

# MODEL EPAX - 5 DIGIT EXTRA LARGE PAX DISPLAY FOR ANALOG INPUTS



- LARGE LED DISPLAY READABLE TO 180 FEET
- VARIOUS ANALOG INPUT MODULES:
  - DC VOLTAGE AND CURRENT
  - PROCESS SIGNALS
  - TRUE RMS VOLTAGE AND CURRENT
  - THERMOCOUPLE OR RTD
  - STRAIN GAGE/BRIDGE
- VARIOUS OUTPUT OPTION MODULES
- PROGRAMMABLE USER INPUTS
- UNIVERSAL AC POWERED (85 to 250 VAC)
- CRIMSON 2 PROGRAMMING SOFTWARE
- NEMA 4X/IP65

## GENERAL DESCRIPTION

The EPAX is a versatile display that can increase productivity by offering the plant floor or production area a large visual display of their current status. Whether your measurement is voltage, current, process, temperature, or strain gage, the EPAX can satisfy your requirement. The EPAX accepts various analog inputs through the use of input modules (MPAX) which allow the unit to adapt to most any application. The MPAX Modules offer the same features as our highly successful PAX Series Panel Meters. Additional plug-in option cards can add alarms, analog output, and communication/bus capabilities, making the EPAX a truly Intelligent Panel Meter.

## SAFETY SUMMARY

All safety regulations, local codes and instructions that appear in this and corresponding 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.



The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.



**CAUTION: Risk Of Danger.**  
 Read complete instructions prior to installation and operation of the unit.



**CAUTION: Risk of electric shock.**

## SPECIFICATIONS

Additional specifications, wiring, programming, and information for the individual MPAX models are contained in the corresponding standard PAX literature.

- DISPLAY:** 4" (101 mm) Red LED  
 5-Digit (EPAX0500): -19999 to 99999
- POWER REQUIREMENTS:**  
 AC MPAX Modules: 85 to 250 VAC, 50/60 Hz, 18 VA  
 EPAX Display: 85 to 250 VAC, 50/60 Hz, 10 VA
- INPUT:** Accepts analog input modules, see "Selecting Your Display Components and Option Cards."
- ANNUNCIATORS:**  
**Display Indication:** Three vertical dots on the left side of the unit identify the displays for the following modes:

TOP	Maximum
MIDDLE	Minimum
BOTTOM	Total

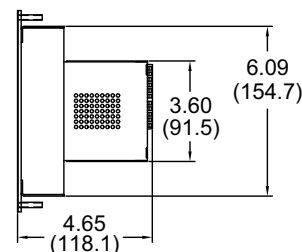
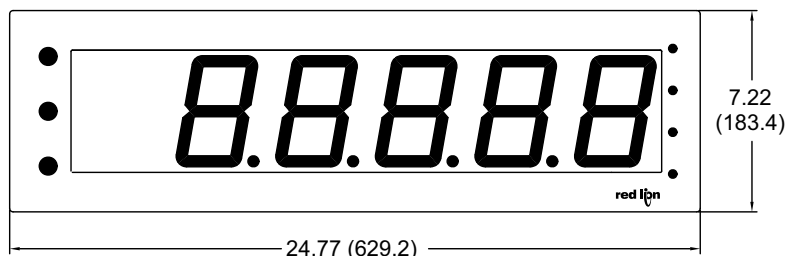
**Setpoint Indication:** Four vertical dots on the right side of the unit identify the setpoint "ON" condition, with SP 1 being the top position through SP 4 at the bottom.

- EPAX Programming:** The unit is a large display, designed to be remotely mounted. Therefore, the unit does not have a programming keypad. Unit programming should be accomplished by one of the following methods:

**Rear Terminal Block:** External switches can be wired via the terminal block to allow unit programming. A minimum of 3 switches would be required.

**Optional Programming Remote (EPAXPGM0):** This option provides a 10 foot interconnecting cable and programming box. The Programming Remote contains buttons similar to the PAX, allowing easy programming of the EPAX display.

## DIMENSIONS In inches (mm)



- Optional Serial Programming:** Like all PAX units, you can purchase an RS232 or RS485 Comms Card and program the unit via Crimson, a Windows® based software program.
- 6. CERTIFICATIONS AND COMPLIANCES:**
- CE Approved**  
EN 61326-1 Immunity to Industrial Locations  
Emission CISPR 11 Class A  
IEC/EN 61010-1  
RoHS Compliant
- UL Listed:** File #E179259  
Type 4X Indoor / IP66 Enclosure rating (Face only)  
IP20 Enclosure rating (Rear of unit)
- ELECTROMAGNETIC COMPATIBILITY**  
EMC specifications determined by the MPAX module.
- 7. ENVIRONMENTAL CONDITIONS:**  
Operating Temperature Range: Determined by the MPAX module  
Storage Temperature Range: -40 to 60°C  
Operating and Storage Humidity: 0 to 85% max. RH (non-condensing)  
Altitude: Up to 2000 meters
- 8. MOUNTING REQUIREMENTS:**  
Max. panel thickness is 0.375" (9.5 mm)  
Min. panel thickness for NEMA 4/IP65 sealing is 0.060" (1.52 mm)
- 9. MODULE INSTALLATION:**  
24-pin shrouded connector on EPAX engages connector on MPAX module upon installation. Shroud ensures proper alignment by providing a lead-in for the module connector.

