



by **ENOVATION** CONTROLS



# PowerView<sup>®</sup> Model PV780B

## *Installation Manual*

00-02-1019  
2018-03-02  
Section 78

In order to consistently bring you the highest quality, full-featured products, we reserve the right to change our specifications and designs at any time. The latest version of this manual can be found at [enovationcontrols.com](http://enovationcontrols.com).

**Warranty** - A limited warranty on materials and workmanship is given with this Murphy product.  
A copy of the warranty may be viewed or printed by going to [www.enovationcontrols.com/warranty](http://www.enovationcontrols.com/warranty)



Please read the following information before installing.

**BEFORE BEGINNING INSTALLATION OF THIS MURPHY  
PRODUCT:**

Read and follow all installation instructions.

Please contact Enovation Controls immediately if you have any  
questions.

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## Hardware Installation

The following instructions will guide you through installing the PowerView display.

### Inspecting Package Contents

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Before attempting to install the product, it is recommended that you ensure all parts are accounted for and inspect each item for damage (which sometimes occurs during shipping). The items included in the box are:

PV780B unit

Installation kit – P/N 78-00-0638 includes:

- Four each machine screws and flat washers
- Four Nylock nuts
- Installation manual web reference insert

### Dash-Mounted Installation

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#### Tools needed.

- Drill with 5/32 in. size bit
- Jigsaw
- Wrench or socket 6-32 Nylock nuts (provided) to studs

### Preparing the Dash

Determine the location of the PV708B in the dash. Use the Installation Template (included at the end of the manual) as a guideline to cut a hole in the dash to the specified dimensions. Drill holes where indicated on the template for the mounting screws.

**NOTE:** When using the paper template from the manual, if you downloaded this document from the Enovation Controls website, be aware that the pdf file may not automatically print to scale. When submitting the file for print, you will need to select None for Page Scaling. Check the accuracy of the printed template by verifying the measurements labeled on the template are correct.

If this manual was supplied with your product, the template will be correct.

## Mounting the Unit

1. Place the back side of the display through the opening in the dash.
2. Use the four screws to line up the unit with the drilled holes.
3. Push the unit through the opening and screws through the drilled holes until the back of the case is flush.
4. Use the Nylock nuts provided to tighten unit to the dash. Use the appropriate wrench or socket to tighten. Torque lock nuts to 8-10 inch-pounds.

## Flush Mounting the Dash

1. Cut the dash to allow for the display without bezel. Carefully follow the measurements of the included dash cut-out to ensure enough of the dash is available to properly secure the display. Torque the 6-32 Nylock nuts to 5 inch-pounds.
2. Place the display behind dash and line up the four mounting holes on the display with the holes in dash.
3. Install four bolts and tighten nuts.

## Mounting Options

A = Elevated Mount with Bezel  
(78051574) / Ram Mount

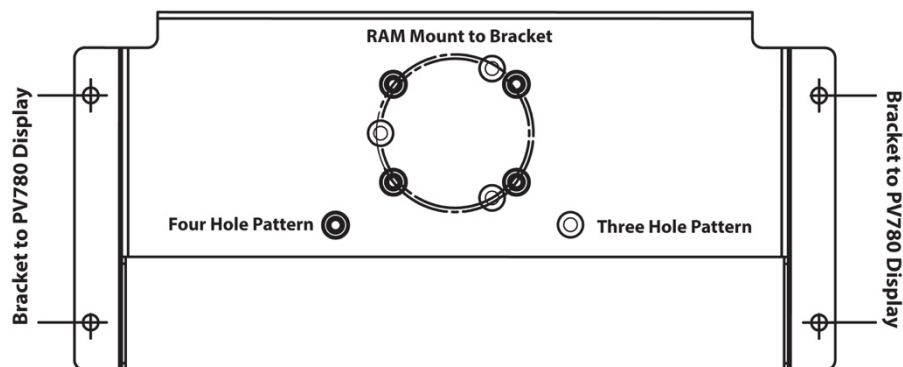
B = Rear Mount

C = Flush Mount



## Support Bracket

A special bracket supports the PV780 display with RAM mount C size components.



