PowerView®
Model PV780

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 www.fwmurphy.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

THIS PAGE INTENTIONALLY LEFT BLANK

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:

PV780 unit

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

- Four each machine screws and flat washers
- Four Nylock nuts
- Installation & Operations 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 PowerView 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 FW Murphy 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.

RAM™ Mount Option

Support Bracket

A special bracket supports the PV780 display with RAM mount C size components.
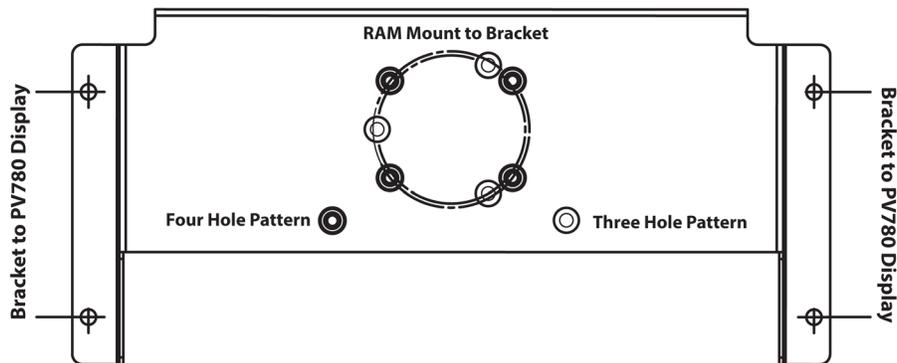
PV780 Bracket for RAM Mount Option		
Part Number	**Description**	**Order Details**
78001053	Bracket and Screw Kit for PV780 Display (RAM mount not included)	Call your regional sales office or account manager.

RAM™ Mounts

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

RAM Mount Options for PV780		
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	

Wiring Information

Pin Out Specifications

PV780
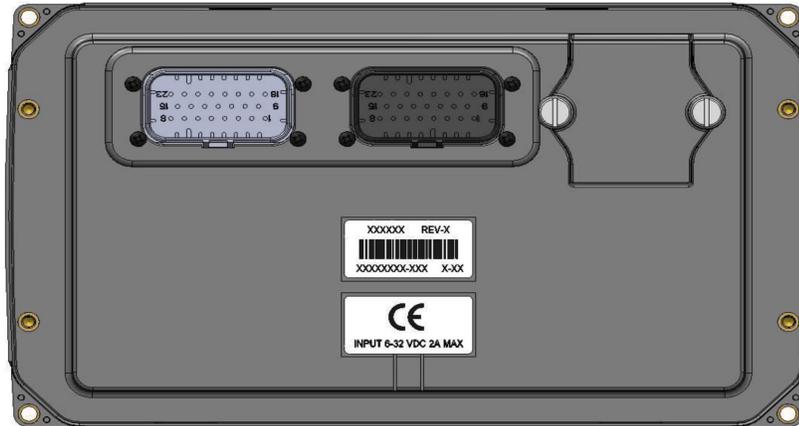
Connector 2 (Gray)		
1	Video Input 1	NTSC/PAL Signal 1
2	Video Input 2	NTSC/PAL Signal 2
3	Video Input 3	NTSC/PAL Signal 3
4	RS-485 High	Data + (B)
5	RS-485 Low	Data - (A)
6	-	No Connect
7	-	No Connect
8	-	No Connect
9	Video Input 1 Ground	
10	Video Input 2 Ground	
11	Video Input 3 Ground	
12	USB ID	Host (grounded); Slave (not connect)
13	Frequency Input	
14	Frequency Return	
15	-	No Connect
16	USB D-	White (Data -)
17	USB D+	Green (Data +)
18	USB 5V	Red (+5V)
19	USB Ground	Black
20	USB Shield	
21	-	No Connect
22	-	No Connect
23	-	No Connect

Connector 1 (Black)		
1	Digital Input 1	Discrete digital; active high
2	Analog Input 3	0-5V; 4-20mA; resistive analog
3	Analog Input 2	0-5V; 4-20mA; resistive analog
4	Analog Input 1	0-5V; 4-20mA; resistive analog
5	CAN1 L	Green
6	CAN1 H	Yellow
7	Battery	Red (Unswitched 12/24V)
8	Ground	Black (Common)
9	Analog Input 3 Ground	Black (Common with Ground)
10	Analog Input 2 Ground	Black (Common with Ground)
11	Analog Input 1 Ground	Black (Common with Ground)
12	Digital Input 3	Discrete digital; active high
13	Digital Input 2	Discrete digital; active high
14	Frequency Output 1	2Hz - 3kHz
15	Ignition In	Ignition (Switched 12/24V)
16	-	No Connect
17	-	No Connect
18	CAN2 L	Green
19	CAN2 H	Yellow
20	Digital Input 4	Discrete digital; active high
21	Digital Input 5	Discrete digital; active high
22	Digital Output	Switched low-side, 500mA
23	-	No Connect

