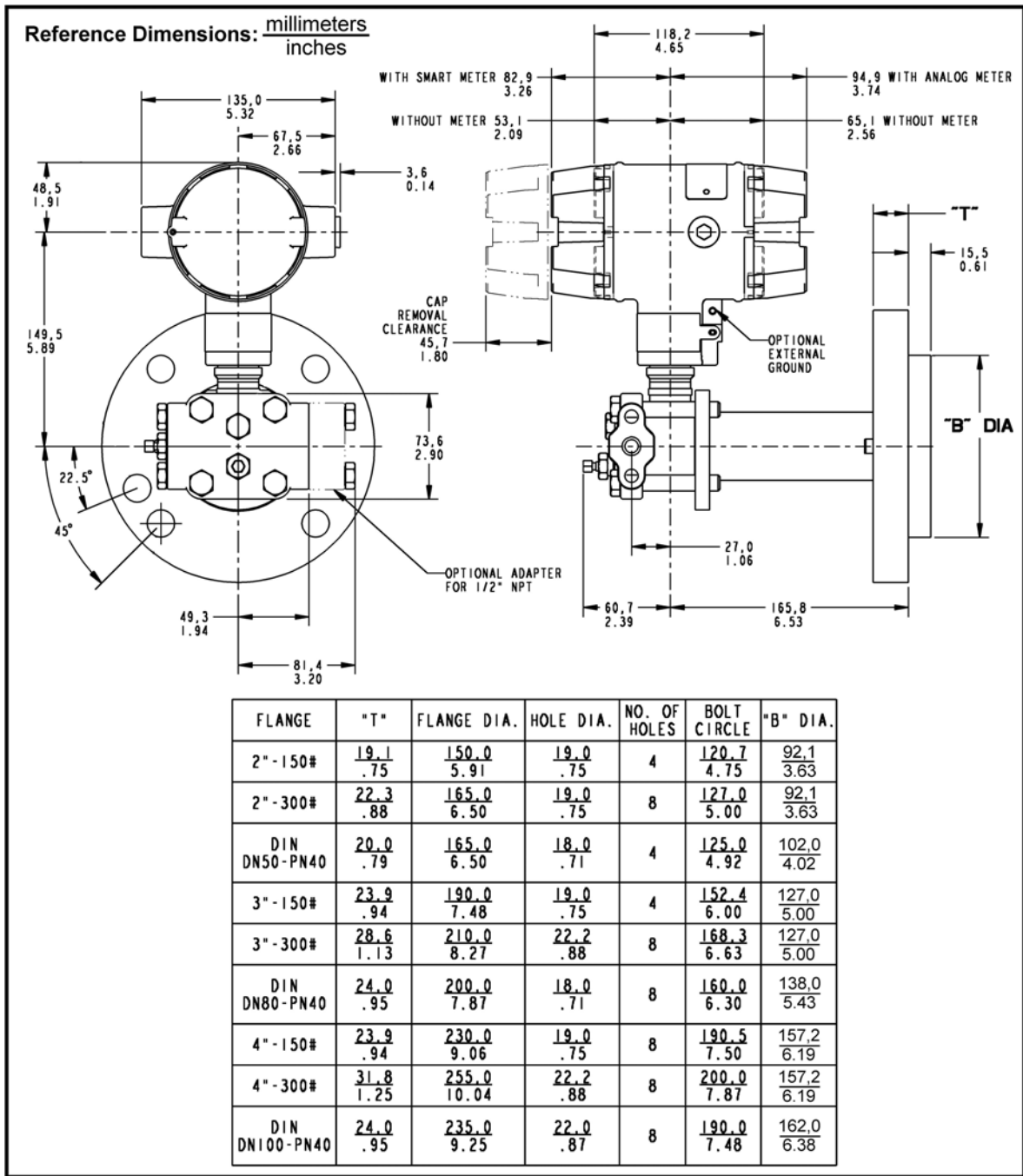


Figure 4—Approximate mounting dimensions for STF924 and STF932 flush diaphragm type

