

MODEL PAXI - SMART COUNTER/RATE METER



- 6-DIGIT LED DISPLAY (Alternating 8 digits for counting)
- DUAL COUNT QUAD INPUTS
- RATE INDICATION
- UP TO 3 COUNT DISPLAYS OR A SERIAL SLAVE
- PROGRAMMABLE SCALE FACTORS
- PROGRAMMABLE FUNCTION KEYS / USER INPUTS
- PC SOFTWARE AVAILABLE FOR METER CONFIGURATION
- PLUG 'N' PLAY FIELD INSTALLABLE OPTION CARDS



EMC COMPLIANT



NEMA 4X / IP65



PARAMETER LOCKOUT



PROGRAMMING SOFTWARE



FRONT PANEL PROGRAMMABLE



ALARMS



ANALOG OUTPUT



COMMUNICATIONS CAPABILITY



FAX/WEB
DOC # 02016

Product Features

The PAXI (PAX Counter/Rate Panel Meter) offers many features and performance capabilities to suit a wide range of industrial applications. The Plug-in options cards allow the opportunity to configure the meter for present applications, while providing easy upgrades for future needs.

The PAXI meter accepts digital inputs from a variety of sources including switch contacts, outputs from CMOS or TTL circuits, magnetic pickups and all standard RLC sensors. The meter can accept directional, uni-directional or Quadrature signals simultaneously. The maximum input signal varies up to 34 KHz depending on the count mode and function configurations programmed. Each input signal can be independently scaled to various process values.

The meter provides six different display indications. These include Counter A, Counter B, Counter C (or slave display), Rate, Rate Maximum (High) and Rate Minimum (Low). Counter A and/or Counter B indicate the corresponding input count value. Counter C indicates the sum or difference between Counter A and Counter B values or can be programmed to be a Serial Slave Display. The Rate display can be programmed to show the speed of Counter A or Counter B. The Maximum and Minimum displays can indicate the peaks and valleys of the speed with programmable capture times to prevent false detection. Annunciators indicate which display is being shown.

The front panel keys and three user inputs are programmable to perform various meter functions. One of the functions includes exchanging parameter lists, allowing double the number of programmable setpoint, scale factor and count load values.

Once the meter has been initially configured, the parameter list may be locked out from further modification entirely or the setpoint, scale factor and count load values can be made accessible. This lockout is possible through a security code or user input.

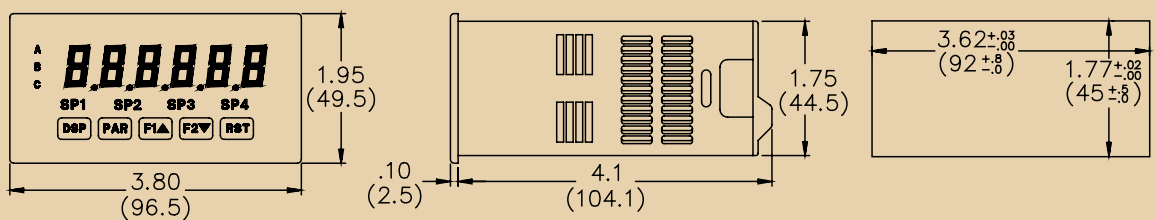
The meter has been specifically designed for harsh industrial environments. With a NEMA 4X/IP65 sealed bezel and extensive testing to meet CE requirements, the meter provides a tough yet reliable application solution.

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.

DIMENSIONS "In Inches (mm)"



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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

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 (PAXCDC)

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 (PAXCDC)

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 (PAXCDC)

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

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.

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:** 6 digit, 0.56" (14.2 mm) red LED

2. **POWER:**

AC Versions (PAXI0000):

AC Power: 85 to 250 VAC, 50/60 Hz, 18 VA

Isolation: 2300 Vrms for 1 min. to all inputs and outputs. (300 V working)

DC Versions (PAXI0010):

DC Power: 11 to 36 VDC, 14W

(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:**

A - Counter A

B - Counter B

C - Counter C

r - Rate

H - Maximum (High) Rate

L - Minimum (Low) Rate

OF - Upper significant digit display of counter

SP1 - Setpoint 1 Output State

SP2 - Setpoint 2 Output State

SP3 - Setpoint 3 Output State

SP4 - Setpoint 4 Output State

4. **KEYPAD:** 3 programmable function keys, 5 keys total.

