MURPHY®

by **ENOVATION** CONTROLS

PowerView®
Model PV780B

Installation Manual

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.

WARNING

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.

Table of Contents

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Hardware Installation

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

Inspecting Package Contents

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

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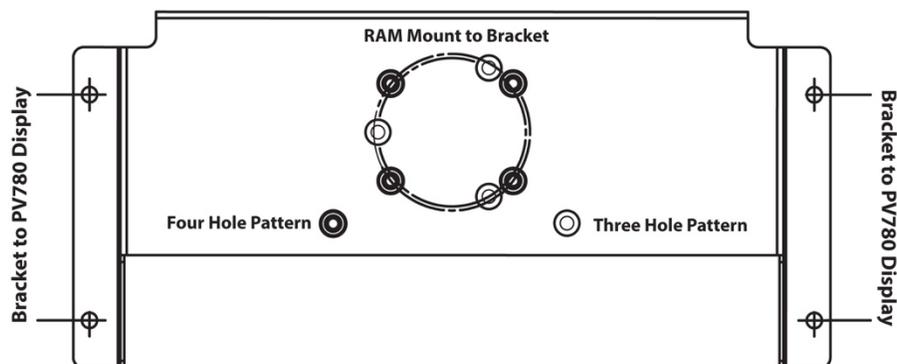
A = Elevated Mount with Bezel (78051574) / Ram Mount

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
78001053	Bracket and Screw Kit for PV780B Display (RAM mount not included)	**Call your regional sales office or account manager.**

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
RAM-101U-B	(2) 1.5 in. Balls with 2.25 in. Arm	
RAM-101U	(2) 1.5 in. Balls with 4.5 in. Arm	
RAM-101U-D	(2) 1.5 in. Balls with 9 in. Arm	
RAM-202U	1.5 in. Ball	**Order on website:**
RAM-201U	4.5 in. Arm	**http://tinyurl.com/mdo3yru**
RAM-201U-D	9 in. Arm	
RAM-103U-B	1.5 in. Ball with 2.25 in. Arm	
RAM-103U	1.5 in. Ball with 4.5 in. Arm	

Bracket Mounting Assembly

Mounting with Kit # 78001295
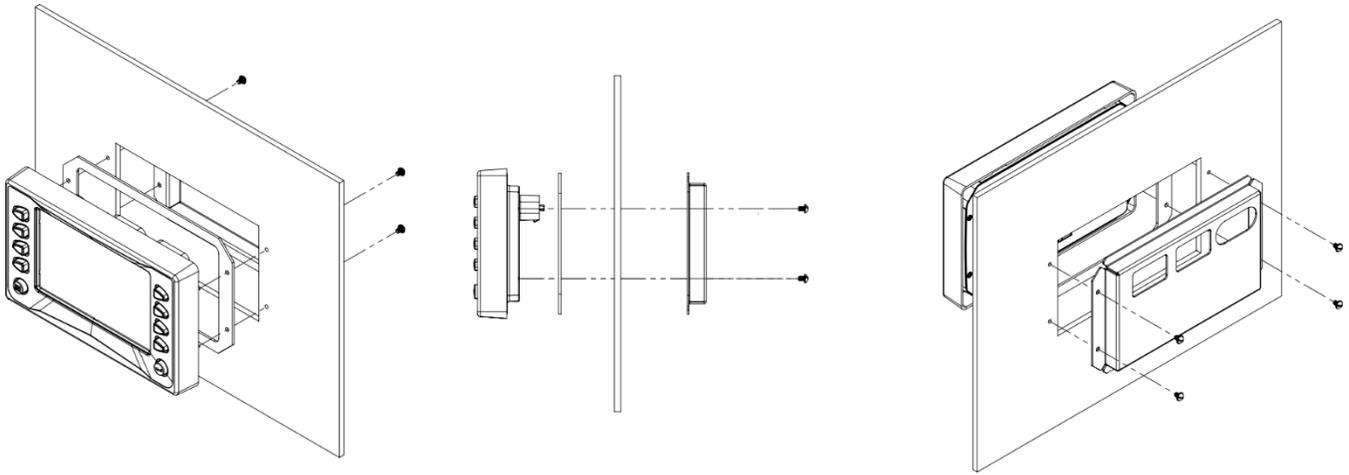
Available Accessories for the PV780B