Reference Dimensions: $\frac{\text{millimeters}}{\text{inches}}$

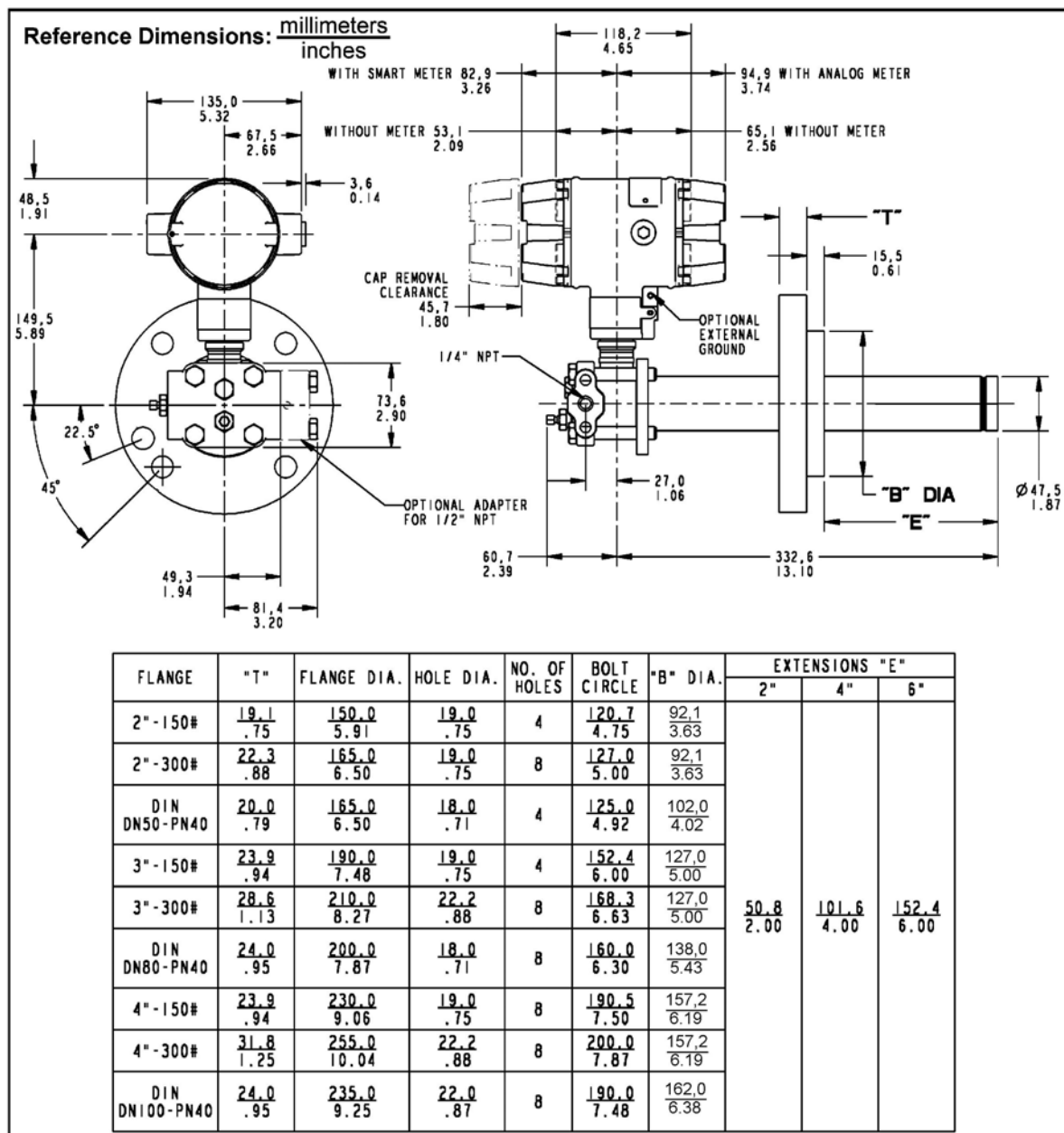


Figure 5—Approximate mounting dimensions for STF924 and STF932 extended diaphragm type

