

## MODEL PAX2S – 1/8 DIN STRAIN GAGE INPUT PANEL METER



- LOAD CELL, PRESSURE AND TORQUE BRIDGE INPUTS
- UNIVERSAL AC/DC POWER SUPPLY
- SELECTABLE 5 VDC OR 10 VDC BRIDGE EXCITATION
- PROGRAMMABLE AUTO-ZERO TRACKING
- 6 / 9 DIGIT DUAL LINE/TRI-COLOR DISPLAY WITH 0.71" & 0.35" DIGITS
- PROGRAMMABLE UNITS DISPLAY
- VARIABLE CONTRAST AND INTENSITY DISPLAY
- UP TO 160 SAMPLES PER SECOND CONVERSION RATE
- BUILT-IN USB PROGRAMMING PORT ENABLING UNIT CONFIGURATION WITH CRIMSON PROGRAMMING SOFTWARE
- NEMA 4X/IP65 SEALED FRONT BEZEL

### DESCRIPTION

The PAX2S Strain Gage Panel Meter offers many features and performance capabilities to suit a wide range of industrial applications. The PAX2S has a strain gage input to handle various types of bridge configurations including load cell, pressure and torque sensors. The optional plug-in output cards allow the opportunity to configure the meter for present applications, while providing easy upgrades for future needs.

Highlighting the PAX2S is a dual line, display with a large 0.71", tri-color 6 digit top display line and a 0.35", 9 digit green bottom display line. The meter also offers programmable units display, providing capability to tag the display with units of measure. Display color change capability provides machine operators a visual display of changing conditions, even when the operator is not close enough to read the actual display value. In addition, a universal power supply provides the ultimate in flexibility for both AC and DC power.

The meter provides a MAX and MIN reading memory with programmable capture time. The capture time is used to prevent detection of false max or min readings which may occur during start-up or unusual process events. The signal totalizer (integrator) can be used to compute a time-input product. This can be used to provide a readout of totalized weight or calculate service intervals of motors, pumps, etc.

The meter has up to four setpoint outputs, implemented on plug-in option cards. The plug-in cards provide dual FORM-C relays, quad FORM-A, or either quad sinking or quad sourcing open collector logic outputs. The setpoint alarms can be configured to suit a variety of control and alarm requirements.

The PAX2 can be programmed to utilize Modbus protocol. With Modbus, the user has access to all configuration parameters. Readout values and setpoint alarm values can be controlled through the bus. Additionally, the meter has a feature that allows a remote computer to directly control the outputs of the meter. Communication and bus capabilities are also available as option cards. These include RS232, RS485, DeviceNet, and Profibus-DP.

The PAX2 includes a built-in USB programming port. With a Windows® based program, made available by Red Lion Controls, configuration data can be downloaded to the PAX2 without the need of any additional option cards.

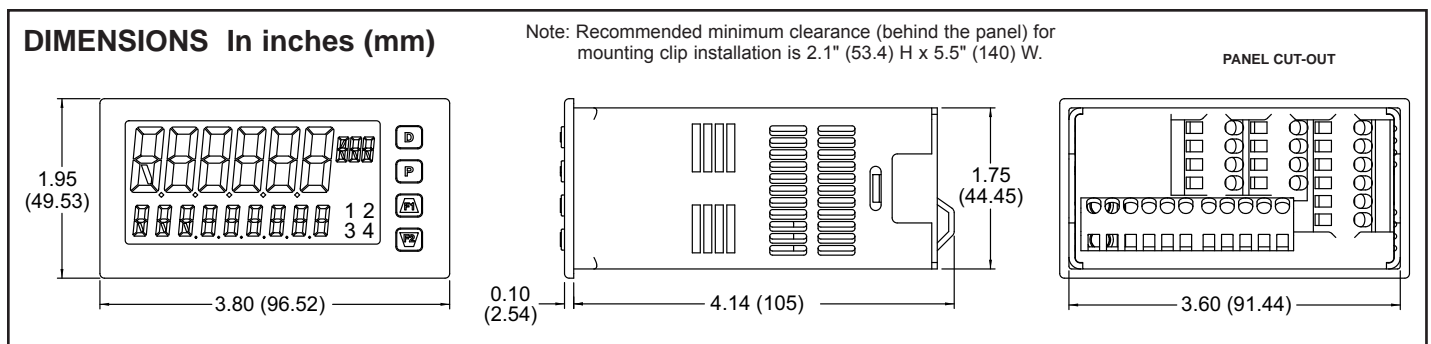
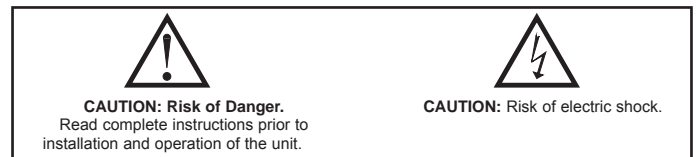
A linear DC output signal is available as an optional plug-in card. The card provides either 20 mA or 10 V signals. The output can be scaled independent of the input range and can track either the input, totalizer, max or min readings, or any setpoint value.