### PV780 Bracket for RAM Mount Option

| Part Number     | Description                                                       | Order Details                                              |
|-----------------|-------------------------------------------------------------------|------------------------------------------------------------|
| <b>78001053</b> | Bracket and Screw Kit for PV780B Display (RAM mount not included) | <b>Call your regional sales office or account manager.</b> |

### RAM™ Mounts

The following mount accessories may be used with our Bracket and Screw Kit “78001053”.

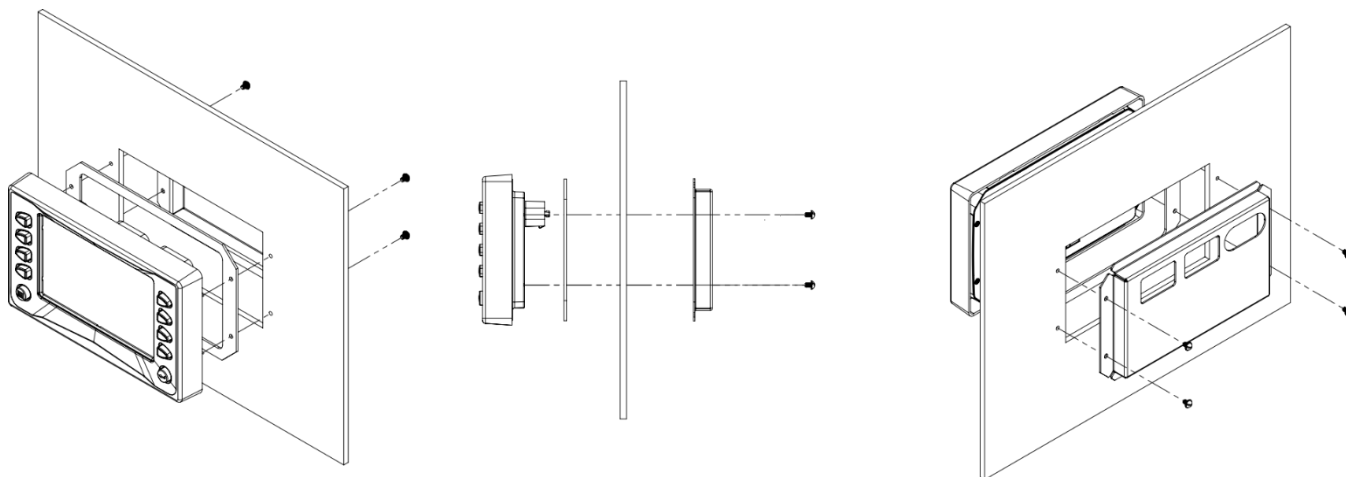


### RAM Mount Options for PV780B

| Part Number       | Description                         | Order Details                                                                                   |
|-------------------|-------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>RAM-101U-B</b> | (2) 1.5 in. Balls with 2.25 in. Arm | <b>Order on website:</b><br><a href="http://tinyurl.com/mdo3yru">http://tinyurl.com/mdo3yru</a> |
| <b>RAM-101U</b>   | (2) 1.5 in. Balls with 4.5 in. Arm  |                                                                                                 |
| <b>RAM-101U-D</b> | (2) 1.5 in. Balls with 9 in. Arm    |                                                                                                 |
| <b>RAM-202U</b>   | 1.5 in. Ball                        |                                                                                                 |
| <b>RAM-201U</b>   | 4.5 in. Arm                         |                                                                                                 |
| <b>RAM-201U-D</b> | 9 in. Arm                           |                                                                                                 |
| <b>RAM-103U-B</b> | 1.5 in. Ball with 2.25 in. Arm      |                                                                                                 |
| <b>RAM-103U</b>   | 1.5 in. Ball with 4.5 in. Arm       |                                                                                                 |

