

ST 3000 Smart Transmitter Series 900 Flush Mount Model

STG93P 0-100 psig / 0-7 barg

34-ST-03-73
10/2002

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 Pressure Transmitters continue to bring proven “smart” technology to a wide spectrum of measurement applications. Honeywell offers the STG93P transmitter for direct insertion in processes with the use of a 1” sleeve, welded into the process line. The primary application is pressure measurement in the head box of pulp and paper plants. The flush mount capability eliminates the possibility of clogging while the insertion design makes transmitter change out rapid and trouble-free. The STG93P transmitter is available in ranges from 0-5 to 0-100 psig and can be installed in a variety of hazardous locations.

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 Flush Mount 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 between the operator and the transmitter through our Smart Field Configurator (SFC). You can connect the SFC anywhere that you can access the transmitter signal lines.

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 downline 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.

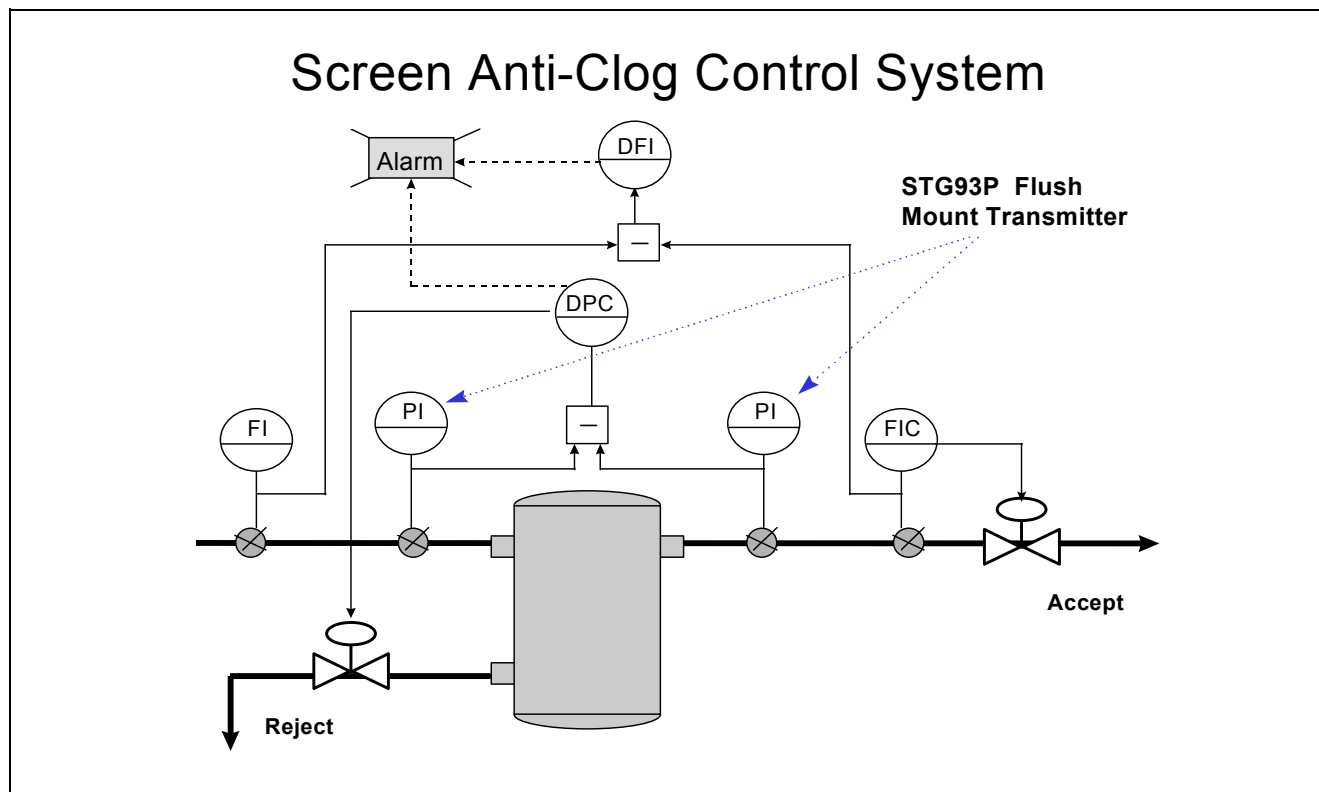


Figure 2 —ST 3000 STG93P Typical Installation.

Smart Technology Delivers Broad Benefits and Reduces Total Cost of Ownership

The ST 3000 Flush Mount Transmitter combines integrated sensor and microprocessor technologies to produce the most accurate and consistent measurement possible, and is based on ST 3000 technology which is the most reliable in the industry. These features help improve product yield, increase process efficiency and enhance plant safety.

