Smart temperature meter

Type series PAX T

Features

- Thermocouple and RTD inputs
- Conforms to its-90 standards
- Optional custom units overlay W/ backlight
- Custom scaling for non-standard probes
- Time-temperature integrator
- Programmable input and output response times
- Programmable function keys / user inputs
- 9 digit totalizer (integrator) with batching
- Plug 'n' play field installable option cards

Techn. Data

The PAXT (PAX Temperature Meter) offers many features and performance capabilities to suit a wide range of industrial applications. The meter employs advanced technology for stable, drift free readout, while incorporating features that provide flexibility now and in the future with plug-in option cards. The plug-in card options allow the opportunity to configure the meter for present applications, while providing easy upgrades for future needs.
The PAXT Temperature meter accepts inputs from a variety of thermocouple and RTD inputs, including 10 ohm copper and 120 ohm nickel, while conforming to the standards of ITS-90. The meter can be programmed to accept custom and non-standard thermocouple and RTD elements, via a 16-point custom scaling feature.
The meter provides a Max and Min reading memory with programmable capture time. The capture time is used to prevent detection of false max and min readings which may occur during start-up or unusual process events. The signal totalizer (integrator) can be used to compute a time-temperature product. This can be used to provide a readout of temperature integration, useful in curing and sterilization applications.
The output can be scaled independent of the input range. The features of the linear output cards are:
- Output tracks either input, totalizer, max or min readings
- Programmable output update times

Once the meter has been initially configured, the parameter list may be locked out from further modification in its entirety or only the setpoint values can be made accessible.
The meter has been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel and extensive testing of noise effects to CE requirements, the meter provides a tough yet reliable application solution.
The PAX series meters can be fitted with up to three optional plug-in cards. However, only one card from each function type can be installed at a time. The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC), and Analog Output (PAXCDL). The cards can be installed initially or at a later date. Each optional plug-in card is shipped with complete installation and programming instructions.

SETPOINT ALARMS PLUG-IN CARDS (PAXCDS)
The PAX series has four setpoint alarm output plug-in cards. Only one of these cards can be installed at a time. These plug-in cards include:
Dual relay, FORM-C, Normally open & closed
Quad relay, FORM-A, Normally open only
Isolated quad sinking NPN open collector
Isolated quad sourcing PNP open collector
The setpoint alarms can be configured in modes to suit a variety of control and alarm requirements.
- High and low absolute, high and low deviation and band acting
- Balanced or unbalanced hysteresis
- On and off delay timers
- Auto reset or latching modes
- Reverse phase output and/or panel indicator
- Selection of alternate list of setpoint values

COMMUNICATION CARDS (PAXCDC)
Plug-in cards also facilitate bus communications. Readout values and setpoint alarm values can be controlled through the bus. Additionally, the meter has features that allow a remote computer to directly control the outputs of the meter. With a communication card installed, it is possible to configure the meter using a Windows® based program. The configuration data can be saved to a file for later recall.

SERIAL RS485 PLUG-IN CARD
An RS485 communication port can be installed with the serial RS485 plug-in card. The RS485 option allows the connection of up to 32 meters or other devices (such as a printer, PLC, HMI, or a host computer) on a single pair of wires not longer than 4,000 feet. The address number of each meter on the line can be programmed from 0-99. Data from the meter(s) can be interrogated or changed and alarm outputs can be reset by sending the proper command string. The function keys and user inputs can be programmed to send data to a printer or other device via serial communications.

SERIAL RS232 PLUG-IN CARD
An RS232 communication port can be installed with the serial RS232 plug-in card. The RS232 is intended to allow only 2 devices, not more than 50 feet apart, to communicate to each other (such as a printer, PLC, HMI, or host computer). Data from the meter(s) can be interrogated or changed and alarm outputs can be reset by sending the proper command string. The function keys and user inputs can be programmed to send data to a printer or device via serial communication.

DEVICENET™ PLUG-IN CARD
A DeviceNet communication port can be installed with the DeviceNet plug-in card. DeviceNet is a high level bus protocol based upon the CAN specifications. The protocol allows the integration of devices of different types and manufacturers within a common communication framework.

ANALOG OUTPUT PLUG-IN CARD (PAXCDL)
Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output plug-in card. The programmable output low and high scaling can be based on the input max, min, or total display value. Reverse acting output is possible by reversing the scaling point positions. The output can be scaled independent of the input range. The features of the linear output cards are:
- Output tracks either input, totalizer, max or min readings
- Programmable output update times
- Programmable for forward or reverse acting

UNITS LABEL KIT (PAXLBK)
Each meter has a units indicator with backlighting that can be customized using the Units Label Kit. The backlight is controlled in the programming. See Accessories for details on this kit.