## Bracket Mounting Assembly

Mounting with Kit # 78001295



## Available Accessories for the PV780B

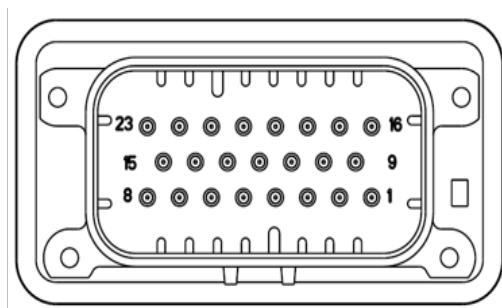
The following PV780B accessories are available through Enovation Controls:

| Part Number | Description                            | Order Details      |
|-------------|----------------------------------------|--------------------|
| 78090098    | Programming Kit, PV780                 | <b>Accessories</b> |
| 78051181    | Cover, PV780                           |                    |
| 78001053    | Bracket Kit (screws included)          |                    |
| 78001055    | Harness, Gray Connector, USB           |                    |
| 78001056    | Harness, Gray Connector, Flying Leads  |                    |
| 78001057    | Harness, Black Connector, Flying Leads |                    |
| 78001017    | Harness, Black Connector, Development  |                    |
| 78001018    | Harness, Gray Connector, Development   |                    |
| 78090069    | Harness, PV750 Conversion, Power/CAN   | <b>Service</b>     |
| 78051180    | Bezel, PV780                           |                    |
| 78001295    | Kit, Mounting Bracket, PV780           |                    |

## Wiring Information

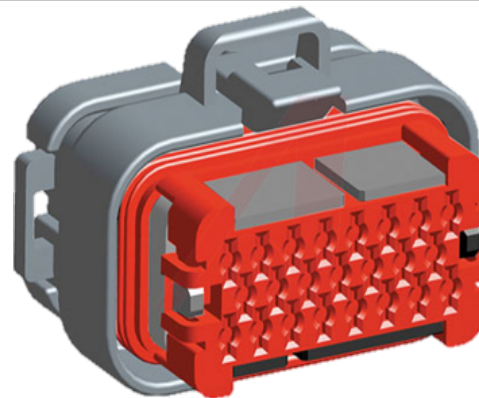
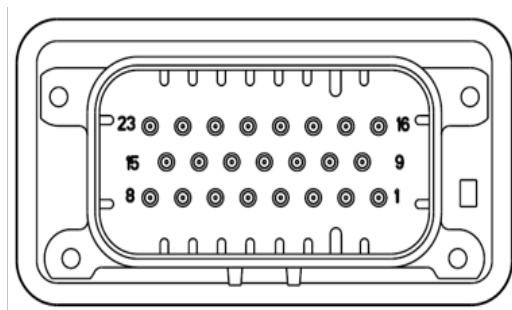
### Pin Out Specifications

| Black Connector |                       |
|-----------------|-----------------------|
| 1               | Digital Input 1       |
| 2               | Analog Input 3        |
| 3               | Analog Input 2        |
| 4               | Analog Input 1        |
| 5               | CAN1 Low              |
| 6               | CAN1 High             |
| 7               | Battery               |
| 8               | Ground                |
| 9               | Analog Input 3 Ground |
| 10              | Analog Input 2 Ground |
| 11              | Analog Input 1 Ground |
| 12              | Digital Input 3       |
| 13              | Digital Input 2       |
| 14              | Frequency Output 1    |
| 15              | Ignition Input        |
| 16              | No Connect            |
| 17              | No Connect            |
| 18              | CAN2 Low              |
| 19              | CAN2 High             |
| 20              | Digital Input 4       |
| 21              | Digital Input 5       |
| 22              | Digital Output        |
| 23              | Frequency Output 2    |



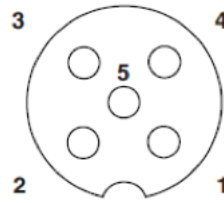
**AMP 770680-1**

| Gray Connector |                         |
|----------------|-------------------------|
| 1              | Video Input 1           |
| 2              | Video Input 2           |
| 3              | Video Input 3           |
| 4              | RS-485 High             |
| 5              | RS-485 Low              |
| 6              | No Connect              |
| 7              | No Connect              |
| 8              | No Connect              |
| 9              | Video Input 1<br>Ground |
| 10             | Video Input 2<br>Ground |
| 11             | Video Input 3<br>Ground |
| 12             | No Connect              |
| 13             | Frequency Input         |
| 14             | Frequency Return        |
| 15             | No Connect              |
| 16             | USB D-                  |
| 17             | USB D+                  |
| 18             | USB 5V                  |
| 19             | USB Ground              |
| 20             | USB Shield              |
| 21             | No Connect              |
| 22             | No Connect              |
| 23             | No Connect              |



