APT4000 Series
4-Wire pH Analyzers

Specification

Overview

The Honeywell Analytical Process Analyzer (APT) 4000 Series 2 continuously measures pH or ORP in industrial processes including chemical, pharmaceutical, petrochemical, pulp and paper, and wastewater.

The APT4000's NEMA 4X/IP65-rated enclosure is specifically designed to meet the measurement needs of Class I, Division 2 (non-incendive) and general-purpose areas. The analyzer can be used with Honeywell pH or ORP sensors, or a wide variety of compatible electrodes. The analyzer has a universal (20-253 V ac/dc, 45-65 Hz) power supply with two 4-20 mA outputs, high/low alarm relays, and an extra relay which can be designated for diagnostic or wash capabilities.
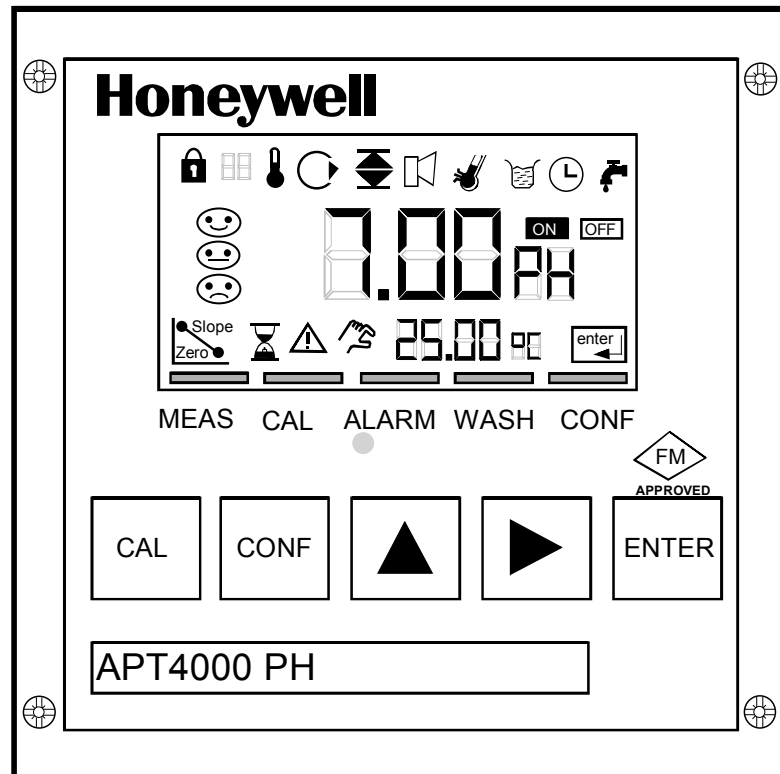

Figure 1—APT4000PH Analyzer

Description

Quick Problem Assessment

The APT4000 has a large front display for quick recognition of process parameters and diagnostics even at a distance. Only the APT4000 employs *visual feedback* to quicken setup and maintenance times and to minimize errors made during calibrations. Visual feedback refers to pictograph type characters that appear on the display both to prompt and respond to operator and process changes.

Pictograph type characters also appear during problem conditions to report diagnostics for easy troubleshooting. There is even a Sensoface® pictograph that provides constant feedback to the operator on whether or not there is a problem with the

sensor. These easily learned and recognized symbols make the APT4000 an easy-to-use instrument in any language.

Foolproof Calibrations

Calibration is easy with automatic buffer recognition, utilizing a variety of buffer standards recognized worldwide. Foolproof calibrations are ensured with special on-board diagnostics that monitor the step-by-step progress of each calibration. Simple messages with pictographs provide feedback on the status of the calibration. Manual one- or two-point calibrations can also be performed for complete flexibility.

The Honeywell APT4000 series of analyzers offers the widest available selection of advanced features in a reliable and economical instrument.

Reliability First
The advanced features of the APT4000 Series 2 analyzer guarantee complete reliability. The APT4000 continuously monitors sensor and analyzer electronics and immediately displays diagnostic information at the onset of a problem. If an error or diagnostic is found, the analyzer will indicate the appropriate error code or pictograph (see Figure 2), blink a red LED and adjust the error current to 22 mA if desired. A manual loop-back check is available to test the integrity of the 4-20 mA output.