**10. CONNECTIONS:** Wiring connections are made to the EPAX terminal block and MPAX module via high compression cage-clamp terminal blocks.

**MPAX Module Wiring:** Instructions are provided in the corresponding PAX Bulletin.

**EPAX Terminal Block Wiring:**

Wire Strip Length: 0.3" (7.5 mm)  
Wire Gage: 30-12 AWG copper wire  
Maximum Torque: 5-7 inch-lbs (0.58-0.81 N-m)



**CAUTION: Disconnect all power before installing or removing module.**

**11. CONSTRUCTION:** Aluminum front panel, enclosure, and rear cover with textured black polyurethane paint for scratch and corrosion resistance protection. Sealed front panel meets NEMA 4X/IP65 specifications for indoor use when properly installed. Installation Category II, Pollution Degree 2. Panel gasket and keps nuts included.

**12. WEIGHT:** 5 lbs (2.25 kg) (*less module*)

## About the MPAX Input Modules

The MPAX Module serves as the input to the EPAX Display. There are several different modules to cover a variety of inputs. The MPAX module provides input scaling which allows the EPAX to display most any engineering unit. Once the MPAX is inserted into the EPAX, the unit has the same functions and capabilities of our PAX Series Intelligent Panel Meters.

## Selecting Your Display Components and Option Cards

To build a complete display unit, you will need an EPAX and an MPAX Input Module. The EPAX is only a display and will not operate without an MPAX module. Please use the following chart to identify the appropriate MPAX module and EPAX Display that will satisfy your application.

SIGNAL TYPE	MPAX MODULES*	EPAX DISPLAYS	OPTION CARD COMPATIBILITY		
	85-250 VAC		SETPOINT	COMMS	ANALOG
Universal DC Inputs	MPAXD000	EPAX0500	YES	YES	YES
Process Inputs	MPAXP000	EPAX0500	YES	YES	YES
Temperature Inputs	MPAXT000	EPAX0500	YES	YES	YES
Strain Gage/Loadcell	MPAXS000	EPAX0500	YES	YES	YES
True RMS AC Voltage/Current	MPAXH000	EPAX0500	YES	YES	YES
Dual Process Inputs	MPAXDP00	EPAX0500	YES	YES	YES

\* For detailed module and option card specifications, see corresponding PAX literature. (i.e. For MPAXD specifications, see the PAXD literature)

## OPTION CARDS AND ACCESSORIES



**WARNING: Disconnect all power to the unit before installing option cards.**

### Adding Option Cards

The PAX and MPAX series meters can be fitted with up to three option cards. The details for each option card can be reviewed in the specification section of the PAX bulletin. Only one card from each function type can be installed at one time. The function types include Setpoint Alarms (PAXCDS), Communications (PAXCDC or PAXUSB), and Analog Output (PAXCDL). The option cards can be installed initially or at a later date.

### COMMUNICATION CARDS (PAXCDC)

A variety of communication protocols are available for the PAX and MPAX series. Only one of these cards can be installed at a time. When programming the unit via Crimson, a Windows® based program, a USB, RS232 or RS485 Card must be used.

PAXCDC10 - RS485 Serial (Terminal)  
PAXCDC1C - RS485 Serial (Connector)

PAXCDC20 - RS232 Serial (Terminal)  
PAXCDC2C - RS232 Serial (Connector)  
PAXCDC30 - DeviceNet  
PAXCDC40 - Modbus (Terminal)  
PAXCDC4C - Modbus (Connector)  
PAXCDC50 - Profibus-DP  
PAXUSB00 - USB Programming

### SETPOINT CARDS (PAXCDS)

The PAX and MPAX series has 5 available setpoint alarm output option cards. Only one of these cards can be installed at a time. (Logic state of the outputs can be reversed in the programming.)

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  
PAXCDS50 - Dual Triac/Dual SSR drive

## LINEAR DC OUTPUT (PAXCDL)

Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output option 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

## PROGRAMMING SOFTWARE

Crimson 2 is a Windows® based program that allows configuration of the EPAX meter from a PC. Crimson offers standard drop-down menu commands, that make it easy to program the EPAX meter. The EPAX program can then be saved in a PC file for future use. A PAX serial option card is required to program the meter using the software.