After the meter has been initially configured, the parameter programming may be locked out from further modification in its entirety, or allowing selected values accessible for quick entry.

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

### SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.



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## ORDERING INFORMATION

### Meter Part Numbers

MODEL NO.	DESCRIPTION	PART NUMBER
PAX2S	Strain Gage Input Panel Meter	PAX2S000

### Option Card and Accessories Part Numbers

TYPE	MODEL NO.	DESCRIPTION	PART NUMBER
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 <sup>1</sup>	RS485 Serial Communications Card with Terminal Block	PAXCDC10
		Extended RS485 Serial Communications Card with Dual RJ11 Connector	PAXCDC1C
		RS232 Serial Communications Card with Terminal Block	PAXCDC20
		Extended RS232 Serial Communications Card with 9 Pin D Connector	PAXCDC2C
		DeviceNet Communications Card	PAXCDC30
		Profibus-DP Communications Card	PAXCDC50
PAXCDL	Analog Output Card	PAXCDL10	
Accessories	SFCRD <sup>2</sup>	Crimson PC Configuration Software for Windows 2000, XP and Windows 7	SFCRD200
	CBLUSB	USB Programming Cable Type A-Mini B	CBLUSB01

Notes:

<sup>1</sup>. For Modbus communications use RS485 Communications Output Card and configure communication (TYPE) parameter for Modbus.

<sup>2</sup>. Crimson software is available for free download from <http://www.redlion.net/>

# GENERAL METER SPECIFICATIONS

1. **DISPLAY:** Positive image LCD  
 Top Line - 6 digit, 0.71" (18 mm), with tri-color backlight (red, green or orange), display range: -199,999 to 999,999;  
 Bottom Line - 9 digit, 0.35" (8.9 mm), with green backlight, display range: -199,999,999 to 999,999,999

2. **POWER:**  
 AC Power: 40 to 250 VAC, 50/60 Hz, 14 VA  
 DC Power: 21.6 to 250 VDC, 8 W  
 Isolation: 2300 Vrms for 1 min. to all inputs and outputs.

3. **ANNUNCIATORS:** Backlight color: Red  
 1 - setpoint alarm 1                      3 - setpoint alarm 3  
 2 - setpoint alarm 2                      4 - setpoint alarm 4  
 Line 1 Units Label – programmable 3 digit units annunciator with tri-color backlight (red, green or orange)

4. **KEYPAD:** 2 programmable function keys, 4 keys total

5. **A/D CONVERTER:** 24 bit resolution

6. **UPDATE RATES:**

A/D conversion rate: programmable 5 to 160 readings/sec.  
 Step response:

Input Rate	5	10	20	40	80	160	Readings/Sec
Response Time *	600	400	200	100	50	30	msec response time *

\* - 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.

7. **DISPLAY MESSAGES:**

“OLOL” - 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.

