Petro Vend® PV200™ Installation Manual

Part Number: M1010

Revision: 12.1

PV200™

IMPORTANT: Before you use this manual, make sure you have the most recent revision. Look at the revision of this document to make sure it agrees with the most current revision found in the FMS Technical Library. Download the latest revision if necessary.

READ CAREFULLY: OPW Fuel Management Systems and Dover Fueling Solutions cannot be held responsible for installations, configurations or use of its products that does not comply with the most recent documentation available.

NOTE: It will be necessary to have Single Sign-On (SSO) credentials to get access to manuals, instructions, software updates and other important assets. Speak with your FMS sales representative or contact FMS Customer Service at 1-888-679-3835 (1-888-OPW-FUEL) for information. Once you have been approved for SSO credentials go to the FMS Technical Library to find the most recent revisions of all manuals and instructions.

NOTE: All references to other manuals and instructions in this manual can be found in the FMS Technical Library. Make sure you have the most recent revision.

Related Manuals

Other related manuals necessary to install, configure, maintain or use this product:

M1014-QS PV200 Quick Start

M1010-DIV2 PV200 Div2 Installation, Operation and Maintenance

See the PV200 Product Page of the FMS Technical Library for other instructions related to options and upgrades.

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Section 1 PV200 Fuel Control System

Figure 1-1 PV200 Fuel Control System

About this manual:

This manual includes specified information about the PV200. Information related to the FSC3000 Fuel Site Controller can be found in the M1700 FSC3000 Installation, Operation and Maintenance Manual.

1.1 Technical Specifications

Specification Table	
Cabinet Dimensions:	18 inch H x 14 inch W x 10 inch D (46 cm x 36 cm x 26 cm)
Pedestal Dimensions:	40 inch H x 14 inch W x 9 inch D (122 cm x 36 cm x 23 cm) is standard; 32-inch and 48-inch heights are optional
Power Requirements:	120 VAC/240 VAC (Switch Selectable), 50/60 Hz, 220 watts maximum
Operating Temperature Range:	-40°F to 122°F (-40°C to 50°C)
Range of Environmental Conditions:	Outdoor use, Altitude less than 5000m, temperature range, relative humidity (80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C), Wet location, Pollution degree 2
Graphics display:	7 inch (18 cm) color display
Pedestal and Cabinet:	Powder-coated aluminum
Reader Options:	Magnetic Card Reader Chipkey Proximity Reader Alpha Keypad Numeric Keypad (installed)
Pedestal Options:	48 inch (Standard) 40 inch: 40 inch ADA (Americans with Disabilities Act) compliant for off island installations 32 inch: 32 inch ADA compliant for on island installations
Heaters:	Turn ON (inside enclosure) 42° F ±2° F Turn OFF (inside enclosure) 46° F ±2° F

1.2 Safety Warnings

This manual contains many important Safety Alerts. There can be a risk of injury or damage to property if you do not obey these alerts. The panels below show the types of safety warnings that can be seen and how each is specified.

DANGER: Indicates an immediately hazardous condition that, if not prevented, will result in death or serious injury.

WARNING: Indicates a possibly hazardous condition that, if not prevented, could result in death or serious injury.

CAUTION: Indicates a possibly hazardous situation that, if not prevented, could result in minor or moderate injury.

NOTICE: Indicates important information not related to hazards. A condition that, if not prevented, can result in property damage.

SAFETY INSTRUCTIONS: Indicates instructions and procedures related to safety or gives the location of safety equipment.

1.3 Information Panels

NOTE: This panel gives more information about an instruction or procedure.

IMPORTANT: This panel contains special information that is important and must be read and obeyed.

REMINDER: This panel shows information that has been given before in the manual that is important to show again.

TIP: A step or procedure that is recommended to make another step or procedure easier.

INFORMATION: This panel shows references to more information in other sources.

READ CAREFULLY: This panel points to information that must be fully read and understood before doing the procedure(s) that comes after.

1.4 Hazardous Areas

A fuel dispenser is a hazardous area as specified in the National Electrical Code. The installation must agree with the codes that follow:

- National Electrical Code (NFPA No. 70)
- Motor Fuel Dispensing Facilities and Repair Garages Code (NFPA No. 30A)

1.4.1 NFPA/NEC – Class I, Div. 1 & Div. 2

The Class I, Division 1 and Class I, Division 2 hazardous areas are specified below:

Class I locations. Class I locations: Where flammable gases or vapors are or can be in the air in quantities sufficient to cause explosive or ignitable mixtures. Class I locations include:

- **Class I, Division 1**. A Class I, Division 1 location is a location where:
  - There can be concentrations of flammable vapors during normal operation.
  - There can be concentrations of flammable vapors during repair or maintenance operations or when the leakage of liquid fuel can occur.
  - A release of concentrations of flammable vapors can occur as a result of equipment failure, incorrect operation or unsatisfactory procedures that could also cause a failure of electrical equipment.
- **Class I, Division 2**. A Class I, Division 2 location is a location where:
  - An accidental failure or incorrect operation of vapor containment system equipment or containers that can release hazardous vapors from flammable liquids or gases.
  - A failure or incorrect operation of positive mechanical ventilation precautions result in the release of hazardous concentrations of flammable gases or vapors.
  - Concentrations of flammable gases or vapors can occasionally flow from a containment or ventilation system to an adjacent Class I, Division 1 location. This flow of gases or vapors must be prevented by sufficient positive-pressure ventilation from a source of clean air. Sufficient precautions to prevent ventilation failure must be installed.

DANGER: To prevent the possibility of explosion or fire, do not use electrical or battery operated power tools in or near the Hazardous Area! Only use pneumatic or hand tools.

WARNING: To prevent possible fire or explosion, do not mount your system site controller or any other electrical part of the system, including printers and modems, within or above the defined "hazardous" areas.

IMPORTANT: It is the installer's responsibility to know and obey all local codes.

OPW Fuel Management System's fuel control systems are listed for use in a non-classified area. All of the equipment must be installed outside of the hazardous areas.

NOTE: Local codes can dictate specific installation requirements. Installation is subject to approval by the local authority that has jurisdiction at the site.

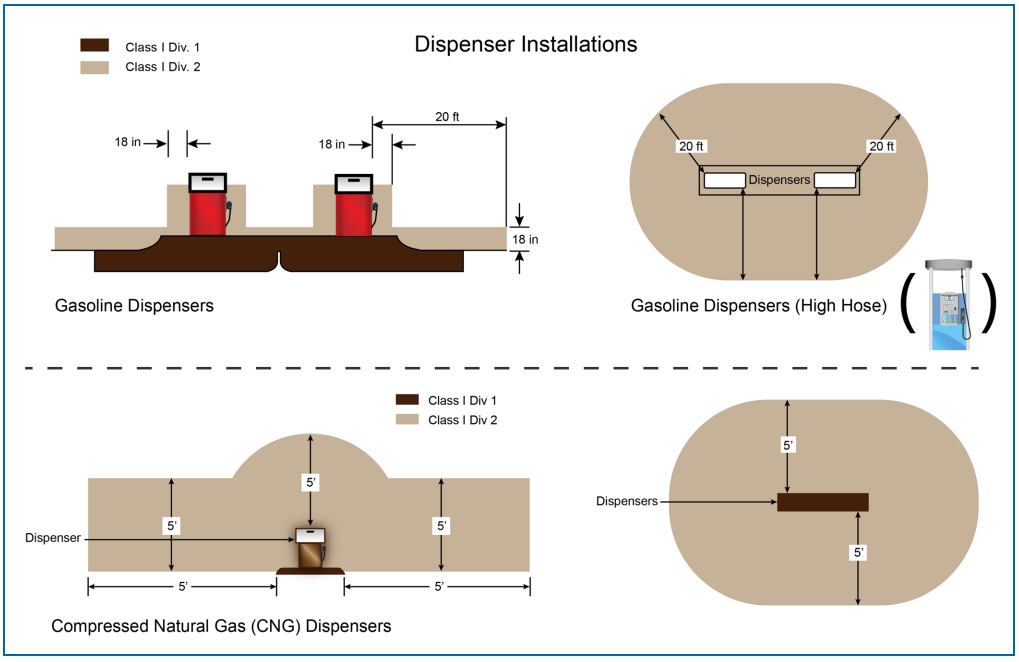
1.4.2 Installation Requirement

OPW-FMS Terminals are designed to be installed above the hazardous area when using the terminal's associated pedestal.

The pedestal can be mounted in the hazardous area but a seal-off must be the first fitting for all conduits that go into the area.

IMPORTANT: All unused knockout holes that have been removed must be sealed.

For more information on conduit and seal-off installation for PV200 see Conduit/Wiring Requirements.



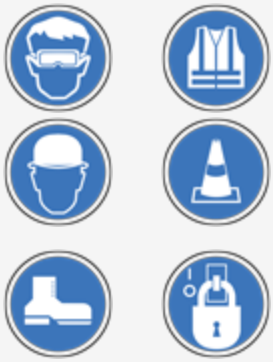
Dispenser Installations

WARNING: Knockouts and installation hardware are provided for all cabinetry. Do **NOT** drill holes in the enclosures. This would violate the safety listing of the system.

CAUTION: Be sure to wear all required personal protective equipment (PPE). This includes safety glasses, hardhat, safety shoes and reflective vest.

Barricade the work area before installation.

Be sure to obey all applicable Lockout/Tagout (LOTO) procedures before installation.



IMPORTANT: It is recommended to do a check of the electrical system with a multimeter to make sure all connections are de-energized before you proceed with the installation.

1.5 Installer Safety

CAUTION: Incorrect installation can cause a risk of injury to installers and users of this equipment. Incorrect installation can result in environmental contamination or equipment damage. Read these instructions carefully!

Refer to the National Electrical Code (NFPA No. 70) and the Motor Fuel Dispensing Facilities and Repair Garages Code (NFPA No. 30A) to make sure your installation is correct.

Installers must obey the instructions in this document to complete a safe installation.

For installations outside the United States, make sure that the installation obeys all applicable local codes.

The installer must know and obey all applicable local codes in the country or county where this unit is installed.

NOTE: Local codes can specify special installation requirements. Installation is subject to approval by the local authority with jurisdiction at the site.

1.6 FCC Compliance

This system complies with Part 15 of the Federal Communications Commission (FCC) Rules & Regulations. Operation is applicable to these conditions:

- This device must not cause harmful interference.
- This device must accept interference received. This includes interference that can cause undesired operation.

Section 2 System Overview

NOTE: It is necessary to use shielded pulser cable to prevent electrical noise when the pump conduit is shared.

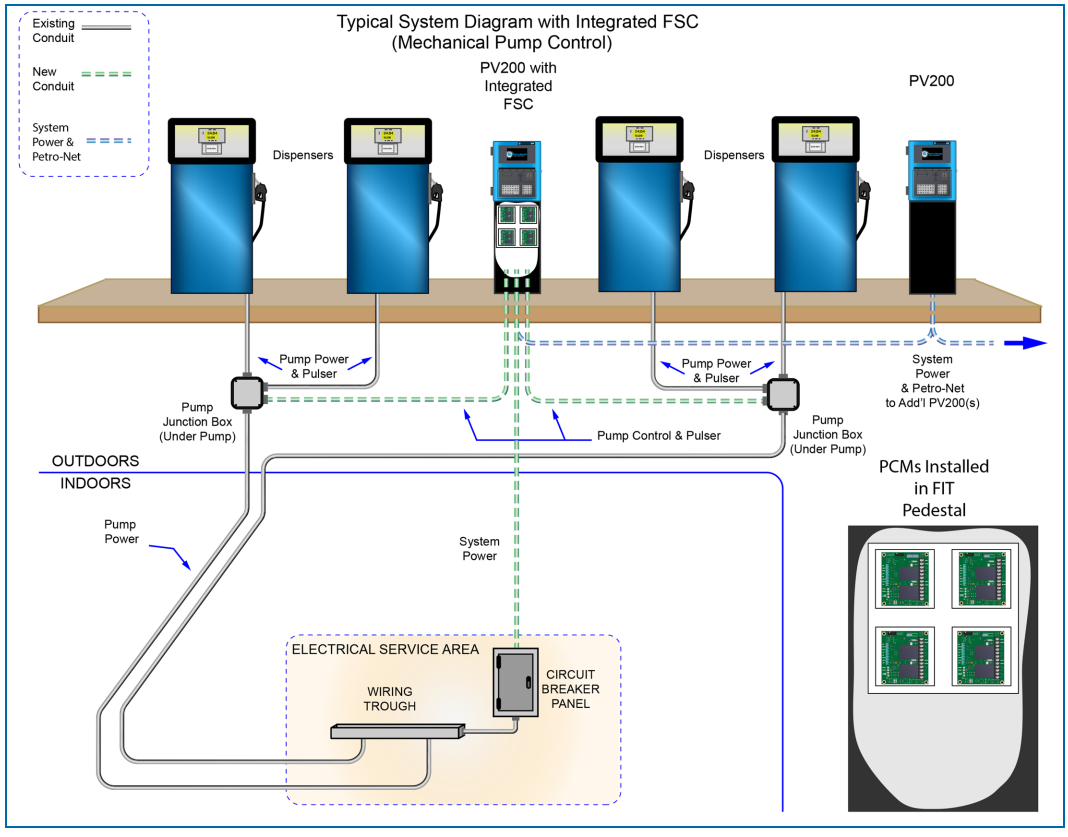
NOTE: Do not run Petro-Net wiring in the wiring trough.

For installations that will use wireless Ethernet communication refer to M00-20-6020 Wireless Ethernet Radio User's Guide.

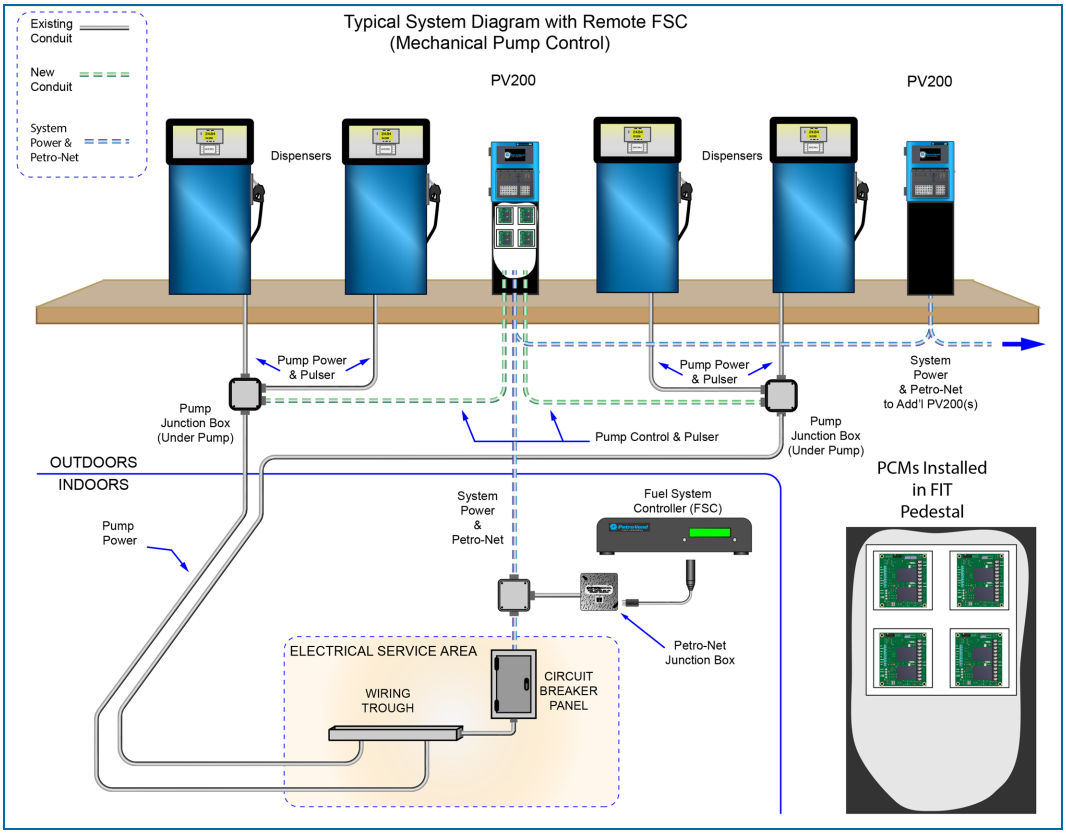
For installations that will use wireless Petro-Net modem communication refer to M00-20-7074 Wireless Petro-Net Modem Installation Guide.

These guides can be downloaded at OPW-FMS Technical Library.

Typical System Diagram with an Integrated FSC (Mechanical Pump Control)

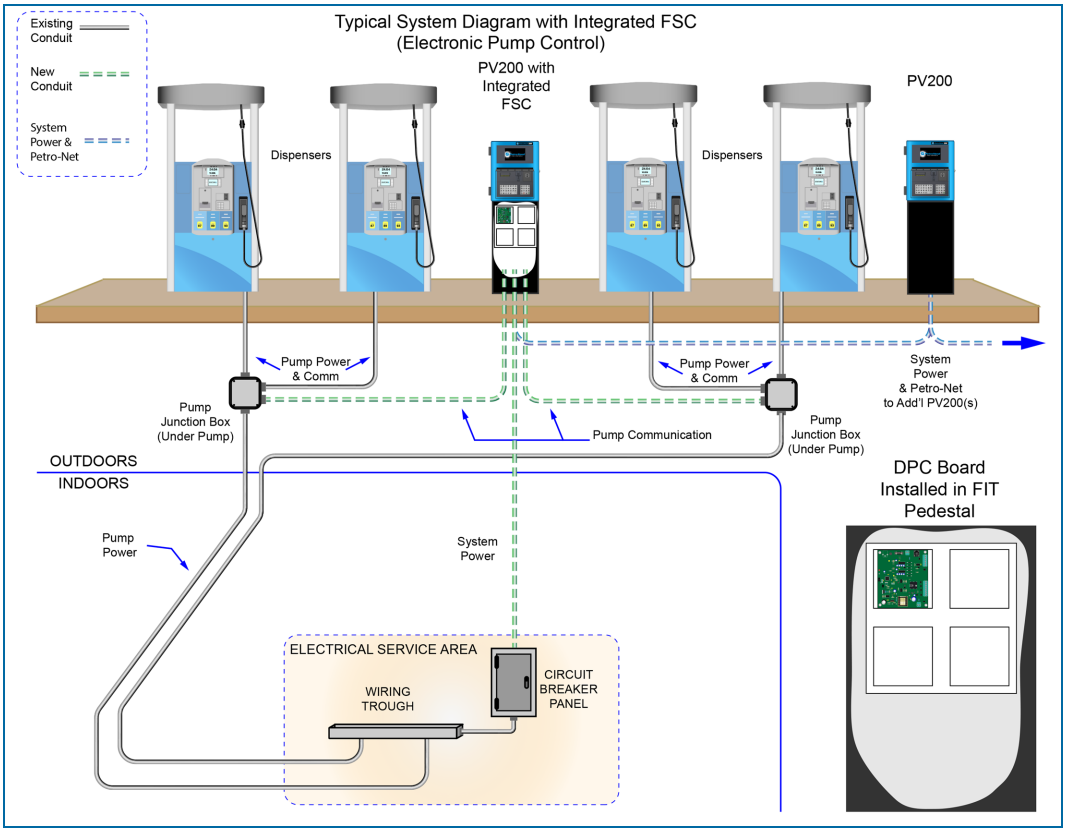


Typical System Diagram with a Remote FSC (Mechanical Pump Control)

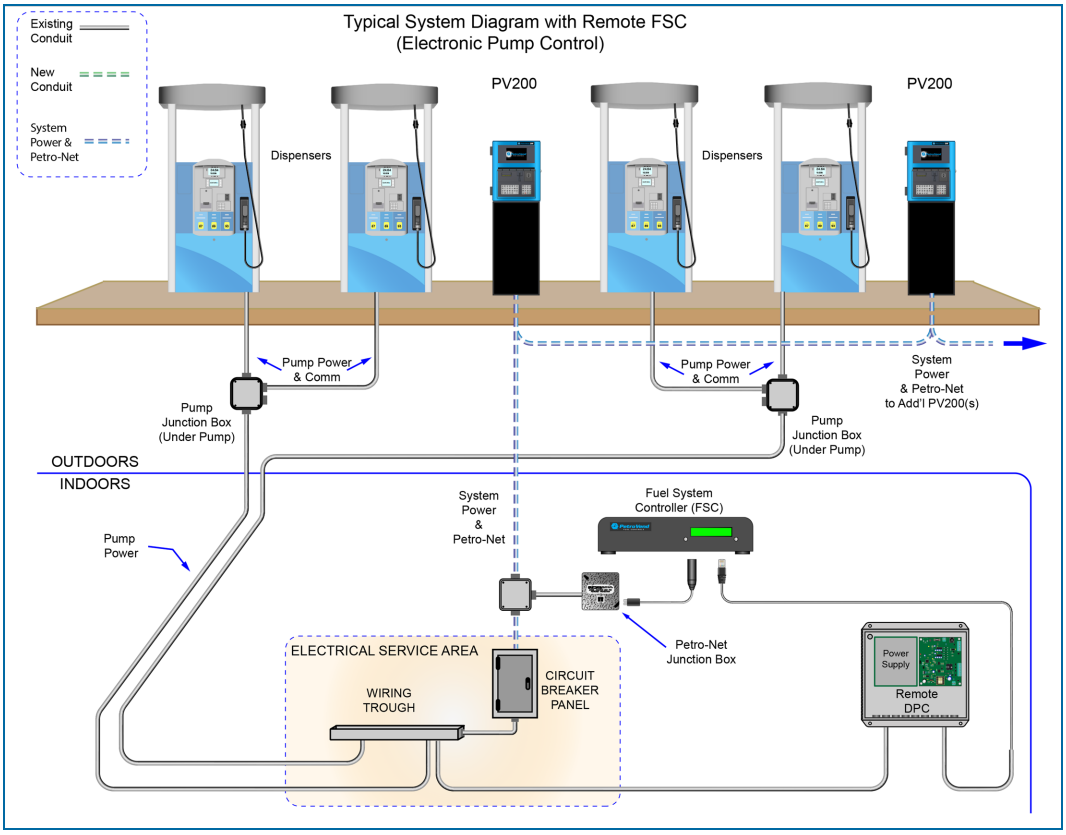


For installations with remote PCMs, see M1700 FSC3000 Installation, Operation and Maintenance Guide.

Typical System Diagram with an Integrated FSC (Electronic Pump Control)



Typical System Diagram with a Remote FSC (Electronic Pump Control)



For installations with remote DPC, see M1700 FSC3000 Installation, Operation and Maintenance Guide. You can download this guide at http://www.opwglobal.com/opw-fms/tech-support/manuals-how-to-videos.

