Honeywell

ST 2000

Pressure Transmitter

Operator Manual

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Notices and Trademarks

Release 2 (03/04)

Warranty/Remedy

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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About This Document

Revision Notes

The following list provides notes concerning all revisions of this document.

Doc ID	Rel ID	Date	Notes
34-ST-11-21	Issue 1	04/03	1st issue of document.
	Issue 2	03/04	Corrections under **Intrinsic Safety Approval, Electromagnetic compatibility**, and **Intrinsic safety Barriers;** Includes **Addendum 34-ST-99-33**, regarding applicability of ATEX Directive 94/6/EC.

Contacts

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Latin America	Honeywell Inc. Sunrise, Florida U.S.A.	(305) 364-2355	

Symbol definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	This CAUTION symbol on the equipment refers the user to the Product Manual for additional information. This symbol appears next to required information in the manual.
	This WARNING symbol on the equipment refers the user to the Product Manual for additional information. This symbol appears next to required information in the manual.
	WARNING: risk of electrical shock. This symbol warns the user of a potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.
	ATTENTION, Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices
	Protective Earth (PE) terminal. Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	Functional earth terminal. Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to protective earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground. Functional earth connection. NOTE: This connection shall be bonded to Protective earth at the source of supply in accordance with national and local electrical code requirements.
	Chassis Ground. Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

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Addenda

Addendum 34-ST-99-33 - ATEX Directive 94/6/EC (8 pages)

1. Overview

1.1..General

- The Series ST 2000 Pressure Transmitter is a microprocessor-based unit. This instrument is 2-wire loop-powered and gives a 4-20 mA output linearized to pressure.
- This transmitter measures and locally displays gauge pressure from 0.2 to 460 bar (3 to 6700 psi) or absolute pressure from 0.2 to 11.5 bar (3 to 165 psi). For greater absolute pressure measurements than 11.5 bar (165 psi) use the appropriate gauge pressure model. The effects of process temperature are compensated and software linearization is included.
- Parameters can be adjusted digitally. The 4 digits LCD indicator displays the measured reading either in engineering units or percentage.

1.2 Models

Table 1 Transmitter Models

GAUGE				
Model #	**NOMINAL Bar/(psi)**	**RANGE LIMITS (min./max.) bar/(psi)**	**SPAN (min./max.) bar/(psi)**	**OVERPRESSURE Max. bar/(psi)**
STG20F	0-2/(0-30)	-1 to 2.3/(-14.5 to 33)	0.2 to 3.3/(3 to 47)	7/(100)
STG20G	0-5/(0-70)	-1 to 5.75/(-14.5 to 83)	0.5 to 6.75/(7 to 98)	12/(174)
STG20H	0-10/(0-145)	-1 to 11.5/(-14.5 to 166)	1 to 12.5/(14.5 to 181)	25/(362)
STG20K	0-20/(0-300)	-1 to 23/(-14.5 to 333)	2 to 24/(30 to 348)	50/(725)
STG20L	0-50/(0-725)	-1 to 57.5/(-14.5 to 833)	5 to 58.5/(72.5 to 848)	120/(1740)
STG20M	0-100/(0-1450)	-1 to 115/(-14.5 to 1667)	10 to 116/(145 to 1682)	250/(3620)
STG20N	0-200/(0-2900)	-1 to 230/(-14.5 to 3335)	20 to 231/(290 to 3350)	500/(7250)
STG20P	0-400/(0-5800)	-1 to 460/(-14.5 to 6671)	40 to 461/(580 to 6686)	600/(8700)
ABSOLUTE				
Model #	**NOMINAL Bar/(psi)**	**RANGE LIMITS (min./max.) bar/(psi)**	**SPAN (min./max.) bar/(psi)**	**OVERPRESSURE Max. bar/(psi)**
STA201	0-2/(0-30)	0 to 2.3/(0 to 33)	0.2 to 2.3/(3 to 33)	7/(100)
STA202	0-5/(0-70)	0 to 5.75/(0 to 83)	0.5 to 5.75/(7 to 83)	12/(174)
STA203	0-10/(0-145)	0 to 11.5/(0 to 165)	1 to 11.5/(14.5 to 165)	25/(362)

EXAMPLE: STG20H

- This transmitter displays gauge pressure.
- Its nominal sensor range is 0-10 bar (0-145 psi).
- The minimum LRV value is –1 bar (-14.5 psi).
- The maximum URV value is 11.5 bar (165 psi).
- The minimum span value is 1 bar (14.5 psi).
- The maximum span value is 12.5 bar (181 psi).
- The maximum permitted overpressure is 25 bar (362 psi).

2. Technical Specifications

2.1 Environmental Conditions

Table 2 Environmental Conditions

	Reference	Operating limits	Process fluid standard connections	Process fluid connections with flush diaphragm seals	Storage
Temperature	23°C 73.4°F	-20/+80°C -4/+176 °F	-20/+80°C -4/+176°F	-20/+130°C -4/+266°F	-20/+90°C -4/+194°F
Humidity (%RH)		0/100			
Supply Voltage (VDC)	24	11.1/30			
	(Resistive load = 576 Ω)				

2.2 Performance In Operating Range

- Performance specifications are given at ambient temperature (23°C/73.4°F) and nominal range. All errors are given as percentages of nominal range.
- Output accuracy: ± 0.2 % of calibrated span or URL, whichever is greater. (Including non linearity, repeatability, hysteresis)
- Thermal drift: referred to 0/60°C (32°F/140°F) range as percentage of the nominal range
  Zero: ± 0.2 %/10°C (50°F)
  Span: ± 0.2 %/10°C (50°F) at nominal range
- LCD display reading: operating between –10 and +65°C (14°F and 149°F)
- 4 digits LCD display, 5 symbols (bar, mbar, PSI, %, sec)
- Power supply effect: negligible between 11.1 and 30 VDC