8. **INPUT:**

Connection Type: 4-wire bridge (differential); 2-wire (single-ended)

Common Mode Range (with respect to input common): 0 to +5 VDC

Rejection: 80 dB (DC to 120 Hz)

INPUT RANGE	ACCURACY* (18 to 28°C)	ACCURACY* (0 to 50°C)	IMPEDANCE/ COMPLIANCE	MAX CONT. OVERLOAD	** RESOLUTION
± 24 mVDC	0.02% of rdg + 3 µV	0.07% of rdg + 4 µV	100 Mohm	30 V	1 µV
± 240 mVDC	0.02% of rdg + 30 µV	0.07% of rdg + 40 µV	100 Mohm	30 V	10 µV

\* After 20 minute warm-up. Accuracy is specified in two ways: Accuracy over an 18 to 28°C and 10 to 75% RH environment; and accuracy over a 0 to 50°C and 0 to 85% RH (non-condensing environment). Accuracy over the 0 to 50°C range includes the temperature coefficient effect of the meter.

\*\* Higher resolution can be achieved via input scaling

9. **EXCITATION POWER:** Jumper selectable

+5 VDC @ 65 mADC max., +/-2%

+10 VDC @ 125 mADC max., +/-2%

Temperature Coefficient (ratio metric): 20 ppm/°C max.

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

Max. Continuous Input: 30 VDC

Isolation To Sensor Input Common: Not isolated.

Response Time: 12 msec. max.

Logic State: User programmable ( $\overline{HSRAC}$ ) for sink/source ( $\overline{LD}/\#$ ) logic

INPUT STATE ( $\overline{HSRAC}$ )	LO/SINK	HI/SOURCE
	20 KΩ pull-up to +3.3 V	20 KΩ pull-down
Active	$V_{IN} < 1.1$ VDC	$V_{IN} > 2.2$ VDC
Inactive	$V_{IN} > 2.2$ VDC	$V_{IN} < 1.1$ VDC

11. **TOTALIZER:**

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: -199,999 to 999,999

Total: 6 digits on Line 1; 9 digits on Line 2

12. **CUSTOM LINEARIZATION:**

Data Point Pairs: Selectable from 2 to 16

Display Range: -199,999 to 999,999

Decimal Point: 0 to 0.0000

13. **MEMORY:** Nonvolatile memory retains all programmable parameters and display values.

14. **ENVIRONMENTAL CONDITIONS:**

Operating Temperature Range: 0 to 50 °C

Storage Temperature Range: -40 to 60 °C

Vibration According to IEC 68-2-6: Operational 5 to 150 Hz, in X, Y, Z direction for 1.5 hours, 2 g.

Shock According to IEC 68-2-27: Operational 25 g (10 g relay), 11 msec in 3 directions.

Operating and Storage Humidity: 0 to 85% max. RH non-condensing

Altitude: Up to 2000 meters

15. **CERTIFICATIONS AND COMPLIANCES:**

## SAFETY

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC 529

IP20 Enclosure rating (Rear of unit), IEC 529

Type 4X Indoor Enclosure rating (Face only), UL50

## ELECTROMAGNETIC COMPATIBILITY

Emissions and Immunity to EN 61326:2006: Electrical Equipment for Measurement, Control and Laboratory use.

### Immunity to Industrial Locations:

Electrostatic discharge	EN 61000-4-2	Criterion A 4 kV contact discharge 8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion A <sup>4</sup> 10 V/m (80 MHz to 1 GHz) 3 V/m (1.4 GHz to 2 GHz) 1 V/m (2 GHz to 2.7 GHz)
Fast transients (burst)	EN 61000-4-4	Criterion A power 2 kV I/O signal 1 kV I/O signal connected to power 2 kV
Surge	EN 61000-4-5	Criterion A power 1 kV L to L, 2 kV L to G signal 1 kV
RF conducted interference	EN 61000-4-6	Criterion A 3 Vrms
Power freq magnetic fields	EN 61000-4-8	Criterion A 30 A/m
AC power	EN 61000-4-11	Criterion A Voltage dip 0% during 1 cycle 40% during 10/12 cycle 70% during 25/30 cycle
		Short interruptions Criterion C 0% during 250/300 cycles

### Emissions:

Emissions EN 55011 Class A

### Notes:

1. Criterion A: Normal operation within specified limits.
2. Criterion B: Temporary loss of performance from which the unit self-recovers.
3. Criterion C: Temporary loss of function where system reset occurs.
4. Self-recoverable loss of performance during EMI disturbance: Measurement input signal may deviate during EMI disturbance. For operation without loss of performance: Unit is mounted in a metal enclosure I/O and power cables are routed in metal conduit connected to earth ground.