Section 3 PV200 Installation

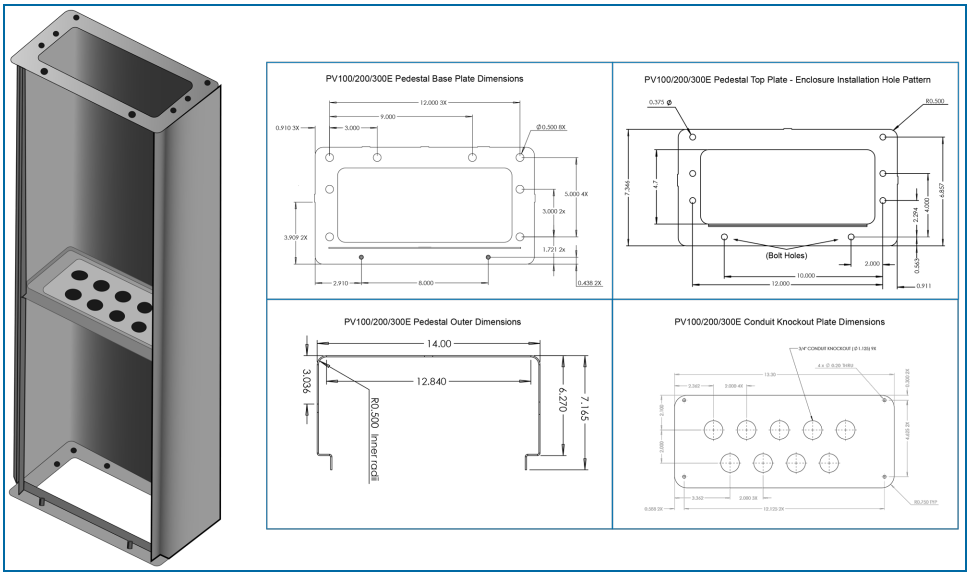
DANGER: To prevent the possibility of explosion or fire, do not use electrical or battery operated power tools in or near the Hazardous Area! Only use pneumatic or hand tools.

The pedestal is available in 3 heights:

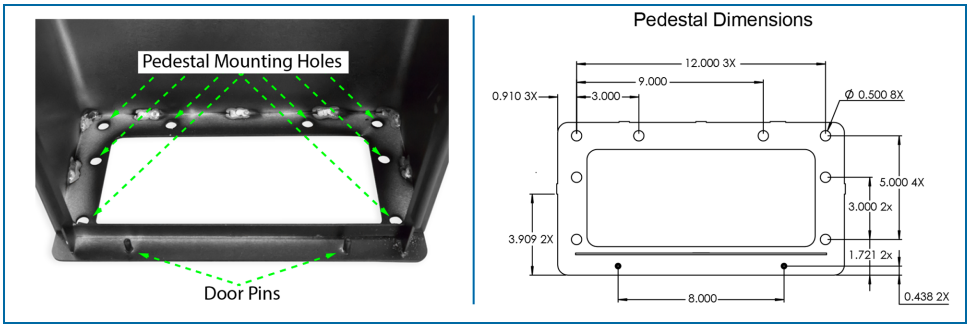
- 48 inch
- 40 inch (Standard) ADA (Americans with Disabilities Act) compliant for off island installations
- 32 inch ADA compliant for on island installations

3.1 Pedestal and Enclosure Installation

INFORMATION: For your reference, the illustrations below show the dimensions and hole placement of the pedestal's base plate, top plate, conduit knockout plate and the outer dimensions of the pedestal.

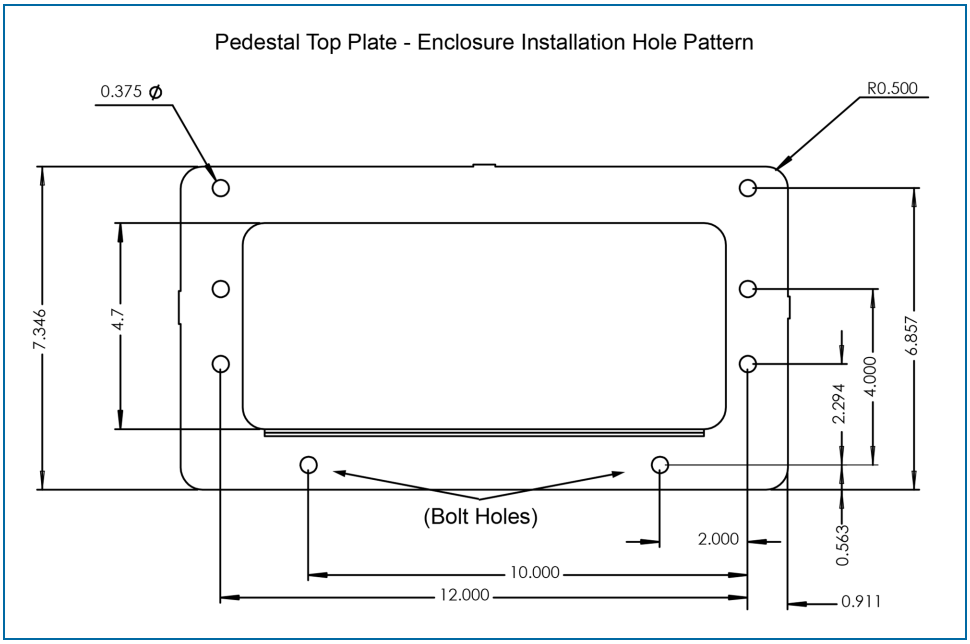


1. Square the base-plate where it is to be installed.



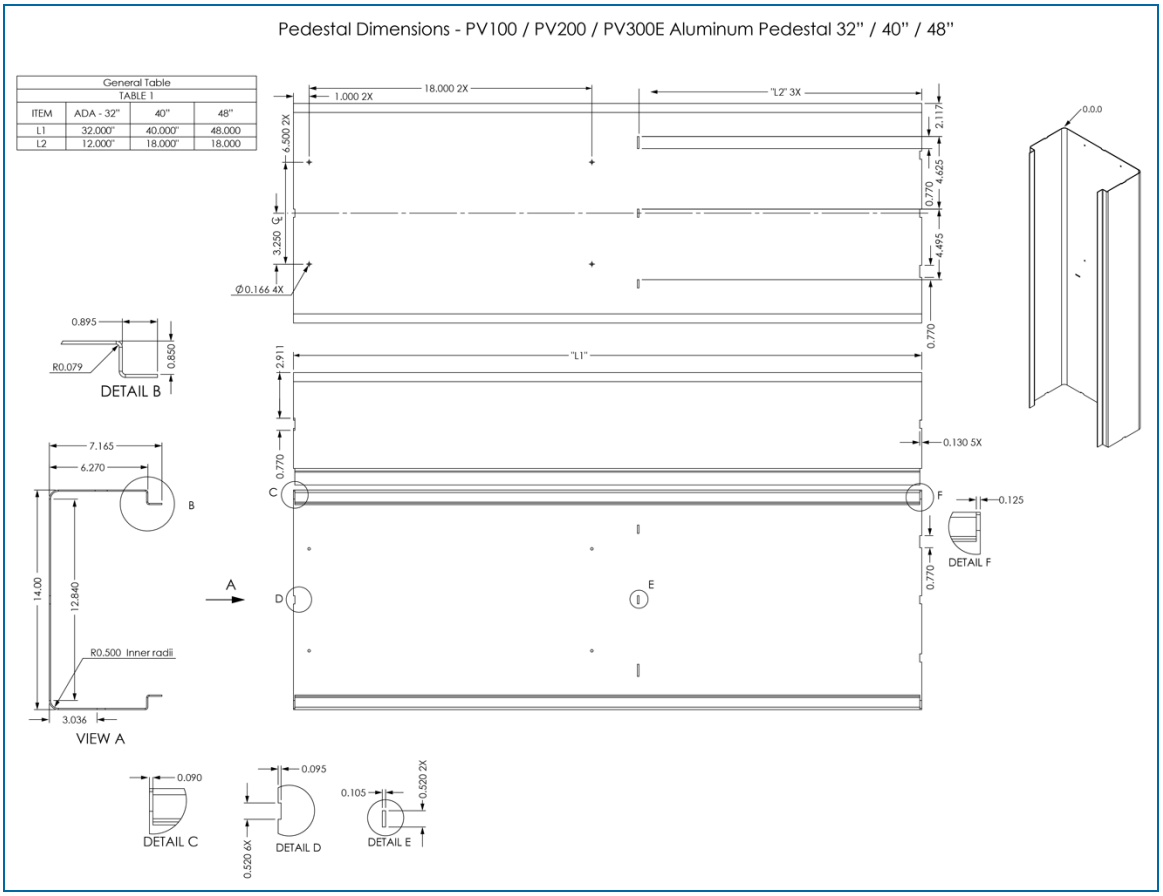
2. Mark the four (4) most applicable locations for the anchor bolts. There are eight (8) bolt holes (see the illustrations above).
3. Drill the holes.
4. Anchor the pedestal with 3/8” anchor bolts.

IMPORTANT: Use a type of anchor bolt that is appropriate for the material in which you will anchor the pedestal (e.g. concrete).

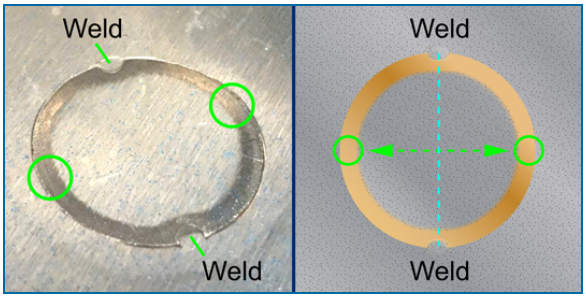


5. Use the provided hardware to attach the enclosure to the pedestal. Align the provided gasket with the mounting holes of the pedestal top plate. Carefully position the enclosure in place so that the open installation holes are aligned with the installation holes of the pedestal (see the illustration above). Put the four (4) bolts through the holes and tighten them using the provided washers and nuts.

INFORMATION: The illustration below shows the height dimensions of the three available pedestal heights.



3.2 Aluminum Enclosure Conduit Knockouts



To remove the Knockout plugs in the bottom of the enclosure, hold a center-punch in the **green** circled areas shown in the illustrations above, and hit the punch with a hammer. The areas to hit are perpendicular to the

welds that hold the knockouts. Deburr the hole with a file and make sure there are no shavings inside the enclosure.

IMPORTANT: All unused, open knockouts MUST be sealed!

3.3 Flex Conduit Installation

1. Remove the applicable knockouts from the base of the PV200 enclosure.
2. Install Flex Conduit from the rigid conduit to the knockouts in the pedestal conduit plate.

IMPORTANT: All unused knockout holes must be sealed to meet NEC compliance codes.

3.4 Power and Communication Wiring

1. Pull three (3) #14 AWG wires (green, black and white) from a dedicated circuit breaker to supply power to the terminal.

NOTE: Petro-Net communication to other terminals should also be pulled in this conduit.

2. Connect power and neutral wires to the power connection terminal block marked “LINE” (or “L”) and “NEUTRAL” (or “N”). Connect the ground to the wire to the terminal labeled “GROUND” (or “GND”).

CAUTION: Petro-Net communication wires can be in the same conduit with the power wiring only when the communication wires have the same voltage-insulation rating as the power wires.

3. Connect the Petro-Net wires to the communication terminal block.

IMPORTANT: Polarity **must** be correct. Attach all terminals marked "1" together and all terminals marked "2" together.

NOTE: Petro-Net is connected internally on integrated units. There is no need to connect to the Petro-Net terminal block unless there are additional terminals or other devices to connect.

Section 4 Preparation of System Conduit & Wiring Requirements

These installation instructions are for a typical installation. Not all possible scenarios can be shown because of the many possible configurations of the system and because every site is different.

Local codes can have specific installation requirements. Installation is subject to approval by jurisdictional authorities at the site of installation. **See the safety information and precautions at the beginning of this manual**.

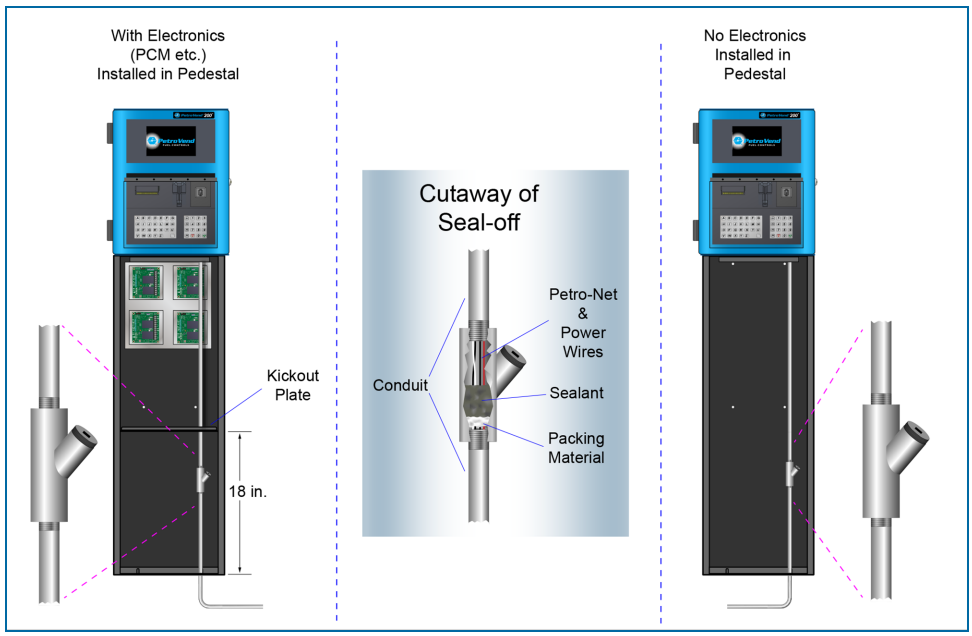
4.1 Conduit/Wiring Requirements

IMPORTANT: All wiring and conduit runs must conform to the National Electric Code (NFPA No. 70), Motor Fuel Dispensing Facilities and Repair Garages Code (NFPA No. 30A) and all national, state and local codes.

All wiring running to the system must be installed in threaded, rigid metal conduit and have the required seal-offs. AC and DC power wires can share conduit, provided they meet the Petro-Net™ wiring specified; otherwise AC and DC power wires must be installed in separate conduits.

WARNING: The PV200 system must be installed outside of the hazardous area. When the pedestal is equipped with a knockout plate, the plate must be above the hazardous area. All pedestal conduit seal-offs must be above the hazardous area. Any unused knockout holes that have been removed must be sealed.

Install your PV200 a minimum of 18" (45.7 cm) from the nearest conventional pump or dispenser or a minimum of 18" (45.7 cm) from the nearest overhead pump or dispenser.



All conduits in the pedestal should terminate into a seal-off. The seal must be the first fitting where the conduit emerges from grade. Install 1/2” (1.3 cm) or 3/4” (1.9) rigid steel conduits, as applicable, to the area where the pedestal is to be located:

- To the PV200 power source.
- To other PV200 terminals or external Fuel Site Controller (FSC) junction box for Petro-Net communications.
- To the remote communication access panel for phone line(s), Ethernet.
- To each mechanical pump or dispenser for control and pulser wires (for pedestal mounted PCMs only).
- To each electronic dispenser for communication wires (for an internal FSC with a DPC board installed in the pedestal only).

INFORMATION: For information about Pump Control Module (PCM) installation and wiring, see M00-20-0340 Pump Control Module Installation, Operation and Maintenance Manual.

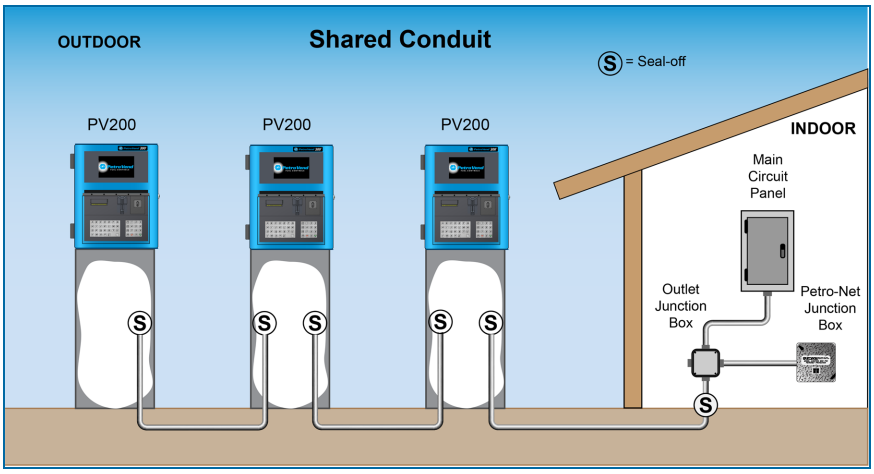
4.1.1 Petro-Net Wiring

The PV200, PCMs, FSC and other devices communicate using an RS-485 protocol called Petro-Net™. Petro-Net wiring is a twisted-pair of 18 AWG wires that must be twisted together to provide immunity to electrical noise. You can order Petro-Net from OPW as Part #: 12-1029.

Petro-Net wiring can run a maximum of 5,000' (1,524 m).

4.2 PV200 Power, Petro-Net

Shared and Separate Conduit

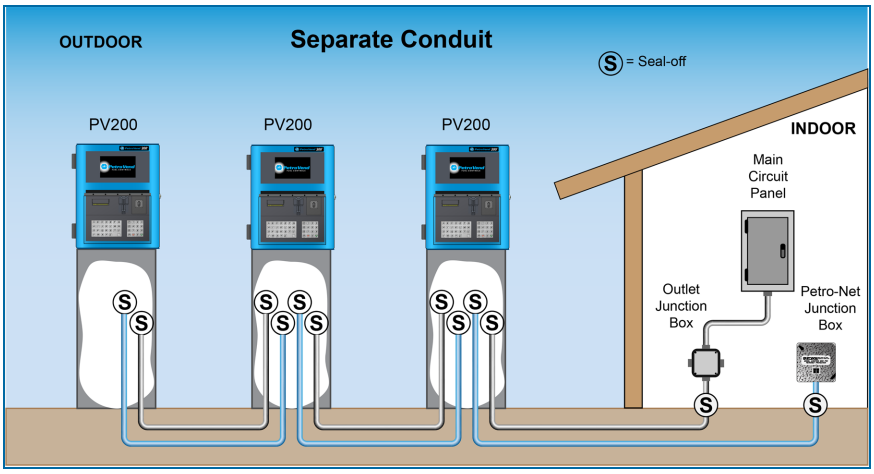


Shared Terminal Power Conduit

This conduit should run from the main circuit panel to each Terminal and can be looped from terminal to terminal. This conduit should only contain the Terminal Feed, Terminal Neutral and Ground wires, with the exceptions noted below.

Terminal Power and Petro-Net Wiring Requirements	
Terminal Feed	Minimum #14 AWG Stranded (Black) - Oil/Gas resistant, Wet Locations
Terminal Neutral	Minimum #14 AWG Stranded (White) - Oil/Gas resistant, Wet Locations
Terminal Ground	Minimum #14 AWG Stranded (Green) - Oil/Gas resistant, Wet Locations
Petro-Net (RS-485)*	Two (2) #18 AWG twisted (10 per ft) pair - 600V-rated - Oil/Gas resistant, Wet Locations
*NOTE: Petro-Net wiring can share terminal power conduit when the Petro-Net cable voltage insulation rating is 600V.	

Separate Terminal Power Conduit

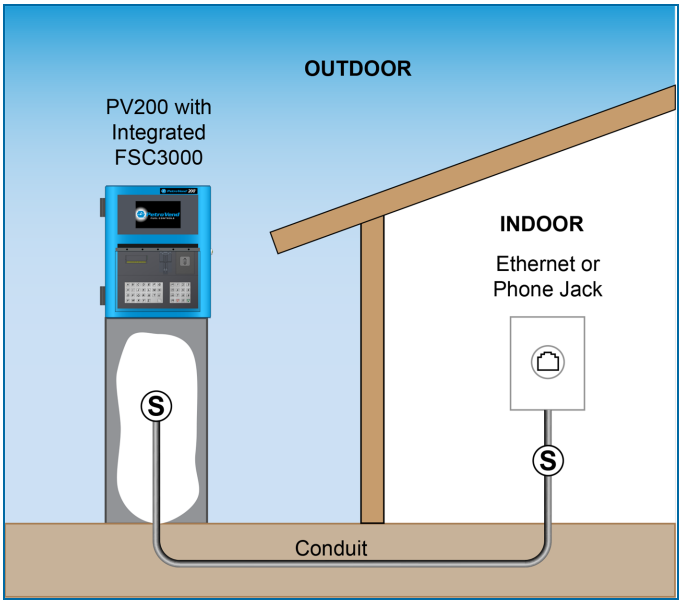


This conduit is required when you use RS-485 Communication wire that doesn't meet requirements to be installed in the Terminal Power Conduit, or you choose to have separate conduit. This conduit should run from where the Petro-Net junction box is mounted to each terminal. This conduit may be looped from terminal to terminal.

Terminal Communication and Power Wiring Requirements	
Terminal Feed	Minimum #14 AWG Stranded (Black) - Oil/Gas resistant, Wet Locations
Terminal Neutral	Minimum #14 AWG Stranded (White) - Oil/Gas resistant, Wet Locations
Terminal Ground	Minimum #14 AWG Stranded (Green) - Oil/Gas resistant, Wet Locations
Petro-Net (RS-485)	Two (2) #18 AWG twisted (10 per ft) pair - Oil/Gas resistant, Wet Locations

Integrated FSC Communication Conduit

Refer to the instructions below if the FSC is to be installed in one of the Terminals.



This conduit is required when you use a Terminal with an integrated FSC controller. This conduit will provide access for a phone line or Ethernet connection (300' [91.4 m] max.), or Serial Cable (50' [15.2 m] max.) to access the FSC.

Wires	*Wire Requirements*
Serial Cable	50' (15.2 m)
Phone-Line	N/A
Ethernet Cable	300' (91.4 m) may be extended with repeaters

NOTE: This conduit is not necessary when a remote FSC or wireless communications are used.

4.2.1 Grounding

The PV200 incorporates internal noise suppression circuitry. To ensure safety and proper operation of the equipment, all devices of the OPW system must be grounded.

A ground wire (preferably Green) must be connected between the device's ground terminal and the main electrical service panel. One earth ground connection is required per OPW device.

WARNING: Do not rely on the conduit to provide ground connections.

4.2.2 Circuit Breakers

Power to the PV200 must be supplied from dedicated circuit breakers. No other equipment should be powered from these breakers, including the pumps that are being controlled.

The AC power for the PV200 can be grouped together for multiple units. It is recommended that no more than eight (8) PV200 terminals be supplied from one breaker.

