FSC3000™

Installation and Configuration Guide
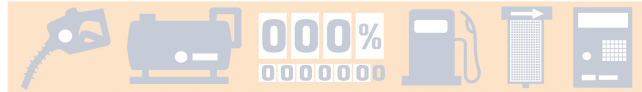
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1 Precautions

1.1 Codes

FCC Compliance

This device [the FSC3000™] complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.2 Warnings

This manual contains many important warnings. Do not ignore these warnings! Failure to comply with the warnings may create conditions dangerous to personnel and/or equipment.

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.

1.3 Hazardous Areas

Installation Codes & Hazardous Areas

Any fuel dispenser is a hazardous area as defined in the National Electrical Code. Installation must be in accordance with the following:

- National Electrical Code NFPA No.70
- Automotive and Marine Service Station Code (NFPA No. 30A)

The installer is responsible to investigate and follow any local codes.

OPW-FMS Fuel Control Systems are listed for use in a non-classified area. All of the equipment must be installed outside of the hazardous areas.

Local codes may dictate specific installation requirements. Installation is subject to approval by the local authority having jurisdiction at the site.

Exception

OPW Terminals are designed to be installed above the hazardous area when using the terminal's associated pedestal.
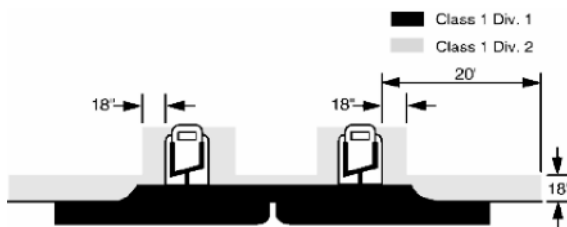
Figure 1-1 Gasoline Dispensers
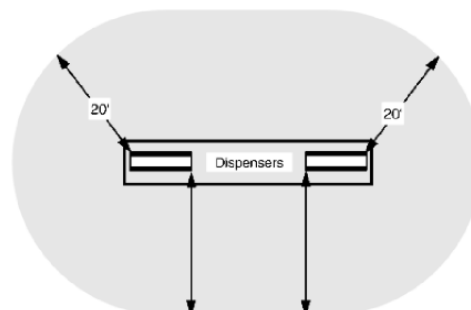
Figure 1-2 Gasoline Dispensers (high hose)
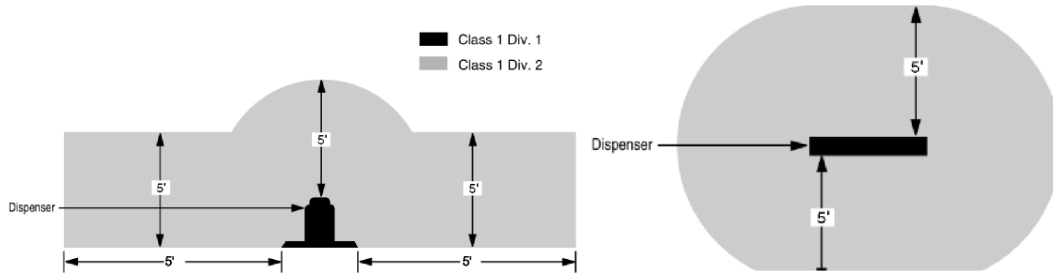
Figure 1-3 Compressed Natural Gas (CNG) Dispensers

The pedestal may be mounted in the hazardous area. When the pedestal is equipped with a knockout plate, such as with the C/OPT™ and FIT500™, this 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.

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2   Introduction

This manual discusses the installation and configuration of three Fuel Control Systems: the K800™ Hybrid, the C/OPT™ and the FIT500™, as well as optional features that may have been purchased with your system. Additionally, this manual discusses the installation and configuration of the optional PetroLink™ system, which may or may not be integrated into any of these Fuel Control Systems. All of these systems use the FSC3000™ to control the system operation. The FSC3000™ may be housed in its own enclosure or may be located inside any of the Fuel Island Terminals.

2.1   Terminology

Identifies terms assigned to specific components and functions within the Fuel Control System.

2.1.1   FSC3000™ General Terminology

Fuel Site Controller (FSC) - Hardware/firmware used to control the fueling system.

Fuel Island Terminal (FIT) - Generic term we use to describe one of the three types of terminals the FSC3000™-based fuel-management system can interface to. Every FSC3000™ requires at least one terminal except when the system is equipped with the PetroLink™ option. Though PetroLink™ does not require a terminal, it is recommended for backup if the PetroLink™ option is down and/or some vehicles are not equipped with PetroLink™ hardware.

There are currently three types of fuel island terminals:

- K800™ Hybrid
- C/OPT™ (Commercial Outdoor Payment Terminal)
- FIT500™

Pump Control Terminal (PCT) - Hardware used to control mechanical pumps via pump relay board.

Pump Control Module (PCM) - Hardware used to control mechanical pumps.

Universal Pump Controller (UPC) - Hardware that allows the FSC3000™-based fuel-management system to control electronic pumps by using a pump manufacturer's console or pump controller.

Direct Pump Control (DPC) - Hardware that allows the FSC3000™-based fuel-management system to control electronic pumps directly using the pump manufacturer's pump protocol.

Dispenser Terminal Controller (DTC) - Hardware that emulates the FIT for each fueling position connected to the system by utilizing the dispenser's built-in card terminal in lieu of a FIT, but can only be used in remote applications.

Petro-Net - RS-485 (2-wire twisted pair) communication wires used to connect main components together.

2.1.2   PetroLink™-specific Terminology

Embedded PC (ePC) - Hardware/software that provides PetroLink™ functionality to the FSC3000™-based fuel-management system.

Wireless Communication Unit (WCU) - Hardware that provides the wireless functionality for PetroLink™.

Mechanical Handle Monitor (MHM) - Hardware used to inform PetroLink™ when a fueling handle is lifted.

HM-485 - RS-485 (2-wire twisted pair) communication wires used only to connect the ePC to the MHM.

2.2   Technical Specifications

Details the technical specifications (i.e., dimensions, operating temperature range, power and wiring requirements) of the fuel site controller, fuel site terminal, mechanical pump control and electronic pump control.

2.2.1   Fuel Site Controller

The FSC3000™ Fuel Site Controller may be housed in its own enclosure or located inside a FIT. See below for images of an integrated FSC verses a remote FSC.
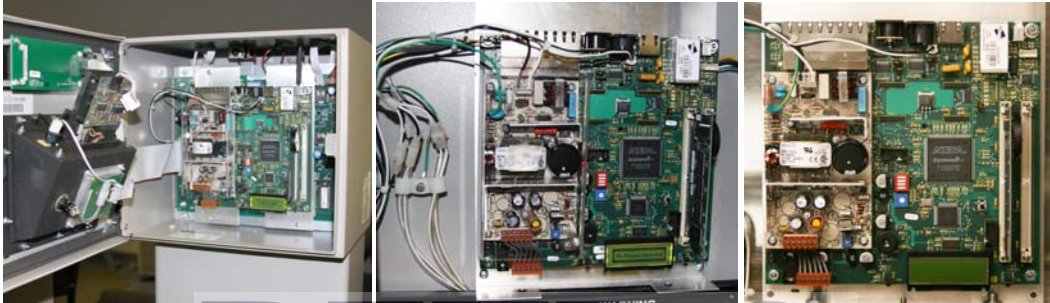
Figure 2-1 Integrated FSC3000™
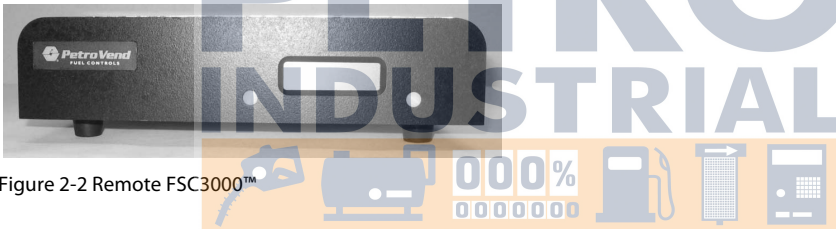
Figure 2-2 Remote FSC3000™

	Remote FSC3000™	Integrated FSC3000™
Cabinet Dimensions (H x W x D)	2-7/8" x 10" x 8-1/8" (7.3 cm x 25.4 cm x 20.6 cm)	See specific FIT specifications
Power Requirements	85-265 VAC, 50/60 Hz; 1A @ 115 VAC; 0.7 A @ 230 VAC	See specific FIT specifications
Operating Temperature Range	32°F - 122°F (0°C – 50°C)	See specific FIT specifications
8 RJ-45 (RS-232) Maximum Length	50' (15.2 m)	50' (15.2 m)
1 DIN (RS-485) (Petro-Net™) Max. Length	5,000' (1,524 m)	5,000' (1,524 m)

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2.2.2 Fuel Island Terminals

The FSC3000™-based fuel-management system has three types of Fuel Island Terminals available:

	K800™ Hybrid	C/OPT™	FIT500™
Cabinet Dimensions	12" H x 13" W x 12" D (30.5 cm x 33 cm x 30.5 cm)	19" H x 16" W x 12" D (48.3 cm x 40.6 cm x 30.5 cm)	19" H x 16" W x 12" D (48.3 cm x 40.6 cm x 30.5 cm)
Pedestal Dimensions	50" H x 12-1/2" W x 6-5/8" D (127 cm x 31.8 cm x 16.8 cm)	48" H x 14" W x 8" D (121.9 cm x 35.6 cm x 20.3 cm)	42" H x 17-1/2" W x 9" D (106.7 cm x 44.5 cm x 22.9 cm)
Power Requirements	115/230 VAC; 50/60 Hz 200 W maximum	115/230 VAC; 50/60 Hz 200 W maximum	115/230 VAC; 50/60 Hz 250 W maximum
Operating Temp. Range	-40°F - 122°F (-40°C - 50°C)	-40°F - 122°F (-40°C - 50°C)	-40°F - 122°F (-40°C - 50°C)
Magnetic Card Reader	STD	STD	STD
ChipKey® Reader	OPT	OPT	---
Prox. Card/Key Reader	OPT	OPT	---
Dual Readers	---	OPT	---
Text Display	STD	OPT - Deduct	---
Graphics Display	---	STD (5" Monochrome)	STD (10" Color)
User Definable Images	---	---	STD
Receipt Printer	---	OPT	OPT
Alphanumeric Entry	Single key	OPT	OPT
Wireless Communication	OPT	OPT	OPT
Enclosure and Pedestal	Painted steel	Painted steel	Stainless steel
Internal FSC	OPT	OPT	OPT
Internal Pump Control	OPT (Up to 4 hoses/FIT)	OPT (Up to 8 hoses/FIT)	OPT (Up to 8 hoses/FIT)

Optional items may require additional cost.