The following PV780B accessories are available through Enovation Controls:

Part Number	Description	Order Details
78090098	Programming Kit, PV780	**Accessories**
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	**Service**
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
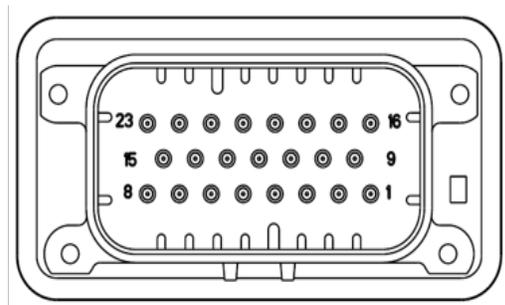
AMP 770680-1

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 Ground
10	Video Input 2 Ground
11	Video Input 3 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
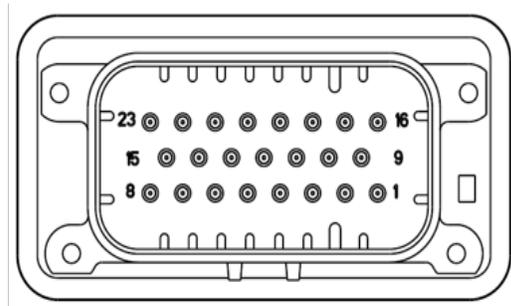
AMP 770680-4

Ethernet (M12) Connector	
1	Ethernet TX+
2	Ethernet RX+
3	Ethernet TX-
4	Ethernet RX-
5	Ethernet Ground
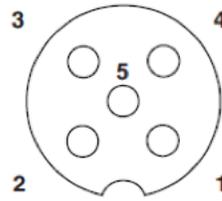
M-12, 5-pos, A-coded,
Plastic Knurl Connector Only

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. **NOTE**: 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

8	GND
7	PWR
15	IGN

Key Switch

Fuse

VBATT
6-36 VDC
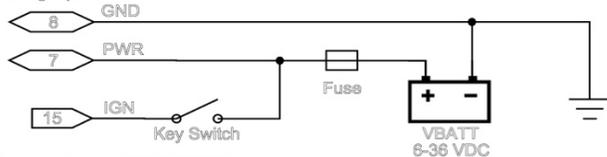
NOTES:
- Mating connector AMPSEAL 770680-1 plug with 770854-3 sockets
- Use 20 to 16 AWG (0.5 to 1.4 mm^2)
- Wire diameter of 1.7 to 2.7 mm.
- Install seal plug 770678-1 in perforated connector wire cavities
- Use 5A Slow Blow Type Fuse

Communications (CAN 2.0A/B)

6	CAN_H 1
5	CAN_L 1
19	CAN_H 2
18	CAN_L 2
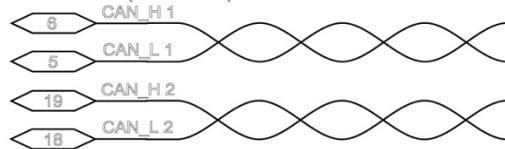
Wire per J1939-11 (STP) or J1939-15 (UTP)
- J1939-11: Keep stub <1m length; up to 30 nodes; 40m max length
- J1939-15: Keep stub <3m length; up to 10 nodes; 40m max length
- Locate display node >0.1m from nearest node
- Space nodes unequally
- Keep CANbus trunk as linear as possible
- Type I - Use external 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

| 4 | AI 1 |
| 9 | AI 1 GND |

0-5 V   4-20 mA

| 3 | AI 2 |
| 10 | AI 2 GND |

0-5 V   4-20 mA

| 2 | AI 3 |
| 11 | AI 3 GND |

0-5 V   4-20 mA

Digital Inputs

1	DI 1
13	DI 2
12	DI 3
20	DI 4
21	DI 5

VBATT

Digital Output

VBATT

| 22 | DO 1 |

WARNING LAMP OR ALARM
(500 mA sink)