2.3 Functional Specifications

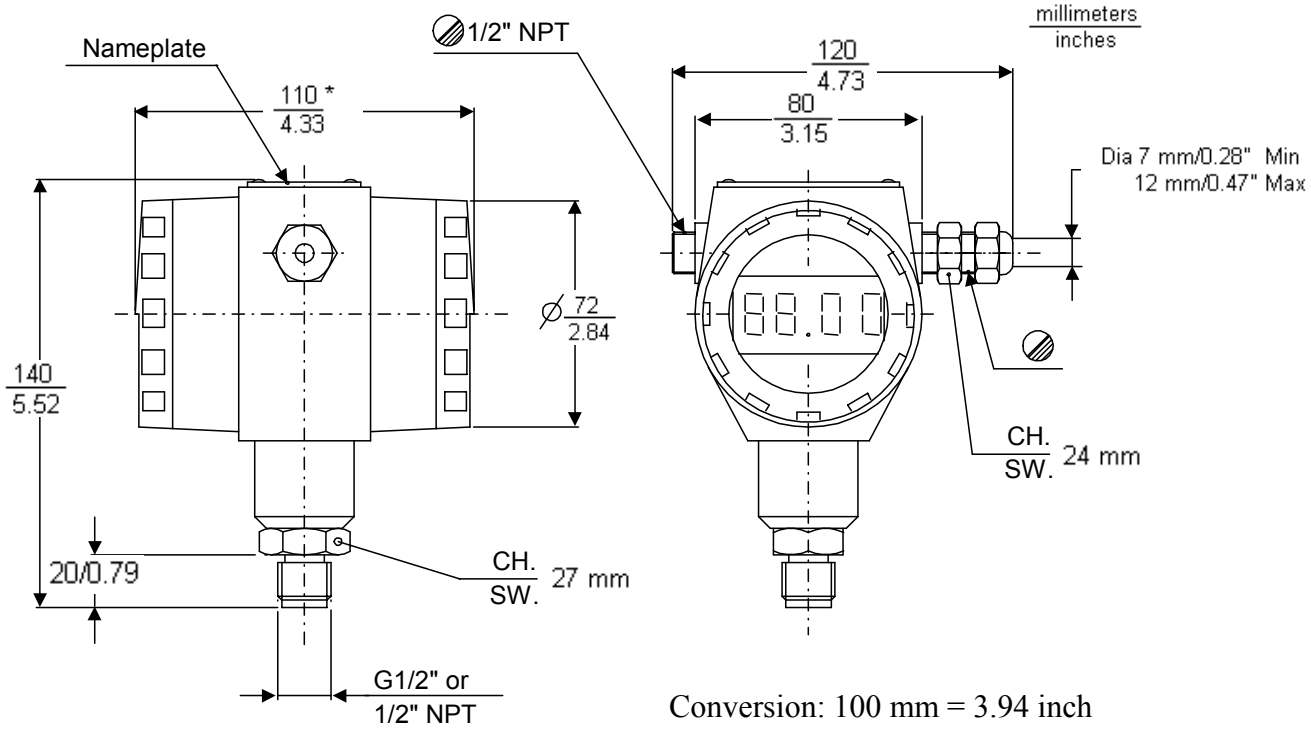
- Output: 2 wire 4–20 mA
- Extended working range: 3.8–20.8 mA
- Extreme output limits: <3.6 mA and > 21.8 mA
- Load Resistance Limits: 0 to 844 ohms as shown in Figure 14 Operating Area.

2.4 Physical Specifications

Material
Housing: Die cast aluminum alloy AL UNI 4514 finished with epoxy resin powder (light beige).
Covers: Aluminum
Covers O-ring: Buna N
Identification tags: SS permanently mounted on the instrument.
Wetted parts: alumina (aluminum oxide), AISI 316, Viton/kalrez.

Environmental protection
The transmitter is dust and sand tight and protected against water penetration as defined by IEC IP 66 – Suitable for tropical climate operation as defined in DIN 50.015.

Process connections	1/2 ANSI B2.1 (NPT-F)	Alum. Ox.	(Figure 5)
	1/2" ANSI B2.1 (NPT-F)	AISI 316	(Figure 6)
	1/2" ANSI B2.1 (NPT-M)	AISI 316	(Figure 7)
	G1/2 UNI/ISO 228/l	Alum. Ox.	(Figure 1)
	1/2 ANSI B2.1 (NPT-M)	Alum. Ox.	(Figure 1)
	G1/2 UNI/ISO 228/l	AISI 316	(Figure 2 Flush connections)
	G1 UNI/ISO 228/l	AISI 316	(Figure 2 Flush connections)
	Union nut (65×1/6)	AISI 316	(Figure 4 Sanitary connection)
	Union nut (78×1/6)	AISI 316	(Figure 4 Sanitary connection)
	Clamp (1 ½")	AISI 316	(Figure 3 Tri-clamp connection)
	Clamp (2")	AISI 316	(Figure 3 Tri-clamp connection)
Electrical connections	Two cable entries on electronic housing 1/2" NPT and cable gland PG 13.5 for 7 to 12 mm diameter cable.		
Terminal board	Standard: two terminals for signal wiring up to 1.5 mm^2 – 14 AWG. Earth connection for shield of cable.		
Mounting	Direct on pressure connection or with optional mounting bracket		
Net weight	0.85 Kg (1.87 Ibs)		



* 100 mm Clearance to remove cover (both ends)

Figure 1

DIMENSIONS:

Conversion: 100 mm = 3.94 inch

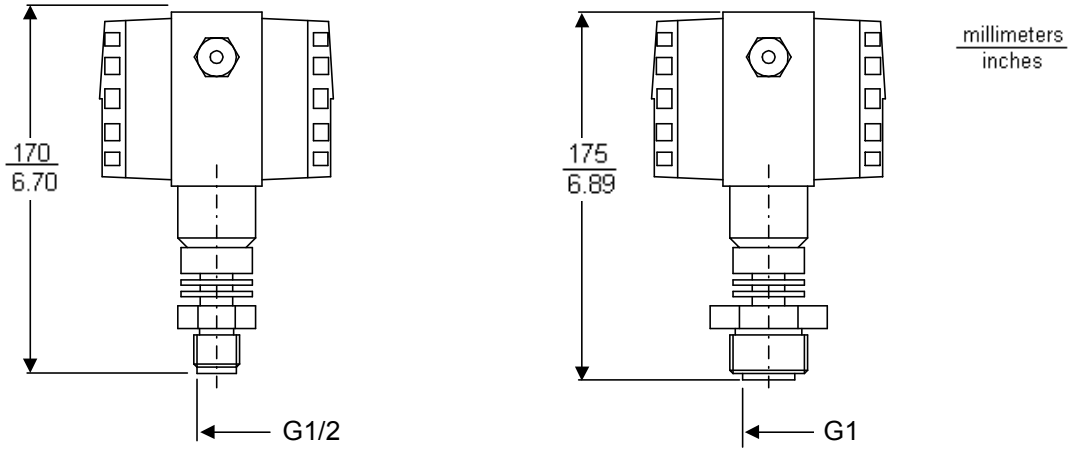


Figure 2 Flush connections

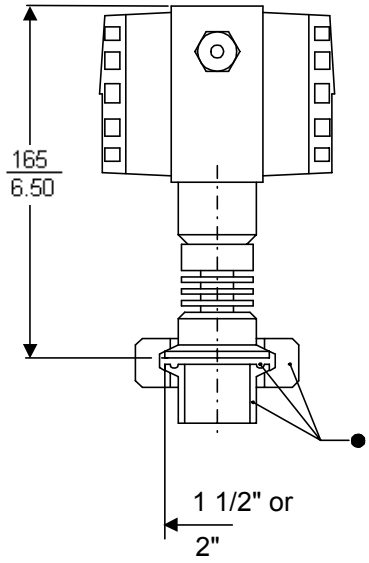
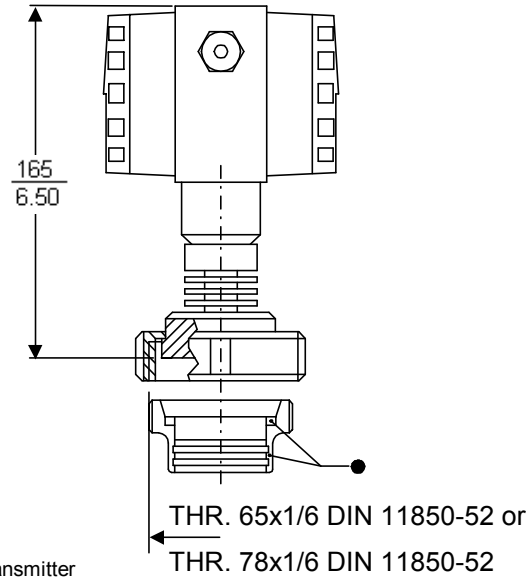


Figure 3 Tri-clamp connection



● Not included with the transmitter

Figure 4 Sanitary connection

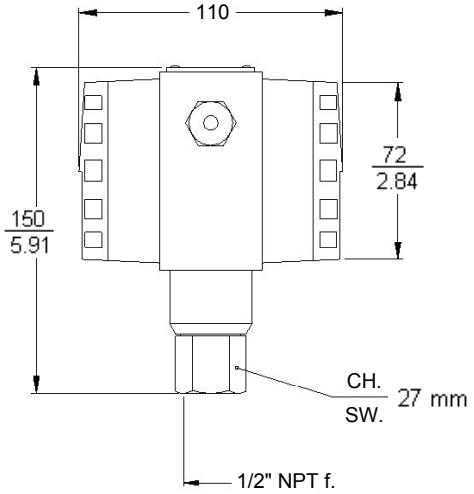


Figure 5

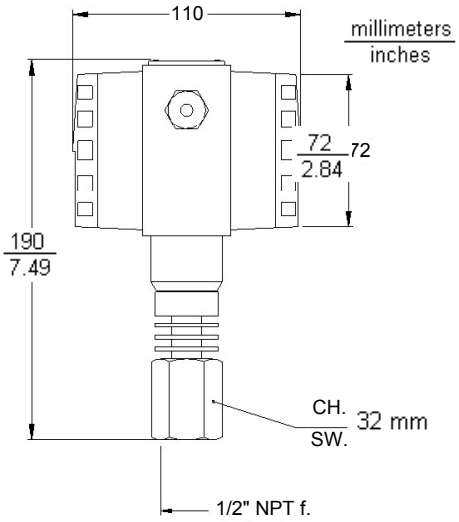


Figure 6

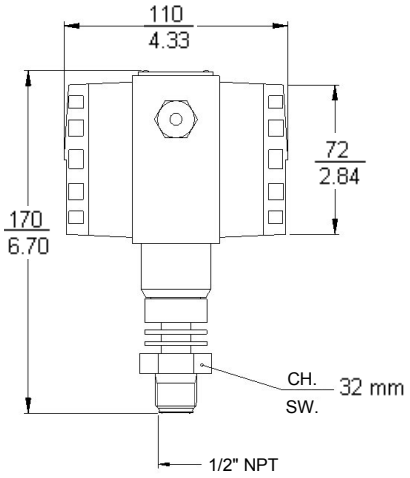


Figure 7

Conversion: 100 mm = 3.94 inch

2.5 Intrinsic Safety Approval

Classification

- Type: intrinsic safety CESI 04 ATEX 039 ⟨Ex⟩ II 1G, EEx ia IIB T6, T5, T4 to EN 50.014 and EN 50.020 suitable for Zone 0 Groups IIA, IIB.
- Certification: Refer to Addendum 34-ST-99-33 at the end of this Operator Manual.
- Ambient temperature ranges T6: -20 to 40°C (-4°F to 104°F)
  T5: -20 to 55°C (-4°F to 131°F)
  T4: -20 to 80°C (-4°F to 176°F)

2.6 Electromagnetic Compatibility

In conformity with the EMC Directive 89/336/EEC according to EN 61326-1-1997.

3. Theory of Operation

3.1 Basic Operation

The functional block diagram of the transmitter is shown in the figure below:

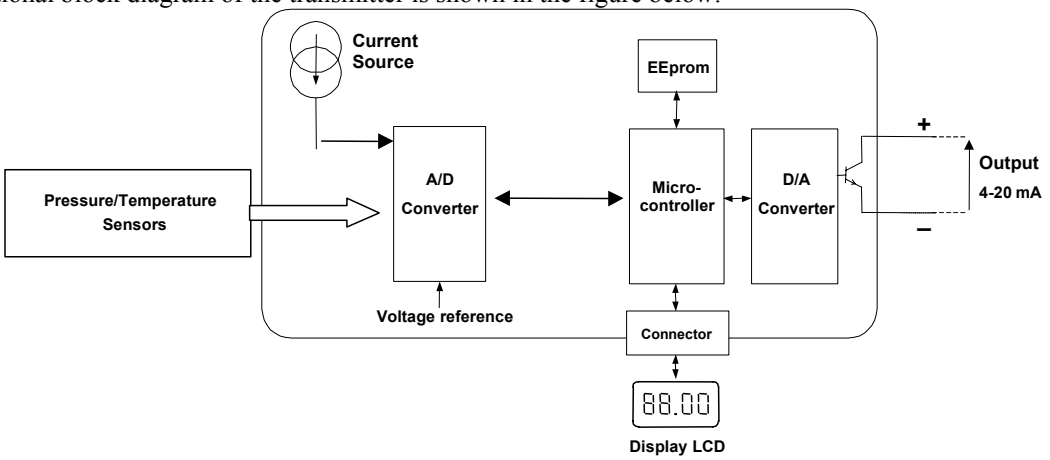


Figure 8 Functional Block Diagram

-
- Inputs are sampled and digitized by the "analog to digital" converter (ADC). The sensor signal integrity is checked by a diagnostic routine. Digital data is linearised and converted to the selected engineering units e.g. bar. The measurement is then ranged to the lower and upper range values. This value is finally converted to a 4-20 mA analog output signal. The configuration is held in a non volatile memory (not lost in case of power failure).
- The transmitter configuration can be changed by using several functions through the push buttons on the LCD display.
- The transmitter continuously performs internal diagnostics to give maximum reliability and help the user to identify any problems. Any critical condition will drive the output to the selected failsafe direction (Hi/Lo).