# 1.0 ASSEMBLING THE DISPLAY



**CAUTION:** The MPAX main circuit board and the option cards contain static sensitive components. Before handling the module or the cards, discharge static charges from your body by touching a grounded bare metal object. Handle the module by the rear plastic cover only, and the option cards by the board edges. Dirt, oil or other contaminants that contact the circuit boards or components can adversely affect circuit operation.



**WARNING:** Exposed line voltage exists on the MPAX main circuit board and the option cards. **DO NOT** apply power to the module OR load circuits until the module is properly installed in the EPAX case.



**NOTE:** All module and option card labels must be installed as shown for safety purposes.

Prior to installing the EPAX Display, it is recommended that the MPAX and any option cards be assembled first. This will allow you the opportunity to insure all the boards are fitted properly into their connectors.

## Installing the Option Cards

If your application requires option cards, they should be installed into the MPAX before it is installed into the EPAX Display. Refer to the literature enclosed with the option cards for installation instruction.

## Installing the MPAX

Remove the MPAX case (plastic) from the rear of the EPAX by removing the two screws and pulling off the metal holding bracket. Install the MPAX into plastic case by aligning the front connector of the MPAX with the hole in the front of the plastic case. The module must be oriented as shown with terminal #1 toward the top of the EPAX case. Next, insert the MPAX case into the EPAX by lightly pushing the connector of the MPAX into the connector of the EPAX PC board. Place holding bracket over the plastic case and install the two screws.

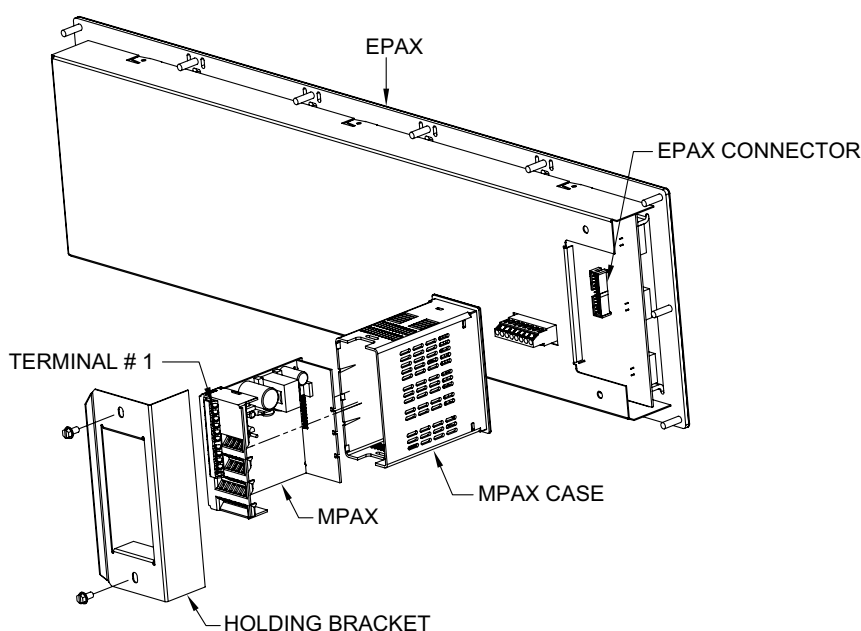


Figure 1, Installing an MPAX Module and Option Cards

## Installing the Labels

Each option card and the MPAX are shipped with a connection label. These labels must be applied to the rear of the EPAX in the positions shown in the drawing.

## Removing The MPAX Module

To remove the MPAX Module from the EPAX Display, first remove all power and load circuits. Then insert a flat screwdriver blade (3/16" or 1/4") into the narrow slot between the EPAX rear cover plate and the module's plastic cover as illustrated in Figure 2. Twist the screwdriver in the direction shown to disengage the internal connectors while firmly squeezing and pulling back on the rear finger tabs (top and bottom). Carefully slide the module out of the EPAX case, keeping it properly aligned with the case opening.