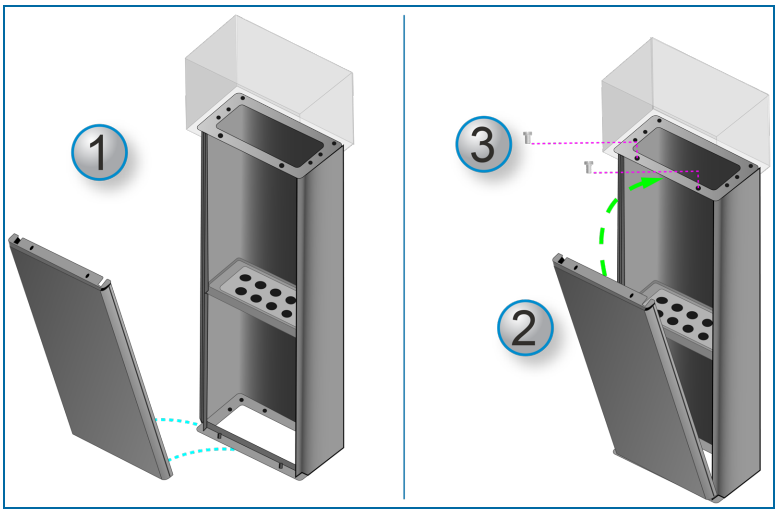
INFORMATION: For information about Pump Control Module (PCM) installation and wiring, see M00-20-0340 Pump Control Module Installation, Operation and Maintenance Manual.

Section 5 Complete the Installation

When the pedestal, terminal, conduit and wiring installations are done, you can complete the installation.

NOTICE: Do a check of the wiring before you apply power to the system components. Line (L) voltage applied to low-voltage inputs will damage the system.

If you have an internal FSC installed in your terminal, remove the yellow paper safety strip from the SIMM battery. If the system must be cold-started, put a piece of paper or business card into the battery clip. A cold-start will clear all configuration settings except for transactions.



Install the pedestal door.

1. Put the two (2) holes in the bottom of the door over the door pins in the front of the pedestal base.
2. Move the top of the door into position as shown in the illustration.
3. Use the two (2) supplied hex bolts to assemble the door to the terminal as shown in the illustration. Make sure that the bolts are tight.

You can now energize the system.

Section 6 Maintenance

The PV200Terminal is designed for years of trouble-free use. For maximum service life, it is recommended that the maintenance items that follow be done at regular intervals.

Cabinet and Door

Wipe down terminals with warm water, mild detergent (dish soap) and a non-abrasive cloth. To protect the finish of the Terminal cabinet and pedestal, a commercially available car wax can be applied.

IMPORTANT: DO NOT use a power washer or hose to rinse off the system!

Lexan Display Cover and Weathershield

Do not use petroleum-based cleaners or harsh detergents to clean the Lexan display Cover or Weathershield.

Keypad

Wipe down the keypad with warm water, mild detergent (dish soap) and a non-abrasive cloth. A damaged keypad should be replaced.

Door Locks

Lubricate door locks every six months, or as needed. Use graphite or molybdenum disulfide ("Moly-B") dry lubricant. Do not apply too much lubricant.

Card Readers

- **Magnetic Card Readers**: Magnetic card readers contain magnetic heads that should be cleaned periodically. This will help to prevent bad reads.
- **ChipKey Readers**: A ChipKey reader is a non-maintenance device. Use multiple ChipKeys to make sure the device works correctly when problems occur. Replace the reader if necessary.
- **Proximity Card Readers**: A Proximity reader is a non-maintenance device. Use multiple Proximity Cards to make sure the device works correctly when problems occur. Replace the reader if necessary.

Receipt Printer

Examine and replace the paper supply if necessary. Make sure the printer works correctly on a regular schedule.

Heaters

Make sure the heater(s) work correctly during periods of cold weather. Refer to the "Technical Specifications" on page 8 for information on the heater operation temperatures.

Section 7 Receipt Printer

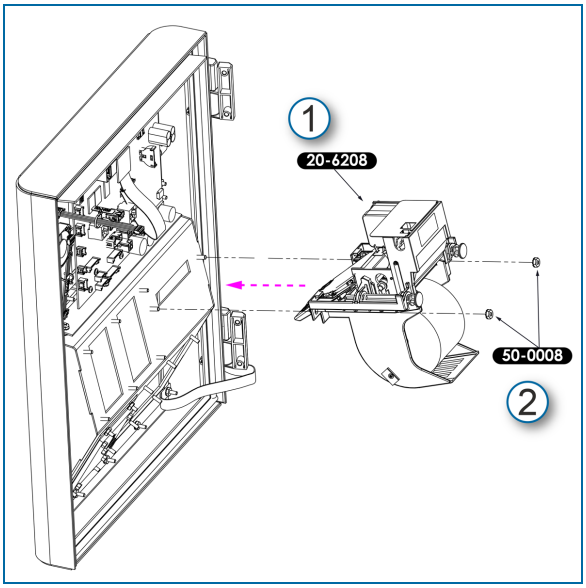
The 20-4445-YES purchase option does not come with the printer installed. The necessary components are included in a box with your PV200 unit. See the installation procedure below.

7.1 Receipt Printer Installation

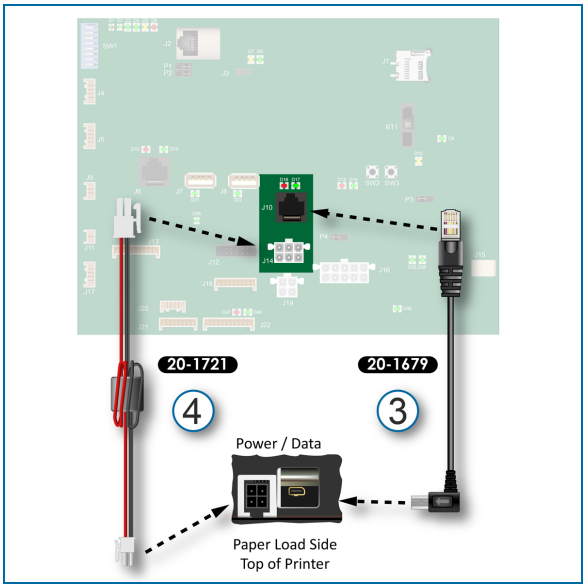
Make sure you have the printer components shown in the table below.

20-4445-YES Receipt Printer Option - YES		
Part Number	***Description***	***Qty.***
20-6208	PRINTER 24V Hengstler - Modified	1
20-1721	PRINTER HENGSTLER POWER CABLE	1
20-1679	COPT PRINTER DATA CABLE ASSY	1
54-1107	Thermal Paper roll for C-56 Hengstler Printer	1
50-0008	NUT KEPS 8-32	2

NOTICE: Make sure that the power supply is OFF before you install the printer to prevent damage to the unit and for general safety during the installation.



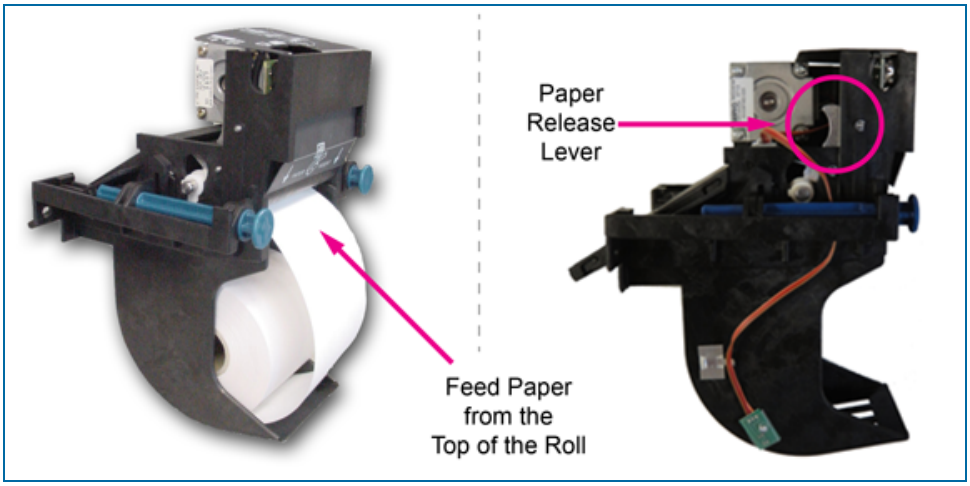
1. Put the printer unit (20-6208) onto the screw posts with the paper chute through the pocket slot.
2. Install and tighten the nuts (50-0008).



3. Install the Data Cable (20-1679).
    a. Verify that the Micro-RS232 connector end is connected to the data port on the top of the printer unit.
    b. Attach the RJ-45 connector end to the J10 Printer Comm port on the main board.
4. Install the Power Cable (20-1721).
    a. Verify that the small connector end of the cable is connected to the power cable port on the top of the printer unit. Make sure the locking tab of the connector points toward the rear of the unit (the side where the paper is loaded).
    b. Attach the large 2x3 Pin Molex connector to the J14 Printer Power Port on the main board.

7.2 Load Receipt Printer Paper

The receipt printer accepts metric-sized thermal paper 58 mm (2.28 in.) or 60 mm (2.36 in.) width and 102 mm (4 inches) in diameter.



1. Make sure the unit is turned on.
2. Remove the roll of paper (54-1107) from its protective material.
3. Put the roll of paper in the paper tray.

NOTE: Paper must feed from the TOP of the roll so the thermal sensitive side is up.

4. Feed the paper into the printer through the paper guide slots. The sensor in the paper guide will sense the paper and start the printer to automatically load the receipt paper.

IMPORTANT: If the printer starts, but does not automatically load the paper, push the paper release lever and feed the receipt paper until the paper advances.

5. Pull out the extra paper in the chute to cut it off.

7.3 Clear a Paper Jam

To clear a paper jam, cut off the document that is jammed in the eject chute and remove the paper.

To completely remove the remaining paper in the chute:

1. Turn the unit OFF before clearing the paper jam.
2. Push the paper release lever (see the image above).
3. Manually pull the paper out of the printer chute.

NOTICE: To prevent damage to the print head, never push this lever while the printer is in operation!

4. If paper remains in the print mechanism and the eject chute it can be removed manually:
    a. Pull out the right blue hinge pin (opposite the wire routing of the chute sensor) to unlock the printer mechanism housing.
    b. Turn the printer mechanism housing open.
    c. Manually turn the motor pinion gear (the brass gear in the illustration) clockwise until the jammed paper is released from the platen roller.
    d. Remove the jammed paper.
    e. Close the mechanism housing.
    f. Push the blue hinge pin in to lock the housing.

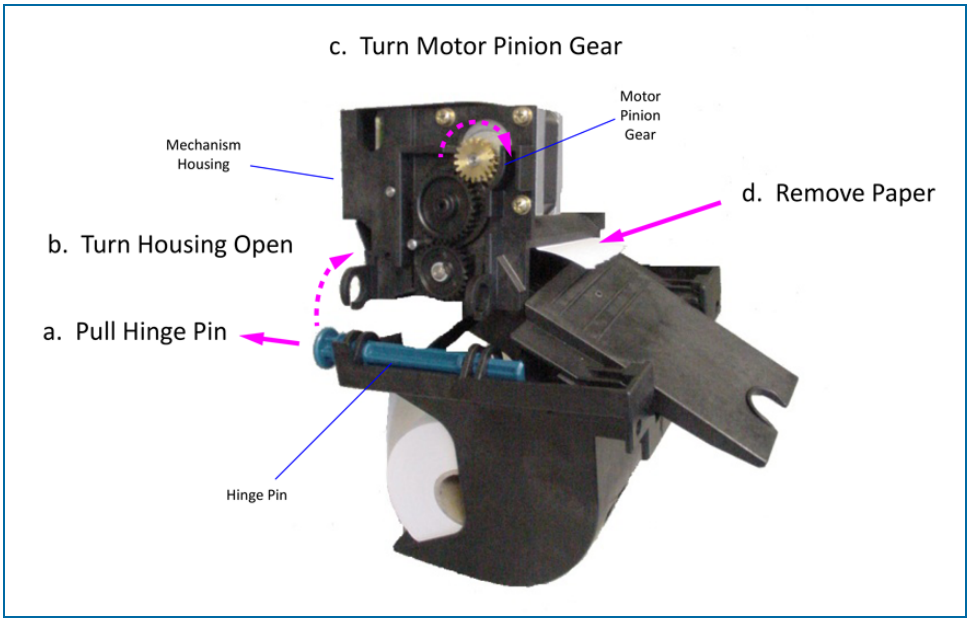
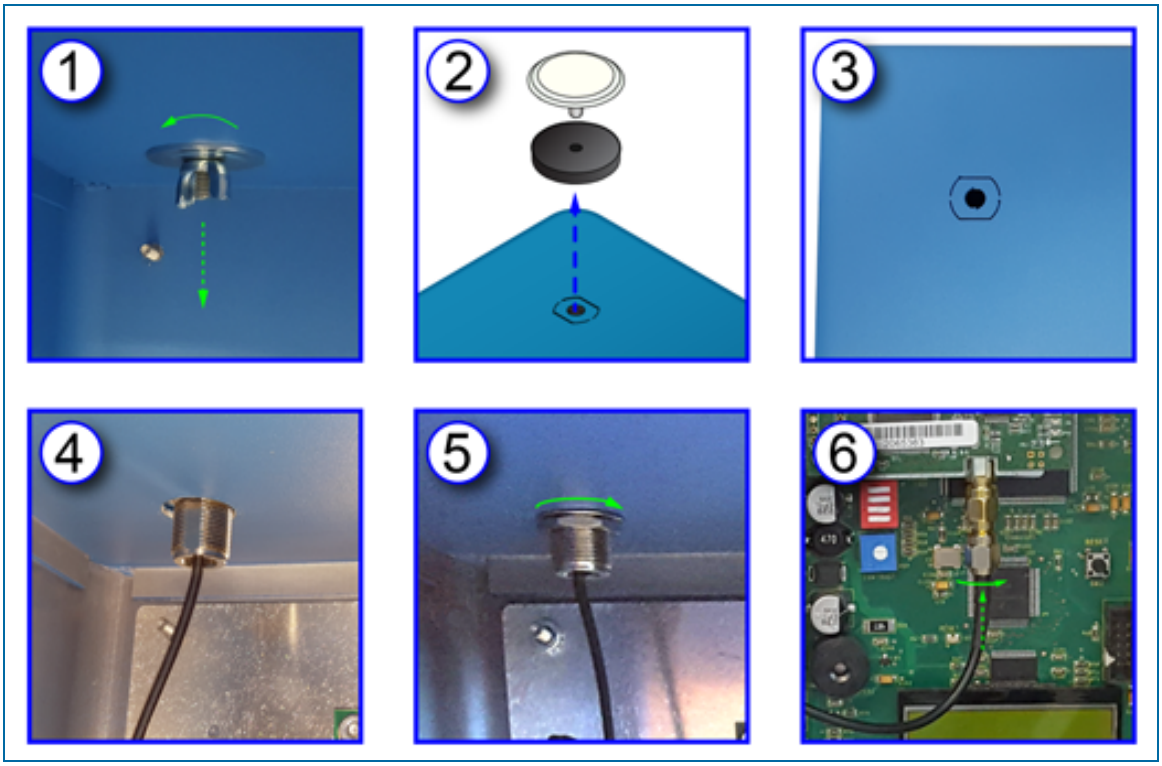


Figure 7-1 Clear Jammed Paper

Section 8 Antenna Installation



To install the 6" antenna to the enclosure for wireless operation:

1. Loosen and remove the hole plug wing-nut and washer from the inside of the enclosure.
2. Remove the hole plug assembly from the knockout on the top of the enclosure.
3. Carefully punch out the knockout.

IMPORTANT: Make sure the knockout is punched out clean and that the top of the enclosure around the hole does not get bent.

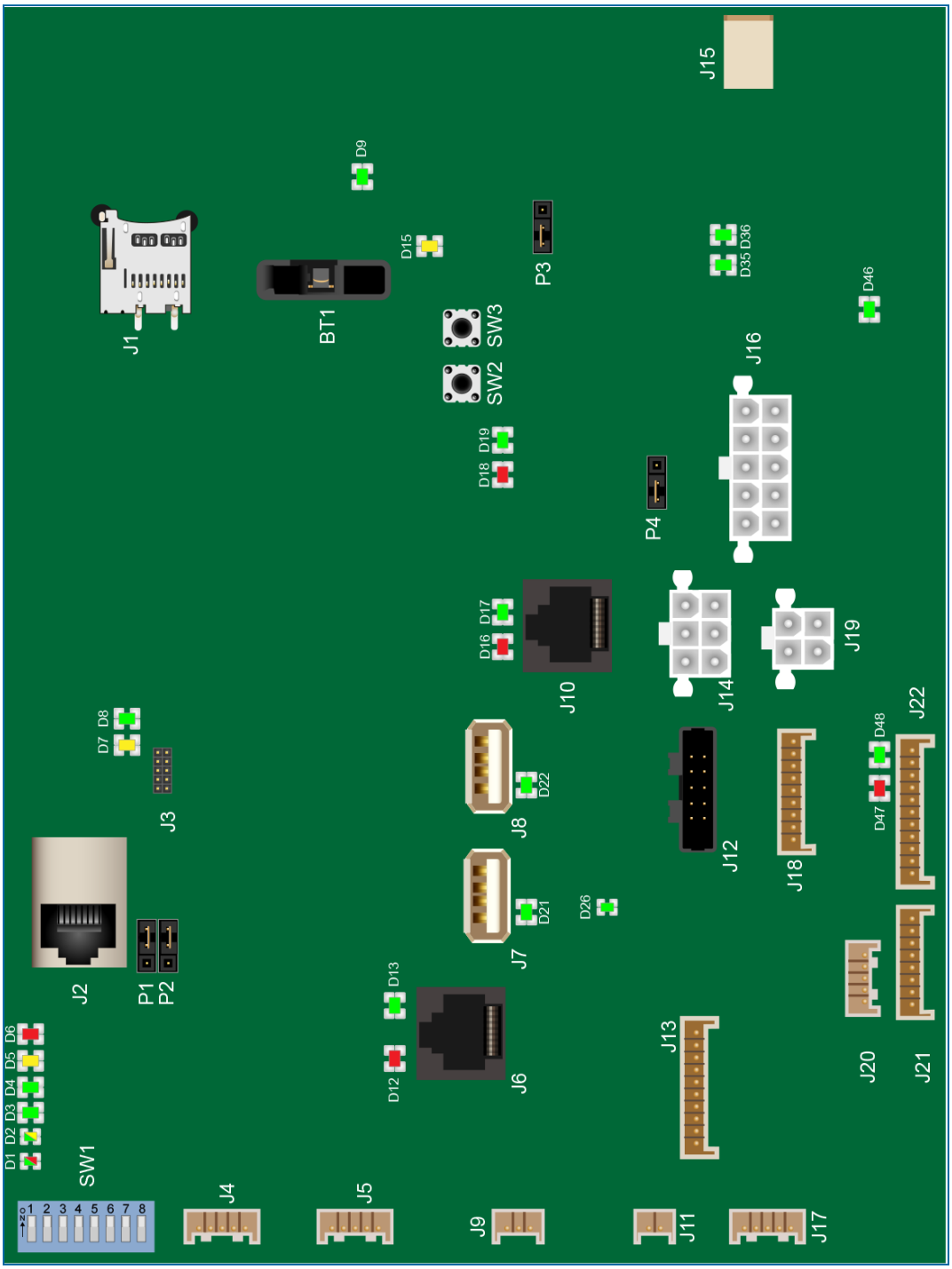
4. Put the bulkhead connector and cable of the antenna assembly through the hole.

NOTE: If the connector does not go through the hole easily, use a file to increase the dimension of the hole sufficient for clearance. Be sure to clean the filings from the bottom of the enclosure.

5. Put the washer and nut of the antenna assembly on the threaded bulkhead connector. Turn the nut clockwise until it is tight.
6. Attach the coaxial cable connector of the antenna to the antenna connector of the wireless bridge module.

Section 9 Main Board

9.1 Main Board Connections



PV200 Main Board Connections					
Location	*Name*	*Connector*	*Cable Type*	*Device*	*Installed/Option*
BT1	Battery			Battery	Installed
J1	(Not Labeled)	SIMM		SD Card	
J2	Ethernet	RJ-45		(Open)	
J3	Factory				
J4	Sensor 2	1x5 Pin	20-1685	20-4013 Light Sensor	Installed
J5	Sensor 1	1x5 Pin		(Open)	
J6	RS232 AUX	RJ-45		(Open)	
J7	USB 2	USB-A		(Open)	
J8	USB 1	USB-A		(Open)	
J9	Fan	1x3 Pin	N/A	20-4421 IC Fan Assembly	Installed
J10	Printer Comm	RJ-45	20-1679	75-3053 Printer	Option
J11	Door Sensor	1x2 Pin			
J12	ChipKey	2x5 Pin	20-1625	20-4117 ChipKey Reader	Option
J13	Magnetic Card Reader	1x10	20-1642	75-3022 Mag Reader	Option
J14	Printer Power	2x3 Pin Molex Type	20-1721	75-3053 Printer	Option
J15	Display Backlight	2 Pin		04-1065 Display	Installed
J16	Power Supply	2x5 Pin Molex Type	20-1720	20-4441 Power Supply	
J17	Backlight Buzzer	1x5 Pin	20-1685		Installed
J18	Prox Reader	1x9 Pin			Option
J19	PetroNet/Power	2x4 Pin			
J20	Function	1x5 Pin			
J21	Numeric	1x8 Pin	20-1686	09-4036 Numeric Keypad	Installed

PV200 Main Board Connections					
Location	*Name*	*Connector*	*Cable Type*	*Device*	*Installed/Option*
J22	Alpha	1x11 Pin	20-1687	09-4037 Alpha Keypad	Option
SW1	DIP-Switch Block				
SW2	ISP				
SW3	Reset				

9.2 Main Board LEDs

PV200 Main Board LEDs				
Location	*Color*	*Function*	*TX/RX*	*Other*
D1	Multi (Green/Red)			
D2	Multi (Green/Yellow)			
D3	Green			
D4	Green			
D5	Yellow			
D6	Red			
D7	Yellow	Ethernet		Currently Not Supported
D8	Green			
D9	Green	Power 3.3V		
D12	Red	Communications RS-232 (RS-232 AUX)	TX	Currently Not Supported
D13	Green		RX	
D15	Yellow	Reset		
D16	Red	Communications RS-232 (Printer Comm)	TX	
D17	Green		RX	
D18	Red	Communications RS-485 (PetroNet)	TX	
D19	Green		RX	
D21	Green	USB B UP		

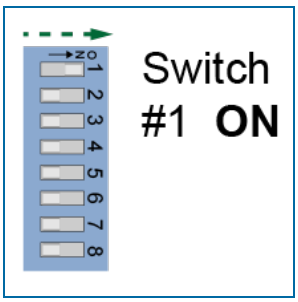
PV200 Main Board LEDs				
Location	*Color*	*Function*	*TX/RX*	*Other*
D22	Green	USB A UP		
D26	Green	Power 5V		
D35	Green	Output #1 (Relay)		Currently Not Supported
D36	Green	Output #2 (Relay)		Currently Not Supported
D46	Green	Power 24V		
D47	Red	Communications RS-232 (Prox Reader)	TX	
D48	Green		RX	

9.3 Main Board Jumpers

PV200 Main Board Jumpers			
P1	Ethernet Injected Power (Pin 7 [24V] & 8 [GND])	1 & 2 (ON)	**2 & 3 (OFF)**
P2		1 & 2 (ON)	**2 & 3 (OFF)**
P3	Power IN	**1 & 2 (24V)**	2 & 3 (12V)
P4	RS485 Termination	**1 & 2 (Off or Disabled)**	2 & 3 (ON or Enabled)

Section 10 PV200 Terminal Setup

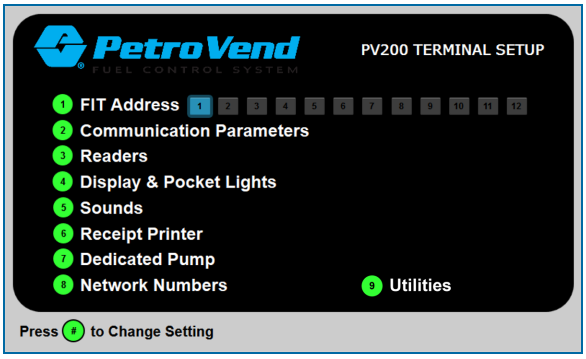
The PV200 Terminal uses an intuitive user interface for easy setup.