PC SOFTWARE (SFPAX)
The SFPAX is a Windows® based program that allows configuration of the PAX meter from a PC. Using SFPAX makesit easier to program the PAX meter and allows saving the PAX program in a PC file for future use. On-line help is available within the software. A PAX serial plug-in card is required to program the meter using the software.

Techn. Data

1. DISPLAY: 5 digit, 0.56" red LED, (-19999 to 99999)
2. POWER:
   AC Versions (PAXT0000):
   AC Power: 85 to 250 VAC, 50/60 Hz, 15 VA
   Isolation: 2300 Vrms for 1 min. to all inputs and outputs. (300 V working)
   DC Versions (PAXT0010):
   DC Power: 11 to 36 VDC, 11 W
   (derate operating temperature to 40° C if operating <15 VDC and three plug-in cards are installed)
   AC Power: 24 VAC,± 10%, 50/60 Hz, 15 VA
   Isolation: 500 Vrms for 1 min. to all inputs and outputs (50 V working).
3. ANNUNCIATORS:
   MAX - maximum readout selected
   MIN - minimum readout selected
   TOT - totalizer readout selected, flashes when total overflows
   SP1 - setpoint alarm 1 is active
   SP2 - setpoint alarm 2 is active
   SP3 - setpoint alarm 3 is active
   SP4 - setpoint alarm 4 is active
   Units Label - optional units label backlight
4. KEYPAD: 3 programmable function keys, 5 keys total
5. TOTALIZER:
   Function:
   Time Base: second, minute, hour, or day
   Batch: Can accumulate (gate) input display from a user input
   Time Accuracy: 0.01% typical
   Decimal Point: 0 to 0.0000
   Scale Factor: 0.001 to 65.000
   Low Signal Cut-out: -19,999 to 99,999
   Total: 9 digits, display alternates between high order and low order readouts
6. MEMORY: Nonvolatile E2Prom retains all programmable parameters and display values.
7. ENVIRONMENTAL CONDITIONS:
   Operating Temperature Range: 0 to 50°C (0 to 45°C with all three plug-in cards installed)
   Storage Temperature Range: -40 to 60°C
   Operating and Storage Humidity: 0 to 85% max. noncondensing
   Altitude: Up to 2000 meters
8. CERTIFICATIONS AND COMPLIANCES:
   SAFETY
   EN 61010-1, IEC 1010-1
   UL Recognized Component, File #E179259
   Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
   ELECTROMAGNETIC COMPATIBILITY
   Immunity to EN 50082-2
   Emissions to EN 50081-2
9. CONNECTIONS: High compression cage-clamp terminal block
   Wire Strip Length: 0.3" (7.5 mm)
   Wire Gauge Capacity: One 14 AWG (2.55 mm) solid, two 18 AWG (1.02 mm), or four 20 AWG (0.61 mm).
10. CONSTRUCTION:This unit is rated for NEMA 4X/IP65 indoor use.
   IP20 Touch safe. Installation Category II, Pollution Degree 2. One piece bezel/case. Flame resistant. Synthetic rubber keypad. Panel gasket and mounting clip included.
11. WEIGHT: 10.4 oz. (295 g)

Input specifications

1. A/D CONVERTER: 16 bit resolution
2. UPDATE RATES:
   A/D conversion rate: 20 readings/sec.
   Step response: 200 msec. typ., 700 msec. max. to within 99% of finalreadout value (digital filter disabled)
   A step is any change of input value.
   Display update rate: 1 to 20 updates/sec.
   If the update rate is faster than step response, then the same value may be refreshed to the display.
   Setpoint output on/off delay time: 0 to 3275 sec.
   Analog output update rate: 0 to 10 sec
   Max./Min. capture delay time: 0 to 3275 sec.
3. FAILED SENSOR RESPONSE:
   Open thermocouple or RTD: display flash [OPEN] message
   Shorted RTD: display flash [SHORT] message
   Output action: Setpoint and analog outputs are programmable
4. RANGE OVERLOAD RESPONSE:
   Display flashes [OLOL] at approximately range max. +5% of range
   Display flashes [ULUL] at approximately range min. -5% of range
5. READOUT:
   Resolution: Variable; 0.1, 0.2, 0.5, or 1, 2, or 5 degree
   Scale: F or C
   Offset Range: -19,999 to 99,999 display units
6. THERMOCOUPLE INPUTS:
   Input Impedance: 20 MW
   Lead Resistance Effect: 0.03mV/ohm
   Max. Continuous Overvoltage: 30 V

