

Panel Meters

AC Inputs

MODEL PAXH - SMART AC VOLTAGE/CURRENT METER

- TRUE RMS VOLTAGE & CURRENT MEASUREMENT
- FOUR VOLTAGE RANGES (300 VAC Max)
- FIVE CURRENT RANGES (5 A Max)
- ACCEPTS AC OR DC COUPLED INPUTS
- THREE WAY ISOLATION: POWER, INPUT AND OUTPUTS
- OPTIONAL CUSTOM UNITS OVERLAY W/ BACKLIGHT
- MAX/MIN READING MEMORY
- PROGRAMMABLE FUNCTION KEYS / USER INPUTS
- 9 DIGIT TOTALIZER (INTEGRATOR) WITH BATCHING
- PLUG 'N' PLAY FIELD INSTALLABLE OPTION CARDS



UL RECOGNIZED
USA



UL RECOGNIZED
CANADA



EMC
COMPLIANT



NEMA 4X /
IP65



PARAMETER
LOCKOUT



PROGRAMMING
SOFTWARE



FRONT PANEL
PROGRAMMABLE



ALARMS



ANALOG
OUTPUT



COMMUNICATIONS
CAPABILITY

Product Features

The PAXH (PAX AC True RMS Voltage and Current 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.

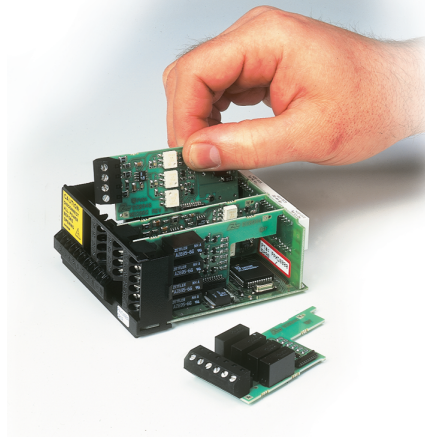
The PAXH meter has four AC voltage input ranges (300 VAC max) and five AC current ranges (5 Amp max). The readout is scalable for applications using external shunts and current transformers. The input signal can be either AC coupled (rejecting the DC component of the signal) or DC coupled (measures both the AC and DC components of the signal).

Unlike many conventional average responding meters, the PAXH is a true RMS meter suited for the readout of both conventional sine waveforms, as well as distorted voltage and current waveforms. Its wide signal bandwidth and high Crest Factor capability allow the PAXH to accurately indicate waveforms such as pulse trains, ripple voltage, and chopped SCR heater waveforms, etc. Competitive average responding meters are frequently calibrated to read out the equivalent RMS value of a sine wave. However, distorted waveforms with Crest Factors greater than 2 or waveforms with DC components may lead to significant errors in these types of readouts.

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.

OPTIONAL PLUG-IN CARDS



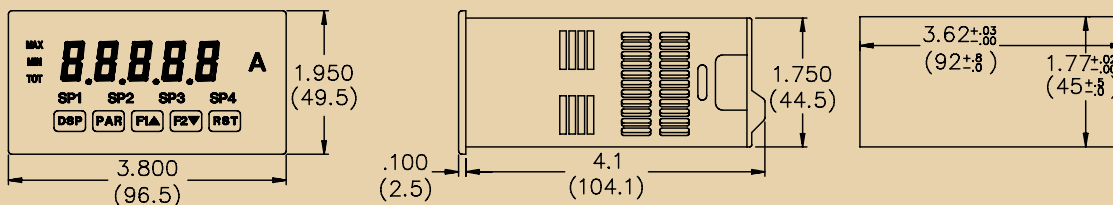
The PAX series meters can be fitted with up to three optional plug-in cards. However, only one card from each function type can be installed at a time. The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC), and Analog Output (PAXCDL). The cards can be installed initially or at a later date. Each optional plug-in card is shipped with complete installation and programming instructions.



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DIMENSIONS "In inches (mm)"



MODEL PAXH - SMART AC VOLTAGE/CURRENT METER

Product Features Continued

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. (Logic state of the outputs can be reversed in the programming.) 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 makes it 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.