**AMP 770680-4**

| Ethernet (M12) Connector |                 |
|--------------------------|-----------------|
| 1                        | Ethernet TX+    |
| 2                        | Ethernet RX+    |
| 3                        | Ethernet TX-    |
| 4                        | Ethernet RX-    |
| 5                        | Ethernet Ground |



M-12, 5-pos, A-coded,  
Plastic Knurl Connector Only

**NOTE:** Ethernet connectivity is optional.

## Configuration Information

Follow these steps to download a custom configuration to the PV780B display:

| Step | Action                                                                                                                                                                                                                                                                                                                                           |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Ensure that PowerVision is open on your computer.                                                                                                                                                                                                                                                                                                |
| 2    | Connect the PV780B to the computer with the programming harness using either the USB pigtail or the USB on-the-go found on the gray connector.<br><b>NOTE:</b> If PowerVision does not detect the display, go to the Adapter Properties. Select IPV4 properties, then change the IP address to 192.168.0.1 and the Subnet mask to 255.255.255.0. |
| 3    | Create your custom configuration file within PowerVision.                                                                                                                                                                                                                                                                                        |
| 4    | Deploy the configuration file to the PV780B.                                                                                                                                                                                                                                                                                                     |

Follow these steps to download a custom configuration using a USB drive:

| Step | Action                                                                                                                                                                                         |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Create your custom configuration file within PowerVision.                                                                                                                                      |
| 2    | Save the file to a USB drive.                                                                                                                                                                  |
| 3    | Connect the USB drive to the USB port on the pigtail or on the USB on-the-go connector provided with the programming kit.                                                                      |
| 4    | Turn off the PV780B and turn it back on while holding down the bottom right key. Continue to hold the button a few more seconds, then release once the screen has entered into the bootloader. |
| 5    | Use the corresponding keys to the up/down arrows to find the desired file. Use the corresponding right arrow key to select and continue. The right arrow turns green; press again to confirm.  |
| 6    | When the installation is complete, a check mark is displayed in the middle of the screen. The PV780B will power cycle and boot to the new configuration.                                       |

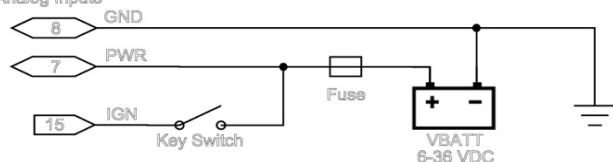
## Wiring Schematics – Black Connector



**WARNING:** Failure to install the unit per the specified wiring diagrams may cause damage to the unit. **DO NOT** connect power to the video ground. Warranty is void for damage caused by incorrect wiring.

### J1 (BLACK CONNECTOR)

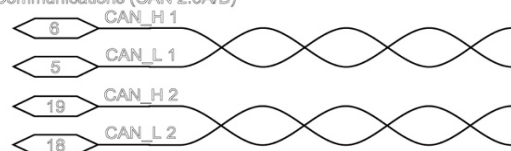
#### Analog Inputs



#### NOTES:

- Mating connector AMPSEAL 770680-1 plug with 770654-3 sockets
- Use 20 to 16 AWG (0.5 to 1.4 mm<sup>2</sup>)
- Wire diameter of 1.7 to 2.7 mm.
- Install seal plug 770678-1 in perforated connector wire cavities
- Use 5A Slow Blow Type Fuse

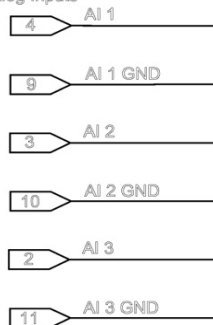
#### Communications (CAN 2.0A/B)



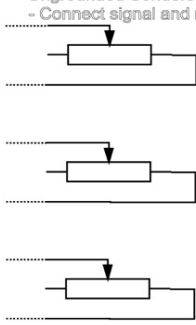
#### Wire per J1939-11 (STP) or J1939-15 (UTP)

