PD8-7000

ProtEX-MAX™ Dual-Line 6-Digit Temperature Meter

ProtEX™ MAX

SUPER-BRIGHT LEDs
Our Brightest Display Ever

MeterView Pro
USB Install

SAFE TOUCH®

IECEx

FM APPROVED

TEMPERATURE

- Modern, Sleek and Practical Enclosure
- Display Mountable at 0°, 90°, 180°, & 270° Degrees
- Explosion-Proof, IP68, NEMA 4X Enclosure
- SafeTouch® Through-Glass Button Programming
- J, K, T, E, R, S, B, N, C Thermocouples
- 100 or 1000 Ω Platinum, 10 Ω Copper, 120 Ω Nickel RTDs
- 1° or 0.1° Resolution
- Averages up to 10 RTD Sensors
- Automatic Cold Junction Compensation
- Input Power Options Include 85-265 VAC or 12-24 VDC
- Large Dual-Line 6-Character Display, 0.60" & 0.46"
- Programmable Displays & Function Keys
- SunBright Display Standard
- 4 Relays + Isolated 4-20 mA Output Option
- External 4-Relay & Digital I/O Expansion Modules
- RS-232, & RS-485 Serial Communication Options
- Modbus® RTU Communication Protocol Standard
- On-Board Digital Input
- Onboard USB and MeterView® Pro Programming Software

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PD8-7000 ProtEX-MAX™ Dual-Line 6-Digit Temperature Meter

INTRODUCTION

The ProtEX-MAX PD8-7000 temperature meter boasts specifications and functionality that clearly makes it one of the most advanced temperature meters available. Its dual-line 6-character display, function keys, and optional expansion modules are only a few of the special features available on the ProtEX-MAX.

Versatile

The PD8-7000 accepts many more thermocouple types and RTDs than earlier models. It can be configured to have either a 1° or 0.1° display resolution on any type of sensor input. The lower display makes configuration simpler. The display itself is quite configurable. There are many relay functions for up to 8 relays; including an Interlock Relay function. The 4-20 mA output can represent up to 12 different parameters/variables. This makes the PD8-7000 one of the most versatile meters on the market.

FRONT PANEL DISPLAY

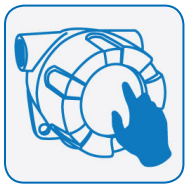
Precise, Accurate, and More Informative

ProtEX-MAX's large 0.6" upper display provides an accurate and precise 4 or 5-digit view of the temperature measurement.

Configurable

The upper display can be programmed to indicate current temperature, maximum or minimum temperature, alternating maximum/minimum temperatures, one of eight alarm set points, or Modbus input. The lower display can also be configured to display engineering units, set points, user defined legends, or simply turned off.

SafeTouch® Button Programming



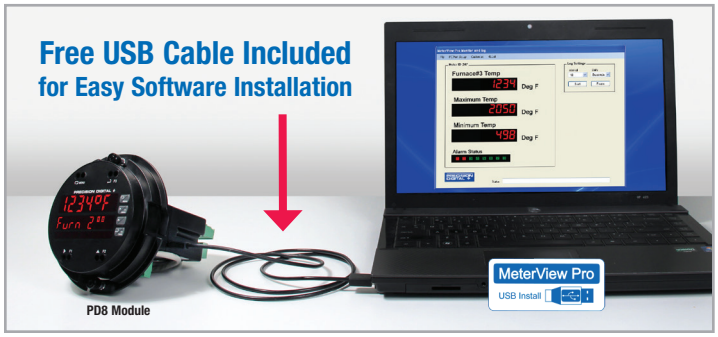
The ProtEX-MAX is equipped with four sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover (and exposing the electronics) in a hazardous area. The SafeTouch buttons are configured by default to duplicate the function of the front panel mechanical pushbuttons associated with the integrated meter.

Standard SunBright LED Display

The ProtEX-MAX's SunBright display features extraordinarily bright LEDs. They are perfect for indoor and outdoor applications where visibility may be impaired by smoke, fog, dust, or distance or even in direct sunlight.

Free USB Programming Software & Cable

The ProtEX-MAX™ comes preloaded with free **MeterView® Pro** programming software that connects and installs directly to your PC with a standard USB cable, also provided free with each instrument. This eliminates the need to insert CDs, install drivers, or download software from the internet. The software will allow you to configure, monitor, and datalog a ProtEX-MAX™ PD8-7000 using your PC. Just simply connect the meter to your PC with the USB cable and within minutes you will be programming it.