A DIP-Switch block in the top left corner of the controller board is used to open the Terminal Setup screen.

- Move switch #1 to the **ON** position to gain access to the Terminal Setup Main Menu.
- Push **Reset**.

IMPORTANT: The unit will not operate if Switch #1 and Switch #8 are both in the ON position. Switch #8 is used to put the screen in Test Mode. Make sure all switches are in the OFF position before you move Switch #1 to open the Terminal Setup screen.



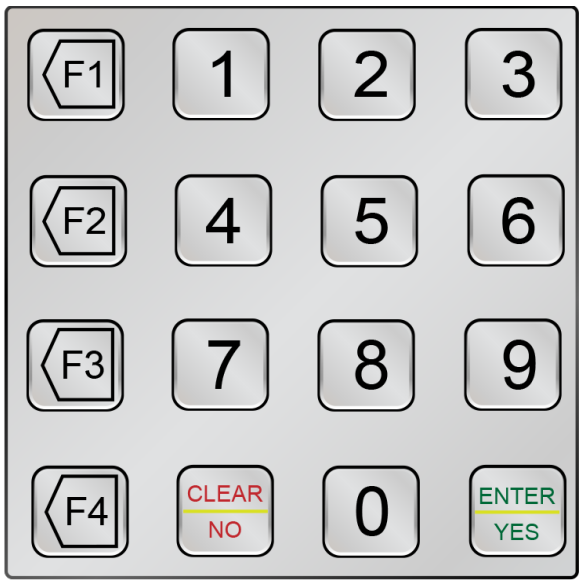
10.1 Screen Controls

Menu Item (push again and again to move through available selections)

Menu Item Selection (ON)

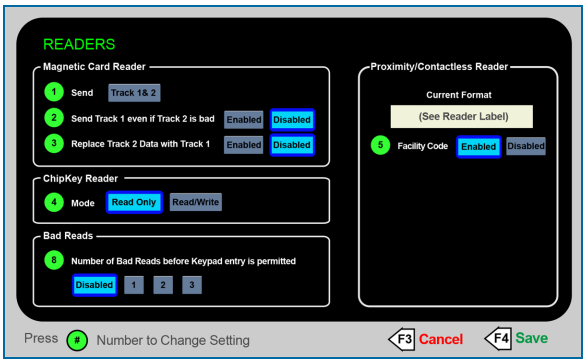
Menu Item Selection (OFF)

Field (on when its menu item is selected. A cursor will blink in the field).



Use the numeric/function keypad to enter numbers and Cancel/Save settings where applicable.

10.2 Readers Menu



NOTE: The PV200 will automatically detect the type of reader(s) that are installed.

Section 11 Exploded View Drawings

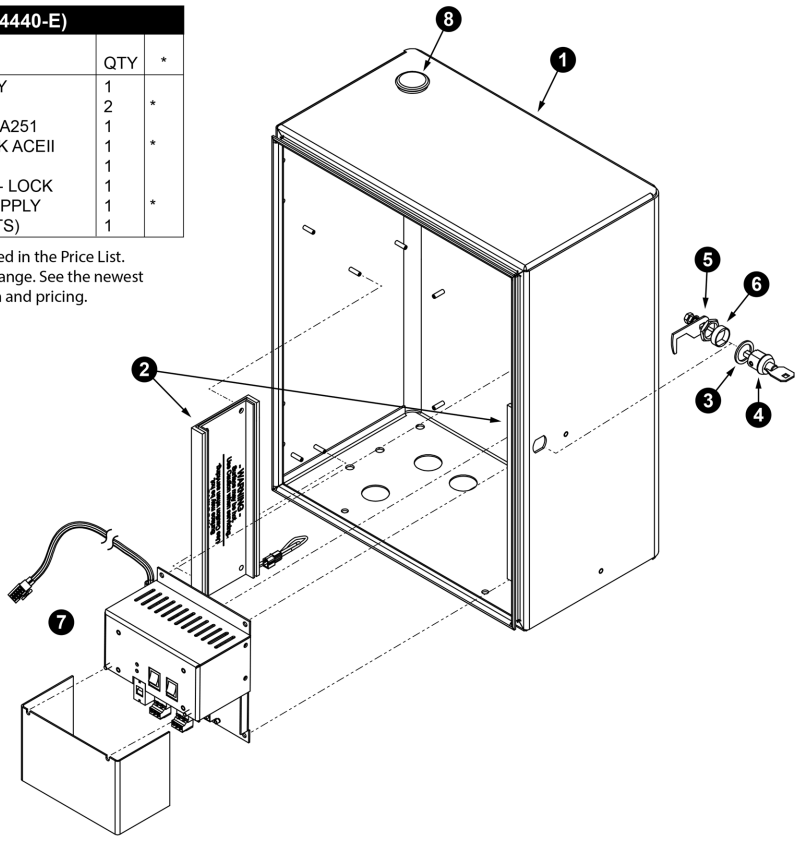
NOTE: The exploded view drawings shown below are for illustration purposes to identify part numbers and show component locations only. These drawings are not intended to illustrate assembly procedures and are not drawn to scale.

11.1 PV200 Enclosure Assembly

OPW-FMS Part Number 20-4440-E

PV200 ENCLOSURE (20-4440-E)				
ITEM NO.	PART NUMBER	DESCRIPTION	QTY	*
1	52-0396-E	ENCLOSURE ONLY	1	
2	20-4224	HEATER	2	*
3	50-2245	WASH MCM 95630A251	1	
4	13-0004	ENCLOSURE LOCK ACEII	1	*
5	13-0044	PV200 LOCK CAM	1	
6	51-0003	SPACER COLLAR - LOCK	1	
7	20-4441	PV200 POWER SUPPLY	1	*
8	50-0500	HOLE PLUG (PARTS)	1	

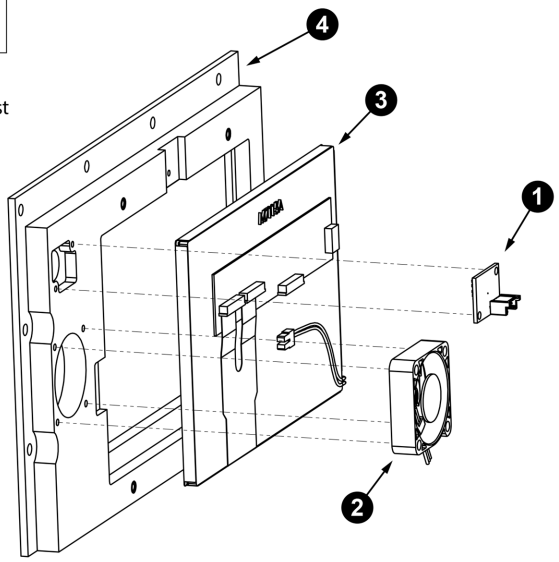
* This column indicates that this item is listed in the Price List.
NOTE: Pricing and listings are subject to change. See the newest Fuel Control Price List for order information and pricing.



11.2 PV200 Display

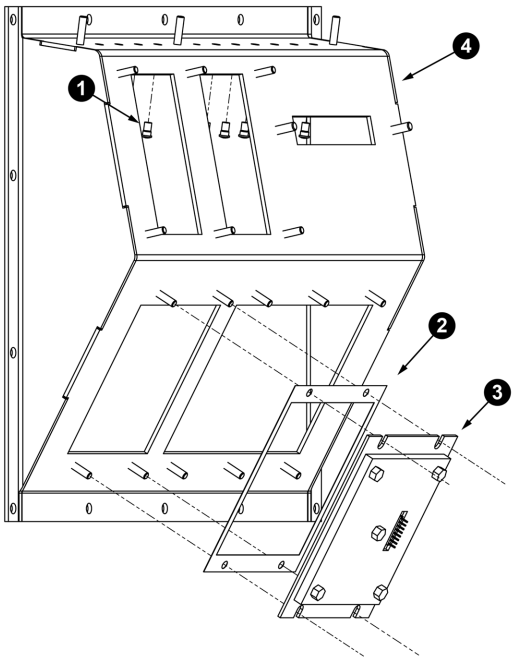
PV200 DISPLAY ASSEMBLY			
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1*	20-0413	AMBIENT LIGHT SENSOR	1
2*	20-4421	IC FAN ASSY	1
3*	04-1065	DISPLAY	1
4	50-3285	DISPLAY BRACKET	1

* These items are listed in the Price List.
NOTE: Pricing and listings are subject to change. See the newest Fuel Control Price List for order information and pricing.



11.3 PV200 Pocket

PV200 POCKET PARTS			
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	04-2004-025	LIGHT PIPE	10
2	50-2253-N	KEYPAD GASKET	1
3	09-4036	KEYPAD NUMERIC 16 POS	1
4	52-0396-P	POCKET, PV200	1



11.4 PV200 Door

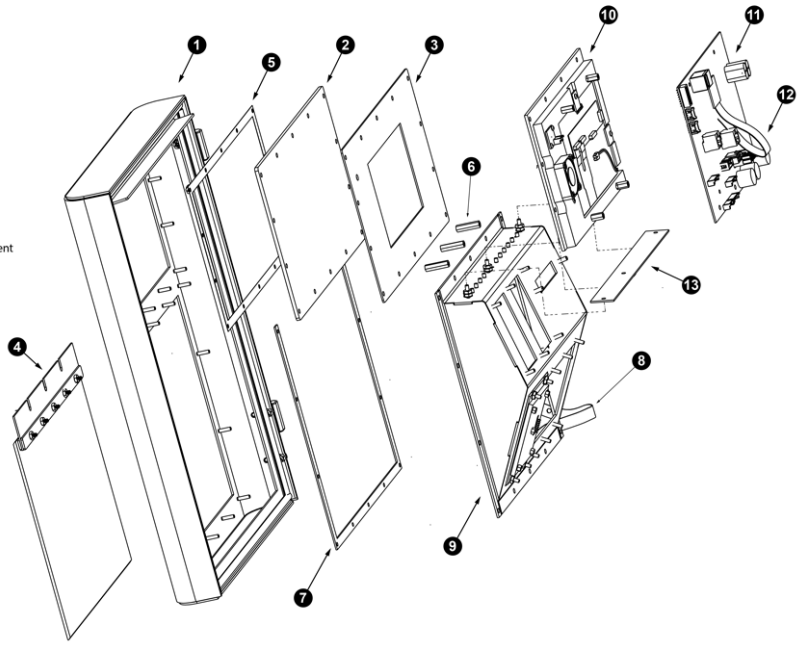
OPW-FMS Part Number 20-4440-D

REMINDER: The Display and Pocket drawings shown above are sub-assemblies of the 20-4440-D.

PV200 DOOR ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	52-0396-D	DOOR	1
2	50-3289	DISPLAY COVER -LEXAN	1
3	51-0446	PLATE- PCB MNTG	1
4*	20-8253	WEATHER SHIELD ASSY	1
5	50-2252	DISPLAY FILTER GASKET	1
6	50-0390	STANDOFF 6-32 X 1	3
7	50-2752	GASKET "U" POCKET	1
8	20-1498	GROUND STRAP 7 IN	1
9	POCKET	POCKET PRE-ASSY	1
10	DISPLAY	DISPLAY PRE-ASSY	1
11*	20-0410	PCB MAIN BOARD	1
12	20-1717	DISPLAY CABLE	1
13*	20-0411	PCB - LED LIGHTS	1

* These items are listed in the Price List.
NOTE: Pricing and listings are subject to change. Some replacement parts are available as remanufacured parts. See the newest Fuel Control Price List for order information and pricing.



11.5 Fastener Specifications

Fastener Specifications				
Assembly	*Fastener*	*Qty*	*Where Used*	*OPW-FMS Part #*
Enclosure (20-4440-E)	Nut, 8-32 UNC, KEPS	22	All	50-0008
Display	6-32 X 5/8 Flat Head Phillips Machine Screw: 18-8 Stainless Steel	4	Fan	50-0497
	M4 316 Stainless Steel Pan Head 10mm Machine Screw	3	Display Clamps	01-19090
		2	Sensor Board	
Pocket	Nut, KEPS 6-32	4	Numeric Keypad	50-0005
		6	Under LED PCB	
Door	Nut, KEPS 6-32	28	All	50-0005
	Screw - #6 - 32 X 3/8 Pan Head Machine Screw	7	Terminal Controller Board	50-0148

11.6 Cables

Cable Part Numbers	
Cable	*OPW-FMS Part #*
Numeric Keypad Cable	20-1686
Cable, 5 Pin (X2)	20-1685
Display Cable	20-1717

Appendix A - Software Upgrade Procedure

Download the PV200 upgrade ZIP file from the PV200 folder of the FMS Technical Library.

Save the ZIP file to a USB flash drive.

When the flash drive has been fully loaded onto the USB flash drive, do the procedure that follows:

1. Put **DIP-Switch 1** of SW 1 in the **ON** position. The PV200 Terminal Setup screen will open on the front panel.

IMPORTANT: The unit will not operate if Switch #1 and Switch #8 are both in the ON position. Switch #8 is used to put the screen in Test Mode. Make sure all switches are in the OFF position before you move Switch #1 to open the Terminal Setup screen.

2. Push the **Reset** (SW3) button.
3. Select **option 9, Utilities**from the Terminal Setup screen. The Utilities screen will open.
4. Select **option 2, Firmware Upgrade** from the Utilities screen.
5. Put the flash drive into the **left USB socket** (J7) on the main board. Push **Enter** on the front panel keyboard.
   - The green LED (D21) under the flash drive will blink for several minutes. Wait for the files to load from the flash drive.
   - When the software is loaded from the flash drive to the compact flash card, the system will reset automatically.
6. The red LED (D1) adjacent to the SW1 DIP-Switch block will flash for approximately a minute. The system will reset again and the new version will run in the configuration mode (because switch 1 is still on).
7. Remove the flash drive.
8. Put **DIP-Switch 1** of SW 1 in the **OFF** position.
9. Push the **Reset** (SW3) button. The unit will go back to normal operation.

This completes the software upgrade procedure.

* There are four files that are automatically extracted from the flash drive:

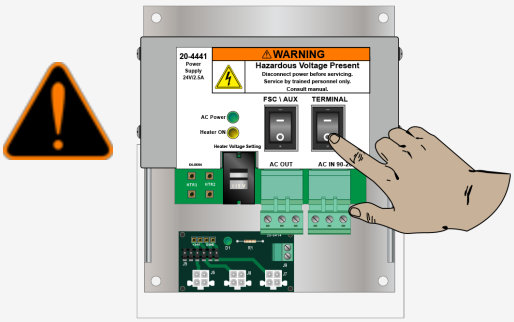
- The PV200_config.db file goes in the root.
- The remaining files are in a folder named “firmware.” The files in the firmware folder are:
  - load.xml
  - PV200_flasher.hex
  - loader.hex

Appendix B - PV200™ Options Installations

Installation instructions for upgrade options can be found in this appendix. These topics include:

An upgrade option for a receipt printer is also available. See "Receipt Printer" on page 34 in this manual for installation instructions.

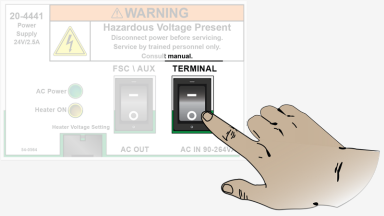
WARNING: De-energize the terminal before you do the procedures below to prevent the possibility of electrical shock, fire or explosion. Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



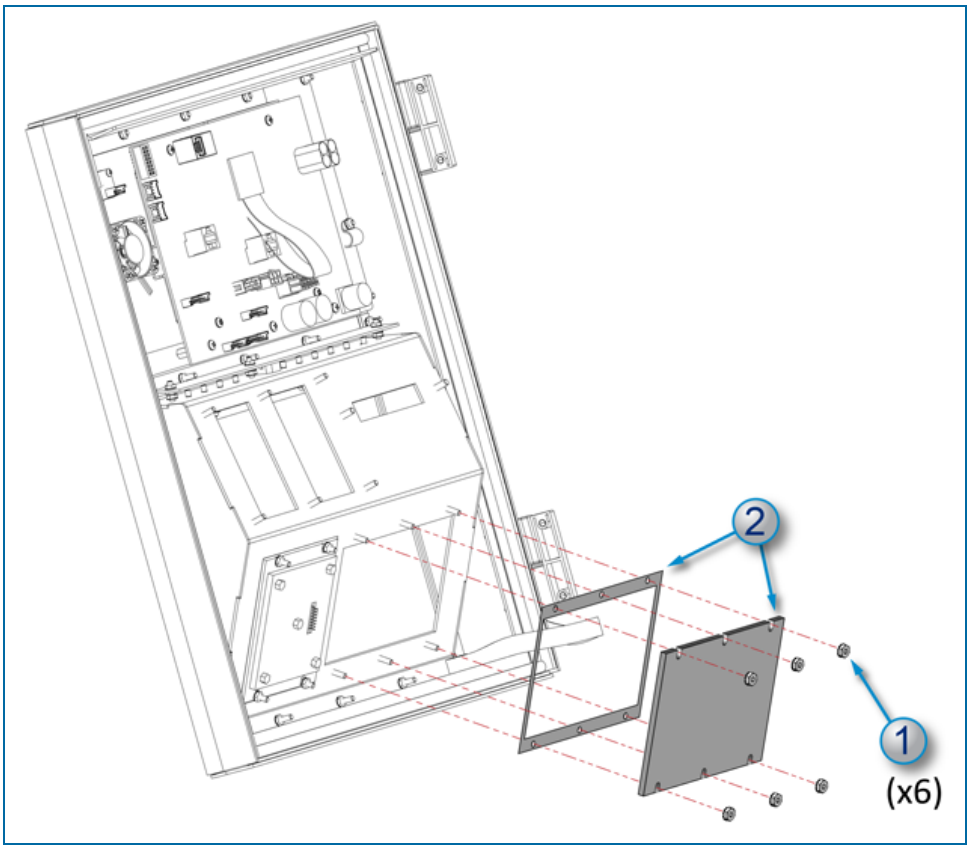
Appendix B - 1 - Alpha Keypad Installation

FMS Part Number 20-4444-YES

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



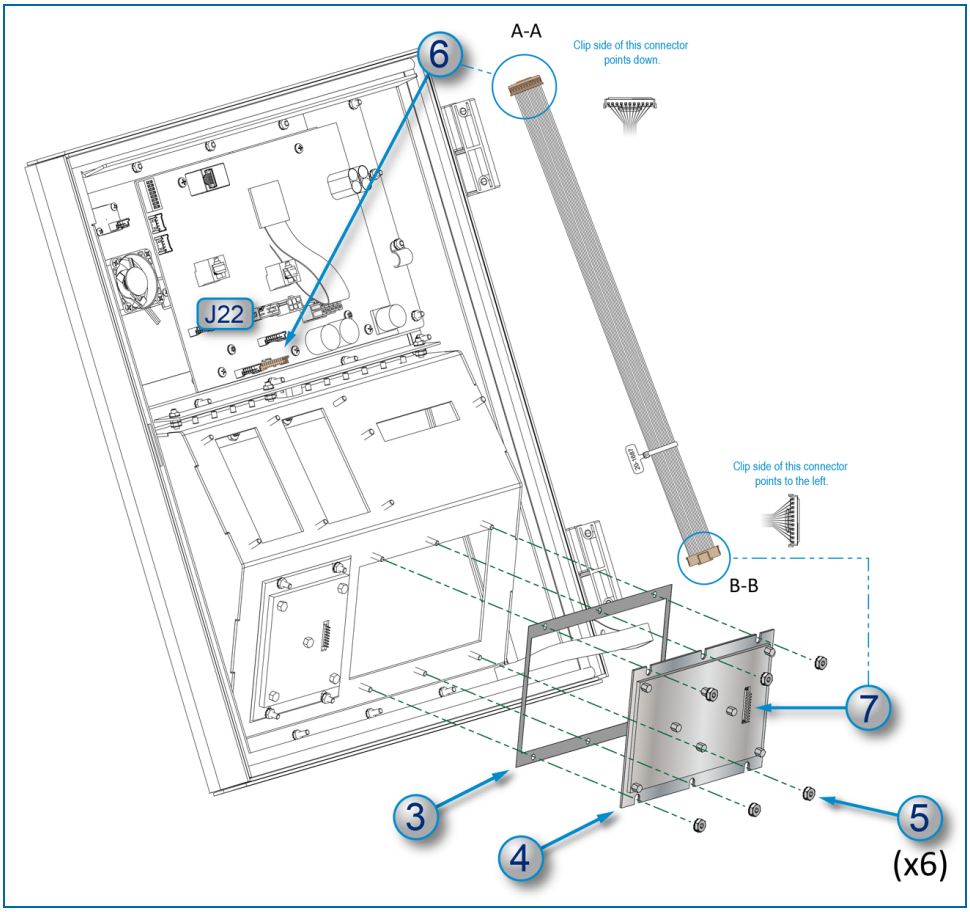
Remove the Blank-out Plate



1. Remove the six (6) nuts from the pocket slot screw studs.
2. Remove the blank-out plate and gasket to open the pocket slot.

Install the Alpha Keypad

20-4444-YES Components		
Part Number	*Description*	*Qty*
50-2253-A	Keypad Gasket	1
09-4037	27 Position Alpha Keypad	1
50-0005	NUT KEPS 6-32	6
20-1687	PV200 Alpha Keypad Cable	1



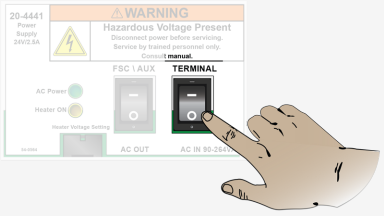
3. Put the Gasket (50-2253-A) over the six (6) pocket slot screw studs.
4. Put the Alpha Keypad (09-4037) over the six (6) pocket slot screw studs on top of the gasket

5. Put the six (6) nuts (50-0005) on the screws and turn them clockwise with a 5/16” socket or nut driver until they are tight.
6. Connect one of the two 11-Pin connectors of the Alpha Keypad Cable (20-1687) into the J-22 connector (labeled "ALPHA") on the Main Board as shown. The clip side of the connector should point down.
7. Connect the other 11-pin connector of the cable into the connector on the rear of the Keypad. The clip side should point to the left.