In addition to the advantages of superior accuracy and reliability, the ST 3000 significantly lowers your lifetime cost of ownership in several ways:

Installation - Wiring cost savings are achieved, as well as reduced costs of piping, manifolds, mounting, safety barriers, etc., with the ST 3000.

Commissioning - The hand-held SFC III Smart Field Communicator lets a single technician remotely configure ST 3000 transmitters and re-range them when application requirements change.

Maintenance - The ST 3000 offers greater accuracy and stability, reducing the frequency of calibration. Self-diagnostics can automatically indicate impending problems before they affect reliability or accuracy. Also, a single technician can diagnose problems remotely, using the SFC or TPS Global User Station, saving time and reducing cost.

Inventory stocking - Enhanced reliability, combined with the high turndown capability of the ST 3000, reduces the quantity of instruments needed to stock as backups for the installed transmitters.

Digital Integration Links the ST 3000 to TPS for Greater Process Efficiency

Digital Integration combines the functions of TPS system with the strengths of the ST 3000 to help achieve maximum productivity, by providing:

Database security and integrity

- PV Status transmission precedes the PV value, guaranteeing that a bad PV is not used in a control algorithm.

Bidirectional communication and a common database for the system and the transmitter -

Data upload and download capability lowers transmitter installation costs.

Single-window diagnostics for the transmitter (electronics and meter body) and loop - Remote troubleshooting reduces maintenance effort and expedites repairs.

Automatic historization of all transmitter parameter changes

- System maintenance log automatically provides audit trail of changes.

Enhanced accuracy - Elimination of D/A and A/D converters improves signal accuracy.

Digital Integration of the ST 3000 Transmitter with TPS allows you to combine advanced transmitter technology with our state-of-the-art, process-connected controllers - the Process Manager, Advanced Process Manager and High Performance Process Manager. Digital Integration of the ST 3000 Transmitter with TPS improves the integrity of the process data measurements, letting you monitor process variability with greater accuracy. Accurate and more reliable data lets you implement advanced control strategies, providing greater bottom-line profits.

Specifications

Operating Conditions – All Models

Parameter	Reference Condition		Rated Condition		Operative Limits		Transportation and Storage	
	°C	°F	°C	°F	°C	°F	°C	°F
Ambient Temperature	25±1	77±2	-15 to 65	5 to 149	-15 to 65	5 to 149	-55 to 75	67 to 167
Process Interface Temp.	25±1	77±2	-15 to 65	5 to 149	-15 to 95*	5 to 203*	NA	NA
Humidity %RH	10 to 55		0 to 100		0 to 100		0 to 100	
Overpressure psi bar	0 0		150 10.3		150 10.3			
Vacuum Region - Minimum Pressure mmHg absolute inH ₂ O absolute	atmospheric atmospheric		300 150		2 (short term) † 1 (short term) †			
Supply Voltage, Current, and Load Resistance	Voltage Range: 10.8 to 42.4 Vdc at terminals Current Range: 3.8 to 21.8 mA Load Resistance: 0 to 1440 ohms (as shown in Figure 3)							

* Process temperatures above 65 °C (149 °F) require a 1:1 reduction in maximum ambient temperature.