3.2 Transmitter Output Levels

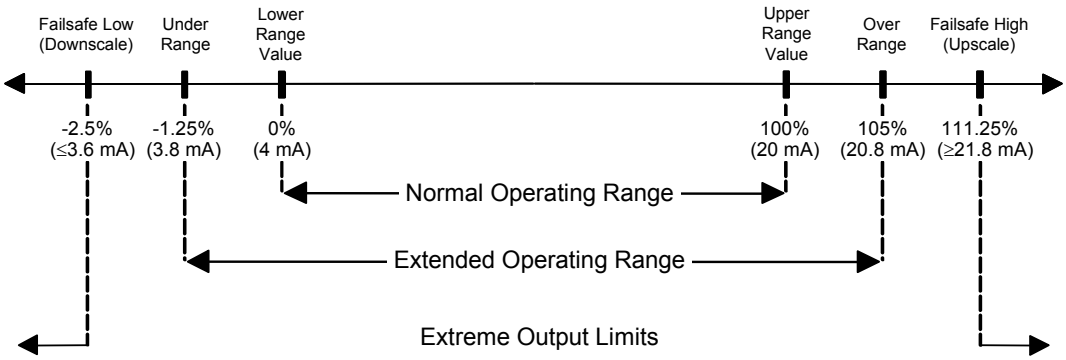


Figure 9 Output levels

3.3 Intrinsic Safety Barriers

- For use in hazardous area, the construction of transmitters series ST 2000 are in accordance with the Certificate listed in Addendum 34-ST-99-33 (near the back of this manual), intrinsically safe, EEx ia IIB T6, T5, T4.
- Safety barriers are required on power supplies between the safe location and the hazardous location.
- The transmitter intrinsic safety entity parameters are 30 V and 152 mA. Suitable safety barriers should limit the available energy to lower values than these (e.g. 28 V/93 mA), and are available from all suppliers of safety barriers (e.g. MTL, PEPPERL+FUCHS, STAHL, ABB, etc).
- Full details of the transmitter certified parameters are: $V_i = 30$ V ; $I_i = 152$ mA ; $P_i = 0.95$ W ; $C_i = 10$ nF ; $L_i = 135$ µH

4. Bench Check Installation And Commissioning

4.1 Unpacking

Unpack the unit and verify the contents are as ordered:

- the ST2000 transmitter,
- one plug ½'' NPT and one ½'' NPT cable gland,
- one Allen wrench (used to adjust the orientation of the head of the transmitter if needed)

	During the delivery, the transmitter head is not locked in order to allow an optimum positioning for the mounting.

4.2 Instrument Identification

- Instrument data can be found on the nameplate fixed to the top of the transmitter housing. (Model, Serial number, Tag, Calibration, Nominal Range, …). A facsimile of this nameplate is included in Addendum 34-ST-99-33.

- The Figure 10 shows both sides of the housing with covers removed.

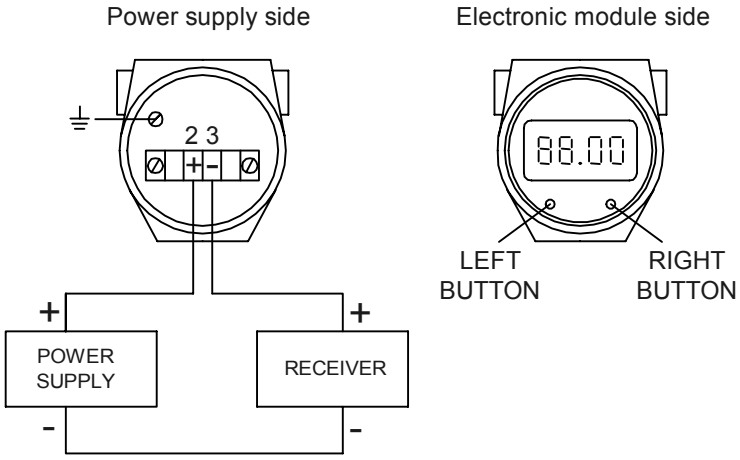


Figure 10 Housing, Covers removed

4.3 INSTALLATION

Transmitter Mounting

- The transmitter is supplied for direct mounting or with a mounting bracket when it is equipped with remote seal and capillary tubing.
- The bracket may be used in any case (supplied on request) for fixing to a DN50 pipe, horizontal or vertical or used for surface mounting. Refer to dimensional drawing for details and clearances.
- The housing position does not affect the instrument operation. Figure 11 and Figure 12 show the simplest mounting, direct on piping.

⚠	When you have finished the mounting, do not forget to lock the transmitter head positioning screw.

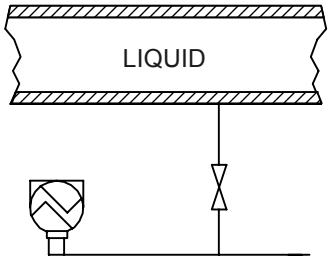


Figure 11 Pressure measurement for liquid

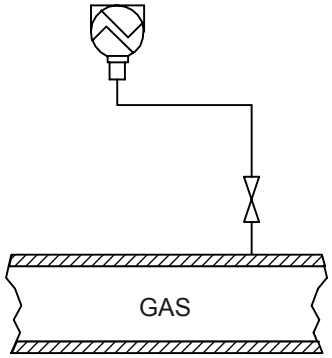


Figure 12 Pressure measurement for gas

Transmitter Wiring

- Remove the cover of terminal compartment for access to terminals +, -, and ground (earth).
- Insert the power supply cable through one of the two 1/2" NPT openings. In the case of reversed polarity the instrument will not be damaged. See Figure 13 for a typical connection.
- A 2-core cable (section 0.5 mm^2 or greater) may be used for connection. Twisted wires are better protected from electrical noise. Some applications may require shielded cables, earth the shield at the power supply ground only. Avoid locating cables near AC power cables such as main supplies.
- Connect the earth screw to a ground, preferably the same ground used in the measuring circuit. Cabling may be up to 3 km long. Reinstall the removed cover.