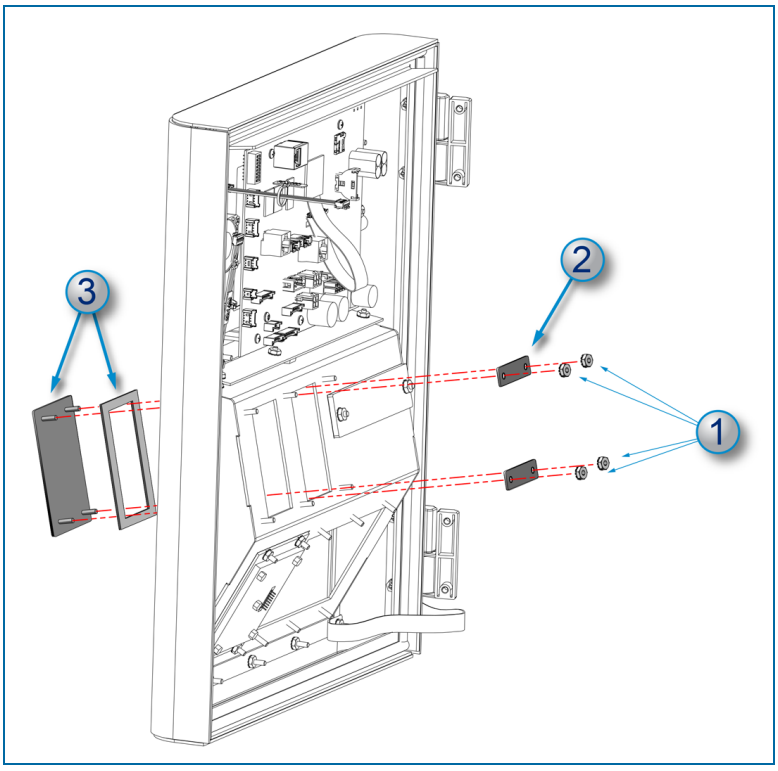
Appendix B - 2 - ChipKey Reader Installation

FMS Part Number 20-4443-CHIP

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



Remove the Blank-out Plate



1. Remove the nuts from the blank-out plate screw posts for the applicable pocket slot where the card reader will be installed.

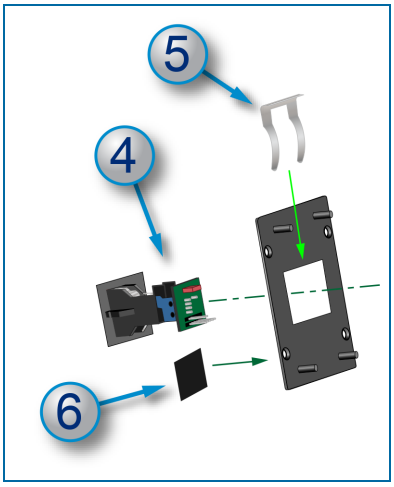
2. Remove the bracket.
3. Pull out the blank-out plate and gasket.

Install the ChipKey Reader

20-4443-CHIP Components		
Part Number	*Description*	*Qty*
20-4117	ChipKey Reader	1
51-0450	ChipKey Plate	1
50-0137	ChipKey Clip	1
54-0328	ChipKey Label	1
50-2254	Gasket	1
51-0449	Mounting Bracket	2
50-0005	NUT KEPS 6-32	4
20-1625	ChipKey Reader Cable	1
54-1052-TC	ChipKeyReader Test Card (not shown)	1

NOTE: Part Numbers in **Green Bold** text in the component list above are availabe as replacement items. See the newest Fuel Control Price List for order information and pricing.

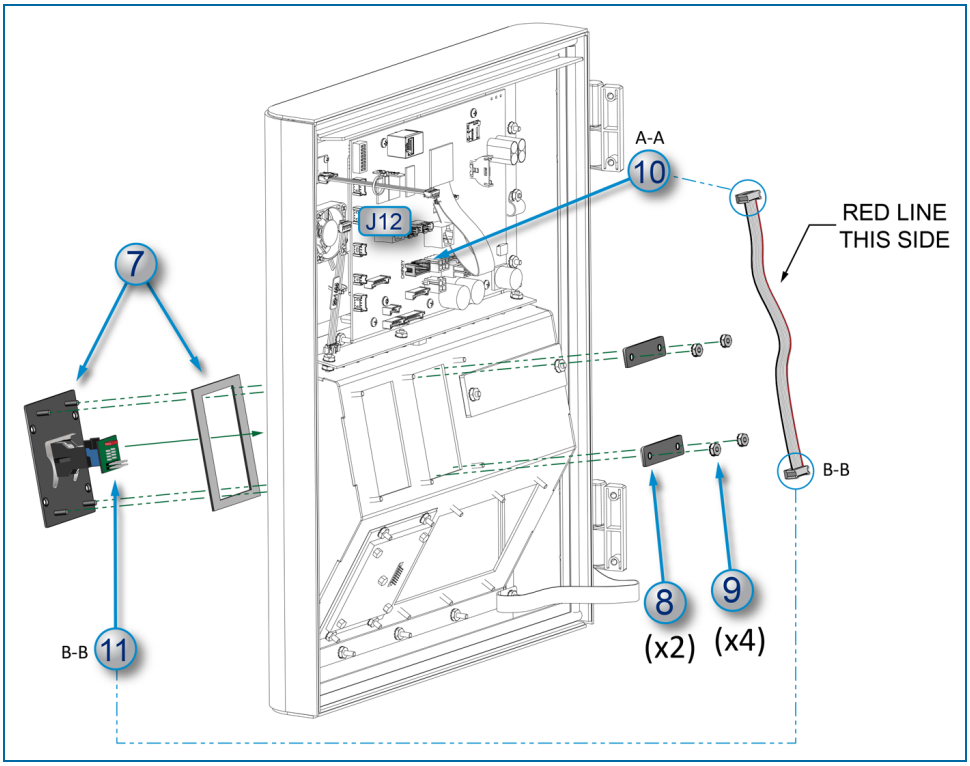
ChipKey Sub-Assembly



The ChipKey Sub-Assembly is assembled at the factory for the upgrade kit. If it is necessary to install a new ChipKey reader do steps 4-6 as shown below

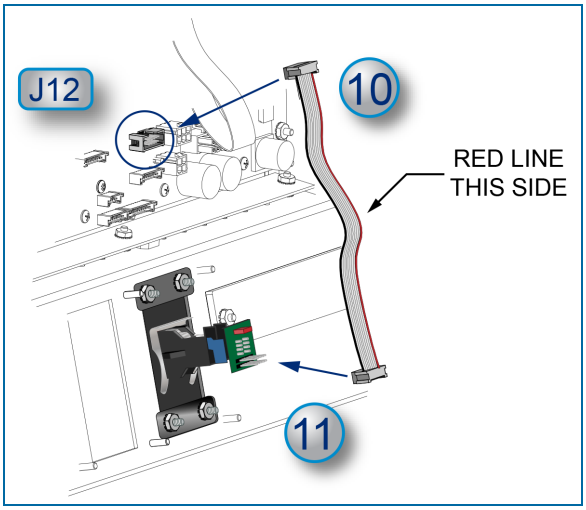
4. Put the ChipKey unit (20-4117) through the ChipKey plate (51-0450) until it is flush.
5. Push the clip (50-0137) through the slots on both sides of the ChipKey unit so that it holds the unit tightly.
6. Peel the backing off of the ChipKey label (54-0328) and attach the label to the front surface of the plate.

ChipKey Sub-Assembly Installation



7. Put the Gasket (50-2254) around the ChipKey Plate studs. Put the Sub-assembly with the Gasket through the open pocket slot until they are flush with the front panel of the pocket.
8. Hold the Sub-assembly and Gasket in place and put the two (2) Mounting Brackets (51-0449) over the top and bottom pairs of studs as shown above.
9. Put the four (4) KEPS nuts (50-0005) on the Chipkey plate studs and turn them clockwise with a 5/16” socket or nut driver until they are tight.

ChipKey Cable Connection

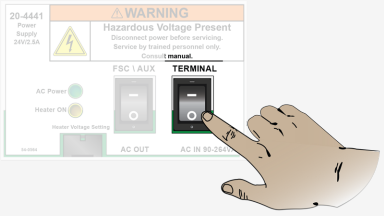


10. With the red line of the ribbon cable (20-1625) pointed to the right, connect the top cable connector into the J12 connector (labeled "CHIPKEY") on the Main Board as shown.
11. Connect the bottom connector of the ribbon cable to the connector on the face of the ChipKey unit's board.

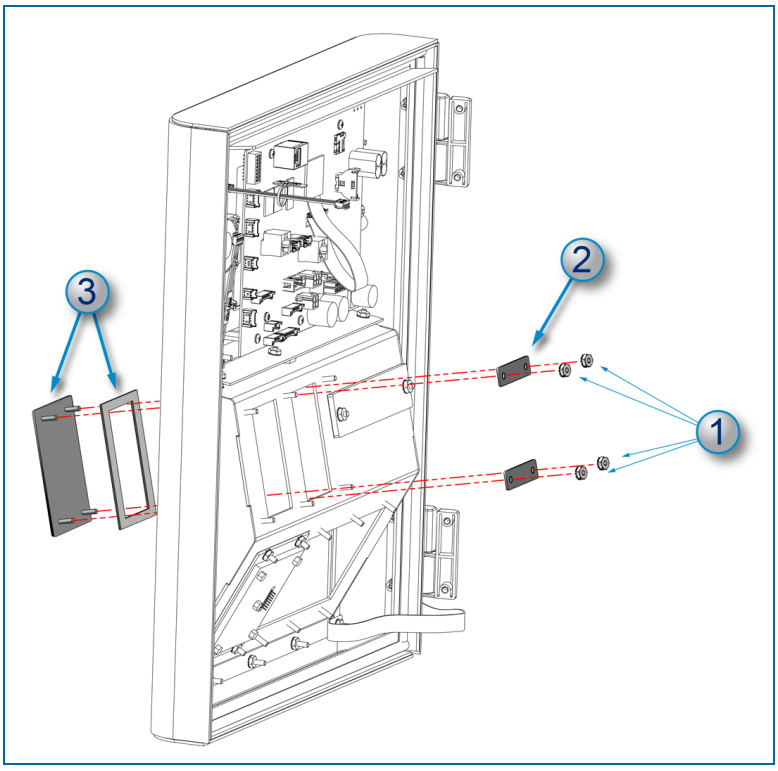
Appendix B - 3 - Magnetic Card Reader Installation

FMS Part Number 20-4443-MAG

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



Remove the Blank-out Plate



1. Remove the nuts from the blank-out plate screw posts for the applicable pocket slot where the card reader will be installed.

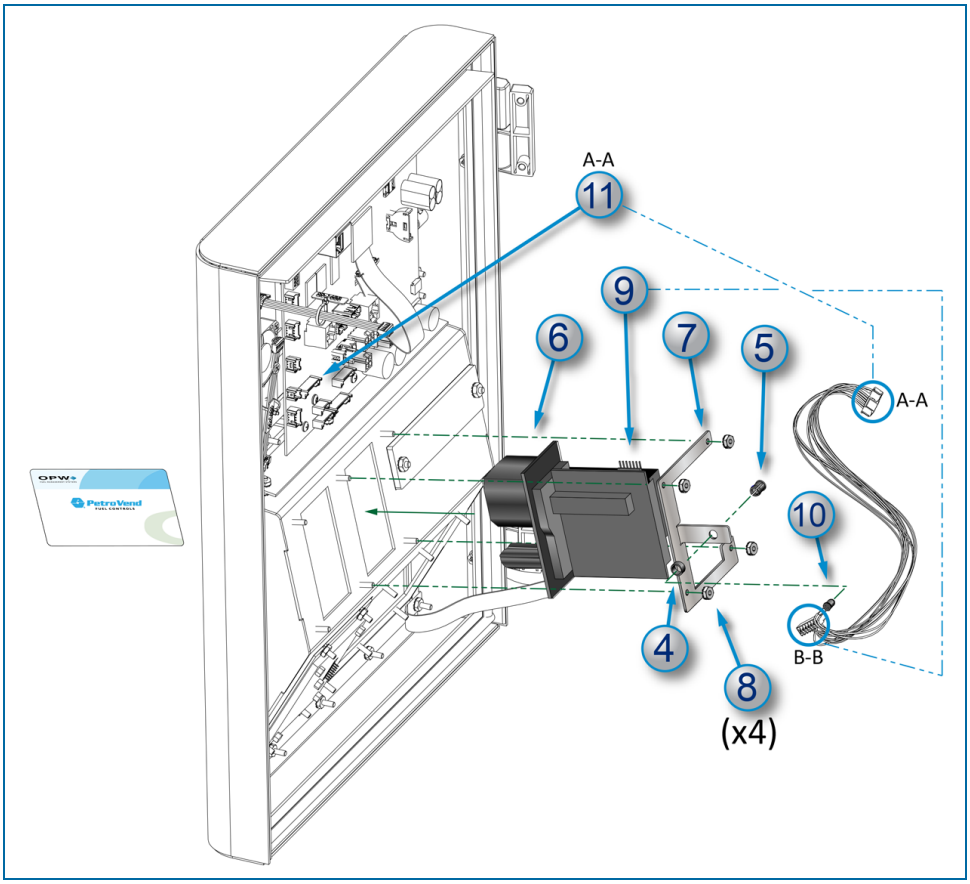
2. Remove the bracket.
3. Pull out the blank-out plate and gasket.

Install the Card Reader

NOTE: If there is a silica gel packet in the card slot of the reader, remove and discard it before you do this installation.

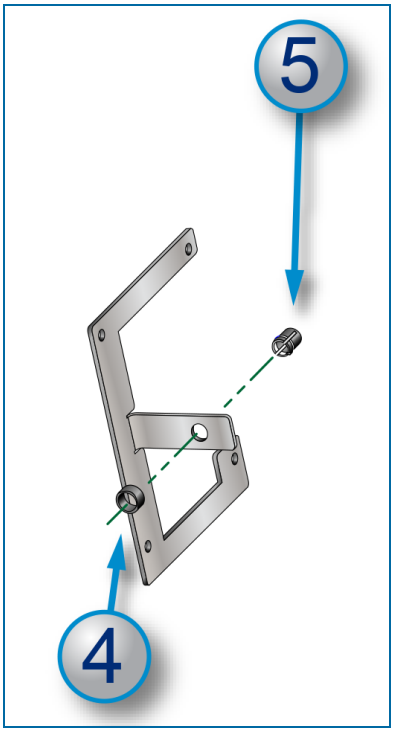
20-4443-MAG Components		
Part Number	*Description*	*Qty*
75-3022	Magnetic Card Reader	1
51-0448	Mounting Bracket	1
50-3199 (A)	LED Ring	1
50-3199 (B)	LED Clip	1
50-0005	NUT KEPS 6-32	4
20-1642	Card Reader Cable Assembly	1
54-1051-TC	Mag Reader Test Card	1

NOTE: Part Numbers in **Green Bold** text in the component list above are available as replacement items. See the newest Fuel Control Price List for order information and pricing.



The LED Ring, Clip and Bracket are assembled at the factory for the upgrade kit. Reference steps 4-5 if it is necessary to assemble the parts in the field again.

4. Hold the LED Ring (50-3199 [A]) against the bracket (51-0448) hole as shown.
5. Squeeze the large end of the LED Clip (50-3199 [B]) and push it through the bracket hole and LED Ring until it snaps in position.



6. Put the front of the Card Reader (75-3022) through the open position slot until the frame is flush with the back of the pocket.
7. Put the bracket over the four (4) screws of the pocket position.
8. Put the four (4) nuts (50-0005) on the screws and turn them clockwise with a 5/16” socket or nut driver until they are tight.
9. Plug the 7 position connector of the wire harness (20-1642) into the connector on the top of the Mag Reader unit (75-3022-1) (B-B).
10. Push the LED light of the wire harness (20-1642) into the LED Clip assembly.

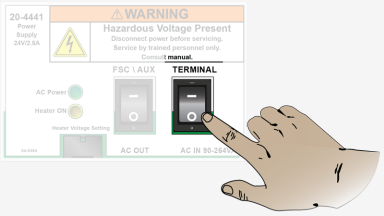
IMPORTANT: If this Card Reader kit is installed as part of a *Dual Card Reader* upgrade, do not do step 11. See "Dual Magnetic Card Reader Installation" on the next page for connection instructions with two (2) readers.

11. Plug the 10 position connector of the wire harness (20-1642) into the J13 connector of the Main Board (A-A).

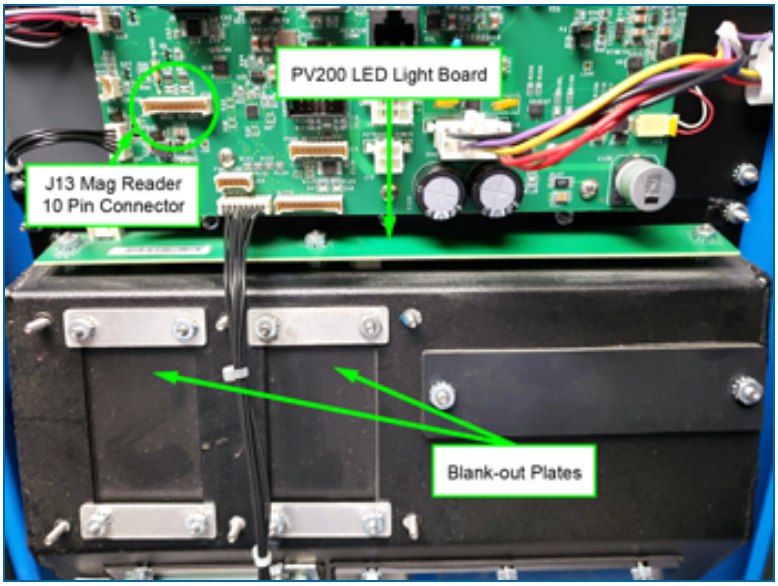
Appendix B - 4 - Dual Magnetic Card Reader Installation

FMS Part Number 20-4443-MAG2

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.

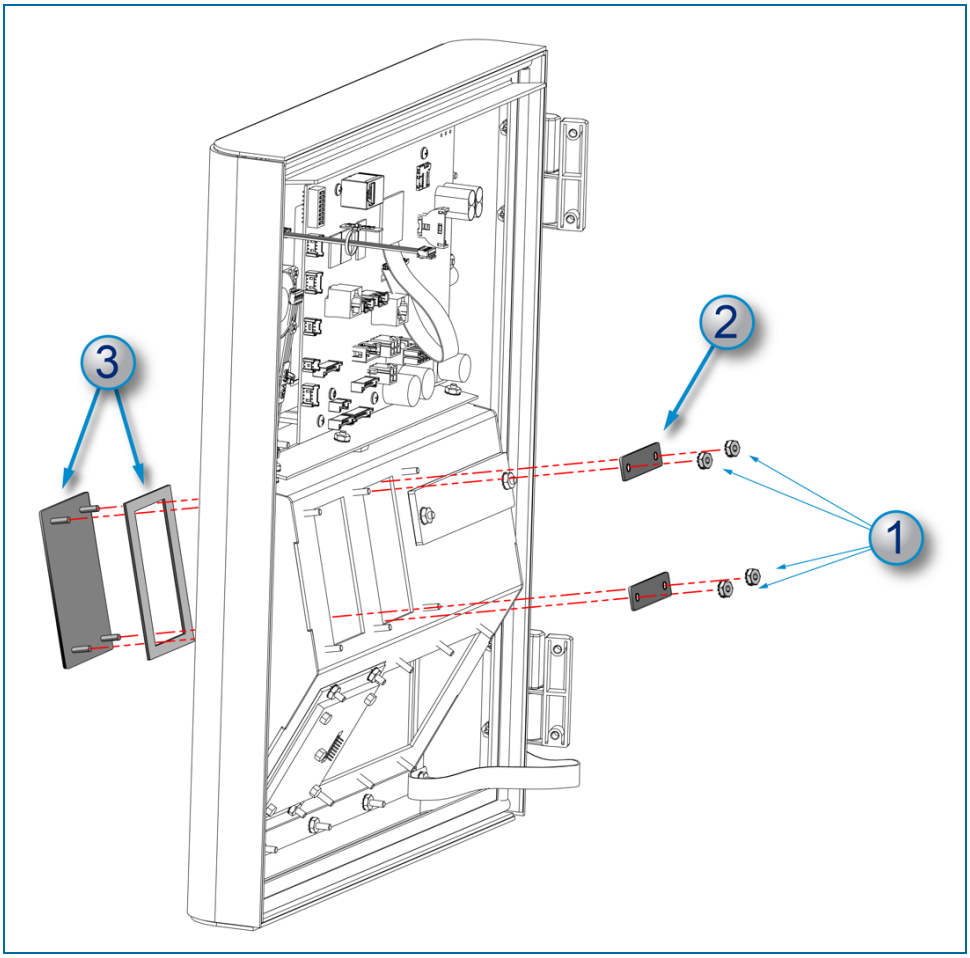


This option can be added with a factory-installed card reader or as a secondary back-up card reader with a primary 20-4443-MAG upgrade installation.



Remove the Blank-out Plate(s)

If a secondary card reader is installed with a factory-installed card reader there will only be one Blank-out Plate to remove. If a primary (20-4443-MAG) and a secondary (20-4443-MAG2) reader are to be installed you must remove the two side-by-side Blank-out Plates. The procedure is the same for the two plates.



1. Remove the nuts from the blank-out plate screw posts for the applicable pocket slot where the card reader will be installed.
2. Remove the bracket.
3. Pull out the blank-out plate and gasket.

Do the same for the second plate (if applicable).