Reference Dimensions: $\frac{\text{millimeters}}{\text{inches}}$

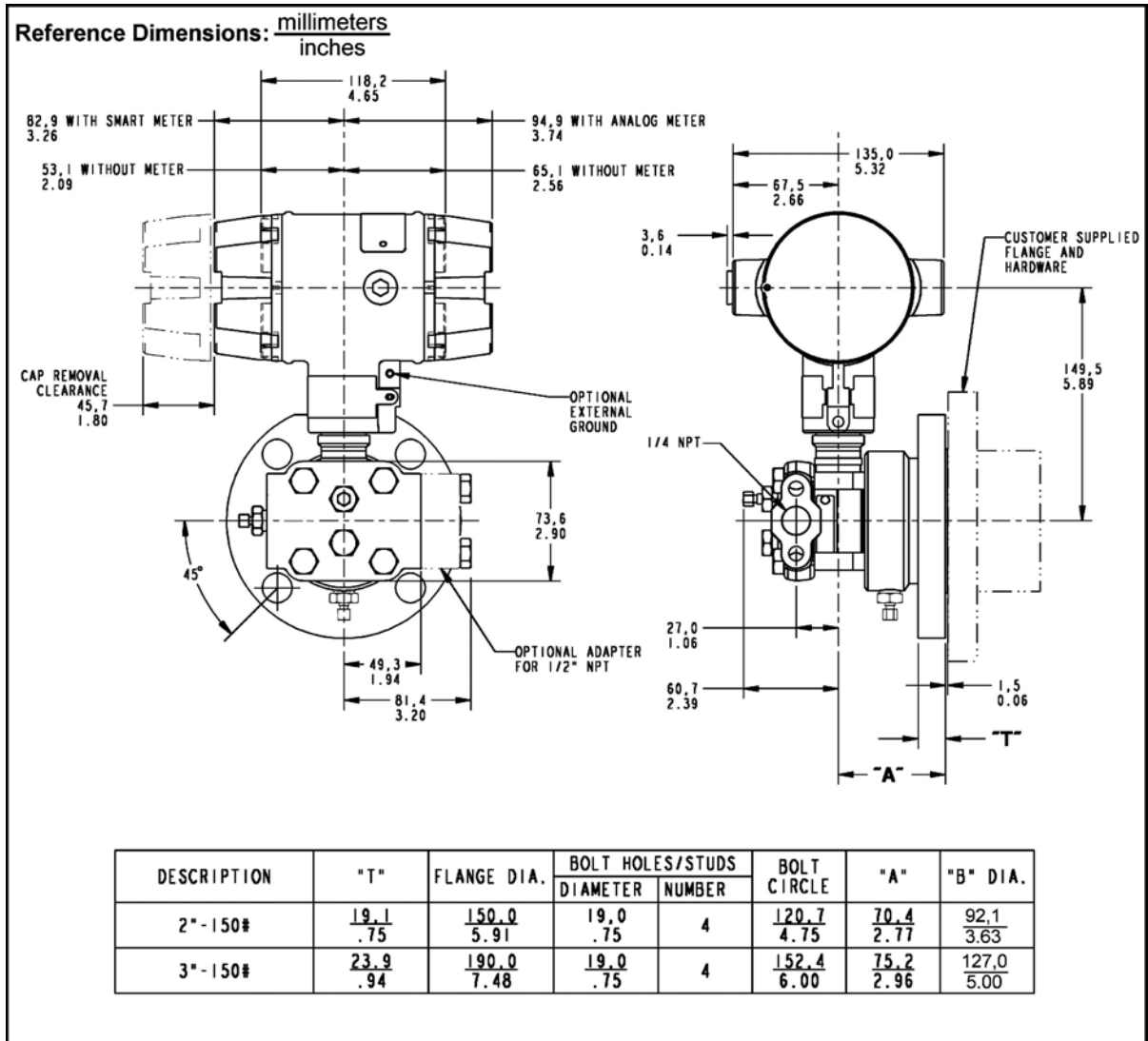


Figure 6—Approximate mounting dimensions for STF92F and STF93F pseudo flange type