Description (continued)

Works with a Variety of Electrodes

The inputs to the APT4000 Series include the Honeywell Durafet® II non-glass pH electrode (with the Honeywell cap adapter cable), Meredian® II glass pH electrodes, or Meredian® II metallic ORP electrodes. In addition, a wide variety of other manufacturers' pH and ORP electrodes can be used with the APT4000.

Fully Certified

Area certification for the ATP4000 is FM Class I, Div. 2, Groups A-D (non-incendive). Each analyzer comes standard with CE.
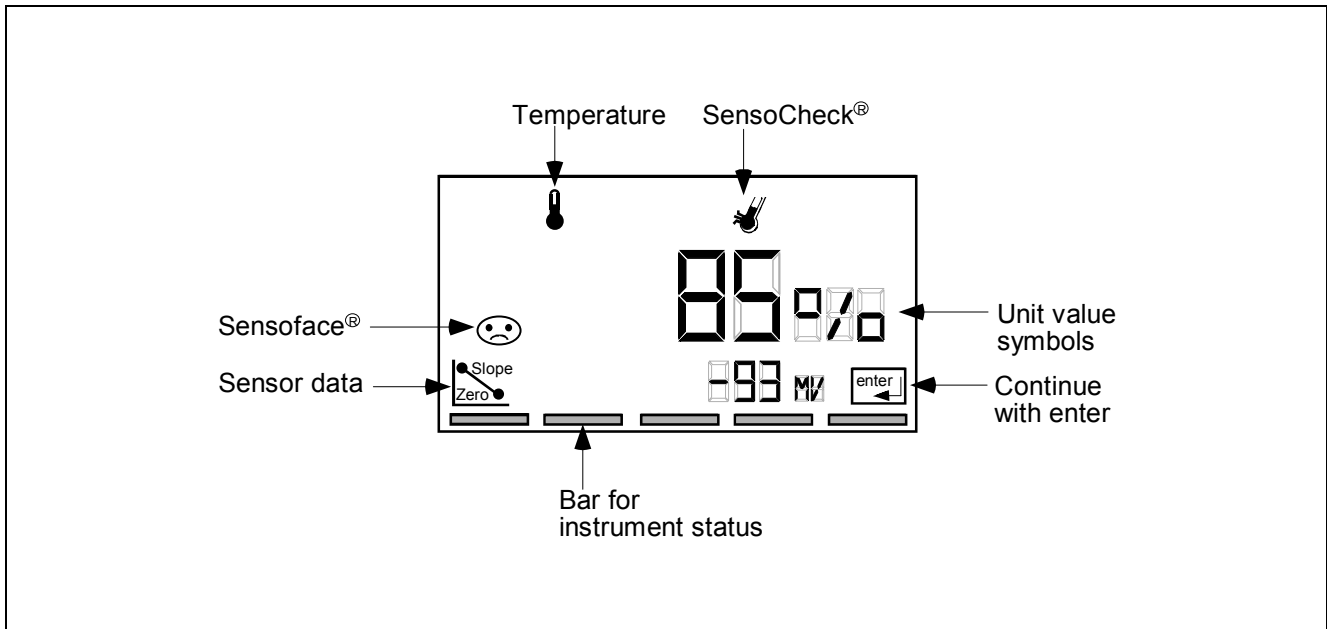

Figure 2—Example of Electrode Error – Input Problem

Features

- pH measurement with Durafet® II ORP or glass pH electrodes

- Large display with easy-to-read 0.75 inch measured value

- Simple operator interface with basic pictographs

- Application in Class I, Division 2 or General Purpose areas

- Continuous diagnostics for monitoring calibration, probe health, and analyzer self-test

- 2nd Parameter Set programmable for alternative applications.

- 2nd 4-20mA output for re-transmission of process temperature.

- NEMA 4X, IP65 plastic enclosure

- Manual loopback check for integrity of 4-20 mA output

- Wall, pipe or panel mounting

- Easy installation with pre-assembled empty enclosure and plug-in terminals

- Optical alarm with relay contact

- Dedicated high/low alarm relays

- PID Control Pulse Length / Pulse Frequency.