Install the Card Reader(s)

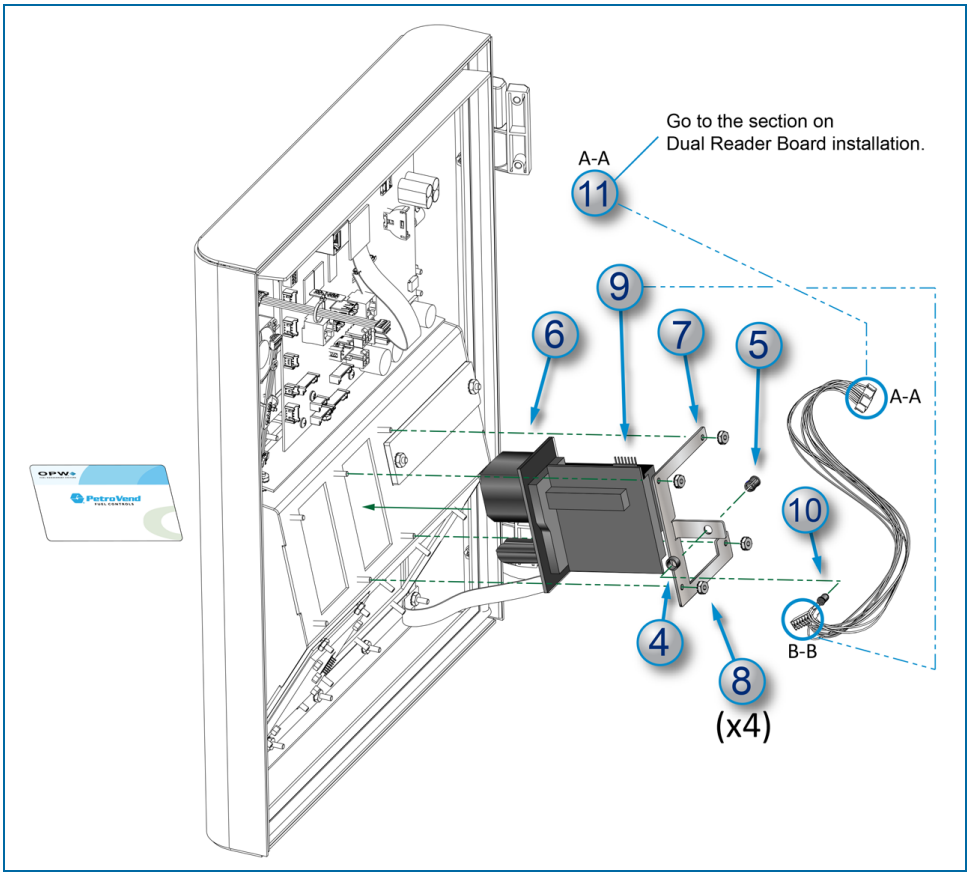
NOTE: If there is a factory-installed Mag Card Reader in one of the pocket slots, disconnect the 10-Pin cable connector from the J13 connector of the PV200 Main Board. This will be connected to the 20-0417 Dual Reader PCB after it is installed.

If two readers will be installed they will use the same installation procedure as shown below.

NOTE: If there is a silica gel packet in the card slot of the reader, remove and discard it before you do this installation.

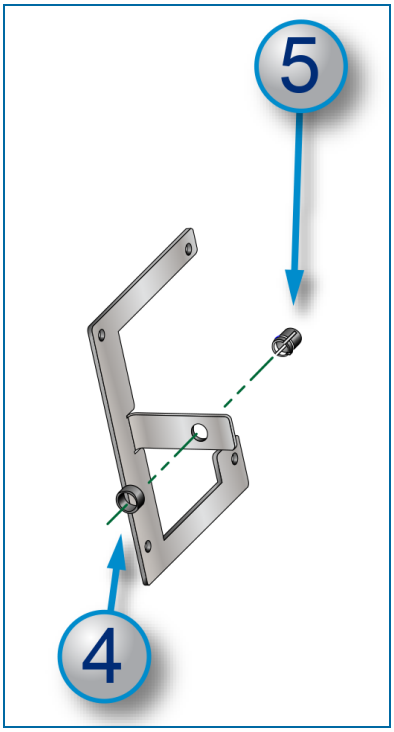
20-4443-MAG2 Components		
Part Number	*Description*	*Qty*
75-3022	Magnetic Card Reader	2
51-0448	Mounting Bracket	2
50-3199 (A)	LED Ring	2
50-3199 (B)	LED Clip	2
50-0005	NUT KEPS 6-32	8
20-1642	Card Reader Cable Assembly	2
20-1698	PV0385 I/F Board Connection Cable	1
20-0417	PV200 Dual Mag Reader PCB	1
54-1051-TC	Mag Reader Test Card	1

NOTE: Part Numbers in **Green Bold** text in the component list above are availabe as replacement items. See the newest Fuel Control Price List for order information and pricing.



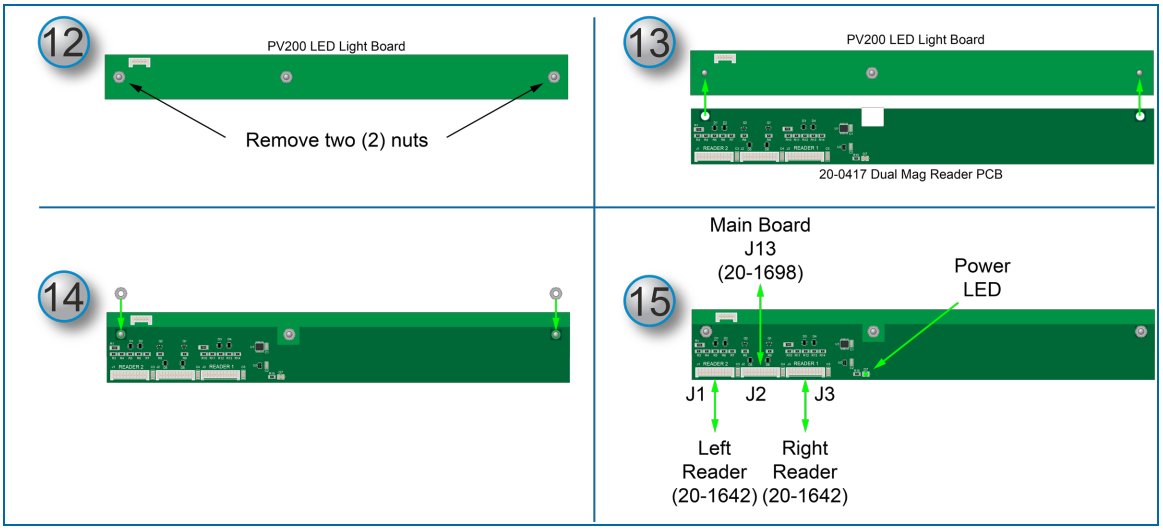
The LED Ring, Clip and Bracket are assembled at the factory for the upgrade kit. Reference steps 4-5 if it is necessary to assemble the parts in the field again.

4. Hold the LED Ring (50-3199 [A]) against the bracket (51-0448) hole as shown.
5. Squeeze the large end of the LED Clip (50-3199 [B]) and push it through the bracket hole and LED Ring until it snaps in position.



6. Put the front of the Card Reader (75-3022) through the open position slot until the frame is flush with the back of the pocket.
7. Put the bracket over the four (4) screws of the pocket position.
8. Put the four (4) nuts (50-0005) on the screws and turn them clockwise with a 5/16” socket or nut driver until they are tight.
9. Plug the 7-Pin connector of the wire harness (20-1642) into the connector on the top of the Mag Reader unit (75-3022-1) (B-B).
10. Push the LED light of the wire harness (20-1642) into the LED Clip assembly.
11. See the section below for connections.

Install the Dual Mag Reader PCB



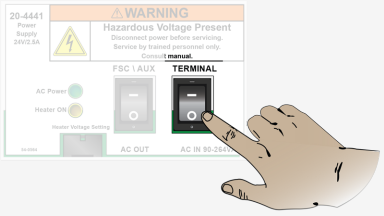
The 20-0417 Dual Mag Reader PCB will be installed on top of the PV200 LED Light Board. See the photo at the top of this instruction for the location of the LED board.

12. Loosen and remove the two (2) 50-0005 nuts from the sides of the LED Light Board.
13. Align the holes of the 20-0417 PCB with the threaded posts where the nuts were removed.
14. Install the two (2) 50-0005 nuts back onto the threaded posts.
15. Make the cable connections as follows:
    - Right Reader: The 7-Pin connector end of the 20-1642 cable was connected to the reader in step 9 above. Connect the 10-Pin connector end of the 20-1642 Cable Assembly to the J3 connector of the Dual Mag Reader PCB as shown above.
    - Left Reader: The 7-Pin connector end of the 20-1642 cable was connected to the reader in step 9 above. Connect the 10-Pin connector end of the 20-1642 Cable Assembly to the J1 connector of the Dual Mag Reader PCB as shown above.
    - Connect one of the 10-Pin connector ends of the 20-1698 Connection Cable to the J2 connector of the Dual Mag Reader PCB as shown above.
    - Connect the opposite 10-Pin connector end of the 20-1698 Connection Cable to the J13 connector of the PV200 Main Board as shown above.

Appendix B - 5 - Proximity Reader Installation

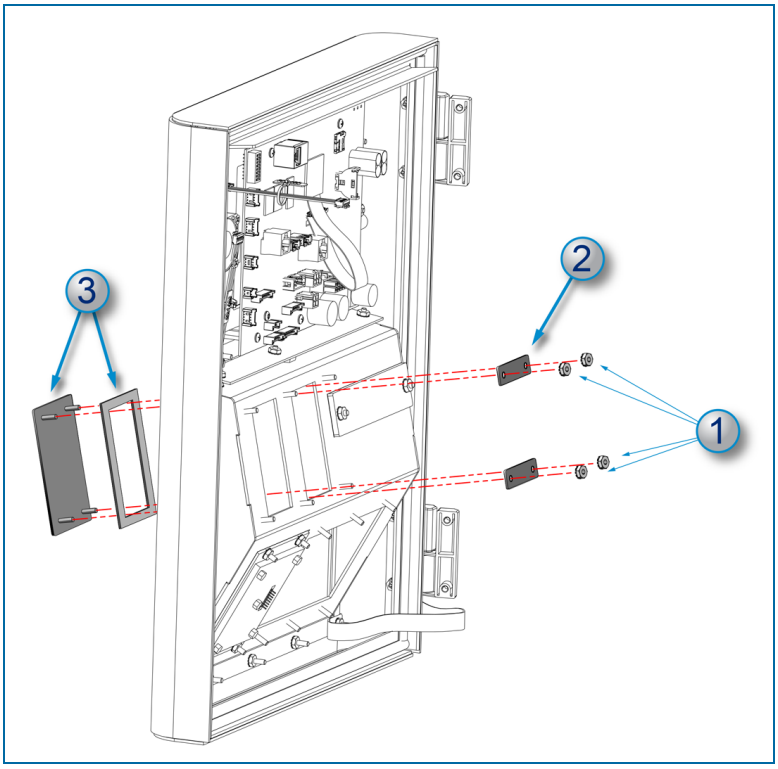
FMS Part Number 20-4443-PROX-XXX

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



IMPORTANT: When you order a Proximity Reader, the correct Format code must be attached to the Part Number. For example, 20-4443-PROX-XXX, where the three Xs show the three-digit Format code. Call Customer Support at 1-888-OPW-FUEL (1-888-679-3835) for more information.

Remove the Blank-out Plate

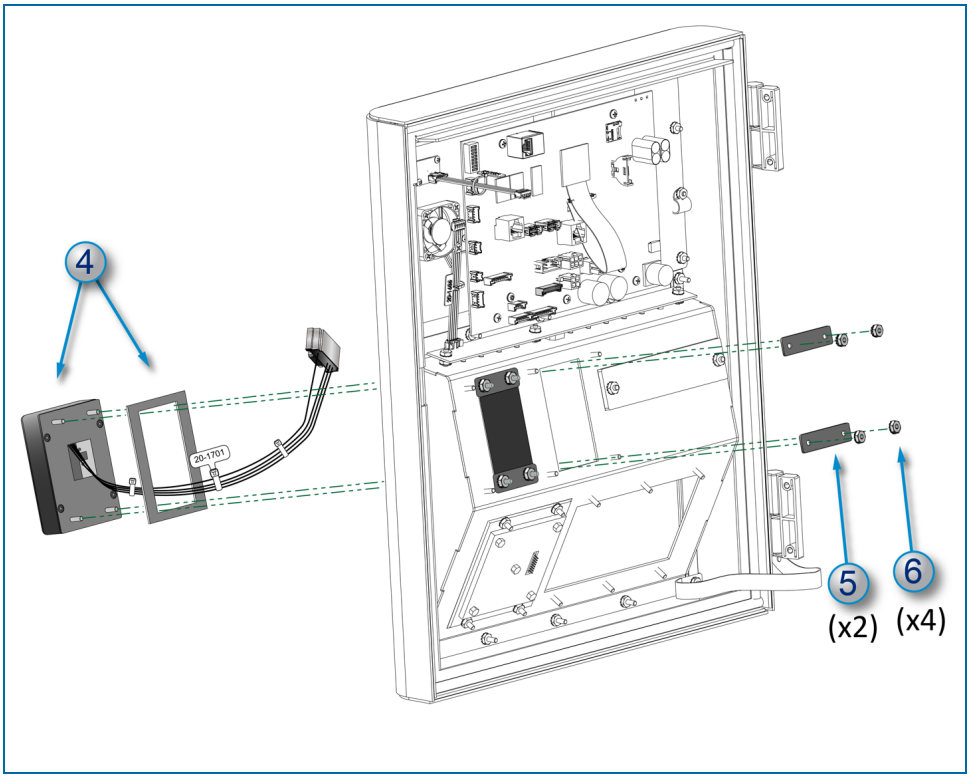


1. Remove the nuts from the blank-out plate screw posts for the applicable pocket slot where the card reader will be installed.
2. Remove the bracket.
3. Pull out the blank-out plate and gasket.

Install the Proximity Reader

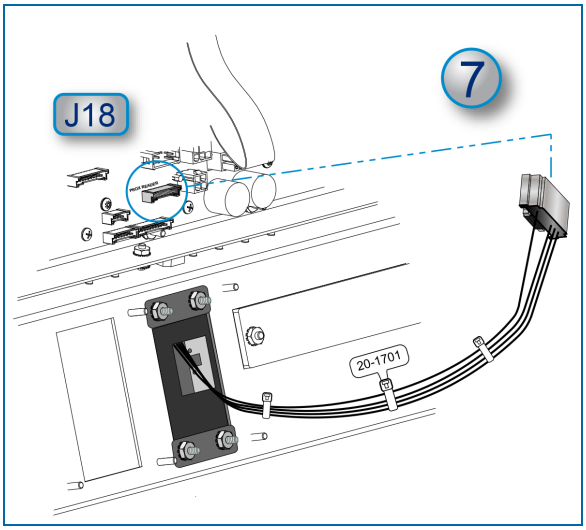
20-4443-PROX-XXX Components		
Part Number	***Description***	***Qty***
20-4450	Prox Reader Assembly	1
20-1701	Cable (pre-installed in the Prox Reader Assembly)	1
50-2254	Gasket	1
51-0449	Mounting Bracket	2
50-0005	NUT KEPS 6-32	4

NOTE: The cable (20-1701) is installed with the Proximity Reader Assembly.



4. Put the Gasket (50-2254) around the pre-installed Cable (20-1701) and studs on the rear of the Prox Reader Assembly (20-4450). Put the Assembly with the Gasket through the open pocket slot until they are flush with the front panel of the pocket.
5. Hold the Assembly and Gasket in place and put the two (2) Mounting Brackets (51-0449) over the top and bottom pairs of studs as shown above.
6. Put the four (4) KEPS nuts (50-0005) on the Prox Reader Assembly studs and turn them clockwise with a 5/16” socket or nut driver until they are tight.

Proximity Reader Cable Connection

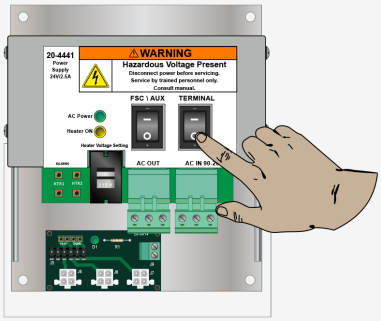


7. Connect the 9-pin connector of the Prox Reader Cable (20-1701) into the J18 connector (labeled "PROX READER") on the Main Board as shown.

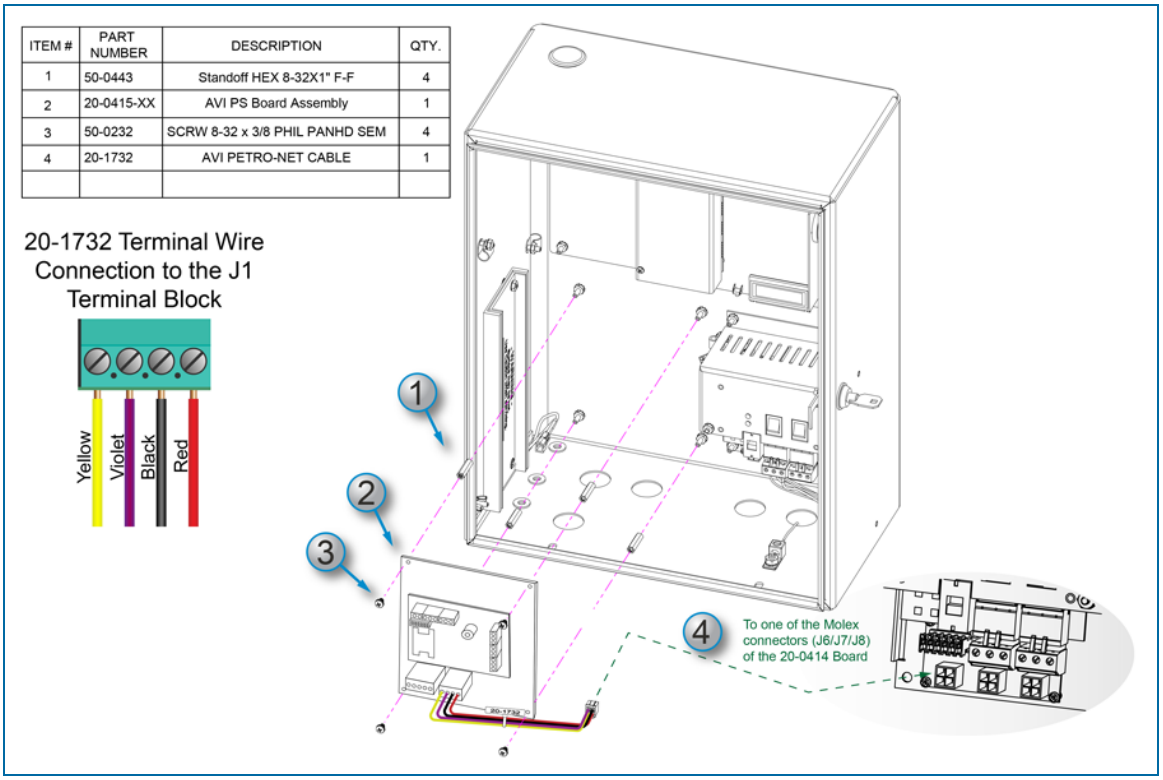
Appendix B - 6 - AVI - PV200 Option Installation

FMS Part Number 20-4465

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



Install the VIS Controller Assembly



1. Remove the nuts from the studs on the back wall of the PV200 enclosure where the VIS Controller Assembly is to be installed.
2. Attach the four (4) standoffs (50-0443) to the studs.
3. Hold the VIS Board Assembly (20-0415-XX) on the standoffs as shown above.
4. Put the four (4) screws through the holes in the VIS assembly and attach them to the standoffs.
5. Connect the 20-1732 AVI Petro-Net Cable to one of the three Molex connectors (J6/J7/J8) of the Petro-Net Power Hub Board (20-0414).
6. Connect the Yellow, Violet, Black and Red terminal wires of the 20-1732 cable to the J1 Terminal Block of the VIS Board Assembly as shown in the illustration above.

Install the Antenna

For information on the installation of the recommended antenna types (Body Mount or Panel style) refer to M1040-ANT AVI Antenna Installation.

Appendix B - 7 - DX Fleet Option

FMS Part Number 20-7092

Applicable Warnings, Battery Safety and Replacement

READ CAREFULLY: Read all of this section fully before you replace or discard the coin cell battery used in this device. It is mandatory to correctly understand all warnings and instructions to prevent dangerous conditions.

The Vantron/Edge board contains a CR-2450 3.0 V Lithium battery.

IMPORTANT: Read the warning statements below carefully. Make sure you understand and obey these warnings

DANGER: The coin cell battery can explode if it is used incorrectly. Do not recharge, disassemble or discard this battery in fire. Replace the coin cell battery with Panasonic or Matsushita Electric Part Number CR-2450 or equivalent ONLY. There can be a risk of fire or explosion if an incorrect battery is used.

To avoid possible explosion or fire, do not replace the lithium battery with a type that is not compatible.

The battery used in this device can present a risk of fire or chemical burn if used incorrectly. Do not disassemble, heat above 100°C or incinerate.

Discard a used, replaced battery immediately. Keep away from children. Do not disassemble and do not discard in fire.

The inside of the terminal contains high-voltage circuitry; ONLY certified technicians should be permitted access to the console.

INFORMATION: For more safety information on the Panasonic CR-2450 coin cell Lithium battery used in this device, refer to the Panasonic Product Safety Data Sheet.

Coin Cell Battery Replacement

DANGER: The inside of the terminal contains high-voltage circuitry; ONLY certified technicians should be permitted access to the console.

ATTENTION: Electrostatic Sensitive Device - To prevent damage to the electronic components in this device from electrostatic discharge, obey the precautions below when you do this procedure. Electrostatic discharge damage can also cause a security breach in a component.

Use an ESD Field Service Kit with wrist strap, dissipative mat and grounding cord when possible.

Do not touch the circuitry if you are not grounded correctly.

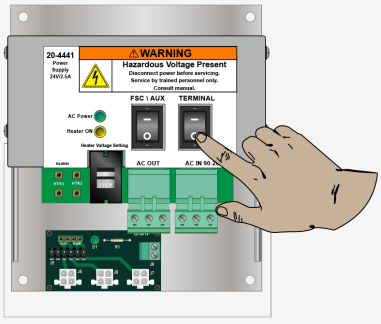
To remove the battery, pull the locking clip to the left to disengage the lock.

Carefully lift the battery out of its socket.

Put the new battery in the empty socket, push down on the battery and pull the locking clip to the right to lock the battery in position.

DX Fleet Option Installation

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



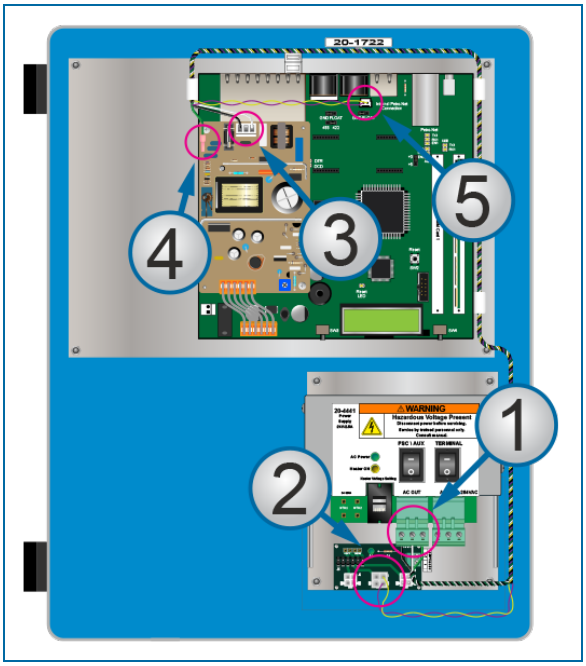
IMPORTANT: Refer to "Integrated FSC Communication Conduit" on page 30 for information on conduit requirements for internal FSC3000 Ethernet communication.