2.2.3 Pump Control

The FSC3000™-based fuel-management system provides various methods for controlling fuel dispensers.

Mechanical Pump Control
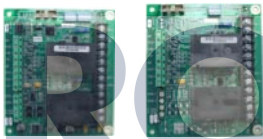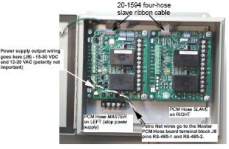
The FSC3000™-based fuel-management system has two types of mechanical pump control:

K800™ Hybrid PCT (Pump Control Terminal) allows control of mechanical pumps by using up to two (2) hose kits (four (4) fueling points) for each FIT board.

- This option is only available if K800™ Hybrid terminals are used

PCM (Pump Control Module) is a stand-alone board that can be mounted into a C/OPT™ or FIT500™ pedestal, or otherwise mounted into a remote PCM box.

- A remote PCM enclosure can contain one master and one slave PCM to control up to four mechanical dispensers
- The enclosure is weatherproof and suitable for mounting outdoors
- C/OPT™ and FIT500™ terminals can support two master/slave PCMs for a total of eight (8) fueling points

	K800™ Hybrid PCT	Pedestal-mounted PCM	Remote PCM
Cabinet Dimensions (H x W x D)	See K800™ Hybrid FIT specifications	See C/OPT™ or FIT500™ FIT specifications	10" x 12-1/2" x 5-11/16" (25.4 cm x 31.8 cm x 14.4 cm)
Power Requirements	See K800™ Hybrid FIT specifications	See C/OPT™ or FIT500™ FIT specifications	115/230 VAC; 50/60 Hz; 1.0/.06 A
Operating Temperature Range	See K800™ Hybrid FIT specifications	See C/OPT™ or FIT500™ FIT specifications	-40°F - 122°F (-40°C - 50°C)
Relay Contact Rating	240 VAC; 20 A; 3/4 HP	240 VAC; 20 A; 3/4 HP	240 VAC; 20 A; 3/4 HP
"In-Use" Detection	Current Sense (100 mA)	Voltage Sense 120-240 V or Handle Sense	Voltage Sense 120-240 V or Handle Sense
Pulser Type	Single Channel	Single Channel	Single Channel
Pulser Output	Mechanical (contact) Electronic (5-12 VDC)	Mechanical (contact) Electronic (5-12 VDC)	Mechanical (contact) Electronic (5-12 VDC)
Pulser Divide Rate	1:1 – 1000:1 1 pulse increments	1:1 – 1000:1 1 pulse increments	1:1 – 1000:1 1 pulse increments
Max. Pulse Speed (50% duty cycle)	6,000 Mechanical 100,000 Electronic	6,000 Mechanical 100,000 Electronic	6,000 Mechanical 100,000 Electronic

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Electronic Pump Control

The FSC3000™-based fuel-management system has two types of electronic pump control:

DPC (Direct Pump Control) allows the FSC3000™ to directly control electronic pumps using the manufacturer's dispenser protocol.

UPC (Universal Pump Control) allows the FSC3000™ to control pumps by the manufacturer's console/pump controller box (PIB, PAM or DHC).

	UPC	**Pedestal-mounted DPC**	**Remote DPC**
Cabinet Dimensions (H x W x D)	N/A	See C/OPT™ or FIT500™ FIT specifications	10" x 12-1/2" x 5-11/16" (25.4 cm x 31.8 cm x 14.4 cm)
Power Requirements	115 VAC; 50/60 Hz; xxA	See C/OPT™ or FIT500™ FIT specifications	115/230 VAC; 50/60 Hz; 1.0/.06 A
Operating Temperature Range	32°F - 122°F (0°C - 50°C)	See C/OPT™ or FIT500™ FIT specifications	-40°F - 122°F (-40°C - 50°C)
Gilbarco Pumps	Yes	Yes	Yes
Wayne Pumps	Yes	Yes	Yes
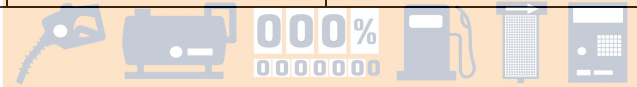
3   Site Installation

The installation instructions in this manual describe typical site installations. Due to the flexibility of the system and the unique nature of every site, it is not possible to show every possible installation scenario. However, for every installation local codes and regulations must be observed.

> Local codes may dictate specific installation requirements. Installation is subject to approval by the local authority having jurisdiction at the site.

The system installation instructions are the same for all FSC3000™-based K800™ Hybrid, C/OPT™ and FIT500™ systems. Specific differences between the systems are noted within the text.

The term FIT is used generically to describe any of the Fuel Island Terminals from these systems.

> Installation of an Integrated FSC3000™ (an FSC3000™ mounted in the FIT) has separate typical installation diagrams than of a Remote FSC3000™. Follow the diagram that applies to your system.

3.1   Warnings

This manual contains many important warnings. Do not ignore these warnings! Failure to comply with the warnings may create conditions dangerous to personnel and/or equipment.

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.

> The pedestal may be mounted in the hazardous area. When the pedestal is equipped with a knockout plate, such as in the C/OPT™ and FIT500™, this 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.

3.1.1   Enclosure Mounting

Knockouts and mounting means are provided for all cabinetry. Do not drill holes in any of the enclosures. Doing so would violate the safety listing of the system.

3.2   Preparation of System Conduit and Wiring Requirements

All wiring and conduit runs must also conform to the National Electrical Code (NFPA 70), Automotive and Marine Service Station Code (NFPA 30A), and all national, state and local codes.

All wiring from the building out to the Fuel Islands must be installed in threaded, rigid, metal conduit and have required seal-offs. AC and DC power wires may share conduit, providing they meet the Petro-Net™ wiring specified; otherwise AC and DC power wires must be installed in separate conduits.

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3.2.1 Conduit Sealing

Conduit entering the hazardous area must have a seal-off installed **18 inches above grade** to prevent liquid or fumes from entering the area.

Shielded cable is not vapor-tight! When running shielded cable through a seal-off, strip the cable jacket back so about three (3) inches of jacketed cable protrudes past each seal-off. Do not damage the shield wire! Stripped section must be in the sealed-off area.
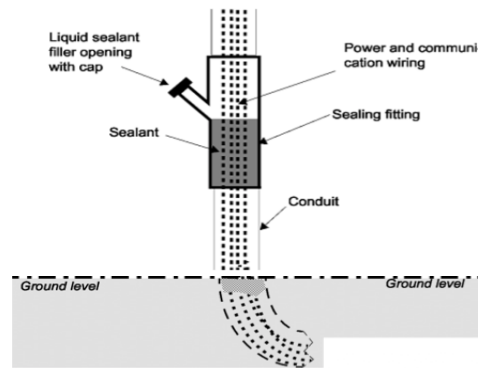
Figure 3-1 Conduit Sealing

3.2.2 Petro-Net™ Wiring

The FITs, PCMs, FSC3000™ 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 number 12-1029.

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

Even though Petro-Net™, HM Petro-Net™, WCU Ethernet and WCU power are low-voltage wiring, they are not intrinsically safe wiring; therefore they should never be installed with any intrinsically safe wiring.

3.2.3 Grounding

OPW Fuel Management Systems incorporates internal noise-suppression circuitry. To ensure proper operation of the equipment and provide necessary safety, all devices of the OPW system must be grounded. A ground wire (per local code) must be connected between the device's ground terminal and the main electrical service panel. One earth ground connection is required per OPW device. The FSC3000™ should be connected to the grounded outlet from the same main electrical service panel. Do not rely on the conduit to provide ground connections.

3.2.4 Circuit Breakers

Power to the FITs and all system hardware (FSC3000™, Journal Printer, etc.) 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 FITs may be grouped together for multiple units. It is recommended that no more than eight (8) FITs be supplied from one breaker.

3.2.5 Pulser Wire

For mechanical pump installations, pulser wires must meet the pulser manufacturer's wire requirements when installed in separate conduit from the pump-control wires. If installed in the same conduit as the pump-control wires, then the wire must be UL-style 2567 or equivalent. You can order Shielded Pulser Cable from OPW as part number 12-1025 (two-conductor) or 12-1026 (four-conductor).

3.2.6 FIT Conduits

All FIT Conduits from the seal-off must be stubbed to the bottom of the K800™ Hybrid FIT enclosure or the pedestal conduit plate of the C/OPT™ and FIT500™ pedestal.

3.2.7 FIT Power, Petro-Net™ and HM-485
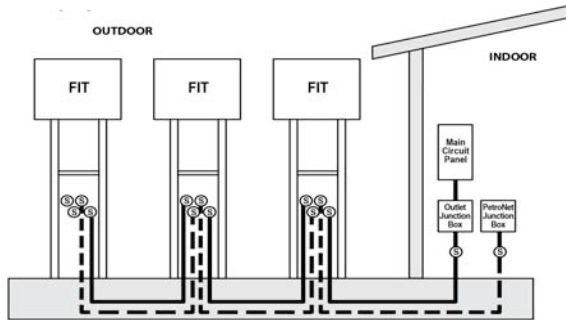
Figure 3-2 Terminal
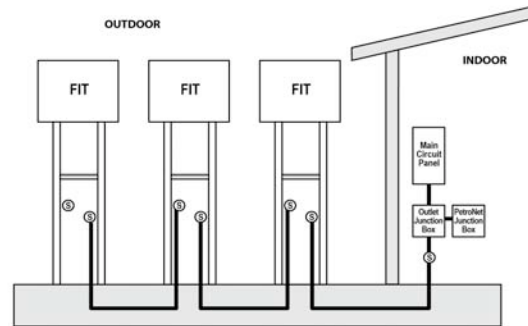
Figure 3-3 Terminal (shared conduit)

Terminal Power Conduit

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

Wires	Wire 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 – 600 V-rated – Oil/Gas resistant, Wet Locations
HM-485*	Two (2) #18 AWG twisted (10 per ft) pair – 600 V-rated – Oil/Gas resistant, Wet Locations

Terminal Petro-Net™ Communication 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.

Required Wires	Wire Requirements
Petro-Net™ (RS-485)	Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations
HM-485	Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations

3.2.8 Integrated FSC3000™ Communication Conduit

This conduit is required when you use a FIT with an integrated FSC3000™ 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 FSC3000™.

This conduit is not required when using stand-alone FSC3000™ or wireless communications.