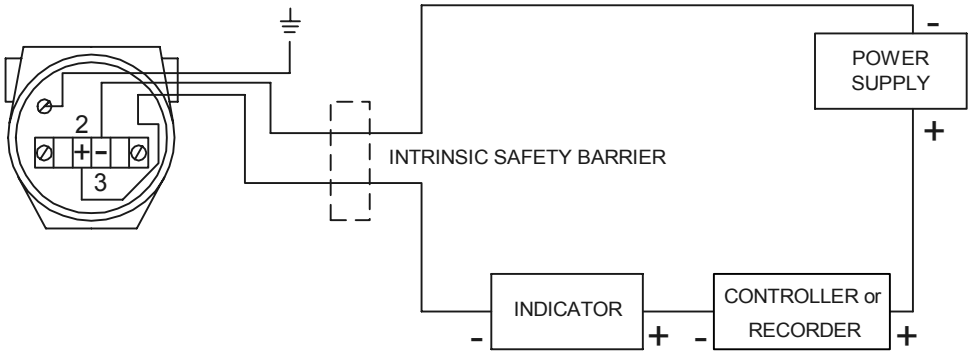


Figure 13 Typical Wiring Connections

Power supply

- To guarantee a 4 to 22.4 mA output signal, the minimum supply voltage must be checked. It is a function of the total resistive load (output load). This value is the sum of the resistance of each component in the circuit, excluding the transmitter. See Figure 14 for minimum supply voltage required.
- The value can also be obtained from the following formula:
  $V = 0.0224 \times R + 11.1$ where R = output load
- For a total circuit resistance of 576 Ohms, the minimum supply voltage must be 24 VDC.
- The power unit must be able to provide a minimum current of 25 mA for standard operation of the current loop.

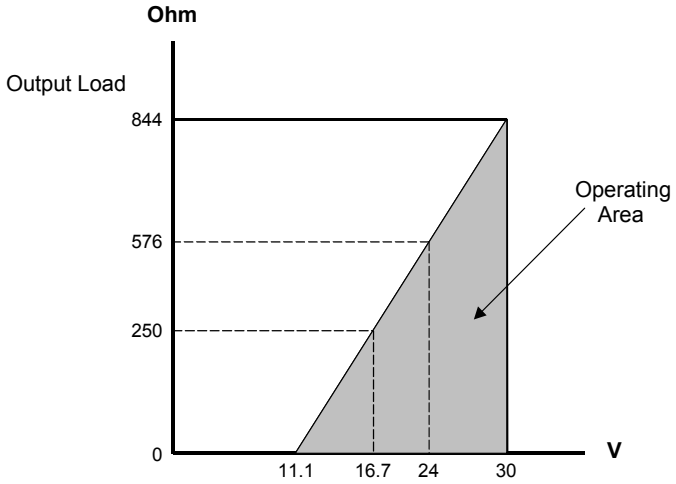


Figure 14 Operating Area

5. Configuration

5.1 Display and Push Buttons

- When you power up the instrument, it will show a pre-established sequence for about 6 seconds. This procedure allows the display of the software revision, test of the LCD segments, internal diagnostics, etc.
- After initialization, the display shows the primary variable (pressure).
- The push buttons combinations are referenced as follows:

LB	⇨	Left Button
RB	⇨	Right Button
LB+RB	⇨	Both buttons are pushed at the same time
LB or RB	⇨	One of the two buttons
LB&RB	⇨	First press **LB**, while **LB** is pressed, press **RB**
RB&LB	⇨	First press **RB**, while **RB** is pressed, press **LB**

5.2 Configuration Of The Display

The display parameters that can be configured are:

GROUP 1: Pressure unit configuration

- bar (automatically to mbar if value low) or
- PSI depending on the selected engineering unit (see function F9)
- % relative to the span set by the user (LRV/URV).

You can also configure the display to alternate between two measurements units:

- Automatic switching between [bar or PSI] and %
- Automatic switching between [bar or PSI] and °C (where °C is the sensor temperature)

GROUP 2: Temperature or pressure

- Temperature of the sensor expressed in °C
- Pressure expressed as % of the sensor normal measuring range (LRL/URL)
- Numerical value of the analog to digital converter.

To select the desired configuration:

- First rotate by pressing **LB** as many times as necessary to reach the desired unit, then release **LB**.
- To change from Group 1 to Group 2, push **LB** followed by **RB** (**LB&RB)**.
- To activate/inactivate the alternate display of [bar <-> %] or [PSI <-> %], enter in Group 1, hold **LB** for about 2 seconds.
- To activate/inactivate the alternate display of [bar <-> °C] or [PSI <-> °C], enter in Group 1, hold **RB** for about 2 seconds.

Example

- If you want to read the pressure as a % of the sensor nominal range (LRL/URL):
  1. Select group 2 by **LB&RB.**
  2. Press **LB** as many times as necessary to read the pressure as a % of the sensor nominal range, then release.

- If you want to read the pressure in bar:
  1. Go back to group 1 by **LB&RB.**
  2. Press **LB** as many times as necessary to read the pressure value with the symbol “bar”, then release.

5.3 Configuration Of The Device - Use Of Functions

The device configuration functions are:

F1	⇨	Save configuration in Non Volatile Memory
F2	⇨	Display of LRV and URV
F3	⇨	Low Range Value
F4	⇨	Upper Range Value
F5	⇨	Damping
F6	⇨	Configure and calibrate LRV/URV from input pressures (span unchanged)
F7	⇨	Configure and calibrate LRV/URV from input pressures (span modified)
F8	⇨	Calibrate zero pressure reference
F9	⇨	Engineering unit (bar/PSI)
F10	⇨	Failsafe direction

- To scroll functions, keep the **LB+RB** pushed until you reach the desired function.
- When the required function appears on the display, the buttons have to be released to remain in that state.
- Functions can be executed according to the procedure described in the following paragraphs.
- A time out is implemented and therefore, if no action is taken after 3 seconds, the device returns to the normal display.

FUNCTION 1: Allows the storage of the configuration in the Non Volatile Memory

Press **LB+RB**	⇨	to select F1, then release
Press **LB**	⇨	A short message will appear (Ld) to confirm that your configuration has been loaded in the Non Volatile Memory.

After this message, the system returns to the normal display and your configuration has been saved.

FUNCTION 2: Low Range Value (LRV) and Upper Range Value (URV) display only

With this function you can read LRV and URV but you cannot change them. (See functions 3 and 4 for any change.)