View looking at the back of the display
Mating connector P/N: **AMP 770680-4**

View looking at the back of the display
Mating connector P/N: **AMP 770680-1**

Signal Definitions

CAN: 3 ports according to CAN specification 2.; 1 port isolated according to NMEA 2000 USB 2.0 host Video input (optional): NTSC/PAL Inputs (3) 0-5 VDC analog inputs, (1) input configurable to support measurement frequencies from 2 Hz - 10kHz values from 0-100% duty cycle Output: Digital, capable of sinking 500mA.

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

Pin	Signal
8	GND
7	PWR
15	IGN

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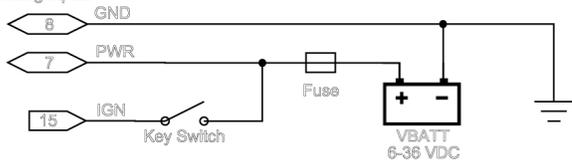
NOTES:
- Mating connector AMPSEAL 770680-1 plug with 770854-3 sockets
- Use 20 to 16 AWG (0.5 to 1.4 mm^2)
- Wire diameter of 1.7 to 2.7 mm.
- Install seal plug 770678-1 in perforated connector wire cavities
- Use 5A Slow Blow Type Fuse

Communications (CAN 2.0A/B)

Pin	Signal
6	CAN_H 1
5	CAN_L 1
19	CAN_H 2
18	CAN_L 2
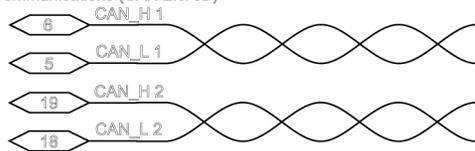
Wire per J1939-11 (STP) or J1939-15 (UTP)
- J1939-11: Keep stub <1m length; up to 30 nodes; 40m max length
- J1939-15: Keep stub <3m length; up to 10 nodes; 40m max length
- Locate display node >0.1m from nearest node
- Space nodes unequally
- Keep CANbus trunk as linear as possible
- Type I - Use external 120 ohm terminator
- Type II - Enable internal terminator

Analog Inputs
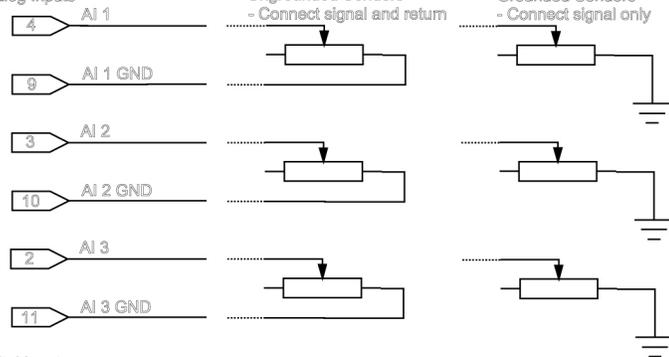
Ungrounded Senders - Connect signal and return | Grounded Senders - Connect signal only | 0-5 VDC Sensors | 4-20 mA Sensors

Pin	Signal
4	AI 1
9	AI 1 GND
3	AI 2
10	AI 2 GND
2	AI 3
11	AI 3 GND

0-5 V   4-20 mA

Digital Inputs

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

VBATT

Digital Output

VBATT

Pin	Signal
22	DO 1

WARNING LAMP OR ALARM (500 mA sink)

Frequency Output

Pin	Signal
14	FO 1

TACHOMETER
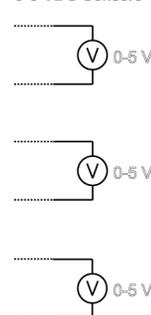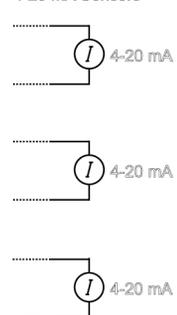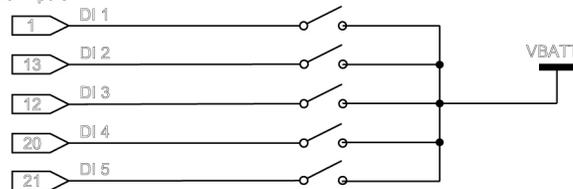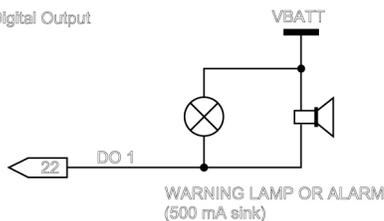
Wiring Schematics – Gray Connector