Your DX Fleet option kit has these components:

- Vantron/Edge - 5-port Ethernet Switch Assembly
- 2 x 8-32 KEPS nuts (FMS P/N 50-0008)
- 18" Black CAT5e Patch Cable (FMS P/N 12-3005-018-BLK)
- 6" RJ45 Patch Cable (FMS P/N 12-3031)
- RJ45 TO DB9 Cable (20-1520-01)
- USB to Seial Port Adapter Cable (75-2030)

20-1722 FSC3000/PV200 Power Cable

IMPORTANT: You must have a 20-1722 Revision 5 (or above) cable installed before you can install the DX Fleet option. The Revision 5 cable can be identified by the Red and Black wires attached to the 4-pin connector that is connected to the Petro-Net Hub. The Red/Black wires terminate at two (2) 2-pin connectors to supply electrical power to the Vantron/Edge and 5-port Ethernet Switch. **If your terminal does not have this cable, call Customer Support** at 888-OPW-FUEL (888-679-3835) to purchase the latest revision of the cable.



To replace the 20-1722 (revision 0-4) cable:

Disconnect the FSC3000 cable harness from the Power Supply:

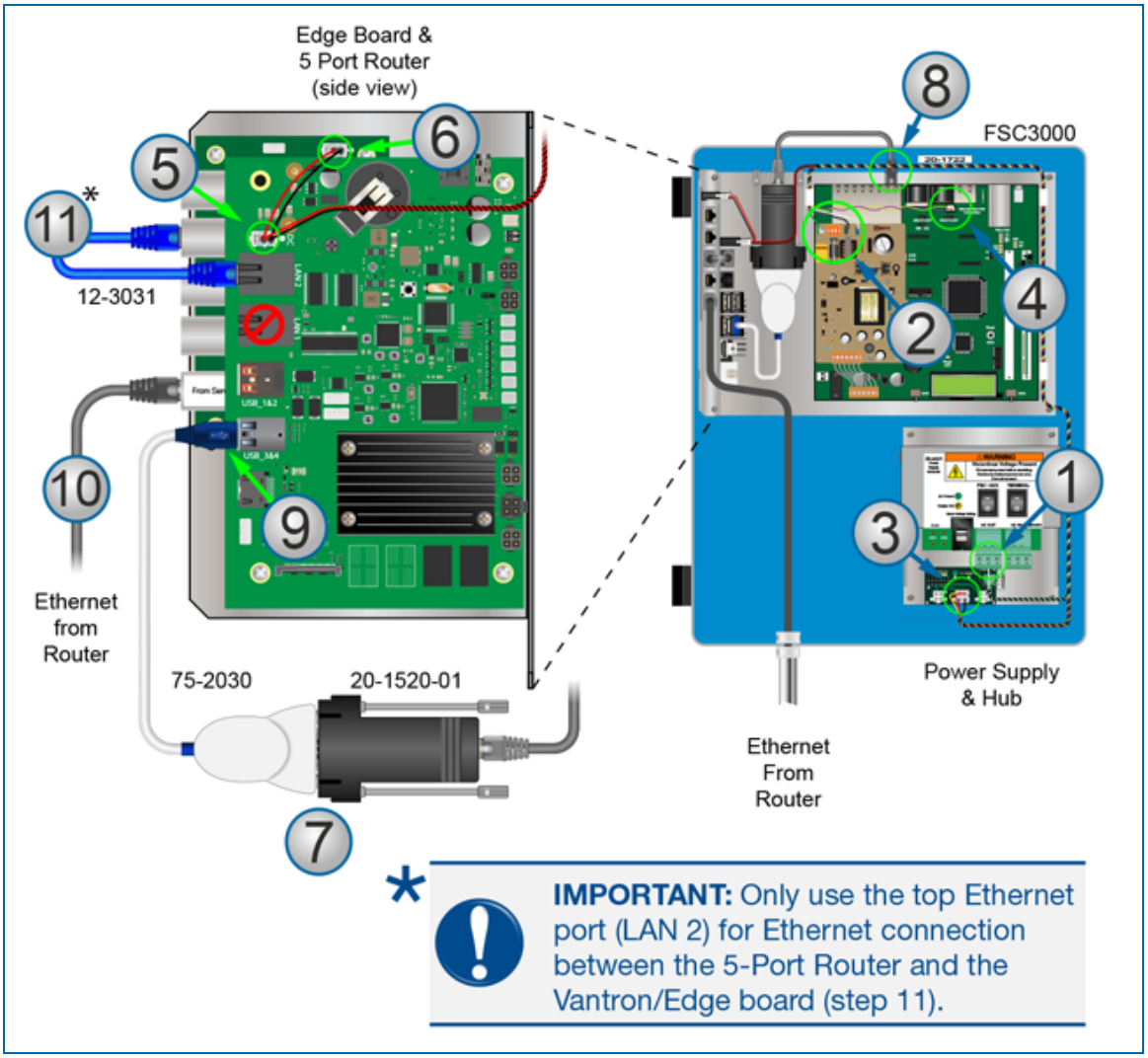
1. AC Out (terminal block with Black/White/Green wires).
2. Petro-Net Power Hub (4-pin connector with Yellow/Violet wires).

Disconnect the FSC3000 cable harness from the FSC board connections:

3. Connector on the FSC Power Supply with the Black/White wires.
4. Connector attached to the spade terminal with the Green wire.
5. 2-pin Molex connector from the Internal Petro-Net Connection.

Remove the harness from the cable clamps

PV200 DX Fleet Option Connections



NOTE: Make the connections to the Vantron/5-port Router assembly before you install the assembly so you can easily see the connection points on the boards.

Do the full connection procedure that follows to install a 20-1722 Revision 5 Power Cable assembly and 20-1520-01 & 75-2030 cables. If a Revision 5 Power Cable assembly was factory-installed, go to step 7 below.

20-1722 Connections

1. 3 Pos. Terminal Block (Black/White/Green): AC Out of the Power Supply
2. FSC3000 Power: 3-Pin connector (Black/White) and 18-24 GA Terminal as shown on the FSC3000 Power Supply board.

3. 4-Pin Connector (Yellow/Violet/Red/Black: Open connector (J6/J7/J8) of the PetroNet/Power Hub.
4. 2-Pin Molex (Yellow/Violet) to the internal PetroNet connector on the FSC3000 board.
5. 2 Position Connector (2 Red/2 Black) to the Vantron/Edge Board as shown.
6. 2 Position Connector (1 Red/1 Black) to the 5- Port Router as shown.

20-1520-01 & 75-2030 Connection

7. Connect the DB9 connectors of the 20-1520-01 and 75-2030 cables together.
8. RJ45 Connector end of the 20-1520-01 to the FSC3000 RS-232 Port 1.
9. USB connector of the 75-2030 adapter to one of the USB ports on the Vantron?Edge board.

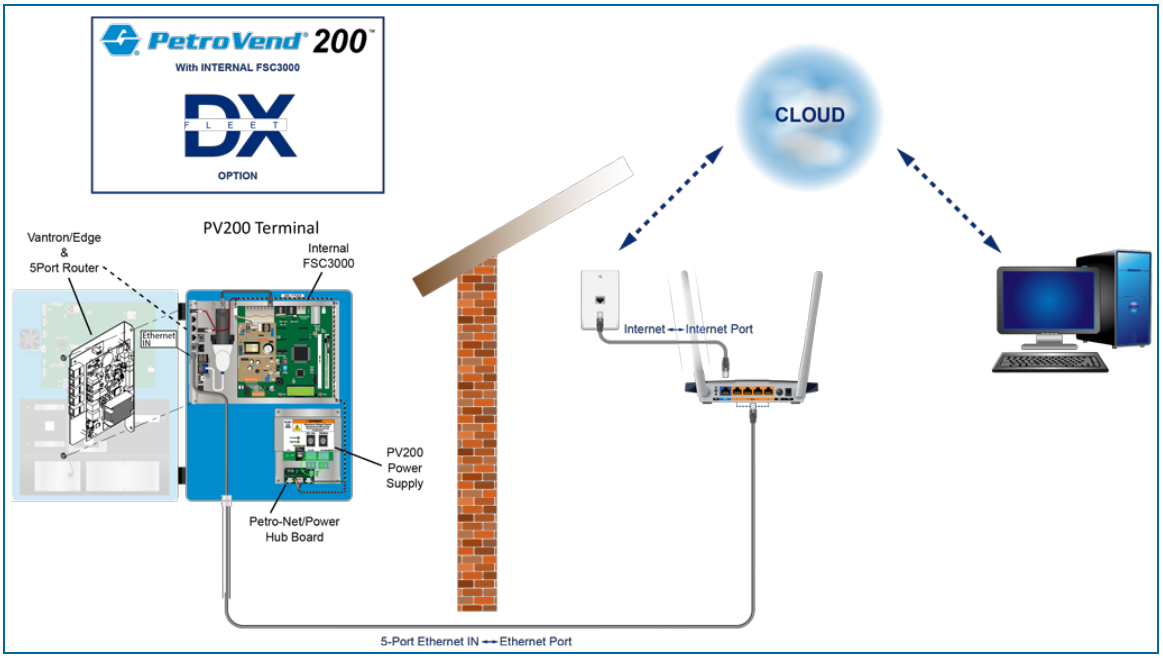
TIP: To add strain relief to this assembly, you can use a cable tie through the cable clamp on the left side of the FSC3000 board and around the assembly connectors as a support.

Ethernet Connections

10. External Ethernet connection from an office router Ethernet port to the 5-Port Router Ethernet In port (marked, **From Server**).
11. 6" RJ45 Patch Cable (FMS P/N 12-3031) from an open port of the 5-Port Router to the Ethernet In of the Vantron/Edge board (marked **LAN 2** adjacent to the Power input of the Vantron/Edge board).

IMPORTANT: To prevent connection issues with the network, ONLY connect to the TOP Ethernet port (LAN 2) for Ethernet connection between the 5-Port Router and the Vantron/Edge board.

Install the Vantron/Edge - 5-Port Ethernet Switch Assembly



- Remove the two nuts from the threaded posts on the left side of the FSC plate.
- Align the holes of the assembly bracket over the threaded posts.
- Put the two (2) 50-0008 8-32 KEPS Nuts on the threaded posts and tighten them.

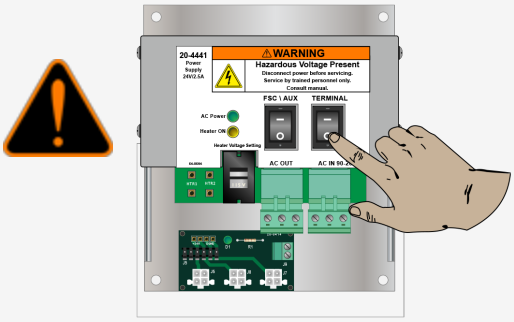
Appendix B - 8 - Modem and Gateway Installations

Internal Installation in a PV200 Terminal

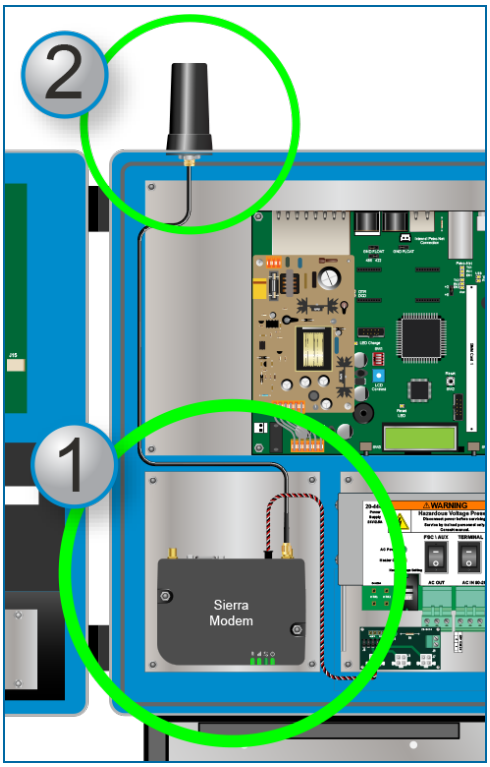
FMS Part Number 20-7500-PV200-T - PV200 Cellular Option (AT&T)

FMS Part Number 20-7500-PV200-V - PV200 Cellular Option (Verizon)

WARNING: De-energize the terminal before you do the procedures below to prevent the possibility of electrical shock, fire or explosion. Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



Install the Cellular Modem and Antenna



The PV200 Internal Cellular Option kit includes:

20-7500-PV200-T and 20-7500-PV200-V		
Part Number	***Description***	***Qty***
20-1617 / 20-1618	Wireless Cellular Modem: 20-1617 for AT&T *or* 20-1618 for Verizon	1
75-2064	Cellular 4G Dome Mount Antenna	1
51-0479	Universal Mounting Plate (PCM)	1
50-0234	SCRW 8-32 x 1/2 PHIL PANHD	2
50-0008	8-32 KEPS Nut	6
20-1742	Power Cable	1
20-1519-01-018	DSUB 9P, Male DTE 18"	1

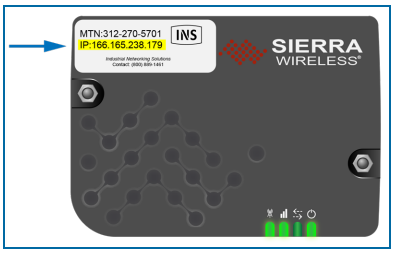
NOTE: Inbound serial communication parameters: 38400,7,E,1

NOTE: The Cellular Modem, Plate, the 8-32 Screws and two (2) of the 8-32 KEP nuts are assembled at the factory.

NOTE: Part Numbers in **Green Bold** text in the component list above are availabe as replacement items. See the newest Fuel Control Price List for order information and pricing.

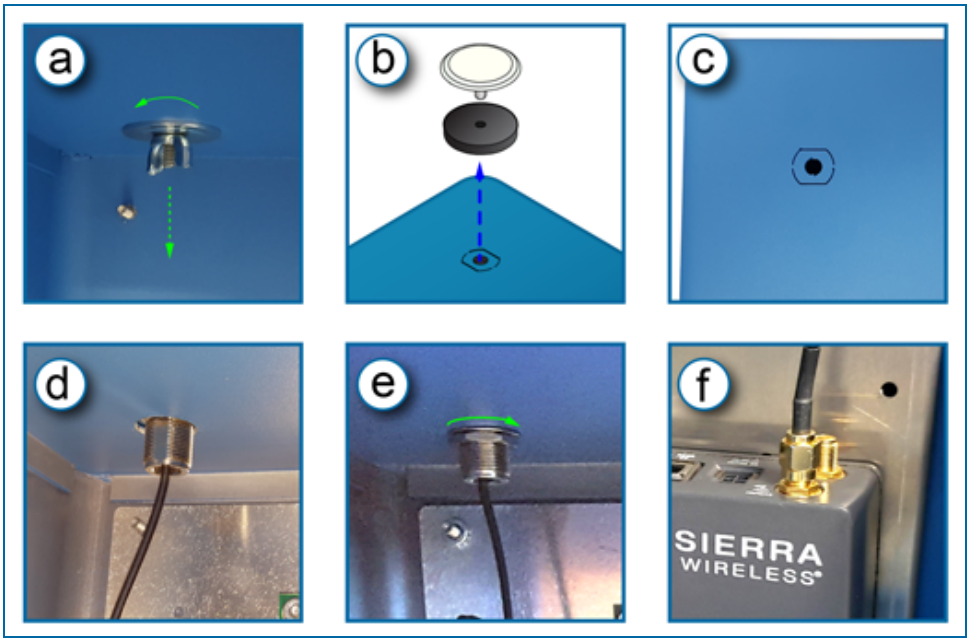
NOTE: If you use Phoenix or PuTTY to configure your system you must use the IP Address of your Cellular Modem to connect. You must also use Port 8001.

The Modem IP address can be found on the sticker that is attached to the front of the unit (see the illustration below).



Modem Installation

1. Align the four (4) mounting holes of the Universal Mounting Plate over the four (4) studs (below the FSC plate and left of the Power Supply). Put four (4) **8-32 Kep Nuts** on the studs and tighten them.



2. Install the Antenna.
    a. Loosen and remove the hole plug wing-nut and washer from the inside of the enclosure.
    b. Remove the hole plug assembly from the knockout on the top of the enclosure.
    c. Carefully punch out the knockout.

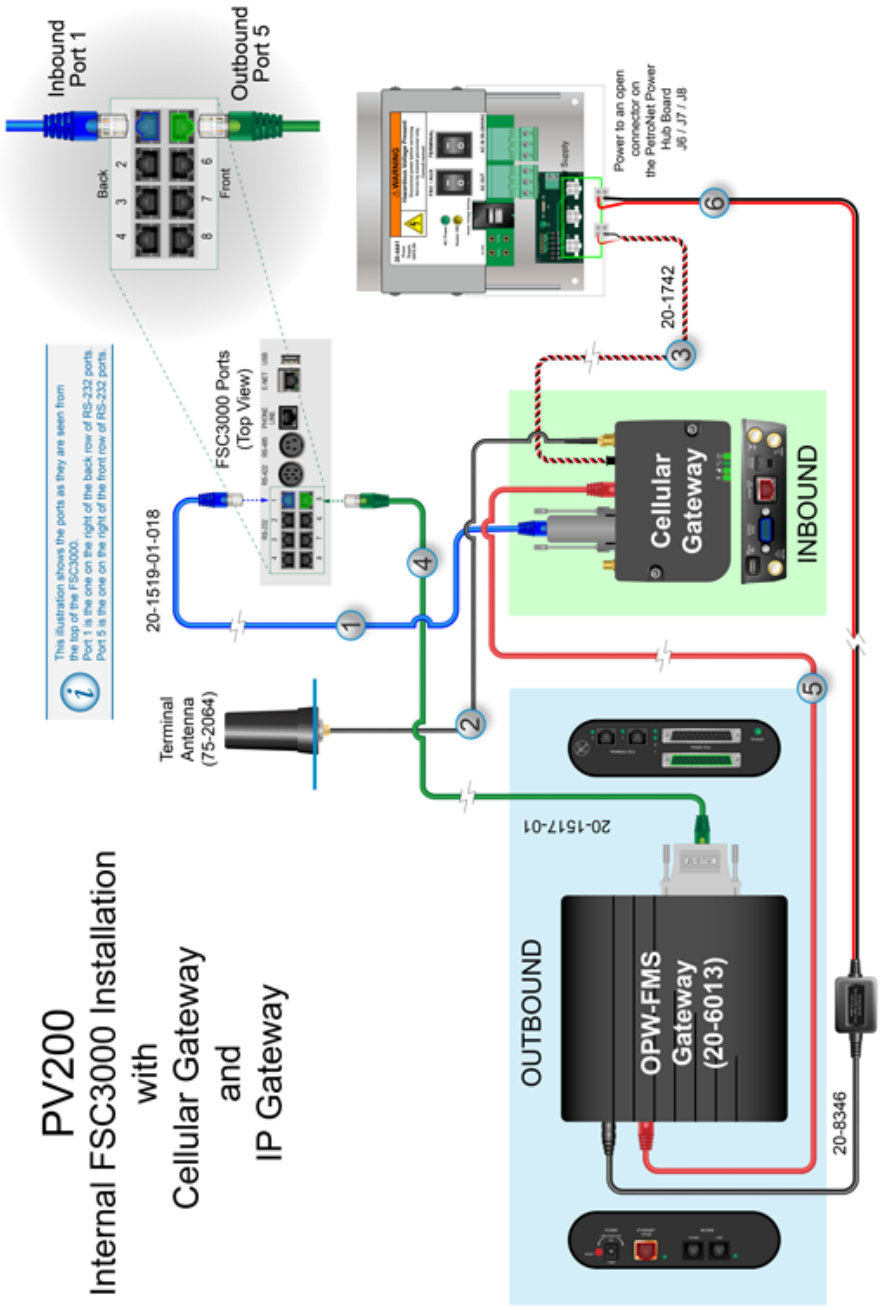
IMPORTANT: Make sure the knockout is punched out clean and that the top of the enclosure around the hole does not get bent.

    d. Put the bulkhead connector and cable of the antenna assembly through the hole.

NOTE: If the connector does not go through the hole easily, use a file to increase the dimension of the hole sufficient for clearance. Be sure to clean the filings from the bottom of the enclosure.

    e. Put the washer and nut of the antenna assembly on the threaded bulkhead connector. Turn the nut clockwise until it is tight.
    f. Attach the coaxial cable connector of the antenna to the Cellular connector of the Cellular Modem.

FSC3000 Internal Connections: Inbound/Outbound with Cellular Modem and IP Gateway



Inbound Connection: FSC3000 and Cellular Modem

NOTE: The colors of the cables in the illustration are used to show the routing of the wires only.

1. P/N 20-1519-01-018:
   - Connect the **DB9 Male connector end** to the **RS232 Port** of the Cellular Modem.
   - Connect one end of the **CAT5e Patch Cable** to the RJ45 socket side of the Connector and the other end to the FSC3000 RS232 Port #1.

INFORMATION: The illustration above shows the ports as they are seen from the top of the FSC3000. Port 1 is the one on the right of the back row of RS-232 ports.

2. Antenna P/N 75-2064: Make sure the Antenna is connected to the **Cellular** coaxial connector on the Cellular Modem (see step 2f of the Antenna installation instructions above).
3. P/N 20-1742:
   - Connect the 4-Pin clip connector plug to the DC Power socket of the Cellular Modem.
   - Connect the white Molex terminal end to an open connector on the PetroNet Power Hub Board (J6 / J7 / J8).

Outbound Connection: FSC3000 and IP Gateway (Optional)

NOTE: One (1) 20-6000 IP Gateway can be installed internally to the PV200. In this scenario, the IP Gateway Ethernet connection comes from the Cellular Modem.