Press **LB+RB**	⇨	until you reach F2, then release
Press **LB**	⇨	Display LRV
Press **LB&RB**	⇨	Display LRV as % of the sensor nominal range
Press **RB**	⇨	Display URV
Press **RB&LB**	⇨	Display URV as % of the sensor nominal range

FUNCTION 3: Allows to change the LRV without changing URV (span will be modified)

Press **LB+RB**	⇨	until you reach F3, then release
Press **LB** or **RB**	⇨	Display LRV
Press **RB**	⇨	Increase until you reach the desired value
Press **LB**	⇨	Decrease until you reach the desired value
Press **RB+LB**	⇨	Store the value in Volatile Memory

After the confirmation LB+RB, the message “Ld” will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

NOTE: The minimum span you are allowed to set without changing URV is 10 % of the sensor nominal range.

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION 4: Allows to change the URV without changing LRV (span will be modified)

Press **LB+RB**	⇨	until you reach F4, then release
Press **LB** or **RB**	⇨	Display URV
Press **RB**	⇨	Increase until you reach the desired value
Press **LB**	⇨	Decrease until you reach the desired value
Press **RB+LB**	⇨	Store the value in Volatile Memory

After the confirmation LB+RB, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

NOTE: The minimum span you are allowed to set without changing LRV is 10 % of the sensor nominal range.

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION 5: Allows to display and modify the damping filter

Press **LB+RB**	⇨	until you reach F5, then release
Press **LB** or **RB**	⇨	Display the filter value
Press **RB**	⇨	Increase until you reach the desired filter value
Press **LB**	⇨	Decrease until you reach the desired filter value
Press **RB+LB**	⇨	Store the value in Volatile Memory

After the confirmation LB+RB, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

NOTE:

- The filter value you are allowed to set is between 1 second and 51 seconds.
- If the filter value is not equal to zero, the "sec." symbol will appear in normal display.

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION 6: Allows to configure and calibrate URV or LRV using the input pressures (span unchanged)

Press **LB+RB**	⇨	until you reach F6, then release
	⇨	Apply LRV pressure
Press **LB**	⇨	Display the applied pressure value
Press **LB&RB**	⇨	Set LRV (4 mA) to the displayed pressure value
	⇨	Apply URV pressure
Press **RB**	⇨	Display the applied pressure value
Press **RB&LB**	⇨	Set URV (20 mA) to the displayed pressure value

The new LRV is accepted only if:

- Pressure value < 105 % of the sensor nominal range
- Pressure value + span < 115 % of sensor nominal range

The new URV is accepted only if:

- Pressure value < 115 % of the sensor nominal range
- Pressure value – span > -1 bar

When the above mentioned conditions are met, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display. If the message "Ld" does not appear, the first step of F6 is displayed again.

NOTE: The minimum span you are allowed to set is equal to 10 % of the sensor nominal range.

Remember to store the new values in the Non Volatile Memory though the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION 7: Allows to configure and calibrate URV or LRV using the input pressures (span modified)

Press **LB+RB**	⇨	until you reach F7, then release
	⇨	Apply LRV pressure
Press **LB**	⇨	Display the applied pressure value
Press **LB&RB**	⇨	Set LRV (4 mA) to the displayed pressure value
	⇨	Apply URV pressure
Press **RB**	⇨	Display the applied pressure value
Press **RB&LB**	⇨	Set URV (20 mA) to the displayed pressure value

The new LRV is accepted only if:

- Pressure value < 105 % of the sensor nominal range
- Pressure value > -1 bar

The new URV is accepted only if:

- Pressure value < 115 % of the sensor nominal range
- Pressure value > -1 bar + 10 % of sensor nominal range

When the above mentioned conditions are met, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display. If the message "Ld" does not appear, the first step of F7 is displayed again.

Only when the condition **Pressure value > -1 bar** is not met, the transmitter will change the span to have a span value equal to 10 % of the sensor nominal range.

Remember to store the new values in the Non Volatile Memory though the F1 function otherwise the data will get lost after switching off the instrument.

FUNCTION 8: Allows to calibrate the zero pressure value of the instrument

Press **LB+RB**	⇨	until you reach F8, then release
	⇨	Ensure zero pressure applied
Press **LB**	⇨	Display the applied pressure value
Press **LB&RB**	⇨	Set the primary value to zero The display will show "0000" value
Release **LB** while **RB** is still pressed	⇨	"Ld " is displayed: loaded in the volatile memory

After the "Ld" message, the system returns to the normal display

Remember to store the new values in the Non Volatile Memory though the F1 function otherwise the data will get lost after switching off the instrument.

FUNCTION 9: Allows to choose the engineering units PSI or bar

Press **LB+RB**	⇨	until you reach F9, then release
Press **LB**	⇨	Display the actual engineering unit
Press **LB&RB**	⇨	Change the unit (bar <-> PSI)
Press **LB**	⇨	Store the engineering unit in volatile memory, then system returns to the normal display

WARNING:

- The time out will confirm the last unit you have selected (same effect as press **LB**).
- If the bar engineering unit has been selected, the symbol "bar" (or mbar) will appear on the display.
- If the PSI engineering unit has been selected, the symbol PSI will not appear with the primary value, but will be displayed alone every ten seconds.

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION 10: Failsafe direction Selection

The transmitter will go to a failsafe direction when it detects a failure. (In that case, the measurement in % on the display goes to 555.5 %.)

LO: low alarm with a fixed current < 3.6 mA
HI: high alarm with a fixed current > 21.8 mA

Press **LB+RB**	⇨	until you reach F10, then release
Press **LB**	⇨	Display the actual failsafe direction
Press **LB&RB**	⇨	Change the direction (Hi <-> Lo)
Press **LB**	⇨	The choice becomes effective, the system returns to the normal display.

WARNING:
The time out will confirm the last direction you have selected (same effect as **LB** pressed).

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

6. Maintenance/Troubleshooting

6.1 Maintenance

- The transmitter has no moving components and therefore the maintenance operations are related only to the environmental conditions.
- It is suggested to plan a periodic check of the internal parts in the top housing to ensure that no moisture penetration is present and that the terminals are clean to assure a good electrical continuity (do not use solvents for cleaning).

6.2 Troubleshooting

- Verification of correct operation of the transmitter should be based on the instructions discussed in the present manual.
- In absence of an output signal or an output value not corresponding to the real value, the following tests are suggested:

Connections

- The process piping must be installed correctly; unwanted gas or liquid pockets can affect the measured value and accumulation of dirt and pipe incrustation may cause blocks.
- The process isolation valve must be in the open position. Check that wiring is correct (polarity) and in good condition, both for main supply and shielding.

External load

Supply voltage value is a function of the resistive load; verify this value. (See Figure 14.)