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)

Pin	Signal	Wire
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

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

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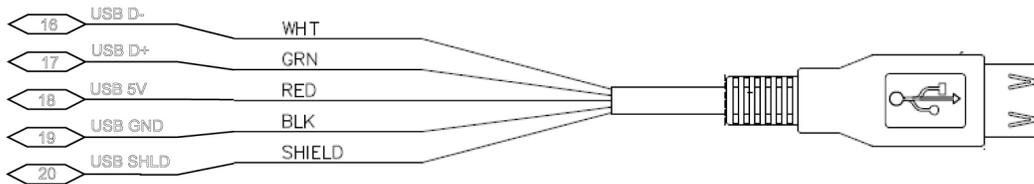
Frequency Input (Engine or Shaft Speed from mag pick-up)

Pin	Signal
13	FI
14	FI GND

MP3298

Flywheel housing   Starter ring gear

Communications (MODBUS)

Pin	Signal
4	RS-485 H (Data +)
5	RS-485 L (Data -)

PVA GAUGES

PVA GAUGE POWER
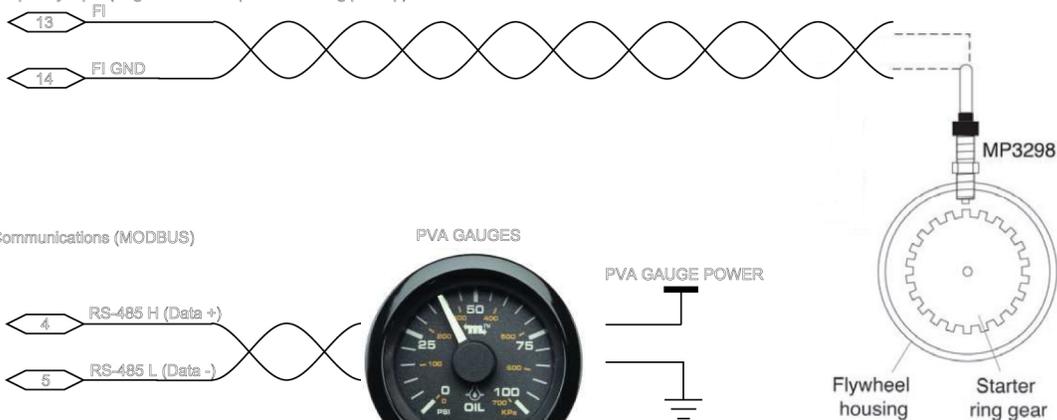
Specifications

Electrical

|	
Display	7 in. / 178 mm color transmissive TFT LCD
Resolution	WVGA, 800 x 480 pixels, 16-bit color, 16:9 aspect ratio
Orientation	Landscape or portrait
Backlighting	LED, 1000 cd/m2 (40,000 hours lifetime)
Microprocessor	Freescale™ i.MX357, 32-bit, 532 MHz
Operating System	QNX® Real-time Operating system
Flash Memory	2 GB
RAM	128 Mbytes SRAM
Clock	Real-time clock with battery back up
Operating Voltage	6 - 36 VDC, protected against reverse polarity and load dump
Power Consumption	10 W full brightness 22 W full brightness with heater (< -10° C)
CAN	(2) CAN 2.0B ports according to ISO-11898-2; (10 kbps – 1 Mbps)
Protocols	J1939, NMEA 2000 (GPS), CAN open, Free Form CAN
RS-485	(1) MODBUS RTU Master / Slave port or PVA gauges
Connection	(2) AMPSEAL 23 pin (mating connectors AMP 770680-1 and AMP 770680-4)
Push Buttons	(10) Tactile
USB	(1) USB 2.0 host (full speed)
Inputs	(3) 0-5 VDC, 4-20 mA or resistive analog inputs (10 bit resolution) (1) frequency input configurable to support measurement frequencies from 2 Hz-10 kHz (5) discrete digital (active high)
Video Inputs	(3) NTSC/PAL (individually viewed channels)
Outputs	(1) 500 mA; switched low-side, new line (1) frequency output to drive tachometer, 2Hz - 3 kHz Vbat rms square wave
Immunity	SAE J1113
Emissions	SAE J1113
Mounting Options	Front mount with bezel, back mount without bezel, optional bracket for RAM™ mount