- Last Error Display.

- Error messaging – Flashing Symbols and Fault Codes.

Applications

The APT4000 pH analyzer is designed to meet the measurement needs of a number of industries, including:

- Chemical

- Pharmaceutical

- Pulp and Paper

- Wastewater

- Power

Specifications

pH/mV Input		
Ranges	*pH value:* *ORP value:*	0.00 pH to +14.00 pH –1500 mV to +1500 mV
Electrode Input Types (internal preamplifier)	Honeywell Durafet® II Electrodes **with Cap Adapter** Honeywell Meredian® I/II Glass pH and Metallic ORP Electrodes Other Manufacturers' Electrodes (Consult factory for applicability)	
Maximum Cable Length	*Glass electrode:* *Durafet® II electrode:* *ORP electrode:*	6.1 m (20 feet) (Honeywell electrodes) 305 m (1000 feet) with junction box 15.25 m (50 feet) (Honeywell electrodes) with junction box
Accuracy	*pH:* < 0.02 *mV:* < 1 mV	*Tc:* 0.0021 pH/K *Tc:* 0.1 mV/K

Electrode Diagnostics	
Sensocheck	Continuous monitoring of glass and reference electrodes (not available with Durafet® II)
Sensoface	- Provides information on the electrode state via Sensocheck - Monitors asymmetry potential, slope, and response time during calibration

Electrode Calibration		
Operating Modes	- Automatic calibration with the buffer sets: - 00- Knick - 01- Mettler Toledo - 02- Merck/Riedel de Haen - 03- Ciba (94) - 04- Tech. Buffers NIST - 05- Standard buffers NIST - 06- Hach buffers - Manual input of individual buffer values	 2.00 / 4.01 / 7.00 / 9.21 2.00 / 4.01 / 7.00 / 9.21 2.00 / 4.00 / 7.00 / 9.00 / 12.00 2.06 / 4.00 / 7.00 / 10.00 1.68 / 4.00 / 7.00 / 10.01 / 12.46 4.006 / 6.865 / 9.180 4.00 / 7.00 / 10.18	
Calibration Timer	0 to 9999 hours	
Calibration Ranges	*Asymmetry potential:* *Slope:*	± 60 mV 80 % to 103 %
Nominal Zero	*Valid range:* *Valid pH-range:*	± 200 mV 6.5…7.5 pH (without automatic temperature correction)

Temperature Input		
Range	*Pt100/1000 Ω RTD:* *8550 Ω Thermistor:*	–20.0 °C to +150.0 °C (–4 °F to +302 °F) –10.0 °C to +110.0 °C (+14 °F to +230 °F)
Resolution	0.1 °C or 1 °F	
Accuracy	± 0.5 °C	
Temperature Compensation	Automatic Nernstian Compensation using Pt100 Ω, Pt1000 Ω, 8550 Ω or manual	
Display	LCD display 76 mm x 48 mm (3" x 1-7/8") dimensions, 7-segment *pH/mV Value:* character height 17 mm (0.66") , meas. symbol 10 mm (0.4") *Temperature:* character height 10 mm (0.4"), meas. symbol 7 mm (0.33") Sensoface with three states, 5 status bars, 16 pictographs / symbols, Red Alarm LED Security protection with four-digit mode codes to access calibration and configuration options	