Wires	Wire Requirements
Serial Cable	50' (15.2 m)
Phone-Line	N/A
Ethernet Cable	300' (91.4 m) may be extended with repeaters
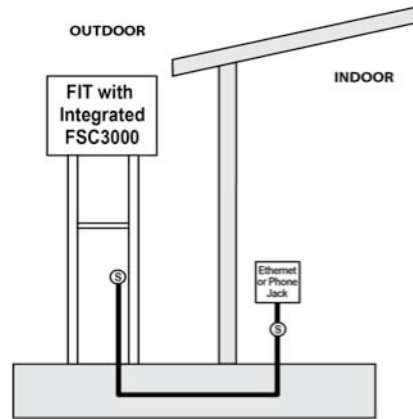
Figure 3-4 Integrated FSC3000 Communication Conduit

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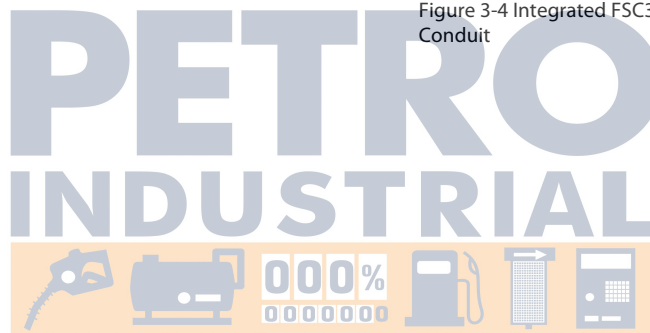
3.2.9 Remote PCM/EPC Power, Petro-Net™ and HM-485
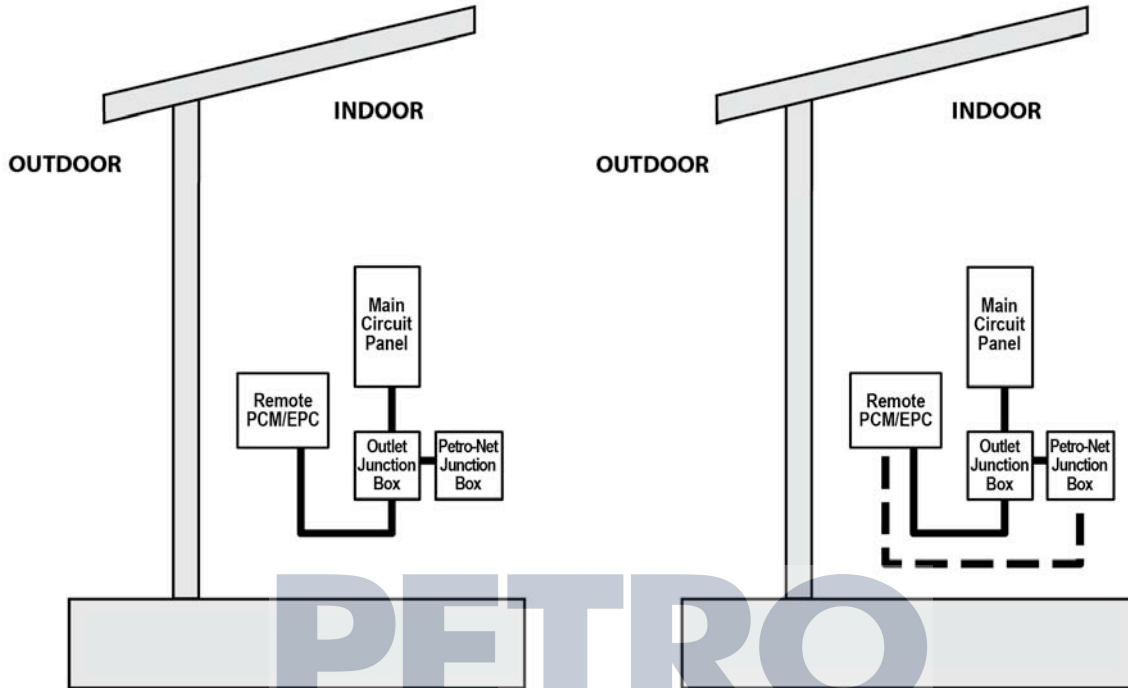
Figure 3-5 Remote PCM

Figure 3-6 Remote PCM (shared conduit)

Remote PCM Power Conduit

This conduit should run from the main circuit panel to each Remote PCM and may be looped from PCM to PCM. This conduit should only contain the PCM Feed, PCM Neutral and Ground wires, with the exceptions noted below:

Wires	Wire Requirements
PCM Feed	Minimum #14 AWG Stranded (Black) – Oil/Gas resistant, Wet Locations
PCM Neutral	Minimum #14 AWG Stranded (White) – Oil/Gas resistant, Wet Locations
PCM Ground	Minimum #14 AWG Stranded (Green) – Oil/Gas resistant, Wet Locations
Petro-Net™ (RS-485)*	Two (2) #18 AWG twisted (10 per ft) pair – 600 V-rated – Oil/Gas resistant, Wet Locations
HM-485*	Two (2)#18 AWG twisted (10 per ft) pair – 600 V-rated – Oil/Gas resistant, Wet Locations

*Petro-Net™ communications wire may share Remote PCM Power conduit when the Petro-Net™ cable voltage–insulation is rated 600 V.

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Remote PCM Petro-Net™ Communication Conduit

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

Wires	Wire Requirements
Petro-Net™ (RS-485)*	Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations
HM-485*	Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations

3.2.10 PCM/PCT Pump Control & Pulser (Mechanical Control) Conduit Requirements
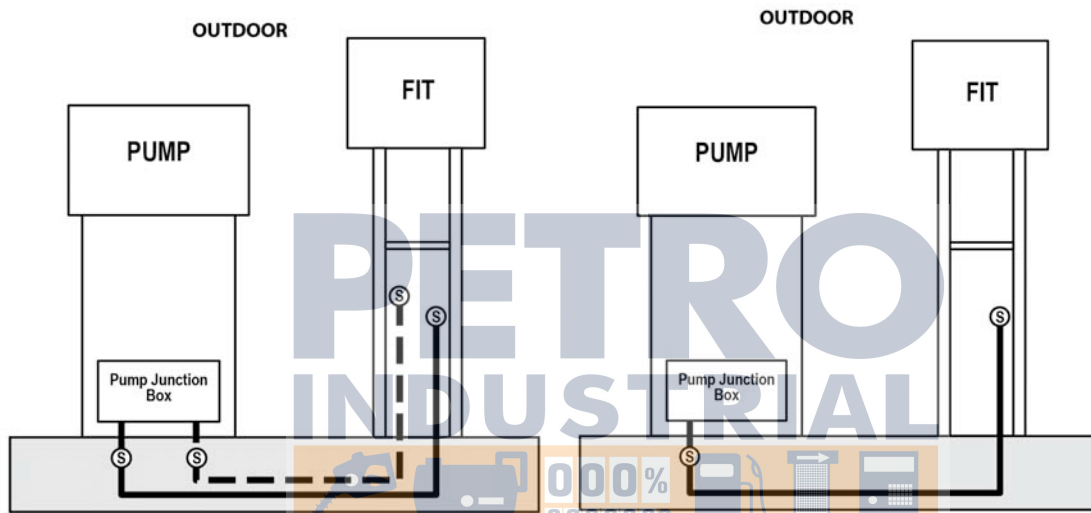
Figure 3-7 FIT (K800™ Hybrid) PCT/PCM

Figure 3-8 FIT (K800™ Hybrid) PCT/PCM (shared conduit)
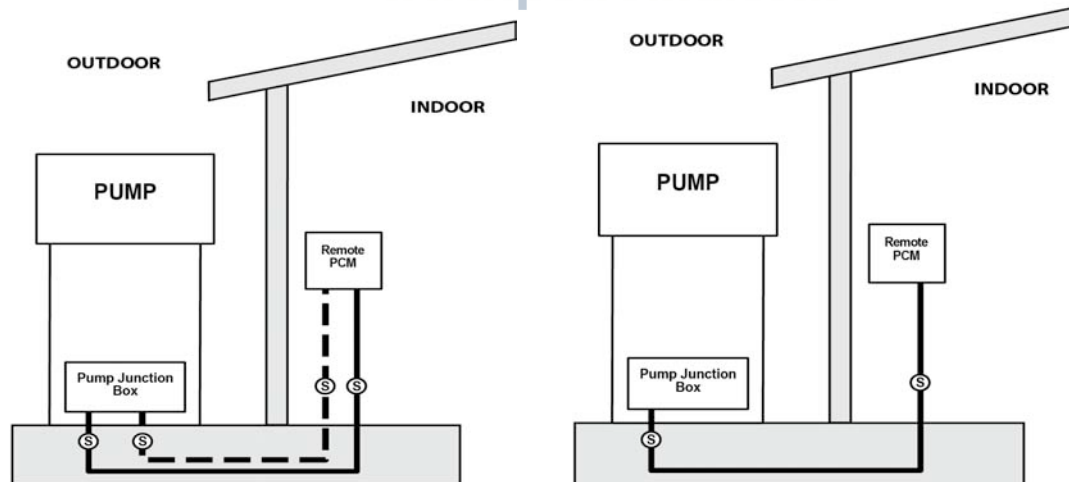
Figure 3-9 Remote PCM

Figure 3-10 Remote PCM (shared conduit)

Pump Control Conduit(s)

This conduit should run from the FIT pedestal and Remote PCM to the pump junction box. This conduit should only contain the Pump Control wires with the exceptions noted below. Wires required are per fueling point; if the conduit is running to two double-sided fuel pumps then four times the wire is required as shown below.

K800 Hybrid PCT

Wires (per fueling point)	Wire Requirements
Pump Control	Four (4) wires - must meet pump manufacturer's specification for pump being controlled
Pulser Wire*	Two- or four-wire cable shielded– 600 V-rated – Oil/Gas resistant, Wet Locations UL-style 2567

PCM

Wires (per fueling point)	Wire Requirements
Pump Control	Six (6) wires – must meet pump manufacturer's specification for pump being controlled
Pulser Wire*	Two- or four-wire cable shielded– 600 V-rated – Oil/Gas resistant, Wet Locations UL-style 2567

* Pump Pulser Wires may share Pump Control Conduit when they meet the specified requirements.

Pump Pulser Conduit(s)

This conduit is dedicated to bring the pump pulser wires from the pump junction box to the Terminal Pedestal and/or Remote PCM box. Wires required are per fueling point; if conduit is running to two double-sided fuel pumps then four times the wire is required as shown below:

Wires (per fueling point)	Wire Requirements
Pulser Wire	Two- or four-wire cable (shielded recommended, but not required)

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3.2.11 DPC Pump Control (Electronic Control) Conduit Requirements

This conduit should run from the FIT pedestal or Remote DPC to the pump junction box. This conduit should only contain the Pump Control wires with the exception noted below. Wires required are per dispenser; if conduit is running to two double-sided fuel pumps then two times the wire is required as shown below:

Wires (per fueling point)	Wire Requirements
Pump Control*	Two wires – must meet pump manufacturer's specification for the controlled pump

*When using Manufacturer's D-BOX only two wires need to be pulled to D-BOX for all pumps.