Frequency Output

| 14 | FO 1 |

TACHOMETER
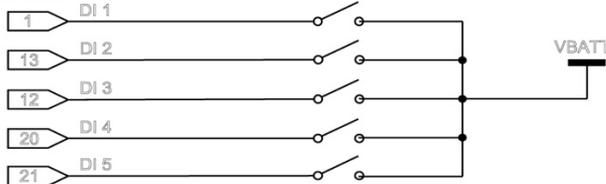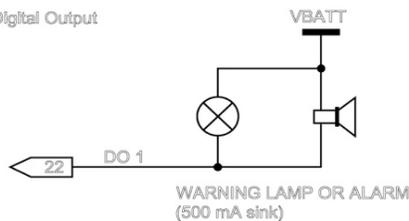
Wiring Schematics – Gray Connector

> **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.
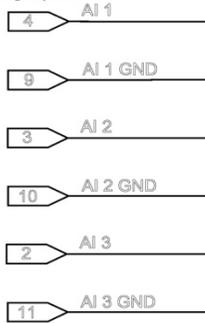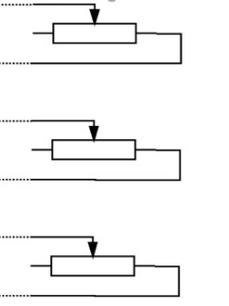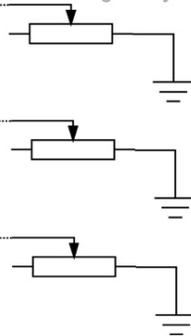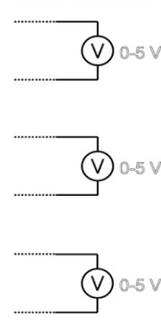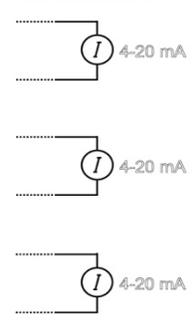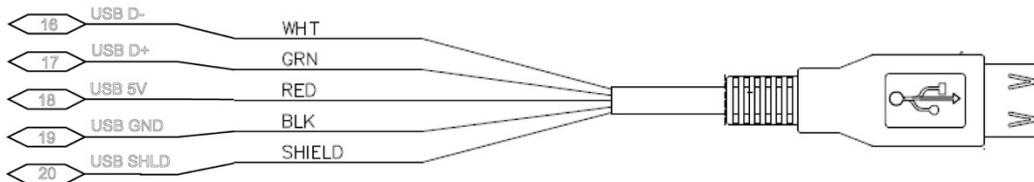
J2 (GRAY CONNECTOR)

NOTES:
- Mating connector AMPSEAL 770680-4 plug with 770854-3 sockets
- Use 20 to 16 AWG (0.5 to 1.4 mm^2)
- Wire diameter of 1.7 to 2.7 mm.
- Install seal plug 770678-1 in perforated connector wire cavities

USB (Programming and Data Logging)