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Easy to Use

The user friendly dual-line display makes the ProtEX-MAX easy to set up & program. Input selection and configuration are conveniently set up via rear switches and front panel programming. Three levels of password protection help maintain the reliability of the programming.

Input Setup

Display Setup

Three Tier Password Protection

The ProtEX-MAX offers 3 levels of password protection:

- Level 1 protection allows the operator use of only the 3 pre-configured function keys on the front panel without a password.
- Level 2 protection allows the operator use of only the function keys and the ability to change set points without a password.
- Level 3 protection restricts the operator from using the function keys and all meter configuration menus without a password.

On-Board Digital Input

The PD8-7000 includes a digital input as standard. This digital input can operate with the tare, reset tare, or interlock relays feature, force relays on from a signal from a PLC or relay on other equipment, and much more. This is ideal for installations where the meter is inaccessible behind a cover, or where an additional function key is needed for customized operation.

Rounding

The rounding feature is used to give the user a steadier display with fluctuating signals. It causes the display to round to the nearest value according to the rounding value selected (1, 2, 5, or 10). For example, with a rounding value of 10, and a input of 12346, the display would indicate 12350.

Max/Min Display

Max/Min (or Peak/Valley) is standard on the ProtEX-MAX PD8-7000. Either display can be configured to show either maximum or minimum excursion since last reset. The displays can also be configured to toggle between Max and Min values. Both values can be simply reset from the front panel.

DIGITAL COMMUNICATIONS

Modbus® RTU Serial Communications

With the purchase of a serial communication adapter, ProtEX-MAX meters can communicate with any Modbus Master device using the ever-popular Modbus communications protocol that is included in every ProtEX-MAX. This greatly increases the flexibility of the meter. Modbus provides much more capability than read PV and write set points.

Modbus PV Input

Remote Message

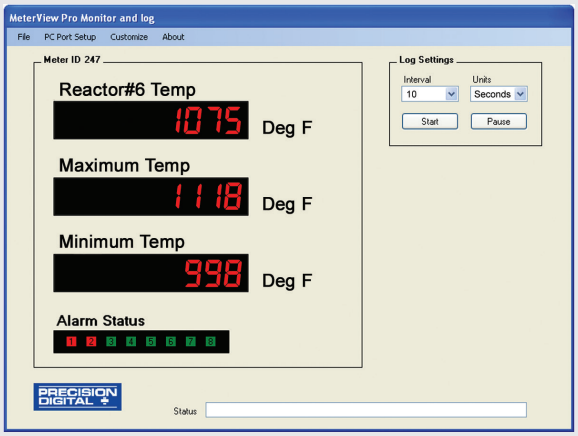
MULTIPLE SENSOR AVERAGING

The PD8-7000 can find the average temperature of up to 10 RTD probes connected in parallel. This new calculated value would then be treated as the PV (temperature) displayed on the meter. The average temperature is also available via Modbus communications and as the retransmitted value for the optional 4-20 mA output.

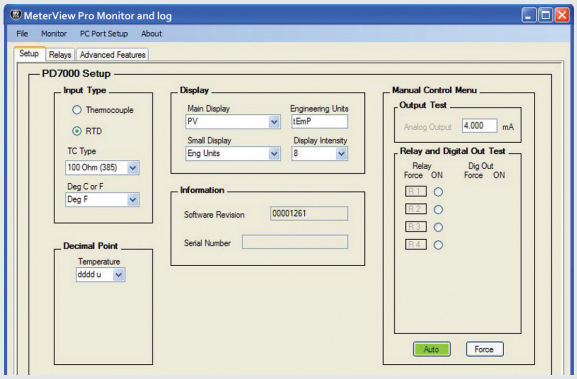
METERVIEW® PRO SOFTWARE

Configure, monitor, and datalog a ProtEX-MAX PD8-7000 from a PC using MeterView Pro Software available via USB or for download at www.predig.com).