Power supply

- The DC voltage must have the correct value and polarity (11.1 – 30 VDC).
- Calibration tests: Follow the instruction in chapter 5.

ST 2000 Pressure Transmitter

34-ST-99-33
3/04

Addendum
(to Operator's Manual 34-ST-11-21)

Overview

ATEX Directive 94/6/EC

The ATEX Directive 94/6/EC is a European CE Mark directive concerning products that are designed for use in potentially explosive environments. This "New Approach" directive is based on, and is an expansion of, European Norms (EN, CENELEC standards).

On June 30, 2003, the ATEX (ATmospheres EXplosibles) directive will replace directives currently in effect, and from that time, only products with the ATEX certification and with ATEX labeling will be approved for free movement in the 19 EU (European Union) and EFTA (European Free Trade Association) countries. As defined in the directive, "free movement" refers to:

- placing a product on the market, and/or
- placing a product into service.

The ATEX Directive 94/6/EC is a living (set of) document(s), subject to further change and refinement, whose details are beyond the scope of this addendum. Further information can be obtained in the Official Journal of the European Communities No L100/1, and in related publications such as Guidelines on the Application of Directive 94/9/EC. Both of these items are available at:

http://europa.eu.int/comm/enterprise/atex/index.htm

Products that have been previously certified under the EN and CENELEC European Norms, and which comply fully with all standards in the New Approach directive have, by application, received certification under ATEX Directive 94/6/EC.

The Honeywell ST 2000 Pressure Transmitter is now ATEX certified, and all units manufactured currently and in the future will include labeling that includes all markings required under the ATEX directive.

Inclusions

To ensure that all required information will be available to the user, the following items are include with this Addendum for reference:

1. Declaration of Conformity – ATEX CE 0344 (Honeywell document number 51453504 Revision A).

Purpose and Content of this Addendum

This Addendum includes information required under the ATEX Directive regarding:

1. The appearance and meaning of each certification mark (CE Mark) that appears on the label(s) affixed to the product.
2. Instructions for installation and use of the product is given in:

   34-ST-11-21 – ST 2000 Pressure Transmitter Release Operator's Manual, of which this Addendum is a part.

Details regarding certification marks that appear in labeling for this product are given in this addendum.

Attention

The publications cited above and the functioning and construction (except for labeling) of the devices described therein are essentially unchanged. The purpose of this addendum is to provide details on the purpose and appearance of the labels attached to each device under ATEX Directive 94/6/EC.

Attention

Before installing the equipment in a potentially explosive atmosphere, please read the information provided in this Addendum, which supports the ATEX certifications for this product.

CE Conformity

The ST 2000 Pressure Transmitter is in conformity with the protection requirements of the following European Council Directives: 94/9/EC, the Explosive Atmospheres (ATEX) Directive, 89/336/EEC, and the Electromagnetic Compatibility (EMC) Directive.

In conformity with the ATEX directive, the CE mark on the certification nameplate includes the Notified Body identification number 0344, (KEMA) adjacent to the EC Type Examination Certificate number.

Deviation from the installation conditions in this manual may invalidate this product's conformity with the Explosive Atmospheres, and EMC Directives.

Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed.

Marking, ATEX Directive

Honeywell's Model ST 2000 Pressure Transmitter, with the following nameplate attached, has been certified to comply with Directive 94/9/EC of the European Parliament and the Council as published in the Official Journal of the European Communities No. L 100/1 on 19-April-1994.

Marking, ATEX Directive

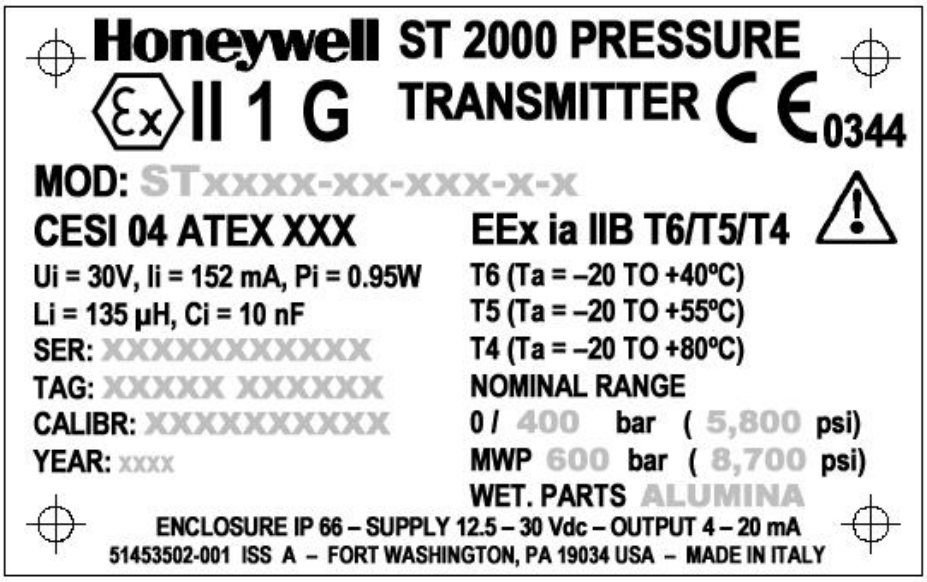
Continued

The following information is provided as part of the labeling of the transmitter:

- Name and address of the distributor: Honeywell, Fort Washington, PA 19034 USA.
- Notified Body for Type Examination Certificate: CESI – 0722, Centro Elettrotacnico Sperimentale Italiano Glacinto Motta SpA, Via R. Rubattino 54, 20134 Milano – Italia.
- Notified Body for Honeywell Production Quality Assurance Notification: KEMA – 0344, Quality B. V. Utrechtseweg 310, 6812 AR Arnhem. The Netherlands
- For complete model number, see the Model Selection Guide 34-ST-16-57.

Nameplate:

51453502-001 is a representation of the nameplate attached to the ST 2000 Pressure Transmitter.



Specific Parameters for Intrinsic Safety

Field wiring terminals, (**+** , **–**):	Ui = 30 V,	Ii = 152 mA,	Pi = 0.95 W
	Ci = 10 nF,	Ri = 0,	Li = 135 µH

Special conditions for safe use,

The ST 2000 Pressure Transmitter is an intrinsically safe apparatus that may be installed in a Group IIB (Ethylene) potentially explosive atmosphere.

Intrinsic Safety

The power terminals (+, -) must be connected only to a certified associated intrinsically safe apparatus.