Input Type	Range	Accuracy (18 to 28°C)	Accuracy (0 to 50°C)	Standard	Wire Color ANSI	Wire Color BS 1843
T	-200 to 400°C -270 to -200°C	1.2°C **	2.1°C	ITS-90	(+) blue (-) red	(+) white (-) blue
E	-200 to 871°C -270 to -200°C	1.0°C **	2.4°C	ITS-90	(+) purple (-) red	(+) brown (-) blue
J	-200 to 760°C	1.1°C	2.3°C	ITS-90	(+) white (-) red	(+) yellow (-) blue
K	-200 to 1372°C -270 to -200°C	1.3°C **	3.4°C	ITS-90	(+) yellow (-) red	(+) brown (-) blue
R	-50 to 1768°C	1.9°C	4.0°C	ITS-90	no standard	(+) white (-) blue
S	-50 to 1768°C	1.9°C	4.0°C	ITS-90	no standard	(+) white (-) blue
B	100 to 300°C 300 to 1820°C	3.9°C 2.8°C	5.7°C 4.4°C	ITS-90	no standard	no standard
N	-200 to 1300°C -270 to -200°C	1.3°C **	3.1°C	ITS-90	(+) orange (-) red	(+) orange (-) blue
C (W5/W26)	0 to 2315°C	1.9°C	6.1°C	ASTM E988-90	no standard	no standard

** The accuracy over the interval -270 to -200°C is a function of temperature, ranging from 1°C at -200°C and degrading to 7°C at -270°C. Accuracy may be improved by field calibrating the meter readout at the temperature of interest.

7. RTD INPUTS:
   Type: 3 or 4 wire, 2 wire can be compensated for lead wire resistance
   Excitation current: 100 ohm range: 165 mA
   10 ohm range: 2.6 mA
   Lead resistance: 100 ohm range: 10 ohm/lead max.
   10 ohm range: 3 ohms/lead max.
   Max. continuous overload: 30 V

Input Type	Range	Accuracy (18 to 28°C)	Accuracy (0 to 50°C)	Standard
100 ohm Pt alpha = .00385	-200 to 850°C	0.4°C	1.6°C	IEC 751
100 ohm Pt alpha = .003919	-200 to 850°C	0.4°C	1.6°C	no official standard
120 ohm Nickel alpha = .00672	-80 to 260°C	0.2°C	0.5°C	no official standard
10 ohm Copper alpha = .00427	-100 to 260°C	0.4°C	0.9°C	no official standard

8. CUSTOM RANGE: Up to 16 data point pairs
   Input range: -10 to 65 mV
   0 to 400 ohms, high range
   0 to 25 ohms, low range
   Display range: -19999 to 99999

Input Type	Range	Accuracy (18 to 28°C)	Accuracy (0 to 50°C)
Custom mV range	-10 to 65mV (1 µV res.)	0.02% of reading + 4µV	0.12% of reading + 5µV
Custom 100 ohm range	0 to 400 Ω (10 mΩ res.)	0.02% of reading + 0.04 Ω	0.12% of reading + 0.05 Ω
Custom 10 ohm range	0 to 25 Ω (1 mΩ res.)	0.04% of reading + 0.005 Ω	0.20% of reading + 0.007 Ω

9. LOW FREQUENCY NOISE REJECTION:
   Normal Mode: > 60 dB @ 50 or 60 Hz ±1%, digital filter off
   Common Mode: >100 dB, DC to 120 Hz

10.CUSTOM LINEARIZATION:
Data Point Pairs: Selectable from 2 to 16
Display Range: -19,999 to 99,999
Ice Point Compensation: user value (0.00 to 650.00 mV/°C)
Decimal Point: 0 to 0.0000

11. USER INPUTS: Three programmable user inputs
Max. Continuous Input: 30 VDC
Isolation To Sensor Input Common: Not isolated
Response Time: 50 msec. max.
Logic State: Jumper selectable for sink/source logic

INPUT STATE	SINK 22 KΩ pull-up to +5 V	SOURCE 22 KΩ pull-down
Active	V_{IN} < 0.7 VDC	V_{IN} > 2.5 VDC
Inactive	V_{IN} > 2.5 VDC	V_{IN} < 0.7 VDC

1. SERIAL COMMUNICATIONS CARD:
Type: RS485 or RS232
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Data: 7/8 bits
Baud: 300 to 19,200
Parity: no, odd or even
Bus Address: selectable 0 to 99, Max. 32 meters per line (RS485)
Transmit Delay: Selectable for 2 to 50 msec or 50 to 100 msec (RS485)

2. DEVICENET™ CARD
Compatibility: Group 2 Server Only, not UCMM capable
Baud Rates: 125 Kbaud, 250 Kbaud, and 500 Kbaud
Bus Interface: Phillips 82C250 or equivalent with MIS wiring protection per DeviceNet™ Volume I Section 10.2.2.
Node Isolation: Bus powered, isolated node
Host Isolation: 500 Vrms for 1 minute (50 V working) between DeviceNet™ and meter input common.