Options		Ordering Information
<p>Mounting Bracket The angle mounting bracket is available in either zinc-plated carbon steel or stainless steel and is suitable for horizontal or vertical mounting on a two inch (50 millimeter) pipe, as well as wall mounting. An optional flat mounting bracket is also available in carbon steel for two inch (50 millimeter) pipe mounting.</p> <p>Indicating Meter (Options ME and SM) Two integral meter options are available. An analog meter (option ME) is available with a 0 to 100% linear scale. The Smart Meter (option SM) provides an LCD display for both analog and digital output and can be configured to display pressure in pre-selected engineering units.</p> <p>Lightning Protection (Option LP) A terminal block is available with circuitry that protects the transmitter from transient surges induced by nearby lightning strikes.</p> <p>HART® Protocol Compatibility (Options HC and H6) Optional electronics modules for the ST 3000 provides HART Protocol compatibility in either HART 5.x or 6.x formats. Transmitters with a HART Option are compatible with any HART enabled system that provides 5.x or 6.x format support.</p> <p>FOUNDATION Fieldbus (Option FF) Equips transmitter with FF protocol for use in 31.25 kbit/s FF networks. See document 34-ST-03-72 for additional information on ST 3000 Fieldbus transmitters.</p> <p>SIL2/SIL3 Certification (Option SL) This ST 3000 product is available for use with safety systems. With the SL option, we are fully certified to SIL 2 capability for single transmitters and SIL 3 capability for multiple transmitter use through TÜV Nord Sys Tec GmbH & Co. KG. (continued)</p>	<p>We are in compliance with the following SIL standards: IEC 61508-1: 1998; IEC 61508-2: 2000; IEC 61508-3: 1998</p> <p>NAMUR NE43 Compliance (Option NE) This option provides software the meets the NAMUR NE43 requirements for failsafe software. Transmitter failure information is generated when the measuring information is no longer valid. Transmitter failure values are: ≤ 3.6 mA and ≥ 21.0 mA. The normal ST 3000 ranges are ≤ 3.8 mA and ≥ 20.5 mA.</p> <p>Indicator Configuration (Option CI) Provides custom configuration of Smart Meters</p> <p>Tagging (Option TG) Up to 30 characters can be added on the stainless steel nameplate mounted on the transmitter's electronics housing at no extra cost. Note that a separate nameplate on the meter body contains the serial number and body-related data. A stainless steel wired on tag with additional data of up to 4 lines of 28 characters is also available. The number of characters for tagging includes spaces.</p> <p>Transmitter Configuration (Option TC) The factory can configure the transmitter linear/square root extraction, damping time, LRV, URV and mode (analog/digital) and enter an ID tag of up to eight characters and scratchpad information as specified.</p> <p>Custom Calibration and ID in Memory (Option CC) The factory can calibrate any range within the scope of the transmitter's range and enter an ID tag of up to eight characters in the transmitter's memory.</p>	<p>Contact your nearest Honeywell sales office, or</p> <p>In the U.S.: Honeywell Industrial Automation & Control 16404 North Black Canyon Hwy. Phoenix, AZ 85053 1-800-288-7491</p> <p>In Canada: The Honeywell Centre 155 Gordon Baker Rd. North York, Ontario M2H 3N7 1-800-461-0013</p> <p>In Latin America: Honeywell Inc. 480 Sawgrass Corporate Parkway, Suite 200 Sunrise, FL 33325 (954) 845-2600</p> <p>In Europe and Africa: Honeywell S. A. Avenue du Bourget 1 1140 Brussels, Belgium</p> <p>In Eastern Europe: Honeywell Praha, s.r.o. Budejovicka 1 140 21 Prague 4, Czech Republic</p> <p>In the Middle East: Honeywell Middle East Ltd. Khalifa Street, Sheikh Faisal Building Abu Dhabi, U. A. E.</p> <p>In Asia: Honeywell Asia Pacific Inc. Honeywell Building, 17 Changi Business Park Central 1 Singapore 486073 Republic of Singapore</p> <p>In the Pacific: Honeywell Pty Ltd. 5 Thomas Holt Drive North Ryde NSW Australia 2113 (61 2) 9353 7000</p> <p>In Japan: Honeywell K.K. 14-6 Shibaura 1-chrome Minato-ku, Tokyo, Japan 105-0023</p> <p>Or, visit Honeywell on the World Wide Web at: http://www.honeywell.com Specifications are subject to change without notice. (Note that specifications may differ slightly for transmitters manufactured before October 30, 1995.)</p>

Model Selection Guide (34-ST-16-30)

Instructions

- Select the desired Key Number. The arrow to the right marks the selection available.
- Make one selection from each table, I and II, using the column below the proper arrow.
- Select as many Table III options as desired (if no options or approvals are desired, specify 9X).
- A (*) denotes unrestricted availability. A letter denotes restricted availability.
- Restrictions follow Table IV.