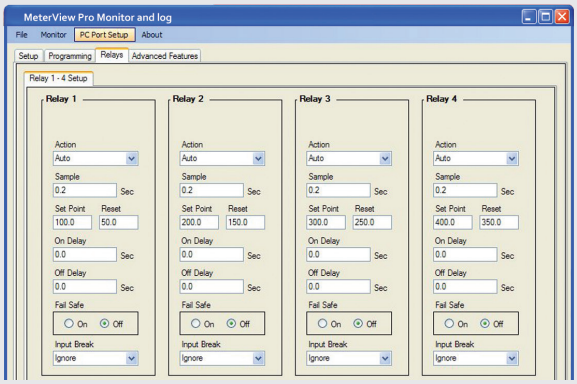
Monitor & Datalog



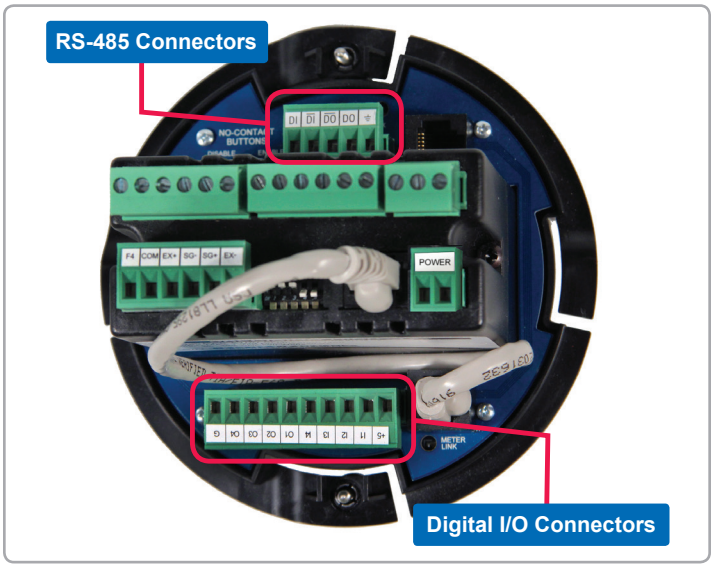
Setup



Relays



INTEGRATED DIGITAL I/O AND SERIAL COMMUNICATIONS

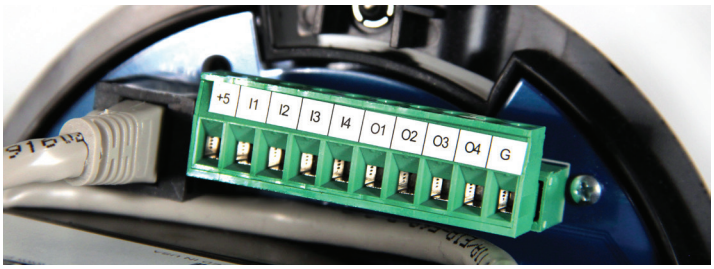


Digital I/O Connections

Four digital inputs and four digital outputs come standard with the ProtEX-MAX. External digital inputs can function similarly to the front panel function keys or digital input F4. They can be configured to trigger certain events (i.e. acknowledge/reset alarms, reset max and/or min values, disable/enable all output relays, and hold current relay states), or provide a direct menu access point. The inputs can be used to configure the meter remotely using panel mount push buttons on a control station, giving the user remote control of the four front panel push buttons.

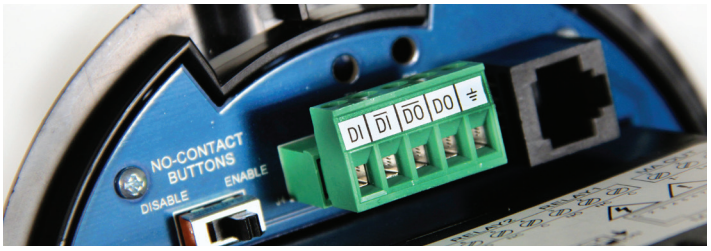
Digital outputs can be used to remotely monitor the ProtEX-MAX's alarm relay output states, or the states of a variety of actions and functions executed by the meter.

Note: The onboard digital inputs (1-4) are configured at the factory to function identically to the front panel pushbuttons (Menu, F1, F2, & F3) in order to work with the SafeTouch buttons. Changing the programming of the digital inputs will affect the function of the SafeTouch buttons.



Serial Communications Connections

ProtEX-MAX meters come with an RS-485 connection for serial communications with other digital devices. The industry standard Modbus® RTU protocol is included with every meter.



OUTPUTS

Relay Outputs

The PROTEX-MAX is available with four 3 A Form C relays (SPDT) with multiple power loss fail-safe options. Relays can be configured for proper protective action upon input loop break. Relay ON and OFF delay times are user adjustable. Up to eight front panel indicators show alarm and/or relay state. All relays can be configured for 0-100% deadband.