CE Marking	• Quality Standard: **ISO 9001**
	• Directive: **2004/108/EC** (European Electromagnetic Compatibility)
	• European Harmonised standard:
	   o **EN 61000-4-3** (RADIATED EMF IMMUNITY)
	   o **EN 61000-4-4** (EFT IMMUNITY POWER and I/O LINES)
	   o **EN 61000-4-5** (SURGES POWER LINES)
	   o **EN 61000-4-6** (RF IMMUNITY)
	   o **EN 61000-4-8** (MAGNETIC FIELD IMMUNITY)
	   o **EN 60945** (ESD)
	   o **EN 60945** (CONDUCTED EMISSIONS)
	   o **HYBRID EN60945 CISPR 11 CLASS B** (RADIATED EMISSIONS)

Environmental

| Operating Temperature	-40° F to 185° F (-40° C to 85° C)
Storage Temperature	-40° F to 185° F (-40° C to 85° C)
Protection	IP66 and 67, front and back
Vibration	Random vibration, 7.86 Grms (5-2000 Hz), 3 axes
Shock	± 50 G in 3 axes

Mechanical

Dimensions	(W x H) 8.37 x 6.0 in (212.5 x 152.3 mm) landscape Unit Depth – 3.57 in (90.8 mm)
Shipping Weight	Approximately 2.5 lbs. (1.13 kg)
Case Material	PC+ABS (meets FMVSS 302 flammability)

Dimensions

Measurements shown in inches (mm)

THIS PAGE INTENTIONALLY LEFT BLANK

MURPHY PV780
DASH CUT-OUT

HATCHED AREA INDICATES CRITICAL AREA

CUT DOTTED LINE

EXTERIOR BEZEL OUTLINE

5.138
[130.51]

.315
[7.99]

.315
[7.99]

.231
[5.87]

.729
[18.53]
.729
[18.53]

.729
[18.53]
.729
[18.53]

.729
[18.53]
.729
[18.53]

5.601
[142.26]

.231
[5.87]

.729
[18.53]
.729
[18.53]

.729
[18.53]
.729
[18.53]

9.498
[241.26]

8.869
[225.27]

4X ∅ .188
[4.76]

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

ENOVATION CONTROLS – SAN ANTONIO OFFICE
5757 FARINON DRIVE
SAN ANTONIO, TX 78249

ENOVATION CONTROLS – HOUSTON OFFICE
105 RANDON DYER RD
ROSENBERG, TX 77471

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

MURPHY ECONTROLS TECHNOLOGIES (HANGZHOU) CO, LTD.
77 23RD STREET
HANGZHOU ECONOMIC & TECHNOLOGICAL DEVELOPMENT AREA
HANGZHOU, ZHEJIANG 310018 CHINA

U.S. SALES & SUPPORT

ECONTROLS PRODUCTS
PHONE: 210 495 9772
FAX: 210 495 9791
EMAIL: INFO@ENOVATIONCONTROLS.COM
WWW.ECONTROLS.COM

MURPHY PRODUCTS
PHONE: 918 317 4100
FAX: 918 317 4266
EMAIL: SALES@ENOVATIONCONTROLS.COM
WWW.FWMURPHY.COM

MURPHY CONTROL SYSTEMS & SERVICES
PHONE: 281 633 4500
FAX: 281 633 4588
EMAIL: CSS-SOLUTIONS@ENOVATIONCONTROLS.COM

MURPHY INDUSTRIAL PANEL DIVISION
PHONE: 918 317 4100
FAX: 918 317 4124
EMAIL: IPDSALES@ENOVATIONCONTROLS.COM

INTERNATIONAL SALES & SUPPORT

UNITED KINGDOM
PHONE: +44 1722 410055
FAX: +44 1722 410088
EMAIL: SALES@ENOVATIONCONTROLS.EU
WWW.FWMURPHY.EU

CHINA
PHONE: +86 21 6237 5885
FAX: +86 21 6237 5887
EMAIL: APSALES@ENOVATIONCONTROLS.COM

LATIN AMERICA & CARIBBEAN
PHONE: 918 317 2500
EMAIL: LASALES@ENOVATIONCONTROLS.COM

SOUTH KOREA
PHONE: +82 70 7951 4100
EMAIL: SKOREASALES@ENOVATIONCONTROLS.COM

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

bsi. ISO 9001 Quality Management
FM 28221 (Tulsa, OK - USA)
FM 620667 (San Antonio, TX - USA)
FM 28221 (Rosenberg, TX - USA)
FM 29422 (UK)

bsi. ISO 9001 Quality Management | TS 16949 Automotive Quality Management
FM 523851 (China)   TS 589322 (China)