Key Number - I - II - III (Optional) - IV
----- - --- - ----- - --,'-- - XXXX

KEY NUMBER

Span	Selection	Avail.
0-25 to 0-400 inH ₂ O/0-62.2 to 0-1000 mbar Compound Characterized	STF924	↓
0-5 to 0-100 psi/0-0.34 to 0-7 bar Compound Characterized	STF932	↓
0-25 to 0-400 inH ₂ O/0-62.2 to 0-1000 mbar	STF92F	↓
0-5 to 0-100 psi/0-0.34 to 0-7 bar	STF93F	↓

TABLE I - METER BODY

	Design	Ref. Hd.	Vent/Drain Valve on Ref. Head	Barrier Diaphragm (wetted)	Diaphragm Plate (wetted)	Extension (wetted)				
Materials	Flush	Carbon* Steel	316 SS	316L SS	316L SS	N/A	A__	•		
		Hast C		316 SS	316 SS		W__	•		
		Hast C		316 SS	316 SS		B__	•		
	Extended	316 SS	316 SS	316L SS	316L SS	316 SS	E__	•		
		Hast C		316 SS	316L SS		X__	•		
		Hast C		316 SS	316L SS		F__	•		
	Pseudo Flange	Carbon* Steel	316 SS	316L SS	N/A	N/A	J__	•		
		Hast C		316 SS			316L SS	M__	•	
		Hast C		316 SS			316L SS	N__	•	
Fill Fluid (Meter Body & Flange)	Silicone						_ 1 _	•	•	
	CTFE						_ 2 _	•	•	
Process Connection	Reference Head			Flange						
	1/4" NPT				High Pressure Side		__ A	•	•	
					Low Pressure Side		__ C	•	•	
	1/2" NPT (with Adapter)				High Pressure Side		__ H	t	t	
			Low Pressure Side		__ K	t	t			

* Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use 316 stainless steel wetted Process Heads.

** Vent/Drains are Teflon coated for lubricity.

TABLE II - FLANGE ASSEMBLY			Selection	Availability		
				24 32	2F 3F	
No Selection			0 _ _ _ _	•	•	
Flange (ANSI Flanges have 125 - 500 AARH Surface Finish)	3" ANSI Class 150	Carbon Steel (non-wetted)	_ 1 _ _ _	•		
	3" ANSI Class 300		_ 2 _ _ _	•		
	DN80-PN40 DIN		_ 3 _ _ _	•		
	4" ANSI Class 150		_ 4 _ _ _	•		
	4" ANSI Class 300		_ 5 _ _ _	•		
	DN100-PN40 DIN		_ 6 _ _ _	•		
	2" ANSI Class 150		_ 7 _ _ _	•		
	2" ANSI Class 300		_ 8 _ _ _	•		
	DN50-PN40 DIN		_ 9 _ _ _	•		
	3" ANSI Class 150	304 SS (non-wetted)	_ A _ _ _	•		
	3" ANSI Class 300		_ B _ _ _	•		
	DN80-PN40 DIN		_ C _ _ _	•		
	4" ANSI Class 150		_ D _ _ _	•		
	4" ANSI Class 300		_ E _ _ _	•		
	DN100-PN40 DIN		_ F _ _ _	•		
2" ANSI Class 150	_ Q _ _ _	•				
2" ANSI Class 300	_ U _ _ _	•				
DN50-PN40 DIN	_ V _ _ _	•				
3" ANSI Class 150	316 SS (non-wetted)	_ H _ _ _	•			
3" ANSI Class 300		_ J _ _ _	•			
DN80-PN40 DIN		_ K _ _ _	•			
4" ANSI Class 150		_ L _ _ _	•			
4" ANSI Class 300		_ M _ _ _	•			
DN100-PN40 DIN		_ N _ _ _	•			
2" ANSI Class 150	_ W _ _ _	•				
2" ANSI Class 300	_ X _ _ _	•				
DN50-PN40 DIN	_ Y _ _ _	•				
Pseudo Flange on Standard DP	316L SS (wetted)	_ R _ _ _		•		
3" ANSI Class 150 w/Vent/Drain		_ P _ _ _		•		
Gasket Ring (wetted)	No Selection		_ _ 0 _ _		•	
	Flush Design	316L SS Hast C	_ _ 1 _ _	g		
	Extended Design	316L SS	_ _ 2 _ _	g		
Extension (wetted)	No Selection		_ _ _ 0 _		•	
	Flush		_ _ _ F _	h		
	Diameter		Length			
	1.87 Inches (for 2", 3" or 4" spud) ***		2 inches	_ _ _ C _	v	
			4 inches	_ _ _ D _	v	
		6 inches	_ _ _ E _	v		
No Selection	No Selection		_ _ _ _ 0	•	•	