Relay Operation/Configuration

There are powerful relay functions that can be configured in the ProtEX-MAX meter, including:

- Automatic reset only (non-latching)
- Automatic + manual reset at any time (non-latching)
- Latching (manual reset only)
- Latching with clear (manual reset only after alarm condition has cleared)
- User selectable fail-safe operation
- Relay action upon sensor break
- Time delay (on and off), independent for each relay
- Manual control mode
- Interlock relay mode

Front panel button or digital input may be assigned to acknowledge relays programmed for manual reset.

Analog Output

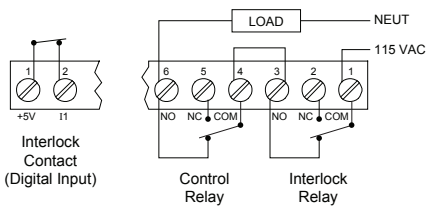
The isolated analog retransmission signal can be configured to represent the measured temperature (including average temperature), maximum or minimum temperature, any of the eight relay set points, manual control setting, or Modbus input. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA. A power supply (24 V @ 40 mA) is standard with the 4-20 mA output option.

Manual Output Control

Take control of any output with this feature. All relays can be forced ON or OFF, and the 4-20 mA output signal can be set to any value within its range. When the relays and 4-20 mA output are controlled manually, an LED labeled "M" is turned on and the associated Alarm LEDs (1-8) flash every 10 seconds indicating that the meter is in manual control mode.

Interlock Relay(s)

This function allows a process to use one or more very low voltage input signals or simple switch contacts to control the state of one or more internal "interlock" relays. A violation (i.e. loss of input, open switch, or open circuit) forces one or more N/O interlock relay contacts to open. One input can be used in series with a number of interlock switches, or up to eight inputs can be required to force-on one (or more) internal interlock relays. Please see Application Note AN-1008 on our website for more information. Requires PDA1044 Digital I/O module or use of on-board digital input F4.



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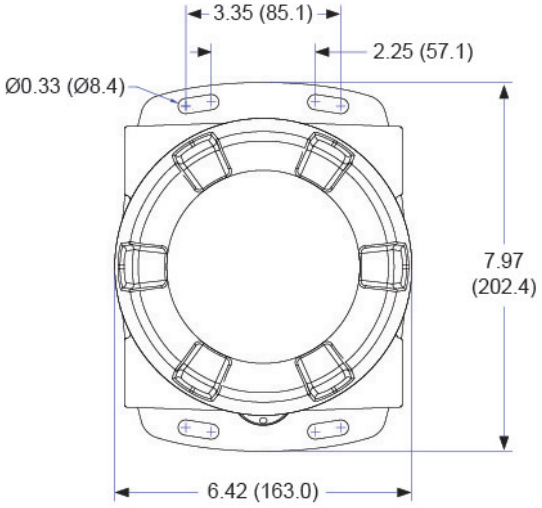
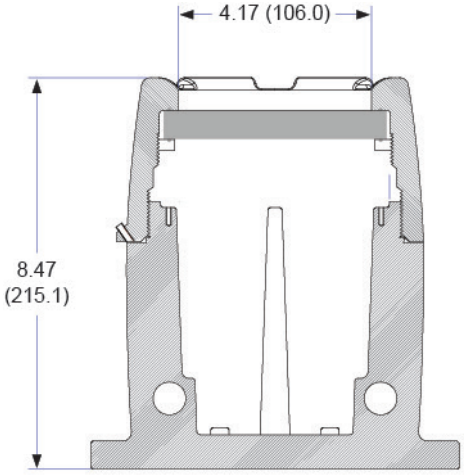
DIMENSIONS

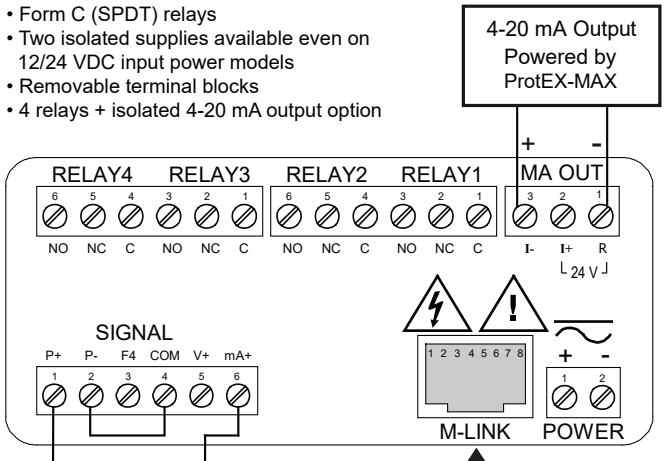
Units: Inches (mm)