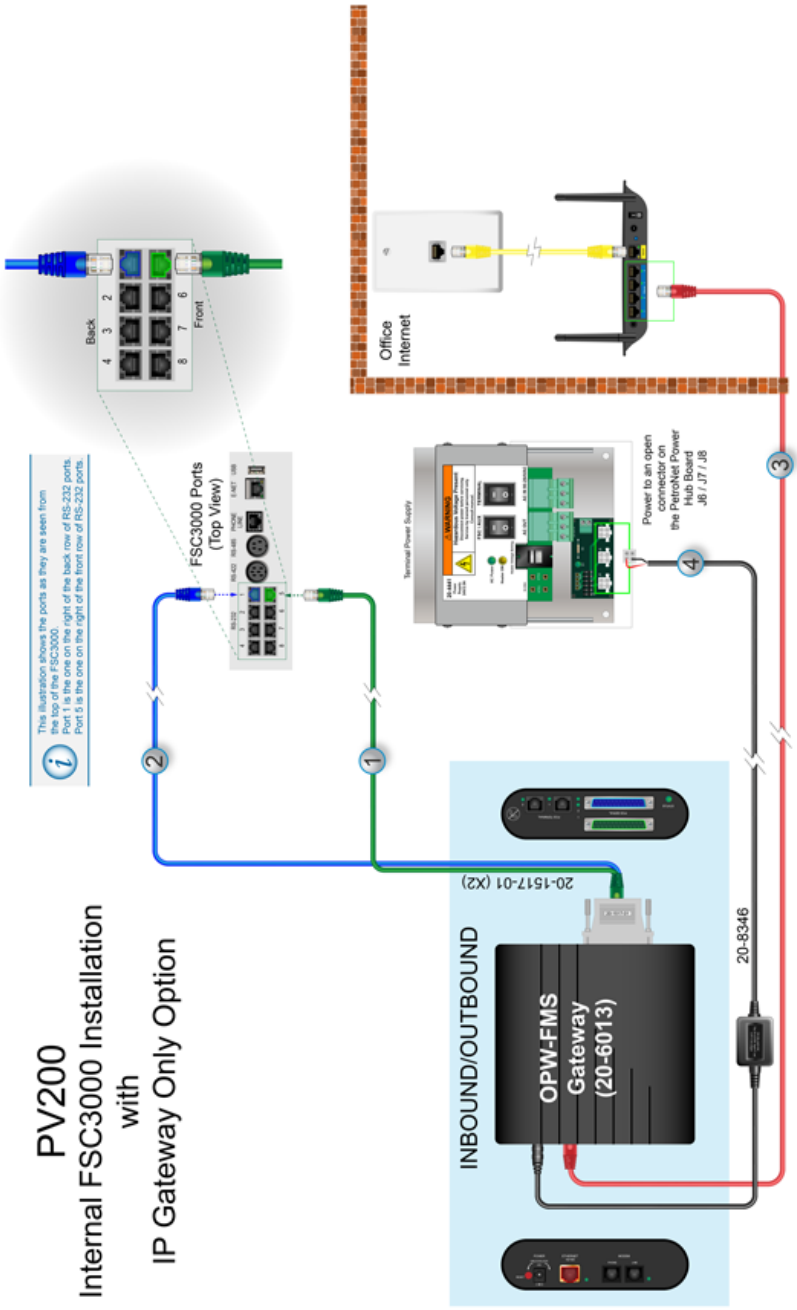
4. P/N 20-1517-01:
   - Connect the DB25 end of the cable to the POS Serial Port 1 of the IP Gateway.
   - Connect the RJ45 end of the cable to the FSC3000 RS232 Port #5.

INFORMATION: The illustration above shows the ports as they are seen from the top of the FSC3000. Port 5 is the one on the right of the front row of RS-232 ports.

5. CAT5 cable (not supplied):
   - Connect one end of the cable to the Ethernet port of the IP Gateway.
   - Connect the other end of the cable to the Cellular Modem Ethernet port.
6. P/N 20-8346 Power Converter (supplied):

- Connect the barrel end plug of the cable to the Power jack of the IP Gateway. Push the end into the socket and turn 90° clockwise to lock the plug.
- Connect the white Molex terminal end to an open connector on the PetroNet Power Hub Board (J6 / J7 / J8).

FSC3000 Internal Connections: Inbound/Outbound with IP Gateway Only



Inbound/Outbound Connection: FSC3000 and IP Gateway (Optional)

NOTE: The colors of the cables in the illustration are used to show the routing of the wires only.

NOTE: In this scenario, Inbound and Outbound connections are made between the 20-6000 IP Gateway and the FSC3000. The Ethernet connection must come from an external hard-wired connection.

IMPORTANT: Refer to "Integrated FSC Communication Conduit" on page 30 for information on the routing of an Ethernet cable to the terminal through a dedicated conduit. You must obey the National Electric Code and all national, state and local codes (refer to"Conduit/Wiring Requirements" on page 1).

You must have two (2) 20-1517-01 DB25 to RJ45 Serial cables for this connection. These cables are supplied with the 20-6013 kit.

1. P/N 20-1517-01 (first cable):
   - Connect the DB25 end of one of the 20-1517-01 cables to the POS Serial Port 1 of the IP Gateway.
   - Connect the RJ45 end of the cable to the FSC3000 RS232 Port #5.

   INFORMATION: The illustration above shows the ports as they are seen from the top of the FSC3000. Port 5 is the one on the right of the front row of RS-232 ports.

2. P/N 20-1517-01 (second cable):
   - Connect the DB25 end of one of the 20-1517-01 cables to the POS Serial Port 2 of the IP Gateway.
   - Connect the RJ45 end of the cable to the FSC3000 RS232 Port #1.

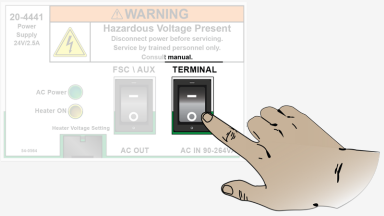
   INFORMATION: The illustration above shows the ports as they are seen from the top of the FSC3000. Port 1 is the one on the right of the back row of RS-232 ports.

3. Connect the external Ethernet cable to the Ethernet port of the IP Gateway. Connect the opposite end to your Access Point/Router (where you distribute Internet to your devices).
4. P/N 20-8346 Power Cable (supplied):

- Connect the barrel end plug of the cable to the Power jack of the IP Gateway. Push the end into the socket and turn 90° clockwise to lock the plug.
- Connect the white Molex Terminal end to an open connector on the PetroNet Power Hub Board (J6 / J7 / J8).

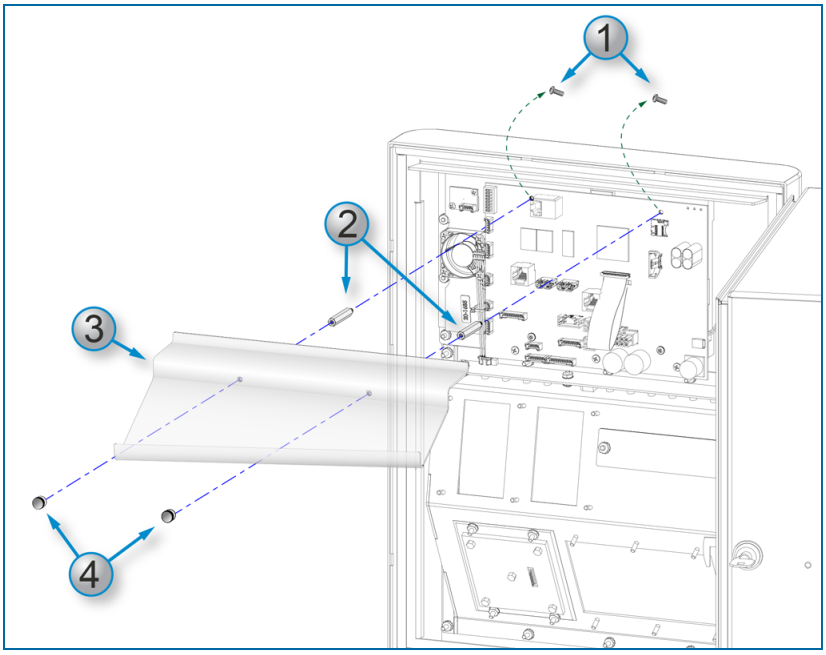
Appendix B - 9 - Drip Shield Kit Installation

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



This Field Installation Kit includes:

Part Number	Description	Qty
50-3293	PV200 Drip Shield	1
50-0518	Standoff M/F 6-32 to 6-32 1 1/2" lg, 1/4" Hex	2
50-0517	Thumb Screw 6-32 Thread Size, 1/4" Long	2



1. Use a Phillips screwdriver to remove the two (2) screws at the top of the Main Board as shown in the illustration.
2. Install the two (2) Standoffs in the holes where the screws were removed in Step 1. Tighten the Standoffs so they are finger-tight.
3. Hold the Drip Shield in place so that the holes align with the Standoffs.
4. Install the two (2) Thumb Screws. Tighten the screw so they are finger-tight.

Energize the Terminal to complete this installation.

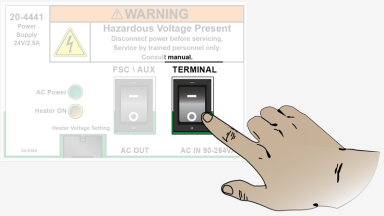
Appendix B - 10 - PV200 Door Gasket Kit Installation

FMS Part Number 20-4468

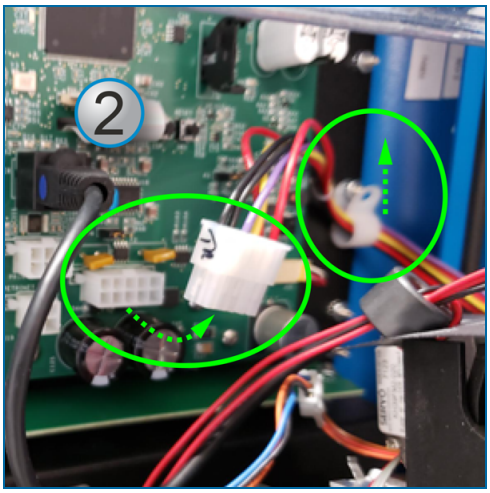
NOTE: Before you use this instruction, make sure you have the latest revision. Check the revision level of this document against the most current revision found at the FMS Technical Library . Download the latest revision if necessary.

The 20-4468 kit contains four (4) pieces of rubber weatherstripping replacements. To install the new weatherstripping:

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.

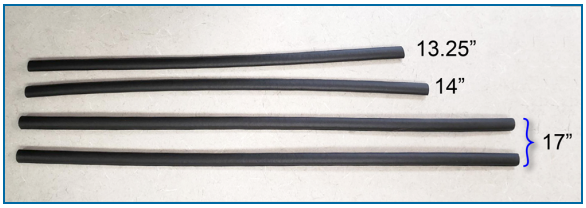


1. Open the door of the unit.



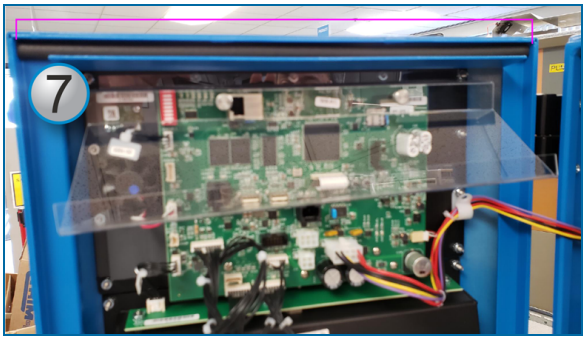
2. Disconnect the Power Supply harness from the Main Board (J16 Connector) and remove the harness wires from the cable clamp.

3. Remove the wing-nut that holds the Ground Strap to the Ground Post on the enclosure. Remove that end of the strap.
4. Pull the Door Assembly straight up until the hinges are disconnected. Take the Door Assembly indoors and put it on a flat surface with the board side up.
5. Pull off all of the rubber gasket material that is currently on the door assembly. Make sure to remove all remaining adhesive.

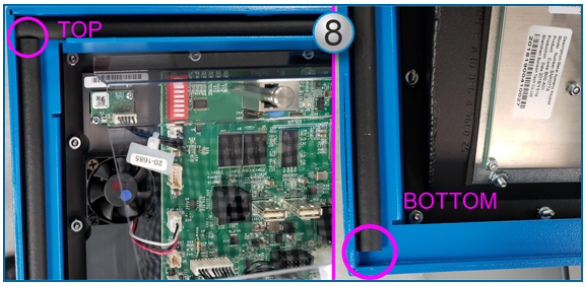


6. The Gasket Upgrade Kit contains 4 lengths of new rubber gasket to be installed:
   - one (1) piece, 13.25 inches
   - one (1) piece, 14 inches
   - two (2) pieces, 17 inches

NOTICE: DO NOT stretch these rubber pieces when you install them. They are cut to the exact lengths necessary. If stretched, they will not provide a sufficient seal to keep water out of the unit.



7. Remove the plastic strip from the back of the 14 inch piece to expose the adhesive. Start at one side of the top slot of the door assembly. With the adhesive face down, carefully push down all the way across the gasket in the slot to install the 14 inch piece as shown in the photo above. Make sure you do not stretch the gasket.



8. Remove the plastic strip from the back of one of the 17 inch pieces to expose the adhesive. With the adhesive face down, start at the top left corner and start the installation of this piece up against the 14 inch piece and against the edge of the door frame as shown. Carefully push down all the way along the gasket against the edge of the door frame to install the 17 inch piece. Make sure you do not stretch the gasket.

IMPORTANT: This 17 inch piece will have a slight gap at the bottom as shown in the photo above. DO NOT TRY TO STRETCH THIS GASKET TO THE BOTTOM!

9. Do the same procedure as Step 8 for the other 17 inch piece and install it from the **top right** corner. Make sure you do not stretch the gasket.

10. Remove the plastic strip from the back of the 13.25 inch piece to expose the adhesive. With the adhesive face down, start at the left and start the installation of this piece up against the 17 inch piece

on the left and against the top edge of the slot as shown. Carefully push down all the way along the gasket against the top edge of the slot to install the 13.25 inch piece. The right edge of this gasket piece will end flush with the edge of the 17 inch piece on the right. Make sure you do not stretch the gasket.

IMPORTANT: The top of the 13.25 inch piece must align with the top of the frame as shown in the photo above. There will be a gap between the bottom of the gasket and the bottom of the frame. DO NOT TRY TO STRETCH THIS GASKET TO THE BOTTOM!

Completed Gasket Assembly

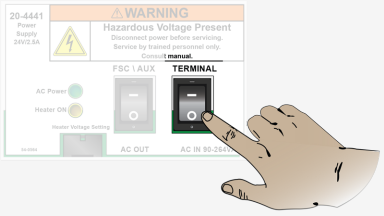
11. Install the Door Assembly back on the enclosure.
12. Attach the Ground Strap back on the enclosure Ground Post with the wingnut.
13. Put the wires of the Power Supply harness back in the cable clamp and connect the Molex plug back to the J16 connector on the Main Board.
14. Push the Terminal rocker switch on the Power Supply to the **|** position to energize the unit.

Appendix B - 11 - Blank Option

FMS Part Number 20-4443-BLNK

If it is necessary to remove a reader that has been installed, it will be necessary to install a Reader Blank-out Plate.

WARNING: To prevent an electrical shock hazard, de-energize the Terminal before you do this procedure! Push the Terminal rocker switch on the Power Supply to the **O** (Off) position.



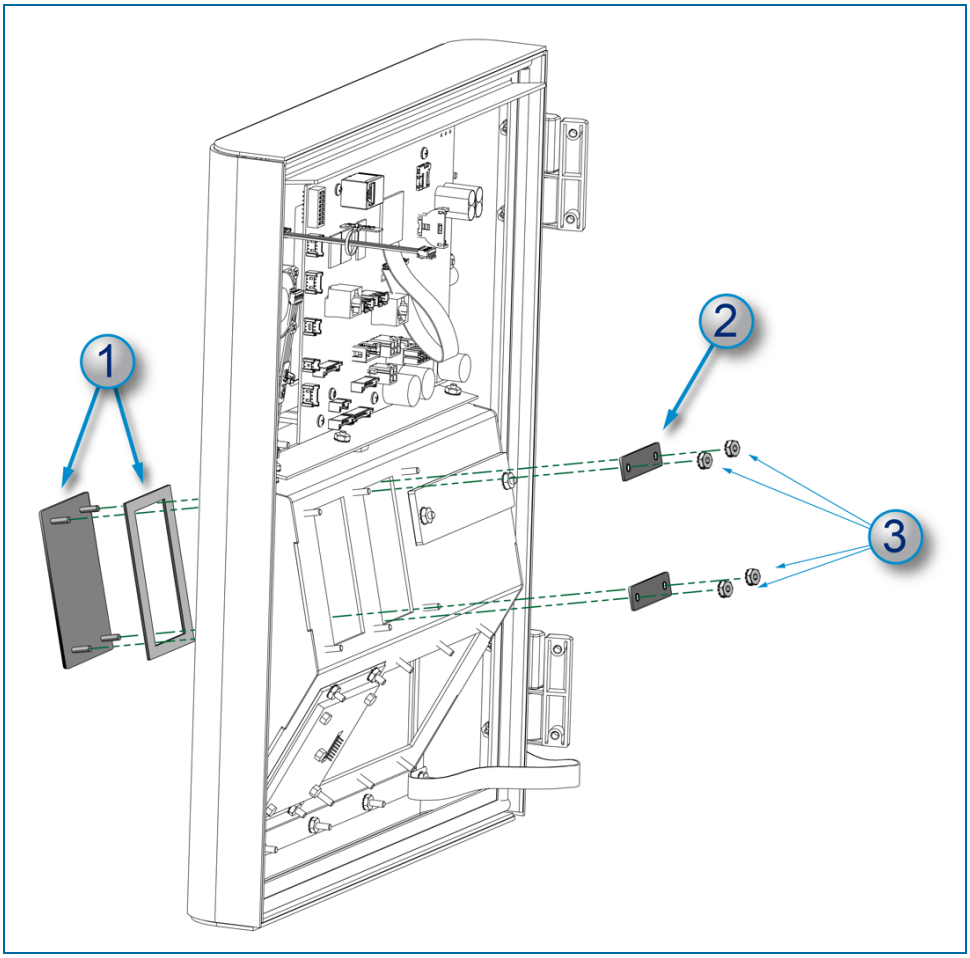
NOTICE: Do not let the pocket slot stay open. Weather (rain, snow,cold etc.) can have an unwanted affect on the operation of the unit's components. Install a Blank-out Plate as a cover for the open pocket slot.

Remove the Reader

Before you install the Blank-out Plate you must remove the reader from the pocket slot. See the instructions for the applicable reader to be removed. Do the instructions in the opposite order to remove the reader.

Install the Blank-out Plate

20-4443-BLNK Components		
Part Number	***Description***	***Qty***
51-0451	PV200 Reader Blank Out Plate	1
50-2254	PV200 Reader Gasket	1
51-0449	BRACKET MTG INSIDE	2
50-0005	NUT KEPS 6-32	4



1. Put the posts of the Blank-out Plate (51-0451) through the gasket (50-2254) and the pocket slot from the outside as shown. Hold the Plate and Bracket in position.
2. Put the two (2) Inside Mounting Brackets (51-0449) over the posts.
3. Put the four (4) Nuts (50-0005) on the posts ant tighten them..

Revisions

Revision #	Approve	Effective	Software Version	Key Changes
0	1145	9/12/2017		Initial Release
1	1285	12/14/2017		Update the DIP-Switch configuration for setup and add note
2	1400	7/19/2018		Add appendix for SW Upgrade Procedure. Update Terminal Setup screen shot to include option 9 for Utilities.
3	1484	1/2/2019		Added updated Power Req., and Range of Environmental Conditions per Intertek audit. Changed heater temp On/Off settings.
4	1735	5/8/2020		Options Appendix
5	1770	7/9/2020		Aluminum Terminal Enclosure knockout procedure
6	1792	9/21/2020		Add pedestal install details, hyperlink to PCM manual, add Complete Install section.
7	1855	2/2/2021		Add DX Fleet option, AVI option update, update Reader Menu image, add IP info for Sierra Modem, add Warning panel for power tools in Hazardous Area
8	1869	3/4/2021		Add temporary RS232 to USB connection.
9	1887	4/27/2021		Remove reference to 20-1722 in DX Fleet Option
10	1933	7/22/2021		Remove external Gateway install from Modem and Gateway Appendix. Update Gateway Option Appendix to show Gateway power converter and clarify orientation of FSC RS-232 ports.
10.1	NA	NA		Re-brand to latest DFS standard

Revision #	Approve	Effective	Software Version	Key Changes
11	2057	10/10/2022		20-8346 Power Converter is now a supplied part for Gateway options.
12	PN	5/15/2023		Add pedestal height dimension illustration.
12.1	AQ/RC	8/14/2023		Update DX Fleet option to clarify correct Vantron Ethernet Port.

NOTE: It is possible that older software versions might not support all features.

Warranty

OPW Fuel Management Systems warrants that all OPW Tank Gauge and Petro Vend Fuel Control systems supplied by OPW Fuel Management Systems to the Original Purchaser will be free from defects in material and/or workmanship under normal use and service for a period of 12 months from the date of installation or 15 months from the date of shipment from OPW. Additionally, OPW Fuel Management Systems warrants that all upgrades and replacement parts (new and remanufactured) supplied by OPW Fuel Management Systems will be free from defects in material and workmanship under normal use and serviced for a period of 90 days from the date of installation or for the remainder of the system's original warranty, whichever is greater, as set forth in the first sentence of this statement. The foregoing warranties will not extend to goods subjected to misuse, neglect, accident, or improper installation or maintenance or which have been altered or repaired by anyone other than OPW Fuel Management Systems or its authorized representative. The buyer's acceptance of delivery of the goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.

If a claim is made within the warranted time period that any equipment and/or remanufactured part is defective in material or workmanship under normal use and service, such equipment and/or remanufactured part shall be returned to OPW Fuel Management Systems, freight prepaid. If such equipment or remanufactured part is found by OPW Fuel Management Systems in its sole judgment to be defective in material or workmanship under normal use and service, OPW Fuel Management Systems shall, at its sole option, repair or replace such equipment and/or remanufactured part (excluding, in all instances, fuses, ink cartridges, batteries, other consumable items, etc.) OPW Fuel Management Systems shall not be held responsible for data loss or retrieval on returned products.

The warranties, as set forth above, are made expressly in lieu of all other warranties, either expressed or implied (including, without limitation, warranties of merchantability and fitness for any particular purpose and of all other obligations or liabilities on OPW Fuel Management Systems' part.) Further, OPW Fuel Management Systems neither assumes, nor authorizes any other person to assume for it, any other liability in connection with the sale of the systems, or any new/replacement part that has been subject to any damage from any act of nature or any force majeure. Any terms proposed by the Original Purchaser either orally or in writing are expressly rejected. The terms and conditions expressed in this document may only be changed upon the express written consent of OPW Fuel Management Systems.

The term "Original Purchaser" as used in these warranties shall be deemed to mean the authorized OPW Fuel Management Systems' distributor to which the system or any new/replacement part was originally sold. These warranties may be assigned by the original purchaser to any of its customers who purchase any OPW Fuel Management Systems' systems or new/replacement parts. This document shall be governed by and construed in accordance with the law of the State of Illinois. OPW Fuel Management Systems and Original Purchaser agree that any legal action or proceeding under or with respect to this document may ONLY be brought in the courts of the State of Illinois, or the United States District Court having jurisdiction in the City of Hodgkins, Illinois. Original Purchaser expressly consents to personal jurisdiction in any of the above-mentioned forums and agrees to waive all defenses based on improper venue or inconvenient form should an action be brought therein.

The sole liability of OPW Fuel Management Systems, for any breach of warranty, shall be as set forth above. OPW Fuel Management Systems does not warrant against damage caused by accident, abuse, faulty or improper installation or operation. In no event shall manufacturer's liability on any claim for damages arising out of the manufacture, sale, delivery or use of the goods exceed the original purchase price of the goods. In no event shall OPW Fuel Management Systems be liable for any direct, indirect, incidental or consequential damage or loss of product.

TERMS

Ex-works our factory, Hodgkins, Illinois, USA
Installation not included.
All trade names are registered. Patents pending.
Subject to engineering improvement and/or other changes.