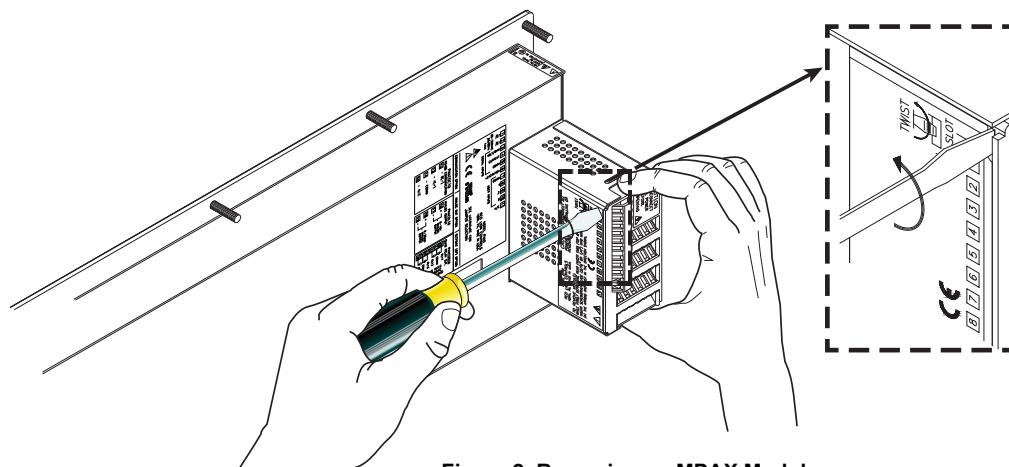


Figure 2, Removing an MPAX Module

## 2.0 INSTALLING THE DISPLAY

### EPAX DISPLAY INSTALLATION

The EPAX display is intended to be mounted into a panel or enclosure. The display is provided with a gasket to provide a water-tight seal. The recommended minimum panel thickness for NEMA 4/IP65 sealing is 0.060" (1.57 mm).

For panel mounting, prepare the panel cut-out to the dimensions shown in Figure 3. The supplied template may be used to mark the cut-out and hole locations on the panel. After the panel cut-out has been deburred, slide the panel gasket over the rear of the display and onto the mounting studs. Insert the display into the panel cut-out as illustrated in Figure 4. Install 14 # 10-32 keps nuts (supplied) and tighten evenly for uniform gasket compression. Do not over-tighten the nuts.

By using additional mounting accessories, the EPAX can be surface-wall mounted, suspended, or bottom mounted. Separate installation instructions are provided with the mounting accessories.

#### DIMENSIONS In inches (mm)

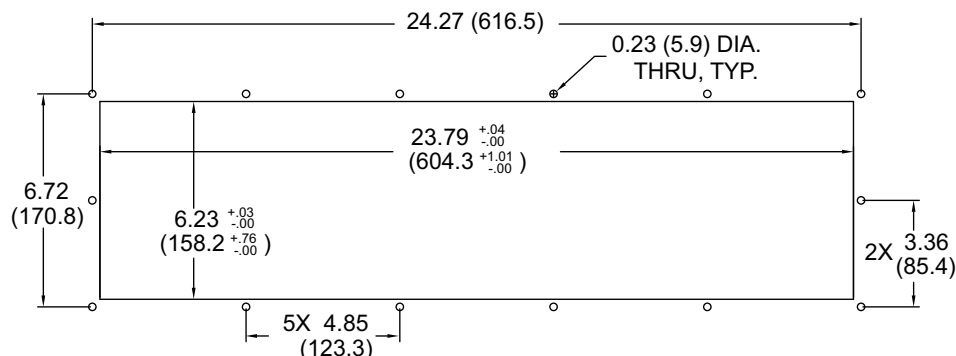


Figure 3, Panel Cut-out for the EPAX

### Environment And Cleaning

The display should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the system near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