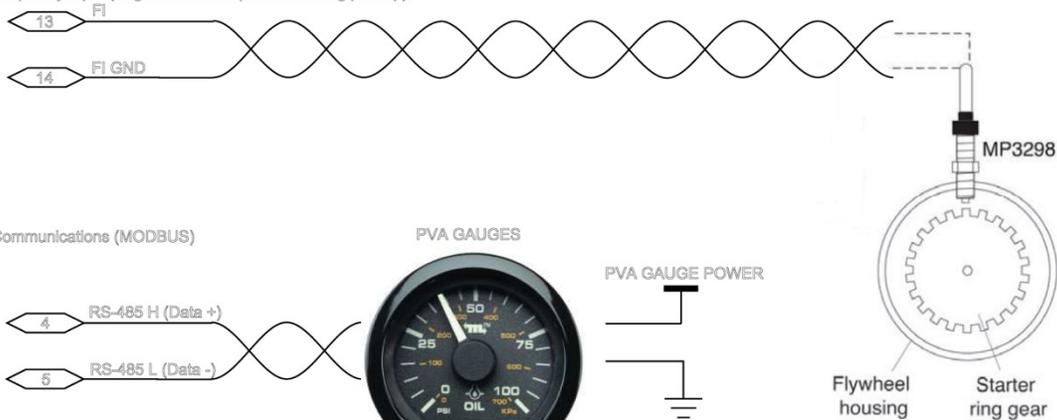| 16 | USB D- | WHT |
17	USB D+	GRN
18	USB 5V	RED
19	USB GND	BLK
20	USB SHLD	SHIELD

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

1	VIDEO 1
9	VIDEO 1 GND
2	VIDEO 2
10	VIDEO 2 GND
3	VIDEO 3
11	VIDEO 3 GND

CAMERA POWER

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

| 13 | FI |
| 14 | FI GND |

MP3298

Flywheel housing   Starter ring gear

Communications (MODBUS)

PVA GAUGES

PVA GAUGE POWER

| 4 | RS-485 H (Data +) |
| 5 | RS-485 L (Data -) |

Specifications

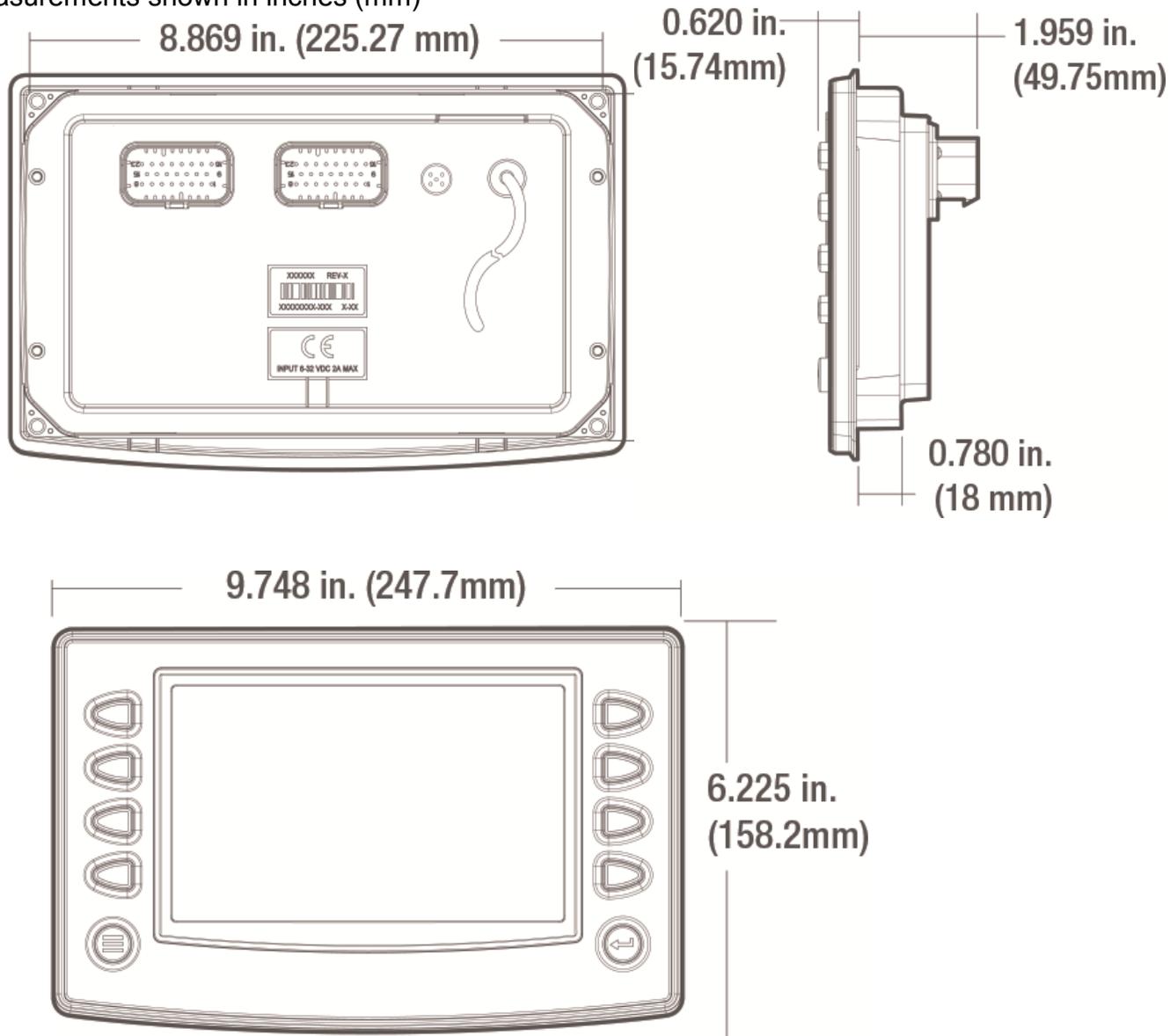| Computing	
Main Processor:	Renesas R-Car M2, 32-Bit Arm Cortex A15 Processor @ 1.5 GHz
Operating Sys:	QNX® Real-time Operating System
Storage:	8GB Flash memory for Operating System, Application and Configuration
Ram:	512 Mb DDR3-SDRAM
Graphics:	Renesas graphics processor
Displays	
Type:	7" (178 mm),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