For Four (4) or Less Dispensers
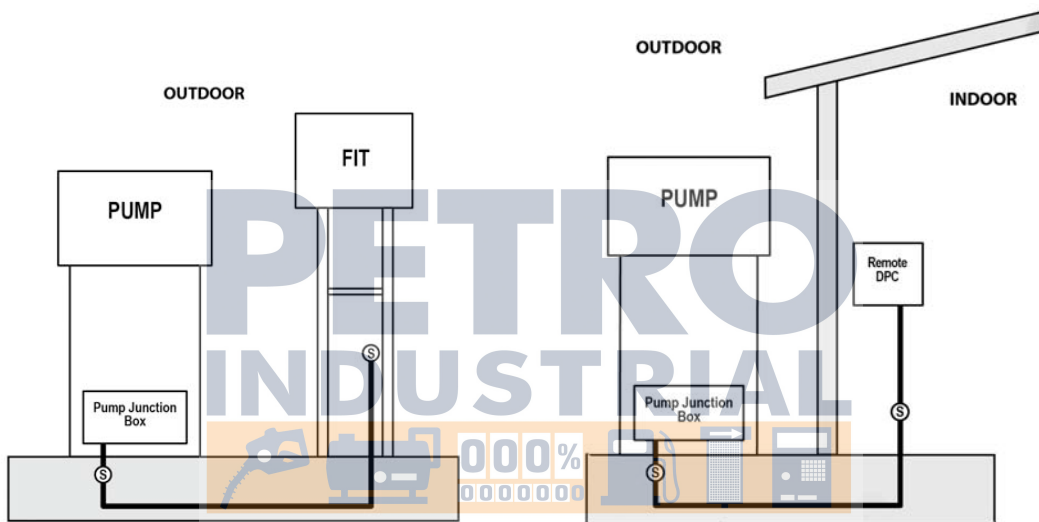
Figure 3-11 FIT DPC (direct)

Figure 3-12 Remote DPC (direct)

For More Than Four (4) Dispensers
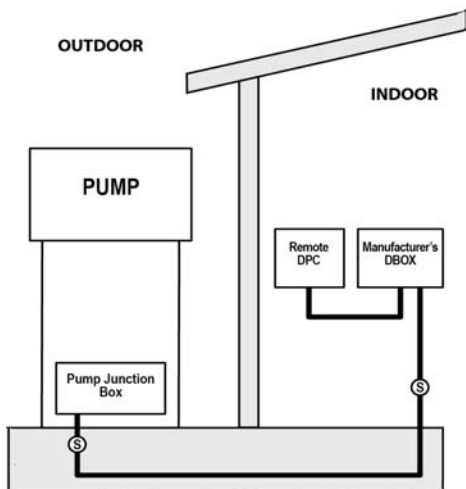
Figure 3-13 Remote DPC (D-BOX)

3.2.12 DPC with DTC (Dispenser Terminal Control)

DTC (dispenser terminal control) is an upgrade option to DPC (direct pump control). However, it is only available for remote FSC3000 applications and cannot be pedestal-mounted.

Depending upon the type of dispenser (Wayne or Gilbarco) installation may vary. Wayne DTC is installed in the same cabinet as the DPC board. Meanwhile, Gilbarco DTC requires additional hardware and is installed in a separate enclosure.

Wayne DTC

For Four (4) or Less Dispensers   *For More than Four (4) Dispensers*
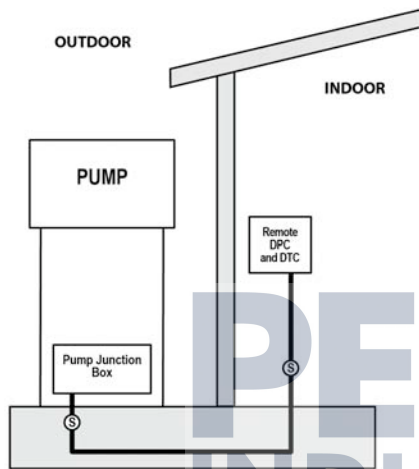
Figure 3-14 Remote DPC w/ DTC (direct)   Figure 3-15 Remote DPC w/ DTC (D-Box)

Gilbarco DTC

For Four (4) or Less Dispensers   *For More than Four (4) Dispensers*
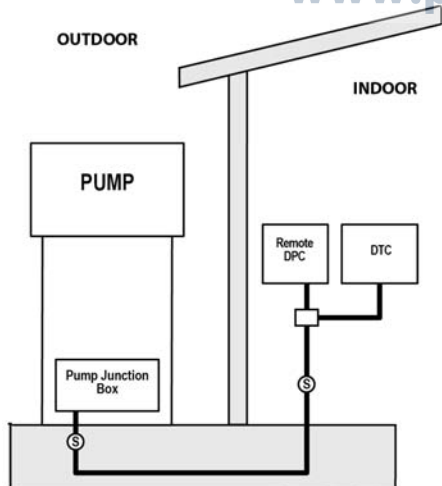
Figure 3-16 Remote DPC with DTC (direct)   Figure 3-17 Remote DPC with DTC (D-Box)

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3.3 System Installation Overview

The four typical installation diagrams below show the different wiring and conduit for an integrated FSC3000™ with mechanical or electrical pump control and for a remote FSC3000™ with mechanical or electrical pump control. Review the installation diagram that matches one's purchased system.

3.3.1 Typical Installation Diagram of an Integrated FSC3000™ with Mechanical Pump Control
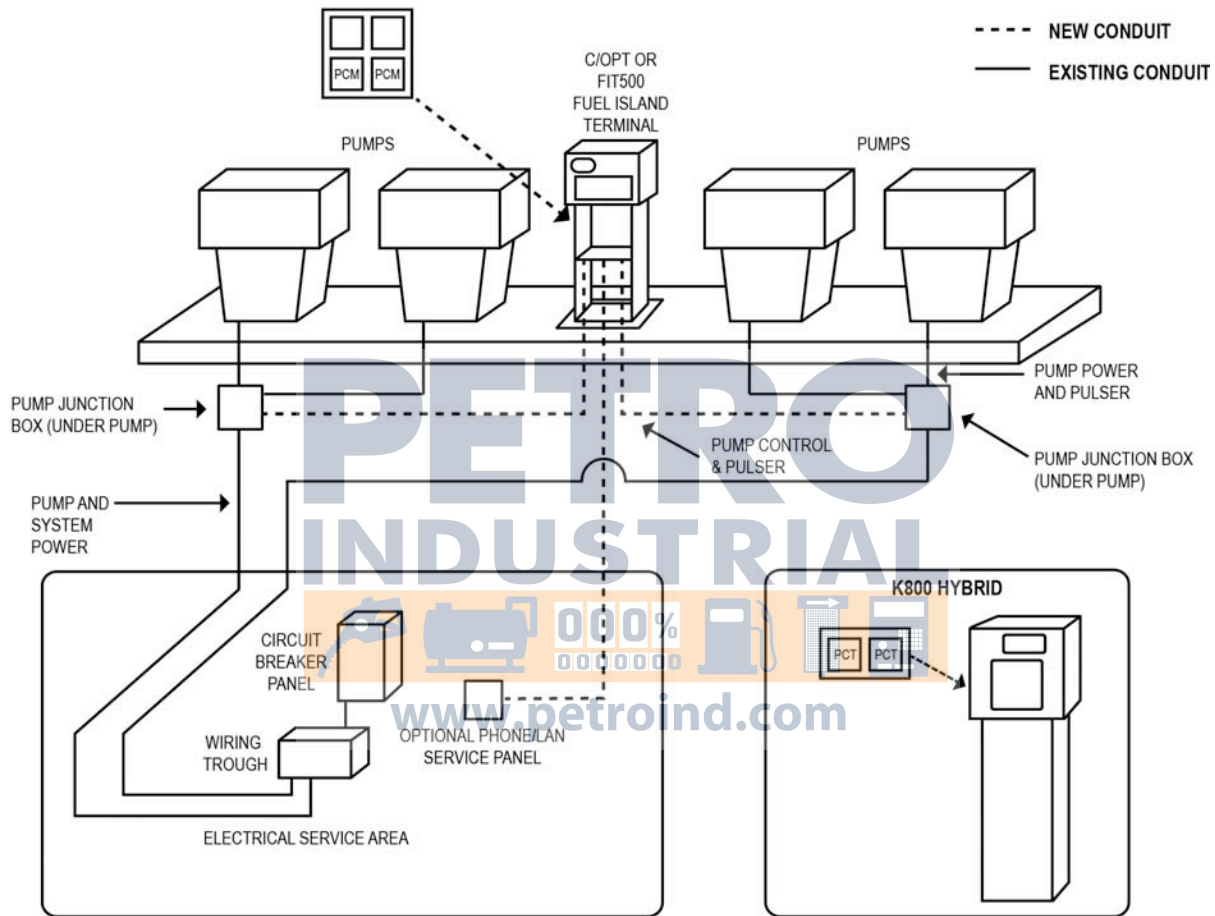
Figure 3-18 Integrated FSC with Mechanical Pump Control

Regarding Pump and System Power: depending on conditions at the site, some installations may require shielded power cable to prevent excessive electrical noise from affecting proper system installation.