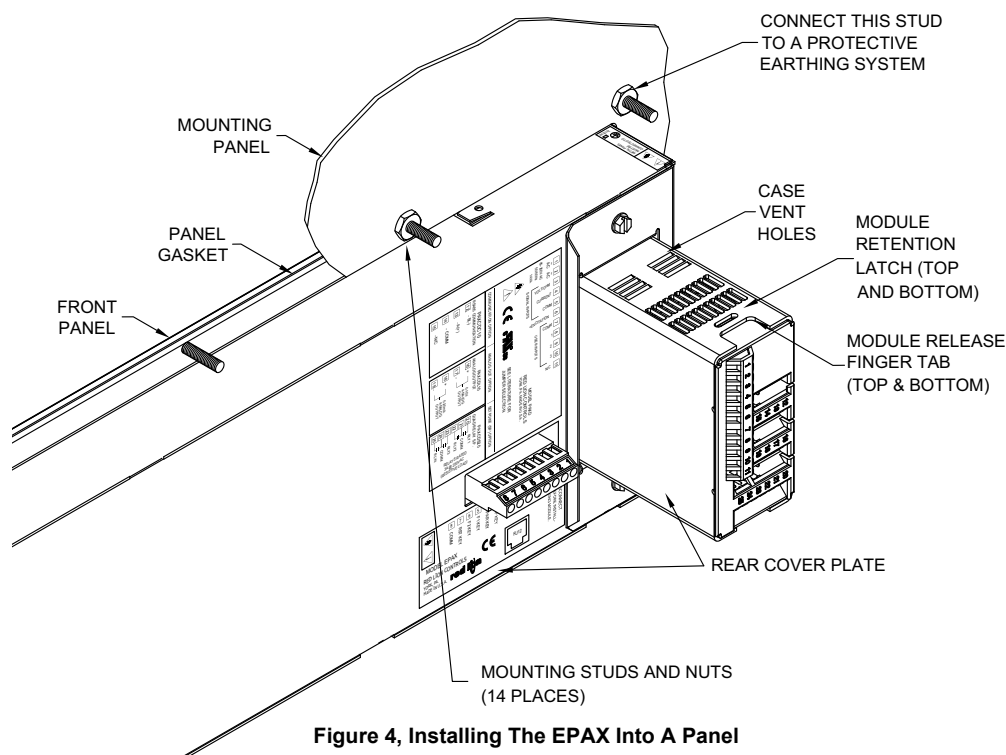
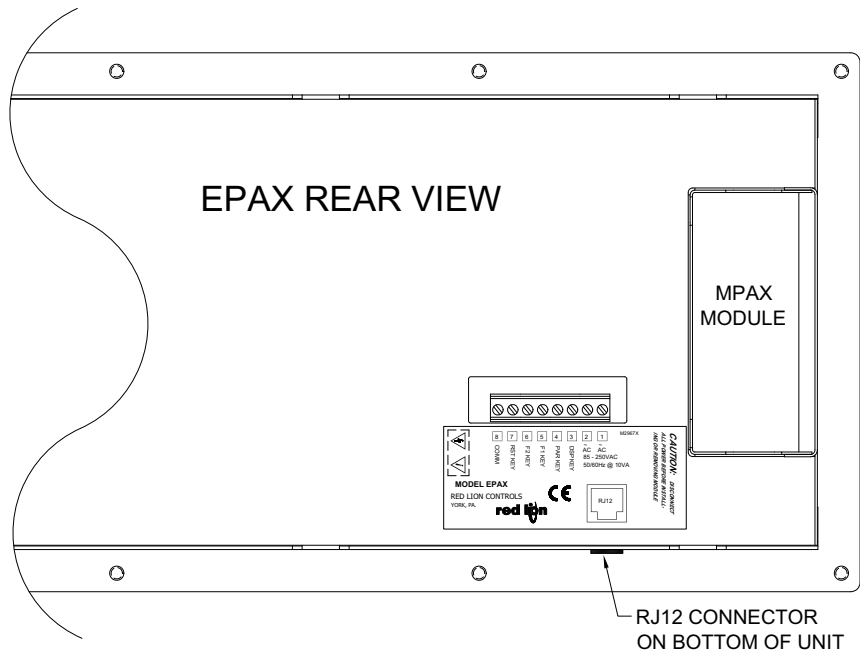


Figure 4, Installing The EPAX Into A Panel

## 3.0 WIRING AND PROGRAMMING THE DISPLAY

Once assembled, the EPAX and MPAX have all the same functions and capabilities of our PAX Series Intelligent Panel Meters. Reference the appropriate PAX information found on our website. Simply follow the instructions to wire and program the display for your application.

Note: Both the EPAX and the MPAX module require power. It is recommended to connect the primary AC power to the EPAX terminal block, then jumper to the MPAX module.



### EPAX PROGRAMMING

The unit is a large display, designed to be remotely mounted. Therefore, the unit does not have a programming keypad. Unit programming must be accomplished by one of the following three methods:

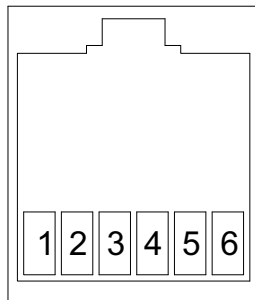
#### Optional Programming Remote (EPAXPGM0)

This optional programming remote plugs into the EPAX through an RJ12 connector and a 10 foot cable. The buttons on the programming box function the same as the PAX unit. Simply program the EPAX exactly as the PAX instructions indicate. The programming box can be left connected to the EPAX for future programming changes or can be disconnected and used to program additional EPAX units.



RJ12 CONNECTOR ON BOTTOM OF UNIT

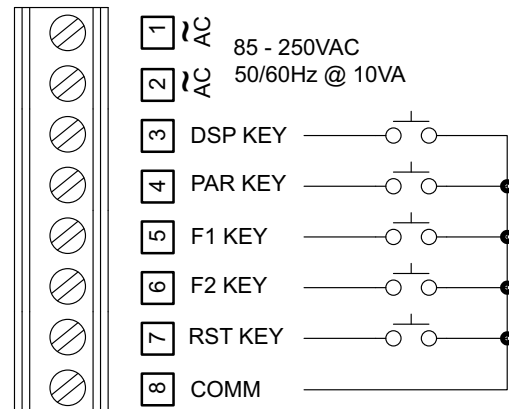
RJ12 FEMALE	
PIN	NAME
1	DSP KEY
2	PAR KEY
3	F1 KEY
4	F2 KEY
5	RST KEY
6	COMM



#### Rear Terminal Block

External normally open switches can be wired via the terminal block to allow unit programming. A minimum of 3 switches would be required. Each external switch must be wired between the key and the common terminal.