CONNECTIONS

- Form C (SPDT) relays
- Two isolated supplies available even on 12/24 VDC input power models
- Removable terminal blocks
- 4 relays + isolated 4-20 mA output option



- Universal 85-265 VAC or 12/24 VDC input power
- Voltage or current inputs
- No jumpers needed for V/mA input selection
- M-Link for adding expansion modules
- Digital input (F4)

SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

Display: Upper display: 0.60" (15 mm) high. Lower display: 0.46" (12 mm) high. Both are 6 digits (-99999 to 999999), red LEDs.
Resolution: 1° (up to four digits) or 0.1° (up to five digits)
Display Intensity: Eight intensity levels
Display Update Rate: 5/second (200 ms)
Programming Methods: Four SafeTouch through-glass buttons when cover is installed. Four internal pushbuttons when cover is removed.
F4 Digital Input Contacts: 3.3 VDC on contact. Connect normally open contacts across F4 to COM. F4 Digital Input Logic Levels: Logic High: 3 to 5 VDC; Logic Low: 0 to 1.25 VDC
Noise Filter: Programmable from 2 to 199 (0 will disable filter)
Filter Bypass: Programmable from 0.1 to 99.9% of span
Recalibration: Recommended at least every 12 months.
Max/Min Display: Max / min temperature readings are stored until reset by the user or until power to the meter is cycled.
Non-Volatile Memory: All programmed settings are stored in nonvolatile memory for a minimum of ten years if power is lost.
Power Options: 85-265 VAC 50/60 Hz, 90-265 VDC 20 W max, or jumper selectable 12/24 VDC ±10%, 15 W max.
Normal Mode Rejection: Greater than 65 dB at 50/60 Hz
Isolation: 4 kV input/output-to-power line. 500 V input-to-output
Environmental:
T6 Class operating temperature range Ta = -40 to 60°C
T5 Class operating temperature range Ta = -40 to 65°C
Max Power Dissipation: Maximum power dissipation limited to 15.1 W.
Connections: Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
Enclosure: Explosion-proof die cast aluminum with glass window, corrosion resistant epoxy coating, color: blue. NEMA 4X, 7, & 9, IP68. Default conduit connections: Four ¾" NPT threaded conduit openings and two ¾" NPT metal conduit plugs with 12 mm hex key fitting installed. Additional conduit opening configurations may be available; verify quantity and sizes on specific device labeling during installation.
Mounting: Four slotted flanges for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting
Dimensions: 6.42" x 7.97" x 8.47" (W x H x D) (163 mm x 202 mm x 215 mm)
Weight: 16.0 lbs (7.26 kg)
Warranty: 3 years parts & labor
USB Connection: Compatibility: USB 2.0 Standard, Compliant
Connector Type: Micro-B receptacle
Cable: USB A Male to Micro-B Cable
Driver: Windows 98/SE, ME, 2000, Server 2003/2008, XP 32/64-Bit, Vista 32/64-Bit, Windows 7 32/64-Bit, Windows 10 32/64-Bit
Power: USB Port

Temperature Input

Inputs: Thermocouple J, K, T, E, R, S, B, N, C; RTD 100 Ω platinum (0.00385 & 0.00392 curves), 10 Ω copper, 120 Ω nickel, 1000 Ω platinum
Input Impedance: Greater than 100 kΩ
Offset Adjust: User programmable offset adjust ±50.0 degrees
Temperature Drift: ±2°C maximum from 0 to 65°C ambient temperature; ±4°C maximum from -20 to 0°C ambient temperature
Sensor Break: Display flashes "Open", relays can be programmed to go "On", "Off", or to "Ignore" (detected as an upscale condition).
Averaging: Up to 10 RTDs connected in parallel can be averaged.
Accuracy & Range: See table below.

Type	Range (°F)	Range (°C)	Accuracy
J	-200 to 2000	-129 to 1093	±1°C
K	-200 to 2400	-129 to 1316	±1°C
T	-200 to 752	-129 to 400	±1°C
E	-200 to 1800	-129 to 982	±1°C
R	-50 to 3000	-46 to 1649	±2°C
S	-50 to 3000	-46 to 1649	±2°C
B	752 to 3300	400 to 1816	±2°C
N	-100 to 2300	-73 to 1260	±2°C
C	32 to 4100	0 to 2260	±2°C
10 Ω	-328 to 500	-200 to 260	±0.1°C
100 Ω	-328 to 1562	-200 to 850	±0.4°C
120 Ω	-110 to 500	-79 to 260	±0.1°C
1000 Ω	-328 to 900	-200 to 482	±0.4°C