3.3.2 Typical Installation Diagram of an Integrated FSC3000™ with Electronic Pump Control
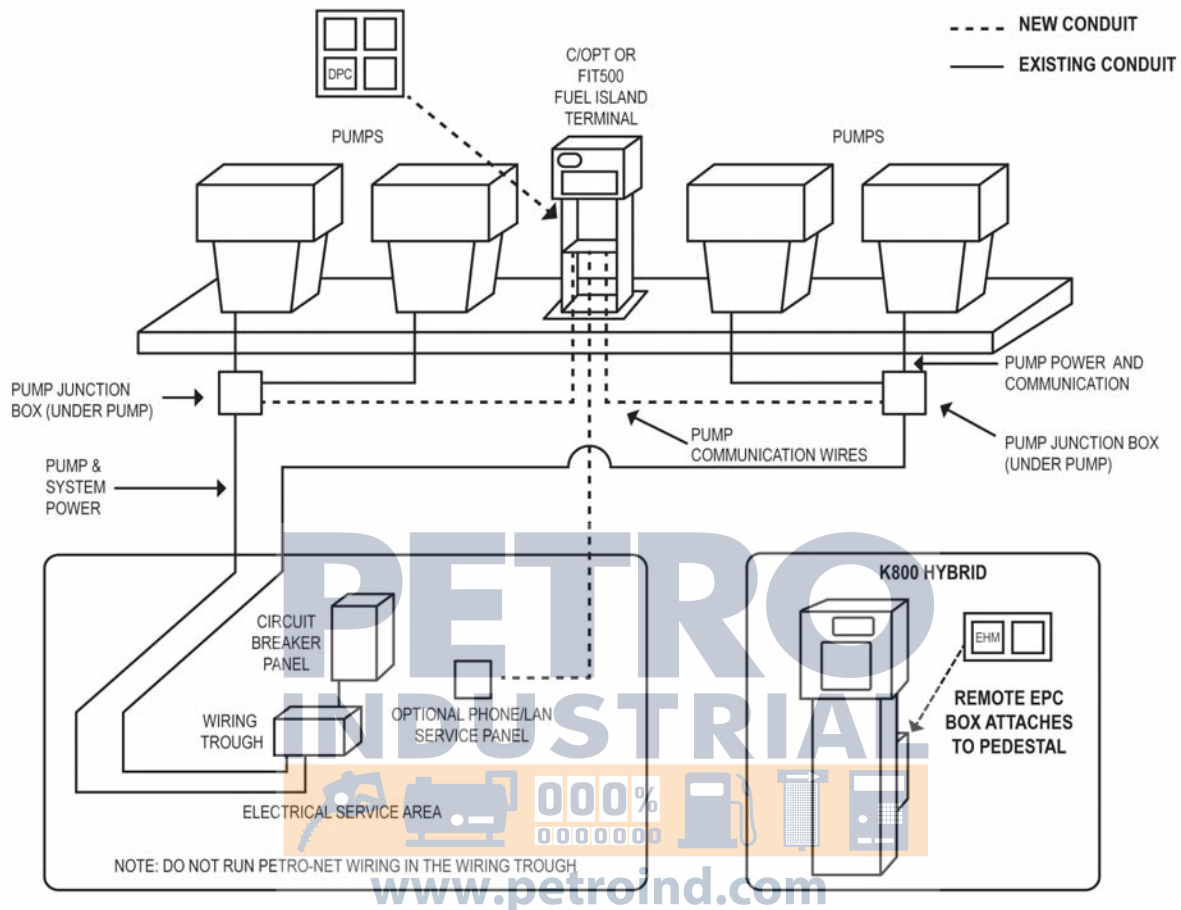
Figure 3-19 Integrated FSC with Electronic Pump Control

Regarding Pump and System Power: depending on conditions at the site, some installations may require shielded power cable to prevent excessive electrical noise from affecting proper system installation.

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3.3.3 Typical Installation Diagram of a Remote FSC3000™ with Mechanical Pump Control
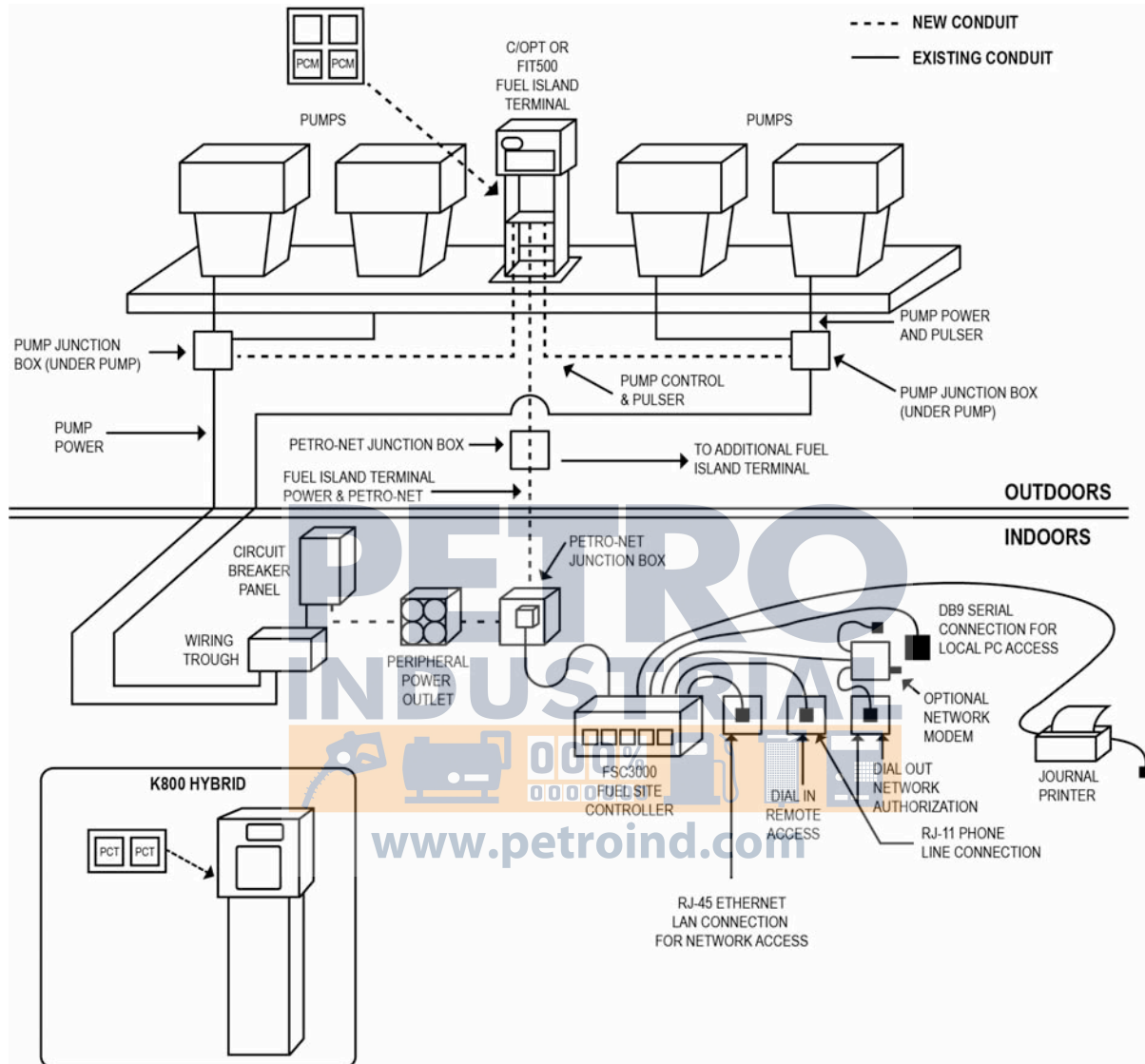
Figure 3-20 Remote FSC with Mechanical Pump Control

3.3.4 Typical Installation Diagram of a Remote FSC3000™ with Electronic Pump Control
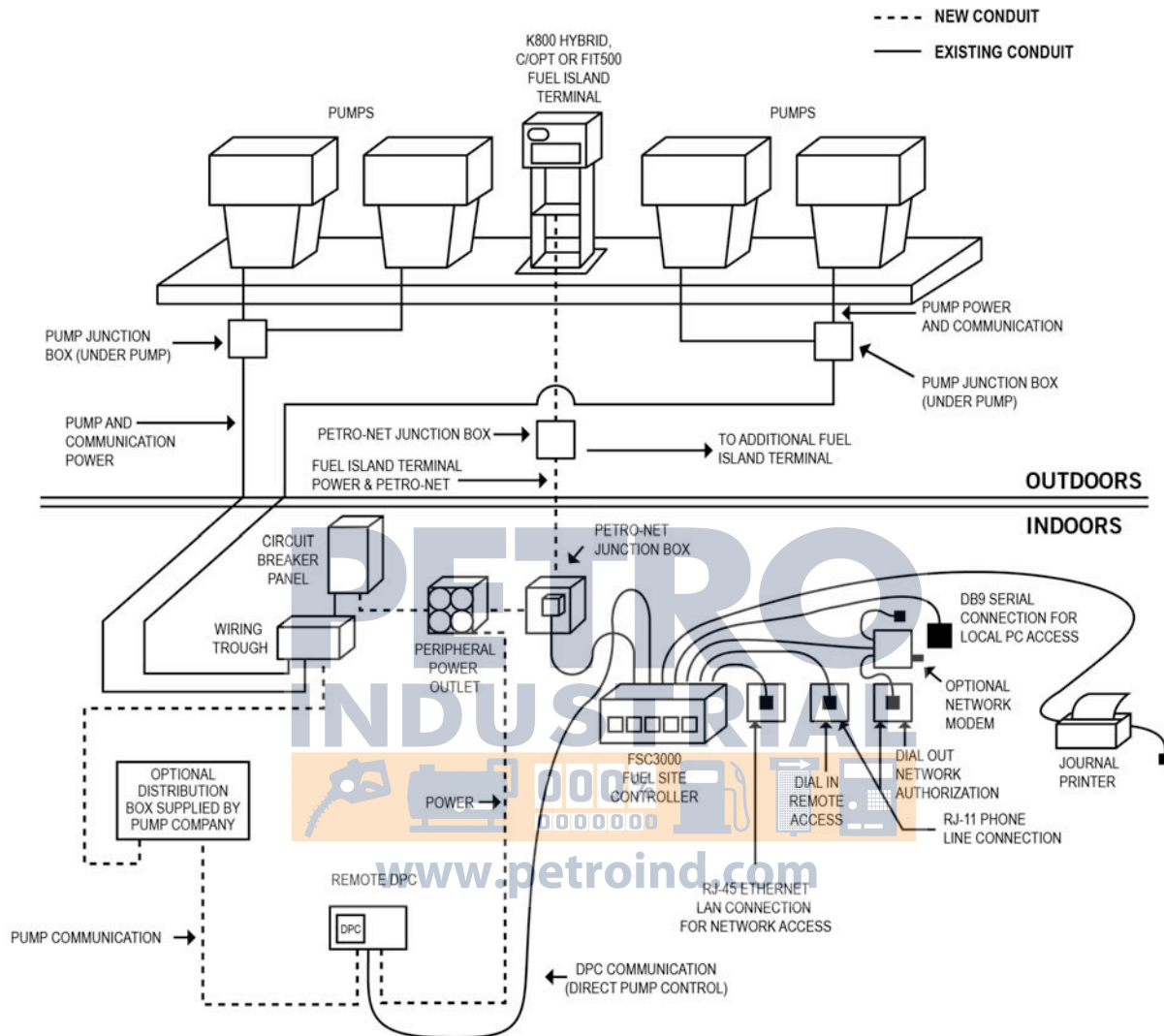
Figure 3-21 Remote FSC with Electronic Pump Control

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3.4 FIT Installation

Install your FIT 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.