Supply/Output	
Output Current	0 mA or 4 mA to 20 mA current loop, 10 V floating Output #1 for pH, Output #2 for Temperature
Supply Voltage	20 V to 253 V ac/dc, 45 Hz to 65 Hz, 2 VA / 1.5 W
Overrange	22 mA for error messages
Current Error	< 0.3 % of current value +0.05 mA
Beginning/End of Scale	Configurable within measurement range for pH or mV
Minimum Span	*pH value:* 2.00 pH to 14.00 pH *mV value:* 200 mV to 3,000 mV
Durafet® II Cap Adapter Power Supply Output	+3 V / 0.5 mA –3.5 V / 0.4 mA
Current Source	3.80 mA to 22.0 mA
PID Function	Relay assignable for PID Control Pulse Length / Pulse Frequency.
Alarms/Relays	
Contacts	*Alarm minimum contact:* SPST N/O *Alarm maximum contact:* SPST N/O *Diagnostic contact:* SPST N/C *Wash contact:* SPST N/O *Hysteresis Limit Contacts:* 0.1 pH or 5 mV
Loadability (resistive)	*AC:* < 250 V / < 3A / < 750 VA *DC:* < 120 V/ < 3A / < 90 W
Physical	
Enclosure	Plastic enclosure made of PBT (polybutylene terephthalate) bluish-gray RAL 7031
Mounting	Wall, Pipe, or Panel Mount
Dimensions	*Height:* 144 mm (5.67") *Width:* 144 mm (5.67") *Depth:* 105 mm (4.13")
Protection	NEMA 4X, IP65
Cable glands	3 breakthroughs for PG 13.5 2 breakthroughs for NPT 1/2" or Rigid metallic conduit
Weight	Approximately 1 kg (2.2 lb.)
Area Certifications / Compliances	
Area Certification	Zone 2 (USA) FM: NI, Class I, Div. 2, Groups A-D, T4
Data Retention	Parameters and calibration data > 10 years (EEPROM)
RFI Suppression / Immunity to ESD	To EN 50 081-1 and EN 50 081-2
Ambient Conditions	*Operation/Environmental temperature:* (T4) –20 °C to +55 °C (–4 °F to +131 °F) (T6) –20 °C to +40 °C (–4 °F to +104 °F) *Transport and Storage temperature:* –20 °C to +70 °C (–4 °F to +158 °F)

Model Selection Guide

Reference 51-52-16-73

Instructions

- APT4000 Analyzer Offers:

    Power Requirements - Universal, 20 to 253V AC/DC 45 to 65 Hz
    Standard - NEMA 4X, IP65
    Standard Approvals:
        General Purpose; also FM Class I, Div 2, Groups A-D
    Standard - All models CE Compliant
    High/Low Alarm Relays
    Three mounting types: **(must be ordered separately)**
        Panel Mount Kit
        Pipe/Wall Mount Kit
        Protective Hood (requires Pipe/Wall Mount Kit)

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection from Tables using the column below the proper arrow.
    A dot (•) denotes unrestricted availability.

Key Number ⌐ _ _ _ _ _ _ _ _ ⌐ - ⌐ _ _ _ ⌐

KEY NUMBER		Selection	Availability		
Description of Measurement Type					
pH/ORP		APT 4000 PH	↓		
Toroidal (Electrodeless) Conductivity		APT 4000 TC		↓	
Contacting Conductivity		APT 4000 CC			↓

TABLE I - Optional Equipment

User's Manual	English	E _ _	•	•	•
Future		_ 0 _	•	•	•
Future		_ _ 0	•	•	•

NOTE: Mounting kit not included with APT4000.