*** For part numbers and pricing information on Tank Spuds refer to page ST-91 (Supplementary Accessories & Kits).

TABLE III - OPTIONS

	Selection	Availability	
		24 32	2F 3F
None	00	•	•
Communication Options			
HART® 5.x Protocol Compatible Electronics	HC	e	e
HART® 6.x Protocol Compatible Electronics	H6	e	e
FOUNDATION Fieldbus Communications	FF	r	r
Indicating Meter Options			
Analog Meter (0-100 Even 0-10 Square Root)	ME	•	•
Smart Meter	SM	•	•
Custom Configuration of Smart Meter	CI	m	m
Local Zero	LZ	x	x
Local Zero and Span	ZS	s	s
Transmitter Housing & Electronics Options			
NAMUR Failsafe Software	NE	15	15
SIL 2 - TÜV Certified transmitter (requires HC and WP options)	SL	p	p
Lightning Protection	LP	•	•
Custom Calibration and I.D. in Memory	CC	•	•
Transmitter Configuration	TC	•	•
Write Protection (Delivered in the "enabled" position)	WP	•	•
Write Protection (Delivered in the "disabled" position)	WX	•	•
316 SS Electronics Housing - with M20 Conduit Connections	SH	n	n
1/2" NPT to M20 316 SS Conduit Adapter (BASEEFA EEx d IIC)	A1	n	n
1/2" NPT to 3/4" NPT 316 SS Conduit Adapter	A2	u	u
Stainless Steel Housing with M20 to 1/2" NPT 316 SS Conduit Adapter (use for FM and CSA Approvals)	A3	i	i
Stainless Steel Customer Wired-On Tag (4 lines, 28 characters per line, customer supplied information)	TG	•	•
Stainless Steel Customer Wired-On Tag (blank)	TB	•	•
End Cap Live Circuit Warning Label in Spanish (only with ATEX 3D)	SP	a	a
End Cap Live Circuit Warning Label in Portuguese (only with ATEX 3D)	PG	a	a
End Cap Live Circuit Warning Label in Italian (only with ATEX 3D)	TL	a	a
End Cap Live Circuit Warning Label in German (only with ATEX 3D)	GE	a	a
Meter Body Options			
SS (NACE) Bolts and 304 SS (NACE) Retaining Ring for Heads	CR	•	•
316 SS Bolts and 316 SS Nuts for Process Heads	SS	•	•
B7M Bolts and Nuts for Process Heads	B7	•	•
316 SS Adapter Flange - 1/2" NPT with CS Bolts	S2	c	c
316 SS Adapter Flange - 1/2" NPT with 316 SS Bolts	S3	c	c
316 SS Adapter Flange - 1/2" NPT with NACE A286 SS Bolts	S4	c	c
316 SS Adapter Flange - 1/2" NPT with B7M Bolts	S5	c	c
Hastelloy C Adapter Flange - 1/2" NPT with CS Bolts	T2	c	c
Hastelloy C Adapter Flange - 1/2" NPT with 316 SS Bolts	T3	c	c
Monel Adapter Flange - 1/2" NPT with CS Bolts	V2	c	c
Monel Adapter Flange - 1/2" NPT with 316 SS Bolts	V3	c	c
316 SS Blind Adapter Flange with CS Bolts	B3	•	•
316 SS Blind Adapter Flange with 316 SS Bolts	B4	•	•
316 SS Blind Adapter Flange with NACE A286 SS Bolts	B5	•	•
316 SS Blind Adapter Flange with B7M Bolts	B6	•	•
316 SS Center Vent Drain and Bushing	CV	•	•
Viton Process Head Gaskets (adapter gaskets ordered separately)	VT	•	•
Viton Adapter Flange Gaskets	VF	17	17
Services/Certificates/Marine Type Approval Options			
User's Manual Paper Copy (Standard, HC, or FF ships accordingly)	UM	•	•
Clean Transmitter for Oxygen or Chlorine Service with Certificate	OX	j	j
Over-Pressure Leak Test with F3392 Certificate	TP	•	•
Calibration Test Report and Certificate of Conformance (F3399)	F1	•	•
Certificate of Conformance (F3391)	F3	•	•
Certificate of Origin (F0195)	F5	•	•
FMEDA Certificate (SIL 1)	F6	•	•
NACE Certificate (F0198)	F7	o	o
Marine Type Approvals (DNV, ABS, BV & LR)	MT	•	•
Warranty Options			
Additional Warranty - 1 year	W1	•	•
Additional Warranty - 2 years	W2	•	•
Additional Warranty - 3 years	W3	•	•
Additional Warranty - 4 years	W4	•	•