- J1939-11: Keep stub <1m length; up to 30 nodes; 40m max length
- J1939-15: Keep stub <3m length; up to 10 nodes; 40m max length
- Locate display node >0.1m from nearest node
- Space nodes unequally
- Keep CANbus trunk as linear as possible
- Type I - Use external 120 ohm terminator
- Type II - Enable internal terminator

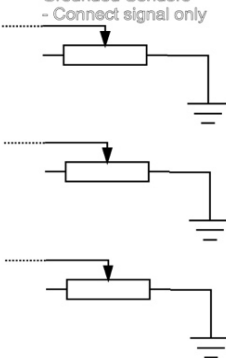
#### Analog Inputs



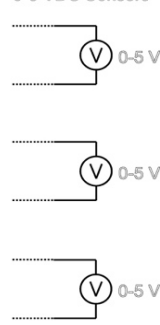
#### Ungrounded Senders - Connect signal and return



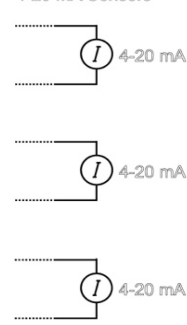
#### Grounded Senders - Connect signal only



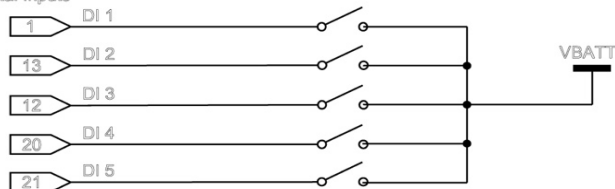
#### 0-5 VDC Sensors



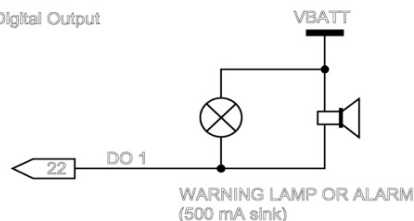
#### 4-20 mA Sensors



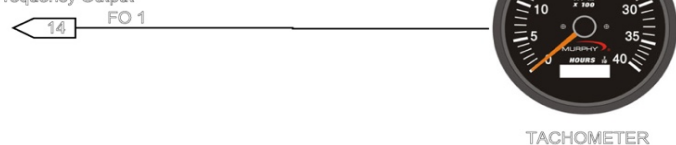
#### Digital Inputs



#### Digital Output



#### Frequency Output



## Wiring Schematics – Gray Connector



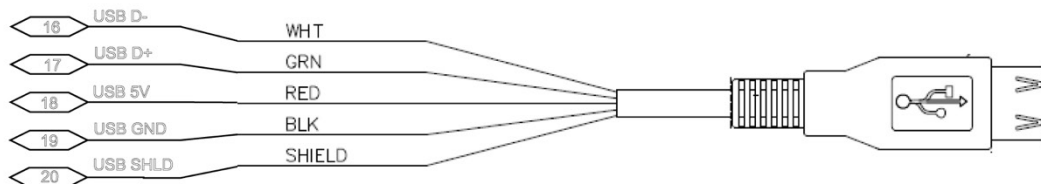
**WARNING:** Failure to install the unit per the specified wiring diagrams may cause damage to the unit. **DO NOT** connect power to the video ground. Warranty is void for damage caused by incorrect wiring.

### J2 (GRAY CONNECTOR)

#### NOTES:

- Mating connector AMPSEAL 770880-4 plug with 770854-3 sockets
- Use 20 to 16 AWG (0.5 to 1.4 mm<sup>2</sup>)
- Wire diameter of 1.7 to 2.7 mm.
- Install seal plug 770678-1 in perforated connector wire cavities