The electrical parameters (U, I, and P) of the associated apparatus connected to the power terminals (+, –) must not exceed the following values:

$U_i \leq 30V$ $I_i \leq 152$ mA $P_i \leq 0.95$ W

Ambient temperature: -20ºC to 80ºC

Temperature classifications: T6 Ta = -20 to +40ºC

T5 Ta = -20 to +55ºC

T4 Ta = -20 to +80ºC

Enclosure classification: IP 66

Installation

Fitness of the transmitter for the installation area

In case of use in areas with danger of explosion, it must be verified that the identified type of transmitter is suitable for the classification of the zone and for the presence of flammable substances in the plant.

The safety essential requisite against the risk of explosion in the classified areas are fixed from the European Directives 94/9/CE of March 23 rd 1994 (as far as it concerns the apparatus) and 1999/92/CE of December 16th 1999 (as far as it concerns the plant).

The classification of the areas with risk of explosion is specified in standard EN60079-10, Electrical Apparatus for Explosive Gas Atmospheres – Part 10, Classification of hazardous areas.

The technical requirements for electric fittings in the classified areas are given in standard EN60079-14, Electrical Apparatus for Explosive Gas Atmospheres – Part14, Electrical installations in hazardous areas (other than mines).

The plate shows the functional data and the references of the notified body for the certification.

Safety data definitions

II 1 G	Transmitter for surface plants with presence of gas or vapours, Group II, category 1, suitable for zone 0 and with redundancy for zone 1 and 2.
EEx ia	Intrinsically Safe transmitter, category ia.
II B	Group IIB apparatus, suitable for substances (gas) of group IIB.
T6, T5, T4	Temperature Class of the transmitter (maximum temperature)
CE	Conformity mark to European Directives applicable to the apparatus
⟨Ex⟩	Conformity marking to 94/9/CE Directive and technical rules
Ta	Ambient temperature
Ui, Ii, Pi, Ci, Li	Maximum Input parameters of the apparatus (related to intrinsic safety)

Notes:

a) Transmitters suitable for the group IIB are also suitable for gas group IIA;

b) Transmitters with temperature class of T6 are also suitable for all substances with higher temperature classifications (T5, T4, T3, T2, T1);

c) Transmitters with temperature class of T5 are also suitable for all substances with higher class of temperature (T4, T3, T2, T1);

d) Transmitters with temperature class of T4 are also suitable for all substances with higher class of temperature (T3, T2, T1);

e) Associated apparatus must be chosen based on the maximum input parameters of the transmitter.

Additional Warnings for Installation

Refer to the Operator's Manual for correct installation.

Process pressure and temperature must not exceed the marked Maximum Allowable Working Pressure (MAWP) or maximum specified process temperature.

When the transmitter is connected to the process it can be subjected to high pressures and temperatures. To avoid accidents from the sudden discharge of pressure and/or contact with dangerous or flammable fluids, pay special attention when the transmitter is taken out of service, heated or repaired. Verify that the transmitter is isolated from the process and is not affected by pressure and/or temperature before servicing.

Electrical Connections

Follow the instructions in the Operator Manual for the electrical connections. For installation in hazardous areas, the transmitter must be connected to associated apparatus (e.g. safety barriers), certified according to the standard EN 50020, with output electrical characteristics compatible with the maximum input parameters (on the nameplate) of the certified transmitter.

The evaluation of the system connected with the associated apparatus, the transmitter, and the interconnecting cables must be done only by experienced personnel, and must match the requirements of EN 50039, Electrical Apparatus for Explosive Gas Atmospheres – Intrinsically Safe Electrical Systems 'i'.

For correct installation, it is necessary to follow the safety instructions of the selected associated apparatus.

Inspection and Maintenance

Inspection and maintenance of the transmitters shall be in accordance with IEC 60079-17, Electrical Apparatus for Explosive Gas Atmospheres – Part 17: Inspection and Maintenance of Electrical Installations in Hazardous Areas (Other than Mines).

Instrument Service

There are no user repairable components in the ST 2000 transmitter. Contact your nearest Honeywell representative for service.

CE

51453504, Revision A

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that the following products,

ST 2000 Pressure Transmitters (per attached list)

to which this declaration relates, are in conformity with the protection requirements of Council Directive: 94/9/EC (ATEX Directive) on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres, and 89/336/EEC (EMC Directive) as amended by 92/31/EEC and 93/68/EEC on the approximation of the laws of the Member States relating to Electromagnetic Compatibility.

The models covered by this Declaration are specified in Technical File 51453500, and shown on the attached list.

Conformity to the EMC Directive is in accordance with the following European Standard.

EN 61326-1997 Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements

Conformity to the ATEX Directive is in accordance with the following European standards.

EN 50014-1997 Electrical Apparatus for Potentially Explosive Atmospheres - General Requirements

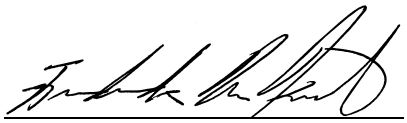
EN 50020-2002 Electrical Apparatus for Potentially Explosive Atmospheres - Intrinsic Safety "i"

EN 50284-1999 Special Requirements for Construction, Test and Marking of Electrical Apparatus of Equipment Group II, Category 1 G

Notified Bodies:	**EC Type Examination Certificates**	**Production Quality Assurance Notification**
	CESI – Elettrotecnico Sperimentale Italiano Giacinto Motta SpA – 0722 Via R. Rubattino 54 20134 Milano, Italia	KEMA Quality B. V. – 0344 Utrechtseweg 310 6812 AR Arnhem The Netherlands

Certificate	Protection	
CESI 04 ATEX 039	Ex II 1 G EEx ia IIB	T6, Tamb –20 to +40°C
		T5, Tamb –20 to +55°C
		T4, Tamb –20 to +80°C

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person is identified below.



Honeywell International Inc.

Industrial Measurement & Control
1100 Virginia Drive
Fort Washington, PA 19034 USA

Frederick M. Kent
Standards & Approvals Engineer

Issue Date: 27 February 2004

ST 2000 Pressure Transmitters

Model	Description
STA201	Absolute Pressure Transmitter
STA202	Absolute Pressure Transmitter
STA203	Absolute Pressure Transmitter
STG20F	Gauge Pressure Transmitter
STG20G	Gauge Pressure Transmitter
STG20H	Gauge Pressure Transmitter
STG20K	Gauge Pressure Transmitter
STG20L	Gauge Pressure Transmitter
STG20M	Gauge Pressure Transmitter
STG20N	Gauge Pressure Transmitter
STG20P	Gauge Pressure Transmitter

Honeywell

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Honeywell International Inc.
2500 West Union Hills
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