General Specifications

1. **DISPLAY:** 5 digit, 0.56" (14.2 mm) red LED, (-19999 to 99999)
2. **POWER:**
 - AC Power:** 85 to 250 VAC, 50/60 Hz, 15 VA
 - Isolation:** 2300 Vrms for 1 min. to all inputs and outputs.
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. **UPDATE RATES:**
 - A/D conversion rate:** 20 readings/sec.
 - Step response:** 1 sec. max. to within 99% of final readout value (digital filter disabled)
 - Display update rate:** 1 to 20 updates/sec.
 - 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.
6. **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
7. **MEMORY:** Nonvolatile E²PROM retains all programmable parameters and display values.
8. **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. relative humidity non-condensing
 - Altitude:** Up to 2000 meters
9. **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
10. **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)
11. **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.
12. **WEIGHT:** 10.4 oz. (295 g)

MODEL PAXH - SMART AC VOLTAGE/CURRENT METER

Input Specifications

1. **A/D CONVERTER:** 16 bit resolution

2. **INPUT RANGES:**



Isolation To Option Card Commons and User Input Commons: 125 Vrms
Isolation To AC Power Terminals: 250 Vrms

Input Range	Accuracy*	Impedance (60 Hz)	Max Continuous Overload	Max DC Blocking	Resolution
200 mV	0.1% of reading +0.4 mV	686 Kohm	30 V	±10 V	0.01 mV
2 V	0.1% of reading +2 mV	686 Kohm	30 V	±50 V	0.1 mV
20 V	0.1% of reading +20 mV	686 Kohm	300 V	±300 V	1 mV
300 V	0.2% of reading +0.3 V	686 Kohm	300 V	±300 V***	0.1 V
200 µA	0.1% of reading +0.4 µA	1.11 Kohm	15 mA	±15 mA	0.01 µA
2 mA	0.1% of reading +2 µA	111 ohm	50 mA	±50 mA	0.1 µA
20 mA	0.1% of reading +20 µA	11.1 ohm	150 mA	±150 mA	1 µA
200 mA	0.1% of reading +0.2 mA	1.1 ohm	500 mA	±500 mA	10 µA
5 A	0.5% of reading +5 mA	0.02 ohm	7 A**	±7 A***	1 mA

*Conditions for accuracy specification:

- 20 minutes warmup
- 18-28°C temperature range, 10-75% RH non-condensing
- 50 Hz - 400 Hz sine wave input
- 1% to 100% of range
- Add 0.1% reading + 20 counts error over 0-50°C range

- Add 0.2% reading + 10 counts error for crest factors up to 3, add 1% reading up to 5

- Add 0.5% reading + 10 counts of DC component

- Add 1% reading + 20 counts error over 20 Hz to 10 KHz range

** Non-repetitive surge rating: 15 A for 5 seconds

*** Inputs are direct coupled to the input divider and shunts. Input signals with high DC component levels may reduce the usable range.

3. **DISPLAY MESSAGES:**

"LOL" - Appears when measurement exceeds + signal range.

"ULUL" - Appears when measurement exceeds - signal range

". . ." - Appears when display values exceed + display range.

"- . . ." - Appears when display values exceed - display range.

4. **MAX CREST FACTOR (Vp/VRMS):** 5 @ Full Scale Input

5. **INPUT COUPLING:** AC or AC and DC

6. **INPUT CAPACITANCE:** 10 pF

7. **COMMON MODE VOLTAGE:** 125 VAC working

8. **COMMON MODE REJECTION:** (DC to 60 Hz) 100 db

9. **USER INPUTS:** Three programmable user inputs

Max. Continuous Input: 30 VDC

Isolation To Sensor Input Common: 1400 Vrms for 1 min.

Working Voltage: 125 V

Response Time : 50 msec. max.

Logic State: Jumper selectable for sink/source logic

INPUT STATE	SINKING INPUTS	SOURCING INPUTS
	22 KΩ pull-up to +5 V	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

10. **CUSTOM LINEARIZATION:**

Data Point Pairs: Selectable from 2 to 16

Display Range: -19,999 to 99,999

Decimal Point: 0 to 0.0000

Output Specifications

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: 125Kbaud, 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 (50V 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 KΩ load min., 20 mA: 500 Ω load max.

Update time: 200 msec. max. to within 99% of final output value (digital filter and internal zero correction disabled)

700 msec. max. (digital filter disabled, internal zero correction enabled)

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. max. to within 99% of final readout value (digital filter and internal zero correction disabled)

700 msec. max. (digital filter disabled, internal zero correction enabled)

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. max. to within 99% of final readout value (digital filter and internal zero correction disabled)

700 msec. max. (digital filter disabled, internal zero correction enabled)

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 @ V_{SAT} = 0.7 V max. V_{MAX} = 30 V

Response Time: 200 msec. max. to within 99% of final readout value (digital filter and internal zero correction disabled)

700 msec. max. (digital filter disabled, internal zero correction enabled)

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. max. to within 99% of final readout value (digital filter and internal zero correction disabled)

700 msec. max. (digital filter disabled, internal zero correction enabled)

MODEL PAXH - SMART AC VOLTAGE/CURRENT METER

Ordering Information

TYPE	MODEL NO.	DESCRIPTION	PART NUMBERS
Meter	PAXH	AC True RMS Voltage and Current Meter, Upgradeable	PAXH0000
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
	CT	External 50:5 AC Current Transformer	CT005050
External 200:5 AC Current Transformer		CT020050	