#### USB (Programming and Data Logging)



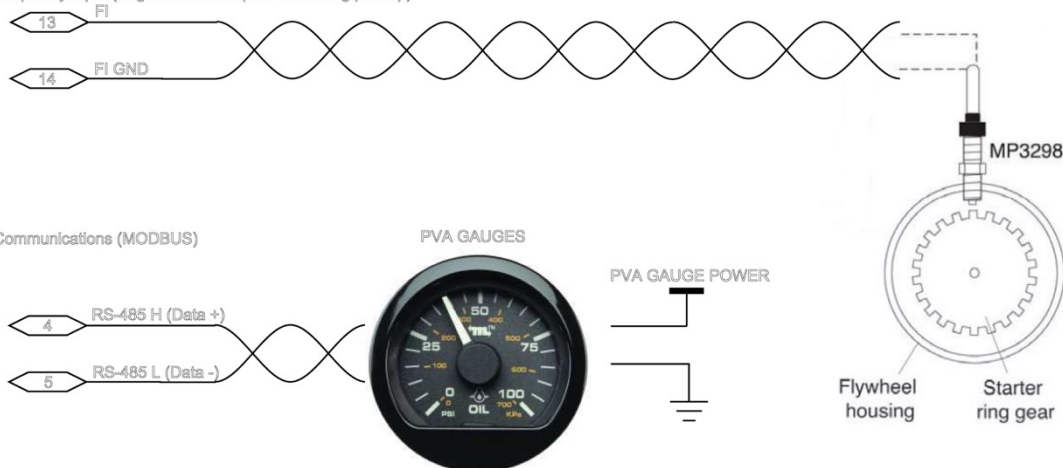
#### Video Inputs



#### VIDEO CAMERA NOTES

- NTSC or PAL format
- Do not mix camera types
- Follow camera manufacturer specifications for power
- Do not power camera using VIDEO GND