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

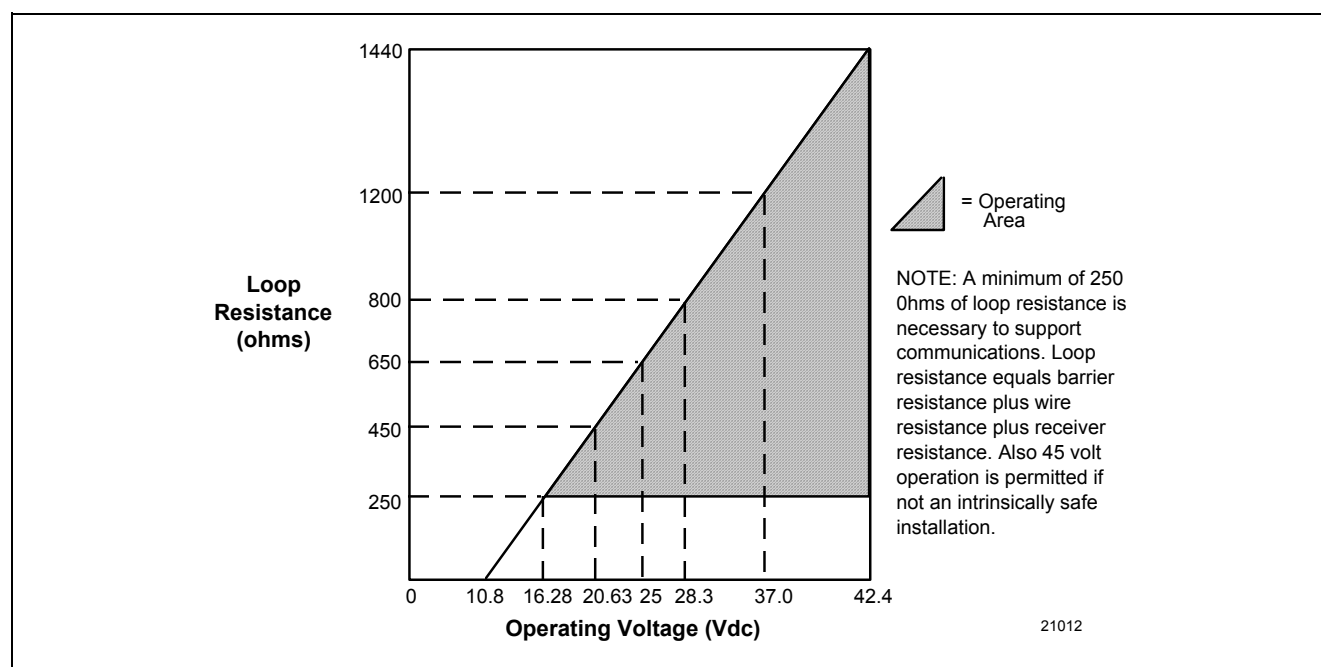


Figure 3 —Supply Voltage and Loop Resistance Chart.

Performance Under Rated Conditions* - Model STG93P 0-100 psig (0-7 barg)

Parameter	Description
Upper Range Limit** psig/barg	100 psig, 7 barg
Minimum Span psig/barg	5 psig, 0.3 barg
Turndown Ratio	20:1
Zero Elevation and Suppression	No limit (except minimum span) from zero to 100% of 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: $\pm 0.10\%$ of calibrated span or upper range value (URV), whichever is greater, - terminal based. For URV below reference point (25 psi), accuracy equals: $\pm 0.0125 + 0.0875 \left(\frac{25 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.0125 + 0.0875 \left(\frac{1.7 \text{ bar}}{\text{span bar}} \right)$ in % span In Digital Mode: $\pm 0.0875\%$ of calibrated span or upper range value (URV), whichever is greater, - terminal based. For URV below reference point (25 psi), accuracy equals: $\pm 0.0875 \left(\frac{25 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.0875 \left(\frac{1.7 \text{ bar}}{\text{span bar}} \right)$ in % span
Zero Temperature Effect per 28°C (50°F)	In Analog Mode: $\pm 0.40\%$ of span. For URV below reference point (50 psi), effect equals: $\pm 0.05 + 0.35 \left(\frac{50 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.05 + 0.35 \left(\frac{3.5 \text{ bar}}{\text{span bar}} \right)$ in % span In Digital Mode: $\pm 0.35\%$ of span. For URV below reference point (50 psi), effect equals: $\pm 0.35 \left(\frac{50 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.35 \left(\frac{3.5 \text{ bar}}{\text{span bar}} \right)$ in % span
Combined Zero and Span Temperature Effect per 28°C (50°F)	In Analog Mode: $\pm 0.50\%$ of span. For URV below reference point (50 psi), effect equals: $\pm 0.05 + 0.45 \left(\frac{50 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.05 + 0.45 \left(\frac{3.5 \text{ bar}}{\text{span bar}} \right)$ in % span In Digital Mode: $\pm 0.45\%$ of span For URV below reference point (50 psi), effect equals: $\pm 0.45 \left(\frac{50 \text{ psi}}{\text{span psi}} \right)$ or $\pm 0.45 \left(\frac{3.5 \text{ bar}}{\text{span bar}} \right)$ in % span
Stability	$\pm 0.03\%$ of URL per year

* Performance specifications are based on reference conditions of 25°C (77°F), 10 to 55% RH, and Hastelloy C diaphragm.