#### EPAX TERMINAL BLOCK



#### Optional Serial Programming

Like all PAX units, you can purchase a serial Communications Card and program the unit via Crimson, a Windows® based software program.



# ENC12 - NEMA 4 /IP65 LARGE DISPLAY ENCLOSURE & SHR - SHROUD FOR EPAX



Picture includes the EPAX, NEMA Enclosure, and Shroud

- LIGHT-WEIGHT ALUMINUM CONSTRUCTION
- COMPLETELY SEALED FOR WASH-DOWN
- MOUNTING CHANNELS FOR VERSATILE INSTALLATION

## DESCRIPTION

The NEMA 4/IP65 Large Display Enclosure is designed to protect the EPAX from dust and hose directed water, when properly installed. This light-weight all aluminum unit utilizes welded seams and neoprene gaskets to meet NEMA 4/IP65 requirements. A textured, polyurethane coating protects against corrosion and is scratch resistant. Figure 1 below shows the overall dimensions of the Enclosure. The Display Enclosure with Mounting Channels weighs 9 pounds (4.1 Kg).

## DIMENSIONS In inches (mm)

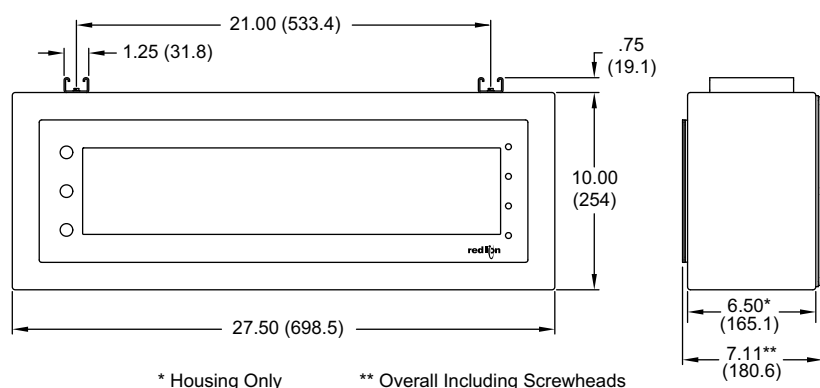


Figure 1

## MOUNTING

Provided with the enclosure are two 1/4-20 UNC x 1" hex bolts, two 1/4-20 UNC "strut nuts", and two 1/4" washers. The "strut nuts" can be installed anywhere in the channel by inserting them, spring side down, into the channels, then rotating them 90 degrees clockwise until the notches engage with the lips of the channel. The bolts and washers provided allow mounting to surfaces 1/4" to 1/2" thick (6.4 to 12.7 mm). Use longer bolts for mounting to thicker surfaces. Bolts fabricated from materials other than steel are not recommended.

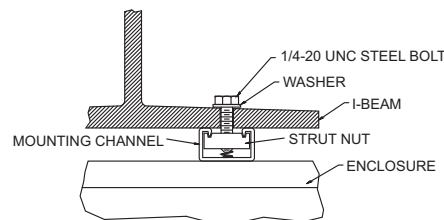


Figure 3

## TYPICAL INSTALLATIONS FOR ENC12 - NEMA 4 /IP65 ENCLOSURE

Removing the rear panel of the enclosure allows access to the Display for service. Either the rear panel or housing may be drilled to accept sealed conduit fittings, liquid-tight cable fittings or other types of wiring connectors. The enclosure may be attached to horizontal surfaces located above or below it, using the mounting channels provided.