3. ANALOG OUTPUT CARD:
Types: 0 to 20 mA, 4 to 20 mA or 0 to 10 VDC
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Accuracy: 0.17% of FS (18 to 28°C); 0.4% of FS (0 to 50°C)
Resolution: 1/3500
Compliance: 10 VDC: 10 KW load min., 20 mA: 500 Ω load max.
Response Time: 200 msec. typ., 700 msec. max. to within 99% of final output value (digital filter disabled)

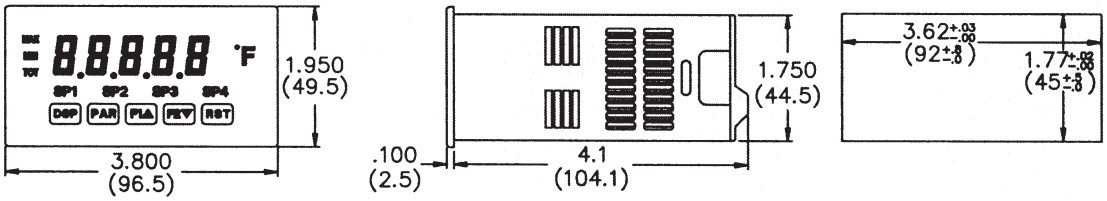
4. SETPOINT OUTPUT CARD: Four types of field installable plug-in cards
Dual Relay Card:
Type: Two FORM-C relays
Isolation To Sensor & User Input Commons: 2000 Vrms for 1 min.
Working Voltage: 240 Vrms
Contact Rating:
One Relay Energized: 5 amps @ 120/240 VAC or 28 VDC (resistive load), 1/8 HP @120 VAC, inductive load
Total current with both relays energized not to exceed 5 amps
Life Expectancy: 100 K cycles min. at full load rating.
External RC snubber extends relay life for operation with inductive loads
Response Time: 200 msec. typ., 700 msec. max. to within 99% of final output value (digital filter disabled)

Quad Relay Card:
Type: Four FORM-A relays
Isolation To Sensor & User Input Commons: 2300 Vrms for 1 min.
Working Voltage: 250 Vrms
Contact Rating:
One Relay Energized: 3 amps @ 250 VAC or 30 VDC (resistive load), 1/10 HP @120 VAC, inductive load
Total current with all four relays energized not to exceed 4 amps
Life Expectancy: 100K cycles min. at full load rating.
External RC snubber extends relay life for operation with inductive loads
Response Time: 200 msec. typ., 700 msec. max. to within 99% of final output value (digital filter disabled)

Quad Sinking Open Collector Card:
Type: Four isolated sinking NPN transistors.
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Rating: 100 mA max @ VSAT = 0.7 V max. VMAX = 30 V
Response Time: 200 msec. typ., 700 msec. max. to within 99% of final output value (digital filter disabled)

Quad Sourcing Open Collector Card:
Type: Four isolated sourcing PNP transistors.
Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
Working Voltage: 50 V. Not Isolated from all other commons.
Rating: Internal supply: 24 VDC ± 10% , 30 mA max. total
External supply: 30 VDC max., 100 mA max. each output
Response Time: 200 msec. typ., 700 msec. max. to within 99% of final output value (digital filter disabled)

Dimensions in inches (mm)



Order Details

- please give additional specifications for models not listed -

TYPE	MODEL NO.	DESCRIPTION	PART NUMBERS
Meter	PAXT	Thermocouple and RTD Panel Meter, Upgradeable, AC Powered	PAXT0000
		Thermocouple and RTD Panel Meter, Upgradeable, DC Powered	PAXT0010
Optional Plug-In Cards	PAXCDS	Dual Setpoint Relay Output Card	PAXCDS10
		Quad Setpoint Relay Output Card	PAXCDS20
		Quad Setpoint Sinking Open Collector Output Card	PAXCDS30
		Quad Setpoint Sourcing Open Collector Output Card	PAXCDS40
	PAXCDC	RS485 Serial Communications Card	PAXCDC10
		RS232 Serial Communications Card	PAXCDC20
		DeviceNET Communications Card	PAXCDC30
	PAXCDL	Analog Output Card	PAXCDL10
Accessories	PAXLBK	Units Label Kit Accessory	PAXLBK10
	SFPAX	PC Configuration Software for Windows 3.x and 95 (3.5" disk)	SFPAX