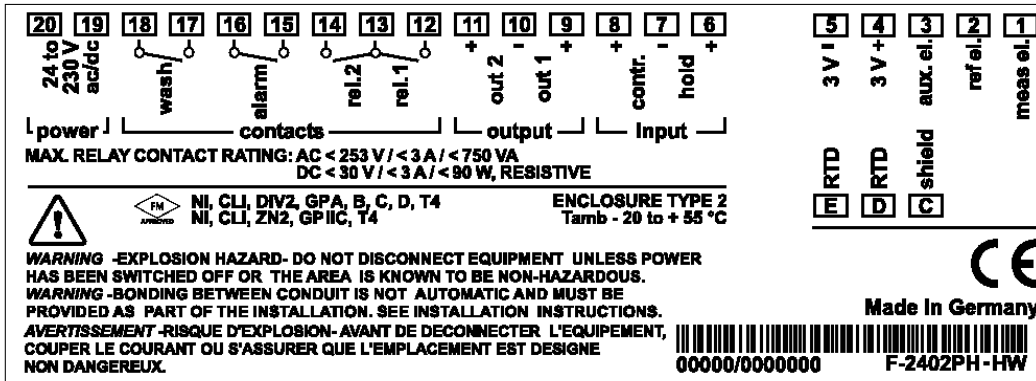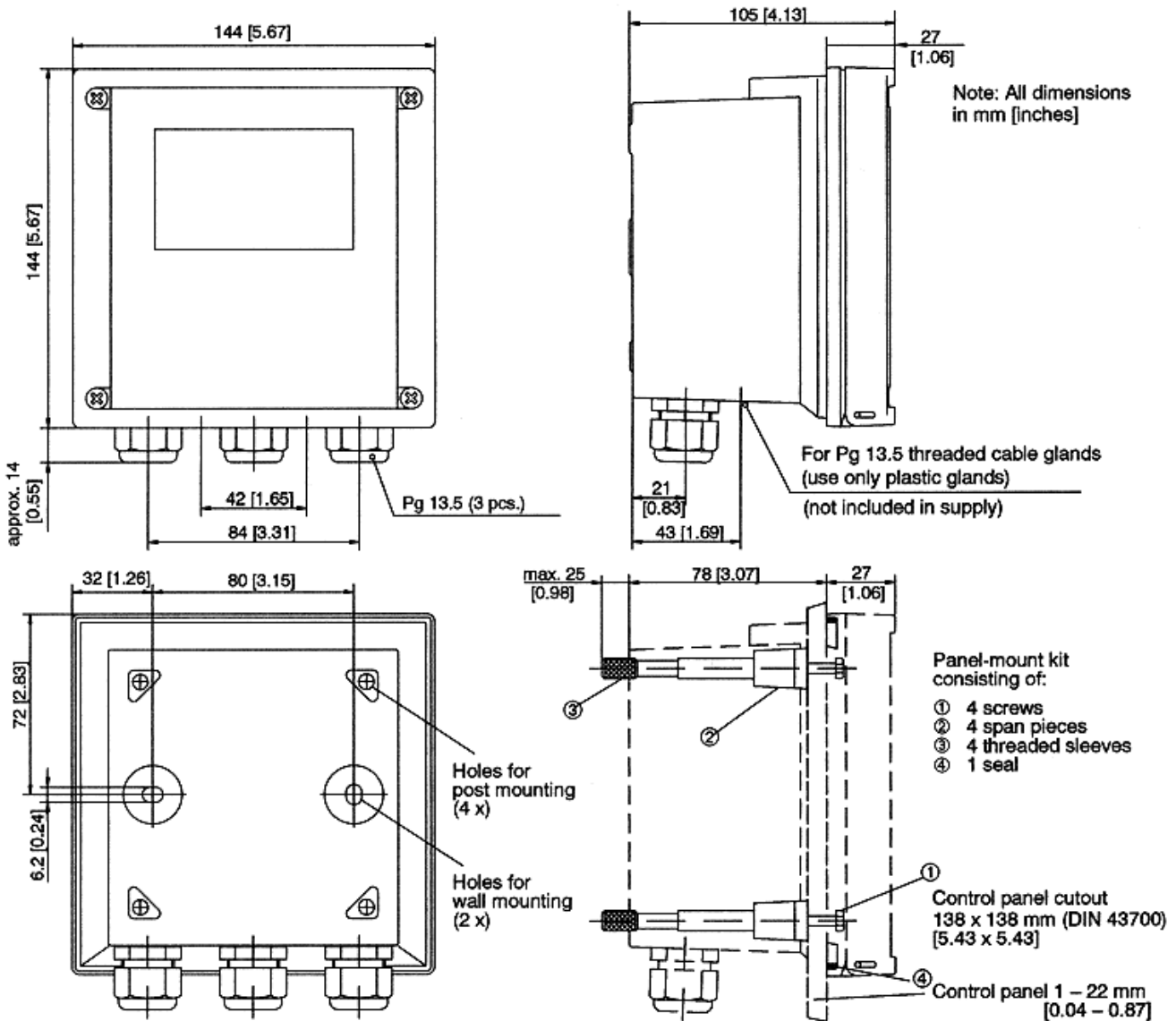| Accessory Parts	Part Number
Mounting Kits:	
Panel Mounting Kit	51205990-001
Pipe/Wall Mounting Kit	51205988-001
Protective Hood (requires pipe/wall kit)	51205989-001
Instruction Manual - pH	70-82-25-103
Instruction Manual - Toroidal (Electrodeless) Conductivity	70-82-25-105
Instruction Manual - Contacting Conductivity	70-82-25-104