**Transmitter URL limit or maximum process connection rating, whichever is lower.

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% span per volt.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.
CE Conformity (Europe)	89/336/EEC, Electromagnetic Compatibility (EMC) Directive.
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
Process Interface	See Model Selection Guide for Material Options for desired seal type.
Diaphragm Materials (wetted)	Hastelloy C
Meter Body Materials (wetted)	316L Stainless Steel
Fill Fluid	Silicone (DC 200)
Electronic Housing	Epoxy-Polyester hybrid paint. Low copper-aluminum alloy. Meets NEMA type 4X (watertight) and designed to meet NEMA 7 (explosion proof).
Process Connections	Flush mount in 1" weld sleeve, with O-ring and locking bolt.
Wiring	Accepts up to 16 AWG (1.5 mm diameter).
Dimensions	See Figure 4.
Net Weight	3.9 pounds (1.8 Kg)
Approval Bodies - Hazardous Areas	Approved as explosion proof and intrinsically safe for use in Class I, Division 1, Groups A, B, C, D locations, and nonincendive for Class I, Division 2, Groups A, B, C, D locations. Approved EEx ia IIC T4, T5, T6 and EEx d IIC T5, T6 per ATEX standards. See attached Model Selection Guide for options.
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).

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.

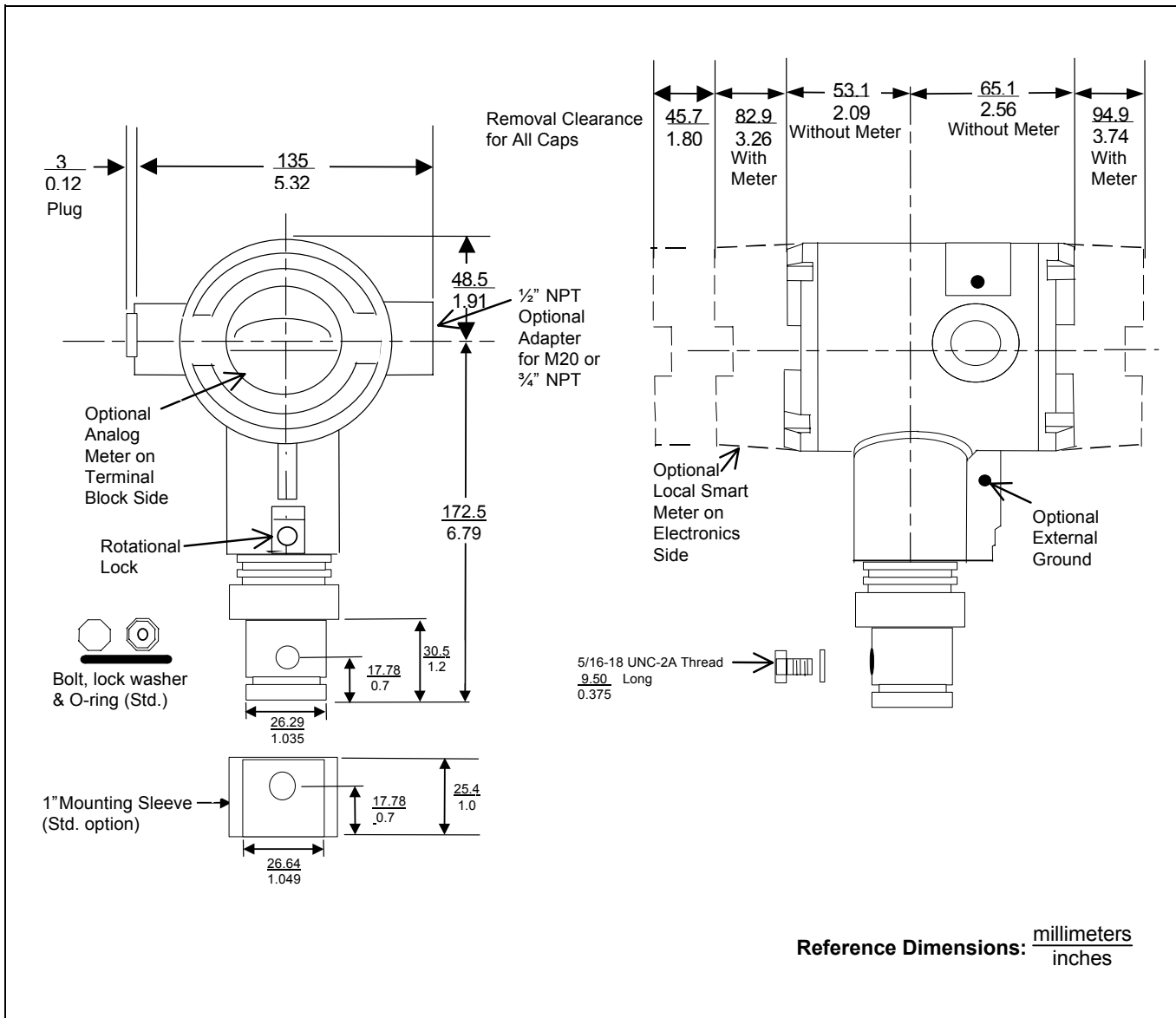


Figure 4 —Typical Mounting Dimensions for 1" Flush Mount Transmitter

Options	Ordering Information
<p>Indicating Meter (ME and SM Options) The Smart Meter (option SM) provides an LCD display for both analog and digital output and can be configured to display 0 to 100% pressure in selected engineering units.</p> <p>Local Zero and Span A local zero and span adjustment option is available (option ZS).</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 (Option HC) An optional electronics module is available for the Series 900 that provides HART Protocol compatibility. Transmitters with the HART Option are compatible with the AMS System. (Contact your AMS Supplier if an upgrade is required.)</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>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</p>
<p><i>Specifications are subject to change without notice.</i></p>	

Model Selection Guide (34-ST-16-52)

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.

Key Number I II III (Optional) IV
 [] - [] - [] - [] + []
 [] - [] - [] - [] + []

KEY NUMBER			Selection	Availability
Span			STG93P	↓
Gauge	0-5 to 0-100 psi	0-0.34 to 0-7 bar		

TABLE 1 METER BODY

Materials of Construction	Process Interface		Barrier Diaphragms		
	316 St. St.	-	Hastelloy C	F _ _	♦
Fill	Silicone			_ 1 _	♦
Process Head	1" Slip-in with Locking Screw (Sleeve not provided)			_ _ 1	♦

TABLE II

No Selection	00000	♦
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TABLE III - OPTIONS