5. **RATE DISPLAY:**

Accuracy: ± 0.01%

Minimum Frequency: 0.01 Hz

Maximum Frequency: see Max Signal Frequencies Table.

Maximum Display: 5 digits: 99999

Adjustable Display (low) Update: 0.1 to 99.9 seconds

Over Range Display: "r **LL**"

6. **COUNTER DISPLAYS:**

Maximum display: 8 digits: ± 99999999 (greater than 6 digits display alternates between high order and low order.)

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General Specifications Continued

7. MAXIMUM FREQUENCY:

FUNCTION QUESTIONS	Single: Counter A or B (with/without rate) or Rate only							
Are any setpoints used?	N	N	N	N	Y	Y	Y	Y
Is Prescaler Output used?	N	N	Y	Y	N	N	Y	Y
Is Counter C used?	N	Y	N	Y	N	Y	N	Y
COUNT MODE	(Values are in KHz)				(Values are in KHz)			
Count x1	34	25	21	17	18	15	13	11
Count x2	17	13	16	12	9	7	8	7
Quadrature x1	22	19	20	17	12	10	11	10
Quadrature x2	17	13	16	12	9	7	8	6
Quadrature x4	8	6	8	6	4	3	4	3
Rate Only	34	N/A	21	N/A	34	N/A	21	N/A

FUNCTION QUESTIONS	Dual: Counter A & B or Rate not assigned to active single counter							
Are any setpoints used?	N	N	N	N	Y	Y	Y	Y
Is Prescaler Output used?	N	N	Y	Y	N	N	Y	Y
Is Counter C used?	N	Y	N	Y	N	Y	N	Y
COUNT MODE	(Values are in KHz)				(Values are in KHz)			
Count x1	13	12	13	11	9	7.5	9	7
Count x2	9 *	7 *	9 *	7 *	5 *	4 *	5 *	4 *
Quadrature x1	7 *	6 *	6 *	5 *	4 *	3.5 *	3.5 *	3 *
Quadrature x2	7 *	6 *	6 *	5 *	4 *	3.5 *	3.5 *	3 *

Notes:

- Counter Modes are explained in the Module 1 programming section.
- If using Rate with single counter with direction or quadrature, assign it to Input A for the listed frequency.
- * Double the listed value for Rate frequency.
- Listed values are with frequency DIP switch set on HI frequency.
- Derate listed frequencies by 20% during serial communications. (Placing a 5 msec. delay between serial characters will eliminate the derating.)
- MEMORY:** Non-volatile E²Prom retains all programming parameters and display values. Exception: Max. and Min. rate values will only be stored if Counter C is set for slave or none.
- CERTIFICATIONS AND COMPLIANCES:**
 - SAFETY**
EN 61010-1, IEC 1010-1
 - ELECTROMAGNETIC COMPATIBILITY**
Immunity to EN 50082-2
Emissions to EN 50081-2
- 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
- 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).
- 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.
- WEIGHT:** 10.1 oz. (295 g)

Input Specifications

- SENSOR POWER:** 12 VDC, $\pm 10\%$, 100 mA max. Short circuit protected.
- INPUTS A and B:**
 - DIP switch selectable to accept pulses from a variety of sources including switch contacts, outputs from CMOS or TTL circuits, magnetic pickups and all standard RLC sensors.
 - LOGIC:** Input trigger levels $V_{IL} = 1.5$ V max.; $V_{IH} = 3.75$ V min.
 - Current sinking:** Internal 7.8 K Ω pull-up to +12 VDC, $I_{MAX} = 1.9$ mA.
 - Current sourcing:** Internal 3.9 K Ω pull-down, 7.3 mA max. @ 28 VDC, $V_{MAX} = 30$ VDC.
 - Filter:** Damping capacitor provided for switch contact bounce. Limits input frequency to 50 Hz and input pulse widths to 10 msec. minimum.
- MAGNETIC PICKUP:**
 - Sensitivity:** 200 mV peak
 - Hysteresis:** 100 mV
 - Input impedance:** 3.9K Ω @ 60 Hz
 - Maximum input voltage:** ± 40 V peak, 30 Vrms
- DUAL COUNT MODES:**
 - When any dual count mode is used, then User Inputs 1 and/or 2 will accept the second signal of each signal pair. The user inputs do not have the Logic/Mag, HI/LO Freq, and Sink/Source input setup switches. The user inputs are

inherently a logic input with no low frequency filtering. Any mechanical contacts used for these inputs in a dual count mode must be debounced externally. The user input may only be selected for sink/source by the User Jumper placement.