FIT Conduit Installation

All conduits in the FIT pedestal should terminate at a point 18" (45.7 cm) above the ground into a seal-off. Install the following half-inch (1/2") or three-quarter-inch (3/4") rigid steel conduits, as applicable, to the area where the FIT pedestal will be located:

- To the FIT power source
- To other FITs or External FSC for Petro-Net™ communications
- To the remote communication access panel for phone line(s), Ethernet
- To the antenna for wireless modem, cellular modem, etc.
- To each mechanical pump or dispenser for control and pulser wires (for Internal PCM only)

Please refer to the appropriate pedestal diagram installations below:
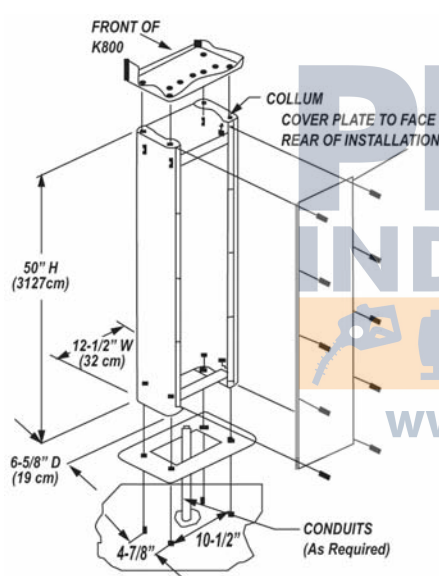
| Figure 3-22 K800™ Hybrid | Figure 3-23 C/OPT™ | Figure 3-24 FIT500™ |
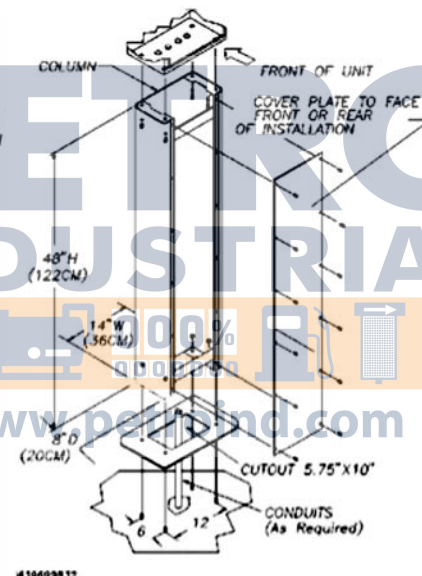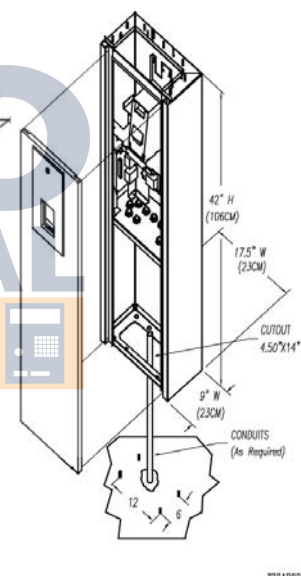
FIT Pedestal and Enclosure Mounting

1. Remove the access panel from the pedestal. The K800™ Hybrid and C/OPT™ panels are held on with screws. The FIT500™ panel slides up and out.
2. Install four (4) 3/8" threaded studs in the ground.
3. Install Pedestal base plates (K800™ and C/OPT™ only) atop the four (4) studs.
4. Set the FIT pedestal atop the four (4) studs.
5. Secure the pedestal to the studs with the four (4) nuts and lock washers.
6. Set the FIT enclosure atop the pedestal.
7. Secure the FIT enclosure tightly to the pedestal with the supplied bolts and washers.

FIT Flex Conduit Installation

8. Remove knockouts from the base of the FIT enclosure.
9. Install Flex Conduit from the rigid conduit to the knockouts in the FIT enclosure (K800™ Hybrid) or pedestal conduit plate (C/OPT™ and FIT500™ pedestals).

Any unused knockout holes that have been removed must be sealed to meet NEC compliance codes.

FIT Power and Communication Wiring

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

Petro-Net™ communication to other FIT(s) should also be pulled in this conduit.

11. 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").

Petro-Net™ communication wires can share the conduit with the power wiring provided the wires have the same voltage-insulation rating as the power wires.

12. Connect the Petro-Net™ wires to the communication terminal block. Polarity **must** be observed. Attach all (1) terminals together and all (2) terminals together.

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

Power & Petro-Net™
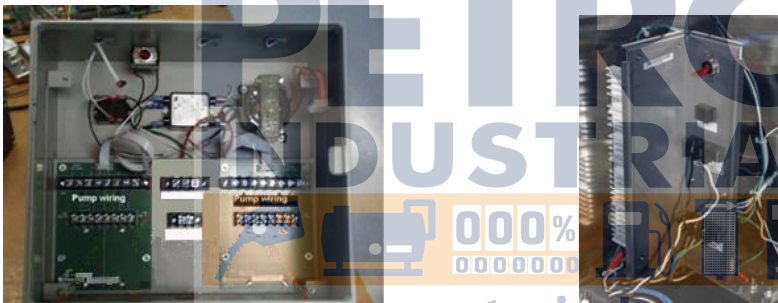
Figure 3-25 K800™ Hybrid

Figure 3-26 FIT500™

Figure 3-27 C/OPT™

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3.5 PCT Installation (for K800™ Hybrid Installations)

The K800™ Hybrid PCT is supplied with noise suppressors that must be installed across each solenoid valve and/or motor contactor. Failure to do so can cause erratic system operation caused by the electrical noise generated by the coils in these devices.

3.5.1 Pump/Dispenser Control Wiring

Wire the pump-control wires to the corresponding pump position on the PV240 Pump Relay Board.

Use one of the two typical PCT Pump Wiring diagrams below based on the type of suction pump or dispenser.

Pump Position #1	
1 & 2	Current Sense (100 mA) (motor/solenoid control)
3 & 4	Auxiliary (reset control)
D	Pulser Cable Shield Ground
C	Pulser Power 12 V
B	Pulser Signal
A	Pulser Common
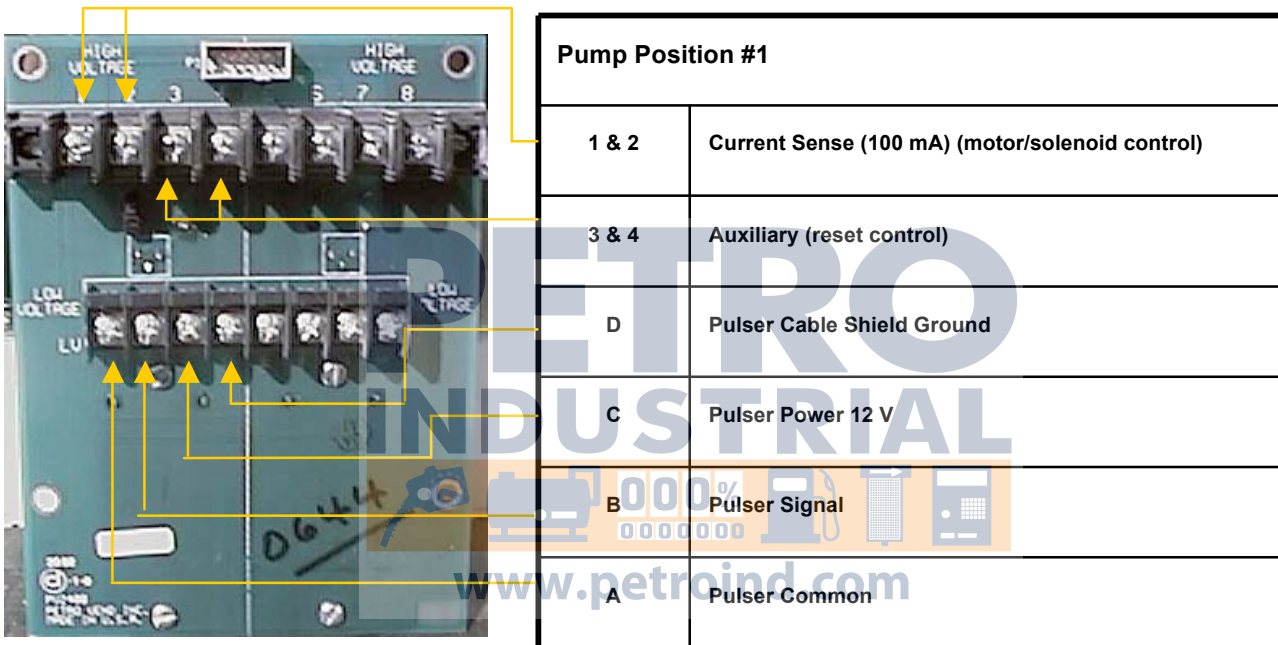
Figure 3-28 PCT Pump Wiring
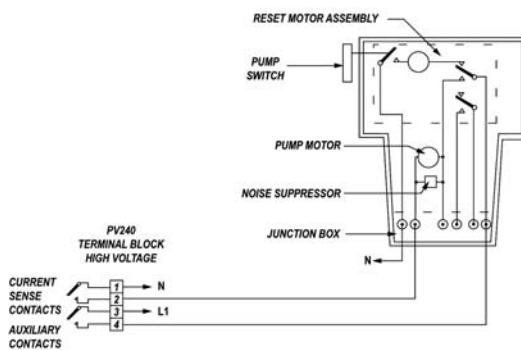
Figure 3-29 Self-contained Pump, Power Reset
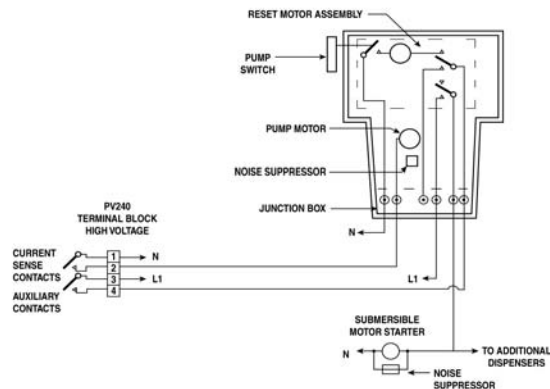
Figure 3-30 Dispenser, Power Reset

3.5.2 Pump/Dispenser Pulser Wiring

There are two types of pulsers: active (voltage-producing) or passive (no voltage produced).