Refer to EMC Installation Guidelines section of the bulletin for additional information.

16. **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)

17. **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.

18. **WEIGHT:** 8 oz. (226.8 g)

# OPTIONAL PLUG-IN OUTPUT CARDS



**WARNING: Disconnect all power to the unit before installing plug-in cards.**

## Adding Option Cards

The PAX2S meters can be fitted with up to three optional plug-in cards. The details for each plug-in card can be reviewed in the specification section below. 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 plug-in cards can be installed initially or at a later date.

## COMMUNICATION CARDS (PAXCDC)

A variety of communication protocols are available for the PAX2S meter. Only one PAXCDC card can be installed at a time. *Note: For Modbus communications use RS485 Communications Output Card and configure communication (TYPE) parameter for Modbus.*

PAXCDC10 - RS485 Serial (Terminal)      PAXCDC30 - DeviceNet  
PAXCDC1C - RS485 Serial (Connector)      PAXCDC50 - Profibus-DP  
PAXCDC20 - RS232 Serial (Terminal)  
PAXCDC2C - RS232 Serial (Connector)

### SERIAL COMMUNICATIONS CARD

**Type:** RS485 or RS232  
**Communication Type:** RLC Protocol (ASCII), Modbus RTU, and Modbus ASCII  
**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:** 1200 to 38,400  
**Parity:** no, odd or even  
**Bus Address:** Selectable 0 to 99 (RLC Protocol), or 1 to 247 (Modbus Protocol), Max. 32 meters per line (RS485)  
**Transmit Delay:** Selectable for 0 to 0.250 sec (+2 msec min)

### 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.

### PROFIBUS-DP CARD

**Fieldbus Type:** Profibus-DP as per EN 50170, implemented with Siemens SPC3 ASIC  
**Conformance:** PNO Certified Profibus-DP Slave Device  
**Baud Rates:** Automatic baud rate detection in the range 9.6 Kbaud to 12 Mbaud  
**Station Address:** 0 to 125, set by rotary switches.  
**Connection:** 9-pin Female D-Sub connector  
**Network Isolation:** 500 Vrms for 1 minute (50 V working) between Profibus network and sensor and user input commons. Not isolated from all other commons.

## PROGRAMMING SOFTWARE

Crimson® software is a Windows® based program that allows configuration of the PAX® meter from a PC. Crimson offers standard drop-down menu commands, that make it easy to program the meter. The meter's program can then be saved in a PC file for future use. Crimson can be downloaded at [www.redlion.net](http://www.redlion.net)

## SETPOINT CARDS (PAXCDS)

The PAX2S meter has 4 available setpoint alarm output plug-in cards. Only one PAXCDS card can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These plug-in cards include:

PAXCDS10 - Dual Relay, FORM-C, Normally open & closed  
PAXCDS20 - Quad Relay, FORM-A, Normally open only  
PAXCDS30 - Isolated quad sinking NPN open collector  
PAXCDS40 - Isolated quad sourcing PNP open collector

### 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).  
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

### 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 @ 240 VAC or 30 VDC (resistive 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

### 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

### 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: 18 VDC unregulated, 30 mA max. total  
External supply: 30 VDC max., 100 mA max. each output

### ALL FOUR SETPOINT CARDS

**Response Time:** See Update Rates step response specification on page 3; add 6 msec (typical) for relay card

## LINEAR DC OUTPUT (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 various display values. Reverse slope output is possible by reversing the scaling point positions.

PAXCDL10 - Retransmitted Analog Output Card

### 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 K $\Omega$  load min., 20 mA: 500  $\Omega$  load max.  
**Powered:** Self-powered  
**Step Response:** See Update Rates step response specification on page 3.  
**Update time:** See ADC Conversion Rate and Update Time parameter