- USER INPUTS:** Three programmable user inputs
 - Max. Continuous Input:** 30 VDC
 - Isolation To Sensor Input Commons:** Not isolated
 - Logic State:** Jumper selectable for sink/source logic

INPUT STATE	SINKING INPUTS 5.1 K Ω pull-up to +12 V	SOURCING INPUTS 5.1 K Ω pull-down
Active	$V_{IN} < 0.7$ VDC	$V_{IN} > 2.5$ VDC
Inactive	$V_{IN} > 2.5$ VDC	$V_{IN} < 0.7$ VDC

Response Time: 6 msec. typical; function dependent. Certain resets, stores and inhibits respond within 25 μ sec if an edge occurs with the associated counter or within 6 msec if no count edge occurs with the associated counter. These functions include CtrStL, CtrStE, INHibT, StOrE, and PrNrSt. Once activated, all functions are latched for 50 msec min. to 100 msec max. After that period, another edge/level may be recognized.

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Output Specifications

1. **PRESCALER OUTPUT:**
NPN Open Collector: $I_{SNK} = 100$ mA max. @ $V_{OL} = 1$ VDC max. $V_{OH} = 30$ VDC max. With duty cycle of 25% min. and 50% max.
2. **SERIAL COMMUNICATIONS:**
Type: RS485 or RS232
Isolation To Sensor & User Input Commons: 500 Vrms for 1 minute
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.
3. **DEVICENET™ CARD:**
Compatibility: Group 2 Server Only, not UCMM capable
Baud Rate: 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.
4. **ANALOG OUTPUT CARD:**
Available Outputs: 0 to 20 mA, 4 to 20 mA, or 0 to 10 VDC
Isolation To Sensor & User Input Commons: 500 Vrms for 1 minute
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 K Ω load min., 20 mA; 500 Ω load max.
Response Time: 50 msec. max., 10 msec. typ.
5. **SETPOINT OUTPUT CARD:**
Dual Relay Card:
Type: Two FORM-C relays
Isolation To Sensor & User Input Commons: 2000 Vrms for 1 minute
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: 5 msec. nominal with 3 msec. nominal release
Time Accuracy: Counter = $\pm 0.01\% + 10$ msec.
Rate = $\pm 0.01\% + 20$ msec.

Quad Relay Card:
Type: Four FORM-A relays
Isolation To Sensor & User Input Commons: 2300 Vrms for 1 minute
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 both relays energized not to exceed 4 amps

Life Expectancy: 100 K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads

Response Time: 5 msec. nominal with 3 msec. nominal release
Time Accuracy: Counter = $\pm 0.01\% + 10$ msec.
Rate = $\pm 0.01\% + 20$ msec.

Quad Sinking Open Collector Card:
Type: Four isolated sinking NPN transistors
Isolation To Sensor & User Input Commons: 500 Vrms for 1 minute
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: Counter = 25 μ sec
Rate = Low Update time

Time Accuracy: Counter = $\pm 0.01\% + 10$ msec.
Rate = $\pm 0.01\% + 20$ msec.

Quad Sourcing Open Collector Card:
Type: Four isolated sinking PNP transistors
Isolation To Sensor & User Input Commons: 500 Vrms for 1 minute
Working Voltage: 50 V. Not isolated from all other commons.

Rating: Internal supply: 24 VDC $\pm 10\%$, 30 mA max. total
External supply: 30 VDC max. 100 mA each output
Response Time: Counter = 25 μ sec
Rate = Low Update time

Time Accuracy: Counter = $\pm 0.01\% + 10$ msec.
Rate = $\pm 0.01\% + 20$ msec.

Ordering Information

TYPE	MODEL NO.	DESCRIPTION	PART NUMBERS
Meter	PAXI	Counter/Rate Panel Meter, Upgradeable, AC Powered	PAXI0000
		Counter/Rate Panel Meter, Upgradeable, DC/24 VAC Powered	PAXI0010
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	SFPAX	PC Configuration Software for Windows 3.x and 95/98 (3.5" disk)	SFPAX