Availability

STF9xx

▼ ▼

TABLE III - OPTIONS (continued)

Approval Body	Approval Type	Location or Classification	Selection	24 32	2F 3F
No hazardous location approvals			9X	•	•
Factory Mutual	Explosion Proof	Class I, Div. 1, Groups A,B,C,D	1C	•	•
	Dust Ignition Proof	Class II, III Div. 1, Groups E,F,G			
	Non-Incendive	Class I, Div. 2, Groups A,B,C,D			
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G			
CSA	Explosion Proof	Class I, Div. 1, Groups B,C,D	2J	•	•
	Dust Ignition Proof	Class II, III, Div. 1, Groups E,F,G			
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G			
SA (Australia)	Intrinsically Safe	Ex ia IIC T4	4G	•	•
	Non-sparking	Ex n IIC T6 (T4 with SM option)			
ATEX*	Intrinsically Safe, Zone 0/1	Ⓧ II 1 G EEx ia IIC T4, T5,T6	3S	•	•
	Flameproof, Zone 1	Ⓧ II 2 G EEx d IIC T5, T6, Enclosure IP 66/67	3D	•	•
	Non-Sparking, Zone 2	Ⓧ II 3 G EEx nA, IIC T6 (Honeywell). Enclosure IP 66/67	3N	•	•
	Multiple Marking** Int. Safe, Zone 0/1, or Flameproof, Zone 1, or Non-Sparking, Zone 2	Ex II 1 G EEx ia IIC T4, T5, T6 Ex II 2 G EEx d IIC T5, T6 Ex II 3 G EEx nA, IIC T6 (Honeywell) Enclosure IP 66/67	3H	•	•
INMETRO (Brazil)	Flameproof, Zone 1	Ex d IIC T5	6D	•	•

b

*See ATEX installation requirements in the ST 3000 User's Manual

**The user must determine the type of protection required for installation of the equipment. The user shall then check the box [] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, subsequently the equipment shall not be reinstalled using any of the other certification types.

TABLE IV

Selection

Factory Identification	XXXX	•	•
------------------------	------	---	---

RESTRICTIONS

Restriction Letter	Available Only With		Not Available With	
	Table	Selection	Table	Selection
a	III	3D or 3H		
b	Select only one option from this group			
c	I	___ H, ___ K		
e			III	4G
g	I	A ___, B ___, E ___, F ___, J ___, W ___, X ___		
h			I II	M ___, N ___, R ___, S ___, ___ 5, ___ 0
i	III	1C or 2J		
j	I	___ 2 ___		
m	III	SM		
n			III	1C, 2J
o	III	CR or B1		
p	III	HC, WP	III	FF, 00
r			III	TC, ME, 4G, 3S
s			III	FF, ME
t		Select S2,S3,S4,S5,T2,T3,V2,V3		
u	III	1C, 2J		
v	I	M ___, N ___, R ___, S ___		
x	III	FF, SM		
15			III	FF
17	III	VT		

Notes: See ST-83 for Published Specials with pricing.
 See ST-89 and User's Manual for part numbers.
 See ST-OE-9 for OMS Order Entry Information including TC, manuals, certificates, drawings and SPINS.
 See ST-OD-1 for tagging, ID, Transmitter Configuration (TC) and calibration including factory default values.
 To request a quotation for a non-published "special", fax RFQ to Marketing Applications.

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Honeywell

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