#### Frequency Input (Engine or Shaft Speed from mag pick-up)



#### Communications (MODBUS)



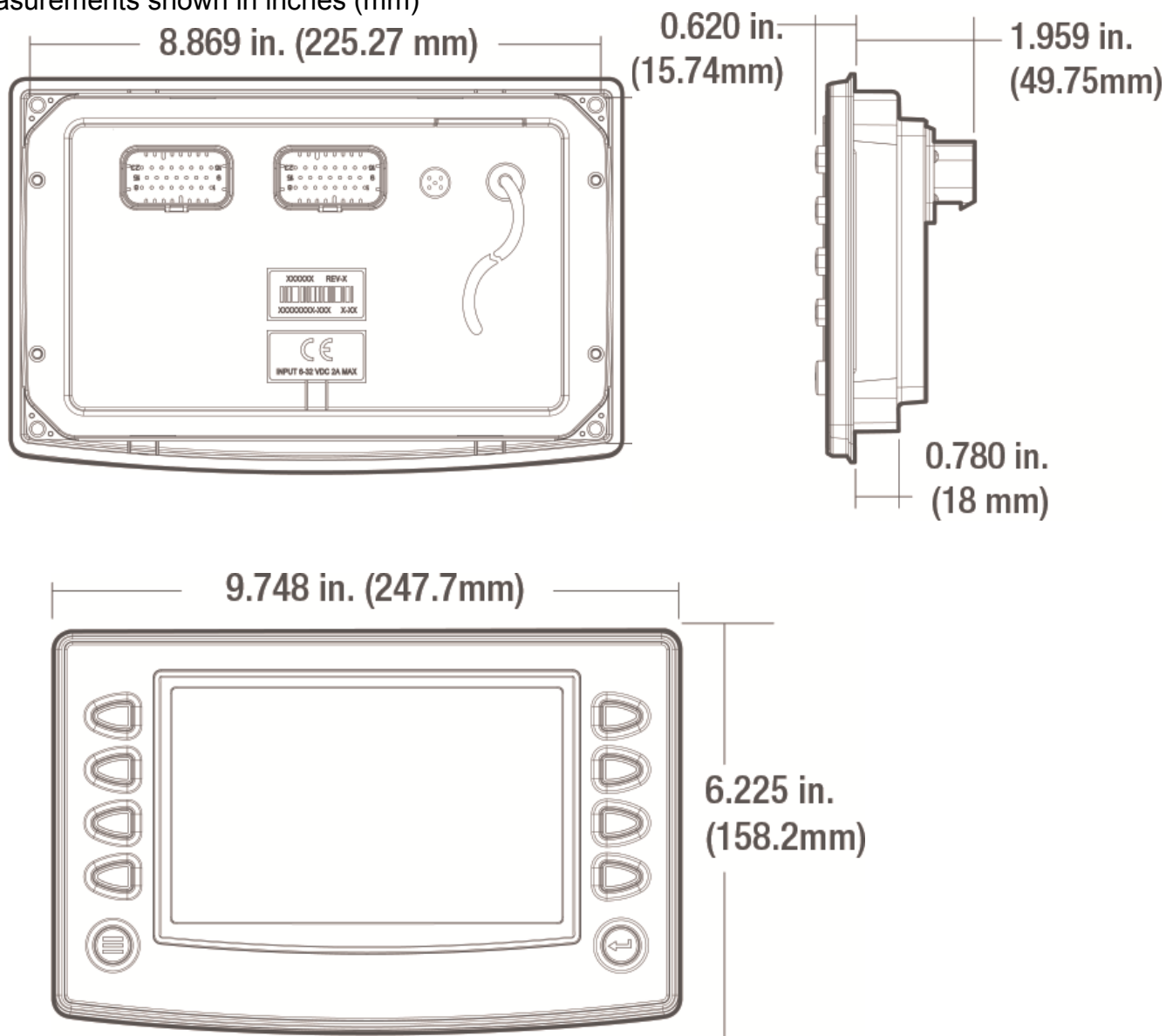
## Specifications

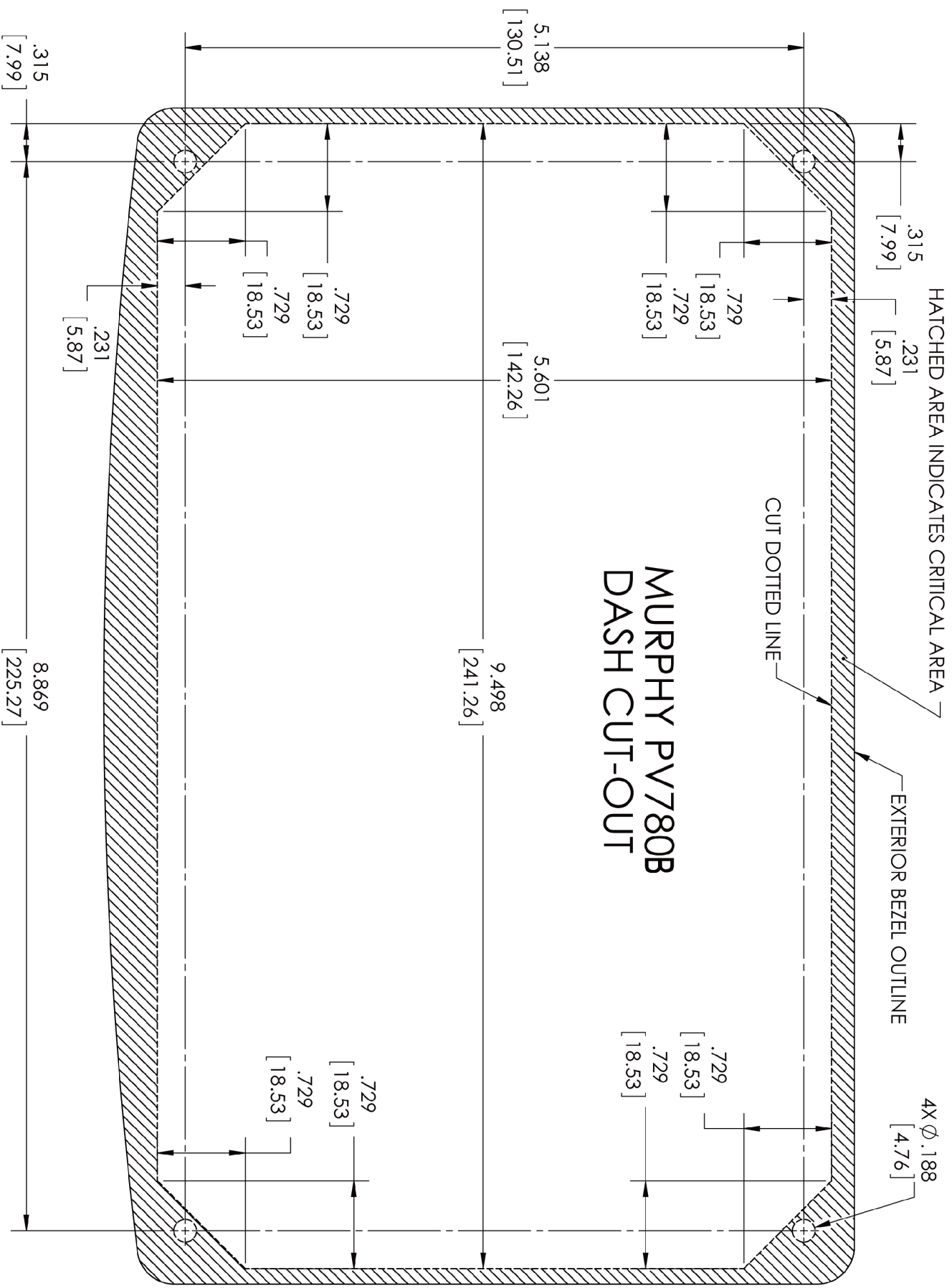
| Computing               |                                                                        |
|-------------------------|------------------------------------------------------------------------|
| <b>Main Processor:</b>  | Renesas R-Car M2, 32-Bit Arm Cortex A15 Processor @ 1.5 GHz            |
| <b>Operating Sys:</b>   | QNX® Real-time Operating System                                        |
| <b>Storage:</b>         | 8GB Flash memory for Operating System, Application and Configuration   |
| <b>Ram:</b>             | 512 Mb DDR3-SDRAM                                                      |
| <b>Graphics:</b>        | Renesas graphics processor                                             |
| Displays                |                                                                        |
| <b>Type:</b>            | 7" (178 mm), LVDS TFT LCD with LED backlight, 24-Bit color             |
| <b>Resolution:</b>      | WVGA, 800 x 480 pixels                                                 |
| <b>Contrast Ratio:</b>  | 600:1 (typical)                                                        |
| <b>Brightness:</b>      | 1000 cd/m <sup>2</sup>                                                 |
| <b>Surface:</b>         | Anti-glare, hard coating                                               |
| <b>Touch Panel:</b>     | Projected capacitive (PCAP) with Glove touch                           |
| <b>Keypad:</b>          | 10 tactile configurable soft keys with white LED backlight             |
| Hardware                |                                                                        |