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

Dimensions

Measurements shown in inches (mm)

MURPHY PV780B
DASH CUT-OUT

HATCHED AREA INDICATES CRITICAL AREA

CUT DOTTED LINE

EXTERIOR BEZEL OUTLINE

.315
[7.99]

.315
[7.99]

.231
[5.87]

.231
[5.87]

.729
[18.53]

.729
[18.53]

.729
[18.53]

.729
[18.53]

.729
[18.53]

.729
[18.53]

.729
[18.53]

.729
[18.53]

5.138
[130.51]

5.601
[142.26]

9.498
[241.26]

8.869
[225.27]

4X Ø.188
[4.76]

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ENOVATION CONTROLS CORPORATE HEADQUARTERS
5311 S 122ND EAST AVENUE
TULSA, OK 74146

ENOVATION CONTROLS LTD. – UNITED KINGDOM
CHURCH ROAD LAVERSTOCK
SALISBURY SP1 1QZ UK

SUN MURPHY INTERNATIONAL TRADING (SHANGHAI) CO., LTD
B15 ROOM, 6# BUILDING, 351 SIZHUAN ROAD
SONGJIANG DISTRICT, SHANGHAI 201601, CHINA

ENOVATION CONTROLS INDIA PVT. LTD.
301, 3RD FLOOR, KRSNA CHAMBERS,
11 GALAXY GARDENS, NORTH MAIN ROAD,
KOREGAON PARK, PUNE 411001,
MAHARASHTRA, INDIA

U.S. SALES & SUPPORT

PHONE: 918 317 4100
EMAIL: SALES@ENOVATIONCONTROLS.COM
WWW.ENOVATIONCONTROLS.COM

MURPHY INDUSTRIAL PANEL DIVISION
PHONE: 918 317 4100
EMAIL: IPDSALES@ENOVATIONCONTROLS.COM

INTERNATIONAL SALES & SUPPORT

EUROPE, MIDDLE EAST, AFRICA
PHONE: +44 1722 410055
EMAIL: SALES@ENOVATIONCONTROLS.EU

CHINA
PHONE: +86 21 6237 5885
EMAIL: APSALES@ENOVATIONCONTROLS.COM

INDIA
PHONE: +91 91581 37633
EMAIL: INDIASALES@ENOVATIONCONTROLS.COM

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FM 29422 (UK)