	Selection	Availability
Custom Calibration and I.D. in Memory	CC	♦
Transmitter Configuration	TC	♦
316 ST.ST. Electronics Housing - <i>with M20 Conduit Connections</i>	SH	n
1/2" NPT to M20 316SS Conduit Adapter (BASEEFA EEx d IIC)	A1	n
1/2" NPT to 3/4" NPT 316 SS Conduit Adapter	A2	u
Stainless Steel Housing with M20 to 1/2" NPT 316 SS Conduit Adapter (<i>use for FM and CSA Approvals</i>)	A3	i

Table III continued next page

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TABLE III - OPTIONS

	Selection	Availability
None	00	♦
HART Protocol compatible electronics	HC	y
FOUNDATION Fieldbus Communications	FF	r
Analog Meter (0-100 Even 0-10 Square Root)	ME	♦
Smart Meter	SM	♦
Custom Configuration of Smart Meter	CI	m
Local Zero	LZ	s
Local Zero and Span	ZS	x
Lightning Protection	LP	♦
Custom Calibration and I.D. in Memory	CC	
Transmitter Configuration	TC	
Write Protection	WP	♦
Calibration Fixture (with 1/4" NPT Port for Pressure Source)	CF	♦
316L SS Mounting Sleeve (requires customer installation to process)	MS	♦
Stainless Steel Customer Tag (4 lines, 28 characters per line)	TG	♦
Stainless Steel Customer Tag (Blank)	TB	♦
Calibration Test Report and Certificate of Conformance (F3399)	F1	♦
Certificate of Conformance (F3391)	F3	♦
Certification of Origin (F0195)/"Attestation" if Amiens built	F5	♦
FMEDA (SIL) Certificate	F6	♦
Additional Warranty - 1 year	W1	♦
Additional Warranty - 2 years	W2	♦
Additional Warranty - 3 years	W3	♦
Additional Warranty - 4 years	W4	♦

Approval Body	Approval Type	Location or Classification		
NO HAZARDOUS LOCATIONS 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, Grps. A,B,C,D,E,F,G		
C S A	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, Grps. A,B,C,D,E,F,G		
S A	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	♦

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

97/23/EC Pressure Equipment Directive (PED)

The ST 3000 pressure transmitters listed in this Model Selection Guide are in conformity with the essential requirements of the PED. A formal statement from TÜV Industry Service Group of TÜV America, Inc., a division of TÜV Süddeutschland, a Notified Body regarding the Pressure Equipment Directive, is available upon request

TABLE IV

Factory Identification			X X X X	♦
Restriction Letter	Table	Available only with Selection	Not available with Table	Selection
a	Availability Pending			
b	Select only one option from this group			
i	III	1C or 2J		
m	III	SM		
n			III	1C, 2J
r			III	TC, ME, 4G, 3S
x			III	FF, ME
s	III	FF, SM		
u	III	F1D3, C1C3, 1C, 2J		
y			III	4G

CE Conformity (Europe) 89/336/EEC, Electromagnetic Compatibility (EMC Directive). All options.

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FOUNDATION™ is a trademark of the Fieldbus Foundation.

Honeywell

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