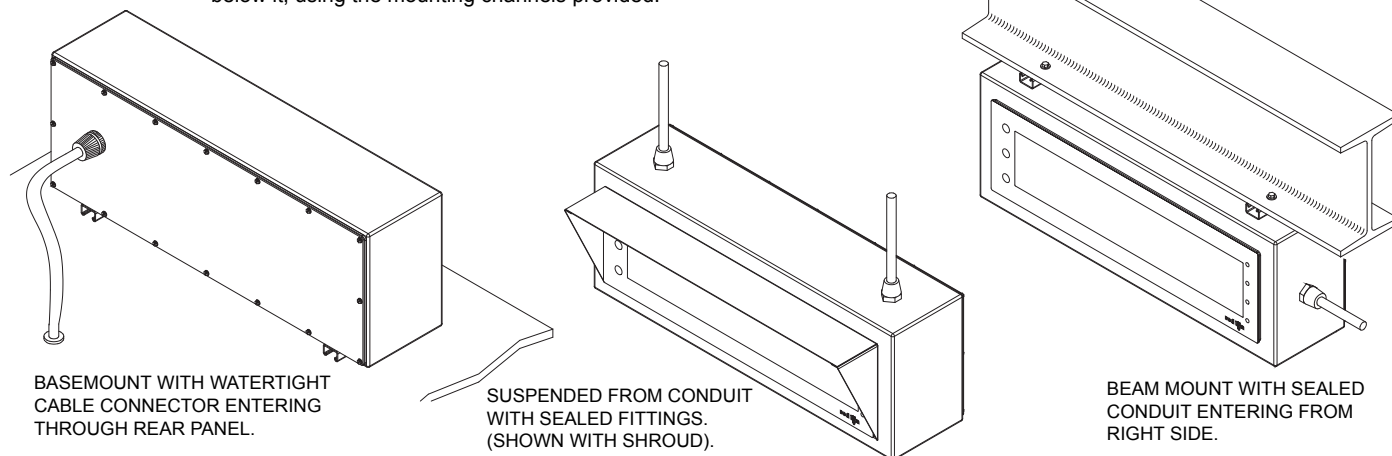


Figure 2

## ASSEMBLY AND INSTALLATION PROCEDURE

1. Install the two mounting channels on the enclosure housing using the four #8-32 screws provided and then insert the strut nuts (provided). Invert enclosure if base mounting.
2. If the wiring is to be routed through the housing, make sure that the mounting channels are oriented properly before drilling, so the Display will be readable. Wiring is generally brought into the right side of the housing or rear panel, closest to the terminals of the MPAX module. Drill the proper size hole in the housing or rear panel for the wiring connector or sealed conduit fitting and attach the fitting(s).
3. Before installing the Display into the housing, be sure that the mounting channels are oriented properly for the type of installation planned. Place the gasket that is supplied with the Display over the studs extending from the front panel of the display.
4. If using the shroud, refer to the Shroud Installation Procedure. Place the Display with gasket through the holes in the housing as shown at right. Working back and forth across the stud pattern, install the #10-32 keps nuts supplied with the Display on the studs. Tighten firmly.
5. Mount the housing, using the strut nuts and steel 1/4-20 UNC bolts and washers, as shown in figure 4. Connect the wires to the Display per the instructions included with the personality board.
6. Remove the center section of the rear panel gasket. Apply the gasket to the rear panel of the enclosure by inserting the #8-32 screws through the panel and into the holes in the gasket. Position the panel on the housing, start all of the screws, then firmly tighten them in a pattern working back and forth across the rear panel.

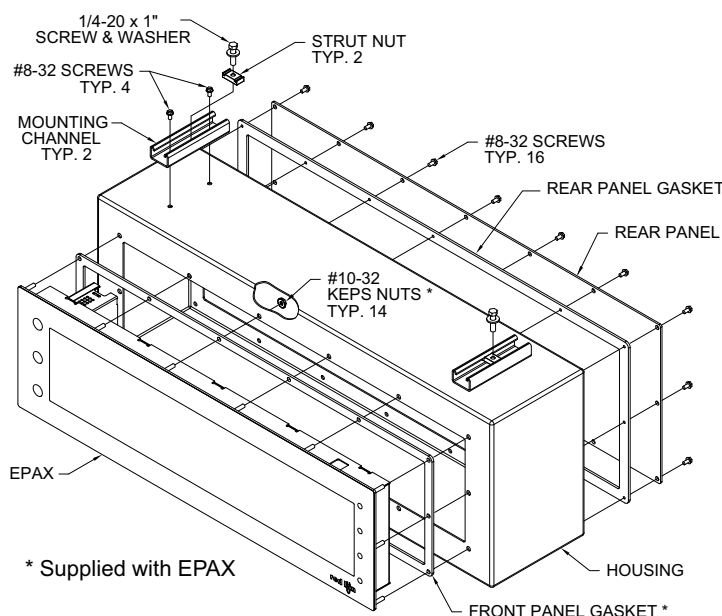


Figure 4

## DIMENSIONS FOR THE EPAX DISPLAY SHROUD

The optional EPAX Display Shroud enhances the readability of the Displays that are installed in areas with high intensity overhead light sources. The Shroud can be used with the EPAX Display in any installation, (panel mount, NEMA 4/IP65 Enclosure, or Universal Mounting Bracket). When properly assembled, the Shroud will not affect the integrity of a NEMA 4/IP65 installation. The Shroud weighs 1.0 pound (0.45 Kg).