| <b>Real-time Clock:</b> | With battery backup                                                    |
| <b>Connectors:</b>      | (2) Ampseal 23 pin<br>(1) M12, 5-pin<br>(1) USB pigtail                |
| <b>Video Inputs:</b>    | (3) NTSC/PAL (Single channel viewable)                                 |
| Communication           |                                                                        |
| <b>CAN:</b>             | (2) CAN 2.0B according to ISO-11898-2, J1939 and proprietary messaging |
| <b>Serial:</b>          | (1) RS-485 serial (Modbus: Master/Slave)                               |
| <b>USB:</b>             | (2) USB 2.0 Full Speed Host                                            |
| <b>Ethernet:</b>        | (1) Ethernet 10/100 Base-T (Optional: 78700628 Only)                   |
| <b>Wi-Fi:</b>           | 802.11 b/g radio (Optional: 78700628 Only)                             |
| <b>Bluetooth:</b>       | Fully Integrated Bluetooth 2.1, Class 1 (Optional: 78700628 Only)      |

| Electrical              |                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating Volts:</b> | 6-36 VDC, Reverse polarity protected                                                                                                                        |
| <b>Outputs:</b>         | (1) 500 mA Switched Low-side<br>(1) Frequency Output (2Hz – 3KHz)                                                                                           |
| <b>Inputs:</b>          | (3) Analog 0-5 VDC, 4-20mA, Resistive, 10-bit resolution<br>(5) Discrete digital, active high<br>(1) Frequency In (2Hz – 10KHz) 5V pk-pk min, 49V pk-pk max |

## Dimensions

Measurements shown in inches (mm)





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