The following diagrams show typical connections for both types of pulsers:
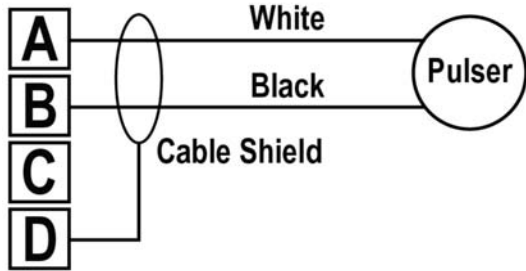
Figure 3-31 Wire Passive Veeder-Root Pulser
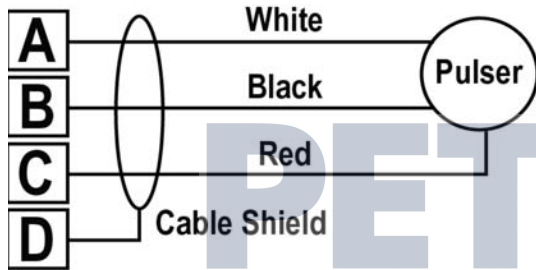
Figure 3-32 Wire Active Veeder-Root Pulser

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3.6   PCM Installation

The PCMs may be installed in the C/OPT™, FIT500™ or in the remote PCM cabinet.
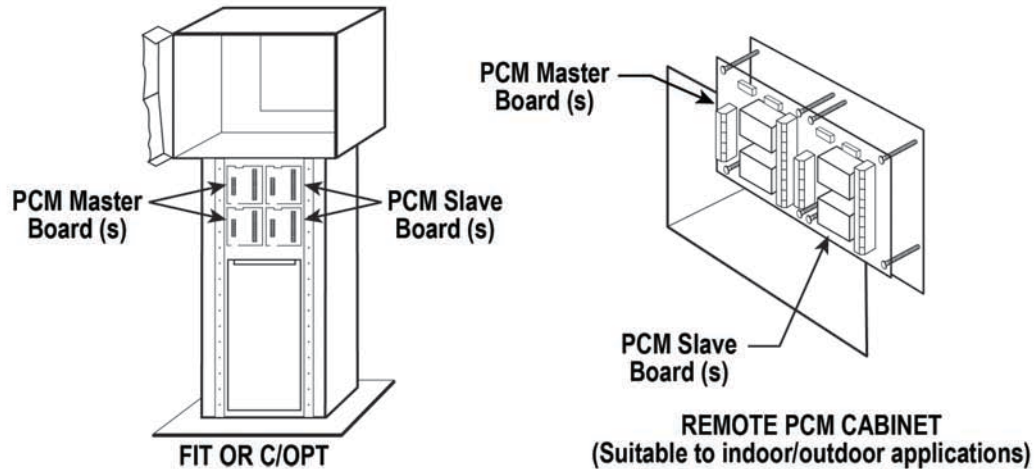
Figure 3-33 PCM Locations

Choose the appropriate section in the pages that follow:

3.6.1   Installing PCM(s) in a C/OPT™ or FIT500™ Pedestal

C/OPT™ Pedestal Mounting

- Mount the PCM Master Board in the pedestal's lower-left position. The pedestals have four (4) positions total.
- Mount the PCM Slave Board in the lower-right position. Another master/slave set can be mounted above the first as shown in the figure to the right.
- Plug the 20-1618 Cable to the connector on the power supply chassis in the top of the enclosure.
- When wiring two (2) Master Boards, daisy-chain the wiring as shown below:
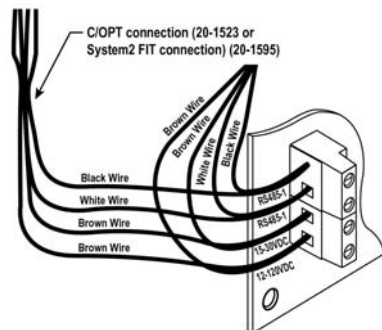
Figure 3-35 PCM Connection Wiring

Figure 3-34 C/OPT™ PCM Pedestal Mounting

3.6.2 Installing PCM(s) in a Remote Enclosure
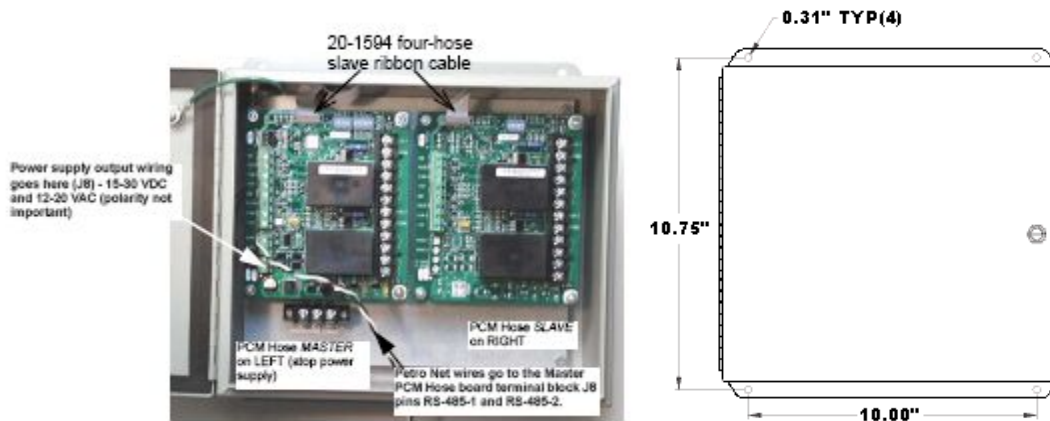
Figure 3-36 PCM Remote Enclosure

Each enclosure can contain one (1) Master Board and one (1) Slave Board to control up to four (4) pumps. Use additional enclosures to control additional pumps.

- Attach the enclosure to a wall with fasteners (not supplied).
- Install the following 1/2" or 3/4" rigid steel conduits, as applicable:
- To the PCM power source.
- To the FSC and other PCMs for Petro-Net™ communication.
- To each mechanical pump or dispenser for control and pulser wires.
- Install a power switch for the PCM. (The enclosure has no switch. (See "PCM Wiring" for more details.)
- Mount the PCM Master Board on the left-side stand-offs in the enclosure. If applicable, mount the Slave Board on the right-side stand-offs.
- Connect the output wiring from the power supply to the PCM Master Board at Location J8 PINS 3 and 4. Pins are labeled 15-30 VDC, 12-20 VAC. Polarity is NOT important.

3.6.3 Remote PCM Power Wiring

For remote PCMs, run three (3) 14-AWG wires from the breaker panel and the user-installed ON/OFF switch to the terminal block inside the enclosure.

Pedestal-mounted PCMs obtain power from the C/OPT™ or FIT500™.

PCM Pump/Dispenser Control Wiring

The PCM is supplied with noise suppressors that must be installed across each solenoid valve and/or motor contactor. Failure to do so can cause erratic system operation caused by the electrical noise generated by the coils in these devices.

- Wire the line-voltage control wires to the corresponding pump position on the PCM Board.
- Use one of the Typical PCM Pump Wiring Diagrams below based on the type of suction pump or dispenser.

The Pump Control Modules use voltage sense to know when the pump is running.

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PCM Board Terminal Identification
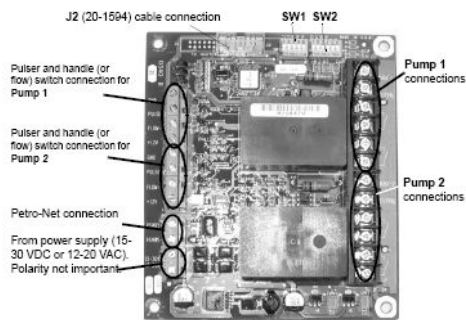
Figure 3-37 PCM Master
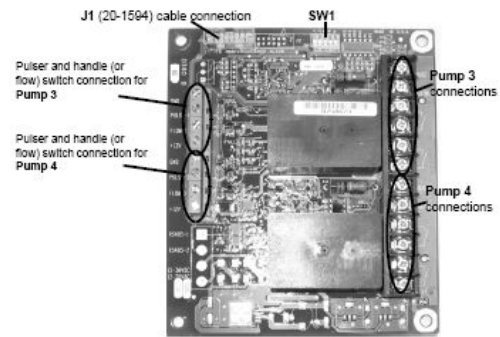
Figure 3-38 PCM Slave

Low-voltage Connections	High-voltage Connections
Gnd – Ground for pulser and flow switch	In-Use – Feedback from solenoid or motor
Pulse – Pulser input	Neutral – Neutral return for In-Use signal
Flow – Flow switch or pump handle input	Relay Contacts – Reset control
+12 V – Supply for pulser	Relay Contacts – Motor control
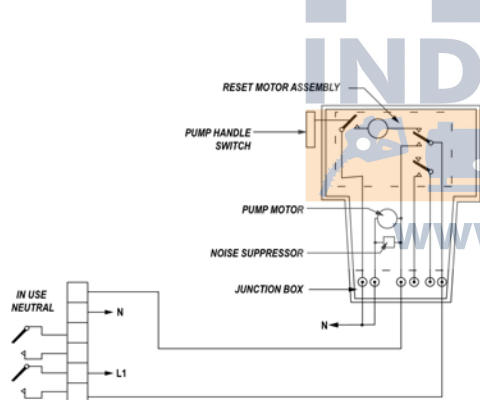
Figure 3-39 Self-contained Pump, Power Reset
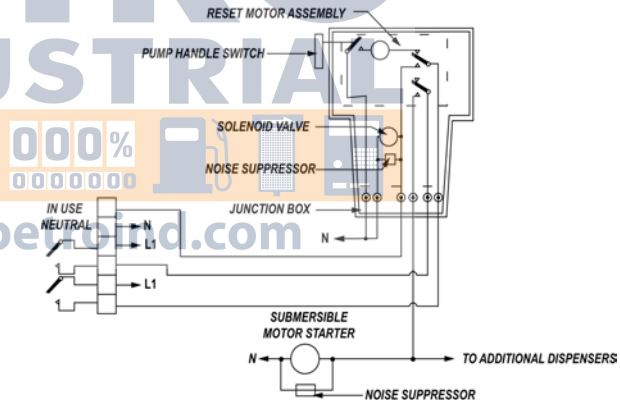
Figure 3-40 Dispenser, Power Reset

The two dispensers controlled by a single PCM Master or Slave must be of the same type.

Active Pulser (Veeder-Root 767191)

Passive Pulser (Veeder-Root 1871)
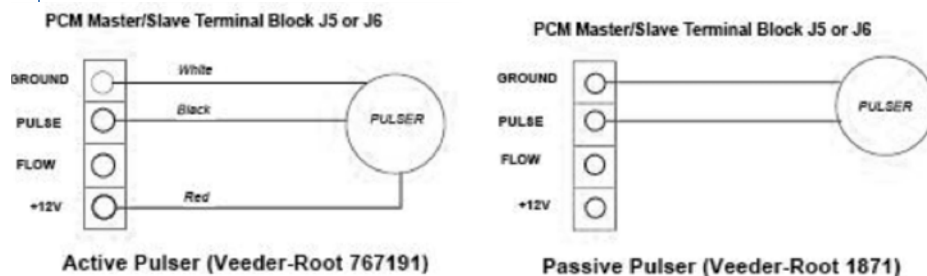
Figure 3-41 Veeder-Root Pulser Wiring

3.7 Universal Pump Control (UPC) Installation

3.7.1 Console Compatibility

Brand	Model	Compatibility Requirements
Gilbarco	TS-1000	The TS-1000 console must be equipped as follows: The TS-1000 must have software version 21.2 (or later) The TS-1000 must have the MEM #2 Kit installed The console must have software version 11.0 (or later)
Wayne	2400, PIB or HyperPIB	The Wayne 2400+ Site Controller must be equipped with main and companion CPU boards with software revision 49-23 (or later) The Plus/2 software must be version 4.20 (or later). For Plus/3, contact Petro Vend distributor for the correct version. The controller must have a PIB PLUS kit (Wayne p/n #850314-03) with software version 34000 or above. The optional Wayne Decade 2400 console may be installed but is not required for UPC operation. Data-Link dispensers are compatible with UPC operation except: (1) DL0 dispensers and (2) variable-ratio blenders with more than four grades.