### DIMENSIONS In inches (mm)

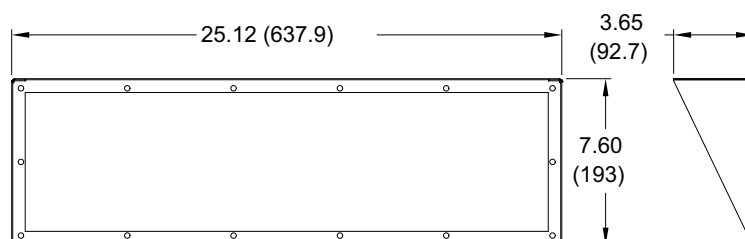


Figure 5

## SHROUD INSTALLATION PROCEDURE

### Installing The Shroud On An EPAX Display In A NEMA 4 /IP65 Enclosure Or Panel

1. Place a gasket over the studs extending from the rear of the front panel of the Display.
2. Orient the shroud as shown in Figure 6, and place it over the display. The studs of the display should now be protruding through the rear of the shroud.
3. Place the other gasket over the studs.
4. Install the unit into the panel or enclosure using the #10-32 keps nuts that are supplied with the Display. Tighten the nuts firmly.

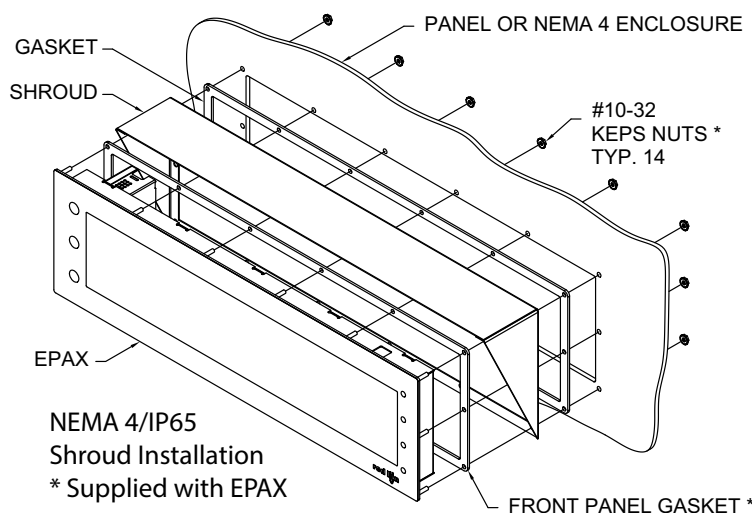


Figure 6

## ORDERING INFORMATION

TYPE	MODEL NO.	DESCRIPTION	PART NUMBER
Display	EPAX	5-Digit Extra Large Display for Analog MPAX Modules	EPAX0500
Analog Input Module	MPAX	Universal DC Input Module, AC Powered	MPAXD000
		Dual Process Input Module, AC Powered	MPAXDP00
		Process Input Module, AC Powered	MPAXP000
		Thermocouple and RTD Module, AC Powered	MPAXT000
		AC True RMS Voltage and Current Module, AC Powered	MPAXH000
		Strain Gage/Bridge Input Module, AC Powered	MPAXS000
Option 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
		Dual Triac/Dual SSR Drive Output Card	PAXCDS50
	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
		Modbus Communications Card	PAXCDC40
		Extended Modbus Communications Card with Dual RJ11 Connector	PAXCDC4C
		Profibus-DP Communications Card	PAXCDC50
	PAXCDL <sup>1</sup>	Analog Output Card	PAXCDL10
	PAXUSB	PAX USB Programming Card	PAXUSB00
Accessories	CBLUSB	USB Programming Cable Type A-Mini B	CBLUSB01
	PGM	Programming Remote for EPAX with 10 foot cable	EPAXPGM0
	ENC12	NEMA 4/IP65 Enclosure for EPAX	ENC12000
	SHR	Shroud for EPAX	SHREPAX0
	EN/SH	EPAX NEMA 4/IP65 Enclosure and Shroud	EPAXENSH

Notes:

<sup>1</sup> Refer to "Selecting Your Display Components and Option Cards."

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

## TROUBLESHOOTING

If for any reason you have trouble operating, connecting, or simply have questions concerning your new unit, contact Red Lion's technical support.

Email: [support@redlion.net](mailto:support@redlion.net)

Website: [www.redlion.net](http://www.redlion.net)

Inside US: +1 (877) 432-9908

Outside US: +1 (717) 767-6511

### LIMITED WARRANTY

(a) Red Lion Controls Inc., (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in "Statement of Warranty Periods" (available at [www.redlion.net](http://www.redlion.net)) current at the time of shipment of the Products (the "Warranty Period"). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state or federal law.

(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.

(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.

(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a).**