Figure 3—APT4000PH Terminal Assignments

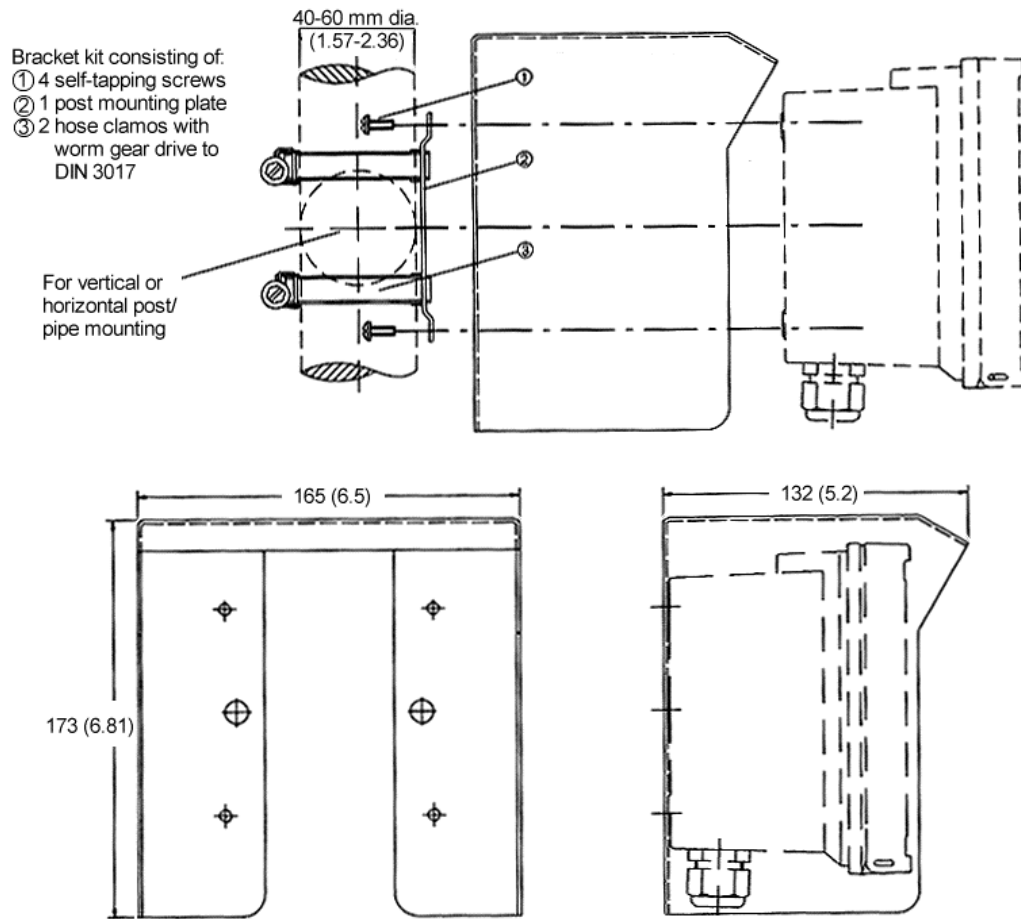**Figure 4—Dimension Drawing for APT4000 and P/N 51205990-001 Panel Mounting Kit**

40-60 mm dia.
(1.57-2.36)

Bracket kit consisting of:
① 4 self-tapping screws
② 1 post mounting plate
③ 2 hose clamos with
    worm gear drive to
    DIN 3017

For vertical or
horizontal post/
pipe mounting

165 (6.5)

173 (6.81)

132 (5.2)

Figure 5—Dimension Drawing for APT4000 with Wall or Pipe Mounting

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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.

For more information, contact Honeywell sales at (800) 343-0228.

Honeywell

Industrial Measurement and Control
Honeywell
1100 Virginia Drive
Fort Washington, PA 19034

www.honeywell.com/imc