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Relays

Rating: 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (≈ 50 watts) @ 125/250 VAC for inductive loads such as contactors, solenoids, etc.
Noise Suppression: Noise suppression is recommended for each relay contact switching inductive loads.
Deadband: 0-100% of span, user programmable
High or Low Alarm: User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turned off).
Relay Operation: automatic (non-latching), latching (requires manual acknowledge), sampling (based on time), pump alternation control (2 to 8 relays), Off (disable unused relays and enable interlock feature, manual on/off control mode).
Time Delay: 0 to 999.9 seconds, on & off relay time delays. Programmable and independent for each relay.
Fail-Safe Operation: Programmable and independent for each relay.
Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.
Auto Initialization: When power is applied to the meter, relays will reflect the state of the input to the meter.

Serial Communications

Protocol: Modbus® RTU
Meter Address/Slave ID: 1 - 247
Baud Rate: 300 - 19,200 bps
Transmit Time Delay: Programmable between 0 and 199 ms or transmitter always on for RS-422 communication
Data: 8 bit (1 start bit, 1 or 2 stop bits)
Parity: Even, odd, or none with 1 or 2 stop bits
Byte-to-Byte Timeout: 0.01 - 2.54 seconds
Turn Around Delay: Less than 2 ms (fixed)
Note: Refer to the ProtEX-MAX® Modbus Register Tables located at www.predig.com for details.

Product Ratings and Approvals

FM: Type 4X; IP66
Class I, Division 1, Groups B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1, T5/T6
Class I, Zone 1, AEx d, IIC Gb T5/T6
Zone 21, AEx tb IIIC T90°C; Ta -40°C to +65°C
T6 Ta = -40°C to +60°C; T5 Ta = -40°C to +65°C
Certificate Number: 3047283
CSA: Class I, Division 1, Groups B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
Class I Zone 1 Ex d IIC
Zone 21 Ex tb IIIC T90°C
-40°C < Tamb. < +60° C; Temperature Code T6
-40°C < Tamb. < +65° C; Temperature Code T5
Enclosure Type 4X & IP66
Certificate Number: 2531731
ATEX: II 2 G D
Ex d IIC T* Gb
Ex tb IIIC T90°C Db IP68
Ta = -40°C to +*°C
*T6 = -40°C to +60°C
*T5 = -40°C to +65°C
Certificate number: Sira 12ATEX1182
IECEx: Ex d IIC T* Gb
Ex tb IIIC T90°C Db IP68
Ta = -40°C to +*°C
*T6 = -40°C to +60°C
*T5 = -40°C to +65°C
Certificate Number: IECEx SIR 12.0073

Isolated 4-20 mA Transmitter Output

Output Source: PV (temperature), max, min, set points 1-8, manual control setting, or Modbus input
Scaling Range: 1.000 to 23.000 mA for any display range
Calibration: Factory calibrated 4-20 mA output
Accuracy: ± 0.1% of span ± 0.004 mA
Temperature Drift: 0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient
Note: Analog output drift is separate from input drift.
Isolated Transmitter Power Supply: Terminals I+ & R: 24 VDC ± 10%. Isolated from the input at >500 V. May be used to power the 4-20 mA output or other devices. All models @ 25 mA max.
External Loop Power Supply: 35 VDC maximum
Output Loop Resistance:

Power supply	Minimum	Maximum
24 VDC	10 Ω	700 Ω
35 VDC (external)	100 Ω	1200 Ω

ORDERING INFORMATION

PROTEX-MAX™ PD8-7000 Models		
85-265 VAC Model	**12/24 VDC Model**	**Options Installed**
PD8-7000-6H0	PD8-7000-7H0	None
PD8-7000-6H7	PD8-7000-7H7	4 Relays & 4-20 mA Output

⚠ **WARNING** - Cancer and Reproductive Harm - **www.P65Warnings.ca.gov**

Accessories	
Model	**Description**
PDAPLUG75	3/4" NPT 316 Stainless Steel Stopping Plug with Approvals
PDA7485-I	RS-232 to RS-422/485 Isolated Converter
PDA8485-I	USB to RS-422/485 Isolated Converter
PDA6846	Pipe Mounting Kit Zinc Plated (Requires 2)
PDA6846-SS	Pipe Mounting Kit Stainless Steel (Requires 2)

Your Local Distributor is:

Disclaimer

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