3.7.2 Petro-Net™ Communication

- Run a conduit from the FSC3000™ Petro-Net™ junction box to where the UPC will be located.
- Attach the UPC's Petro-Net junction box within three feet of the UPC.
- The UPC must be within three (3) feet of the Console or Pump Controller.
- Connect Terminals 1 and 2 on the junction box cover to the corresponding Petro-Net™ wiring.
- Secure the junction box cover to the box.
- Insert the four-pin Petro-Net™ plug into the socket of the junction box.

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3.7.3 Console Connections

The UPC is shipped with a personality kit that is specific to the manufacturer of the console or pump controller to be controlled.

- Connect the 6-pin socket of the RS-232 cable to the 6-inch "personality" cable supplied with the UPC.
- Plug the personality cable into the console as follows:

Brand	Model	Personality Cable	Port
Gilbarco	TS-1000	20-1436-GIL2	PIB Plus
Wayne	2400, PIB or HyperPIB	20-1436	J-103 Gossip Port on Console

3.7.4 EPROM Installation

The personality kit contains an ***EPROM (Erasable Programmable Read-Only Memory)*** chip that contains the UPC program for the specific console/pump controller.

- Remove the cover to the UPC and plug the EPROM into its socket on the UPC circuit board.
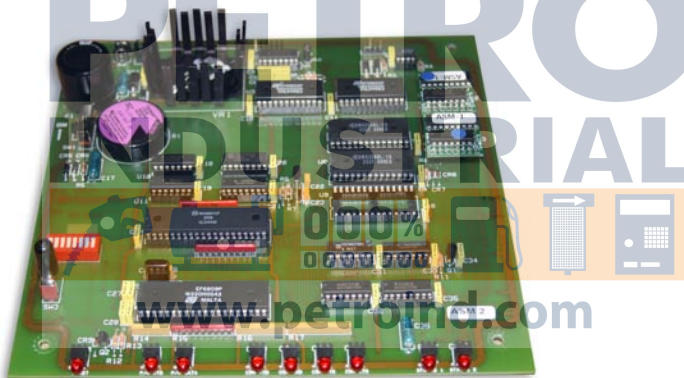
Figure 3-42 EPROM Installation

- Align the notch on the EPROM with the notch outline on the circuit board and make sure all of the pins are properly inserted.

Be very careful when handling the EPROM. Avoid applying excessive pressure when inserting the EPROM into its socket. The EPROM is also sensitive to electrostatic discharge and should be handled in only a static-free environment.

Do not replace the cover to the UPC. The switches will be set in the configuration section.

3.8 Direct Pump Control (DPC) Installation

3.8.1 Pump Types

The FSC3000™ can communicate directly with Wayne, Gilbarco and Gasboy® dispensers.

The DPC interface utilizes the Electronic Handle Monitor board to provide the DPC interface, which provides isolation and converts the RS-232 output from the FSC3000™ to the communication method required by the pumps.

The DPC interface can connect to the EPC (PetroLink™) to provide handle status – refer to PetroLink™ section for more information. Meanwhile, DPC installations without PetroLink™ will only require jumpers to be set up.

Wayne

The pumps connect directly to DPC interface, unless you exceed four (4) pump loops, then it is recommended to connect one (1) pump loop to the Wayne Data Distribution Box.

The Interface will be capable of handling four (4) double-sided dispensers/pumps (without the pump manufacturing distribution box).

To connect more than four (4) dispensers/pumps will require use of the pump manufacturer's distribution box.

Gilbarco

The pumps connect directly to DPC interface, unless you exceed four (4) pump loops, then it is recommended to connect one (1) pump loop to the Gilbarco Distribution Box (setup for current loop). This will require a user-supplied connector to connect two (2) wires from the DPC interface to the distribution box.

The Interface will be capable of handling four (4) double-sided dispensers/pumps (without the pump manufacturing distribution box).

To connect more than four (4) dispensers/pumps will require use of the pump manufacturer's distribution box.

Gasboy®

Unlike Gilbarco and Wayne pumps, Gasboy® does not use the Direct Pump Control/Electronic Handle Monitor board or a pump manufacturer's distribution box.

Parts Required

Part #	Part Description	Remote DPC	Pedestal DPC
20-8225	Remote PCM enclosure	Yes	No
20-0612	DPC Interface	Yes	Yes
20-1018	Cable (FSC3000 to DPC Interface)	Yes	Yes
20-1618	Power Cable (C/OPT™ or FIT500™)	No	Yes

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3.8.2 Installing DPC Interface in a Remote Enclosure (for Wayne and Gilbarco only)

- Attach the enclosure to a wall with fasteners (not supplied)

Enclosure needs to be no further than 50' (15.24 m) from FSC3000™ controller.
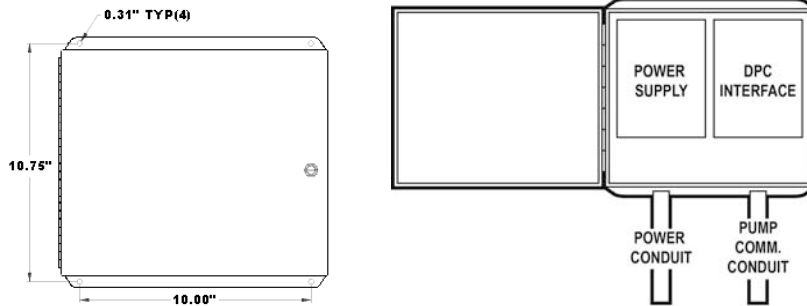
Figure 3-43 DPC Remote Enclosure

- Install the following 1/2" or 3/4" rigid steel conduits and wires, as applicable:
- DPC power source conduit and pull three (3) 14-AWG wires from the breaker panel
- Pump Communication Conduit and pull wires from each dispenser

If there are more than four (4) pump loops it is recommended you use the manufacturer's distribution box. Pump communication conduit is not required if manufacturer's distribution box is located near remote DPC enclosure.

- Mount the DPC interface (electronic handle monitor) board on the right-side stand-offs in the enclosure
- Remove Connector from CN12 DPC Interface (electronic handle monitor) board and attach output wiring from the power supply to the connector (Polarity is NOT important)
- Reconnect connector to CN12 on the DPC Interface
- Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block
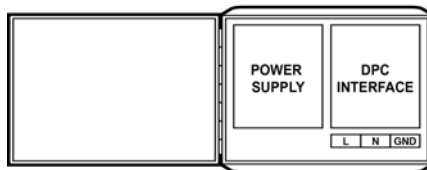
Figure 3-44 DPC Connections

- Attach Pump communication wires to each pump loop on CN5
- Pump directly connected to DPC interface:
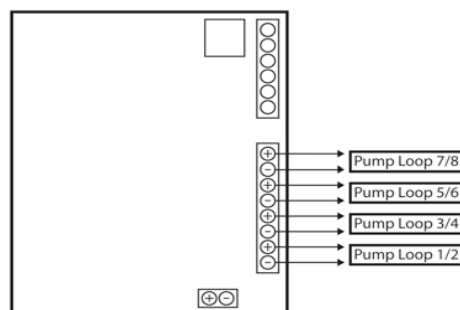
- Wayne Data Distribution Box connected to DPC interface:
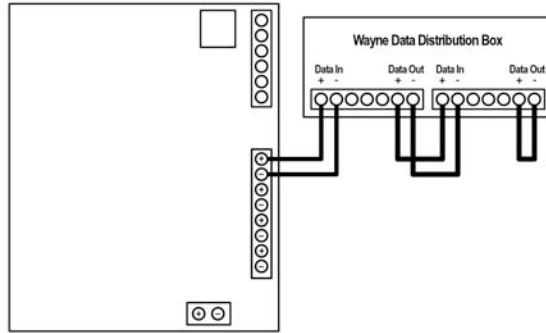
- Gilbarco Universal D-Box connected to DPC interface:

Ensure the Gilbarco is set up for current loop.
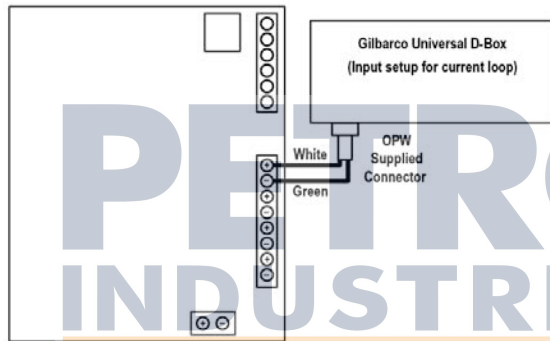
- Run Cable from Port CN4 to port 4 on the FSC3000™ controller

Cable can be extended up to 50' (15.24 m).
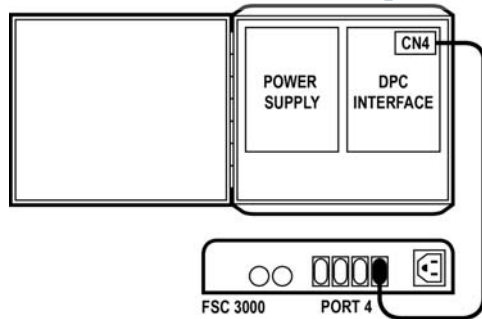
3.8.3 Installing DPC Interface (Electronic Handle Monitor) in a Terminal Pedestal (for Wayne and Gilbarco only)

During an installation where the FSC3000™ is integrated into the terminal, the DPC can be mounted in one of the PCM pedestal mounts.

- Mount the Electronic Handle Monitor as shown in the drawing of the pedestal
- Remove Connector from CN12 DPC Interface (electronic handle monitor) board and attach wiring (grey and orange) from the power supply cable 20-1618 to the connector (Polarity is NOT important)
- Reconnect connector to CN12 on the DPC Interface
- Run cable from pedestal into C/OPT™ or FIT500™ enclosure
- Connect 4-pin connector into C/OPT™ power supply or FIT500™ main board

Petro-Net™ wires are not used and should be capped.

Figure 3-45 DPC Installation in Pedestal
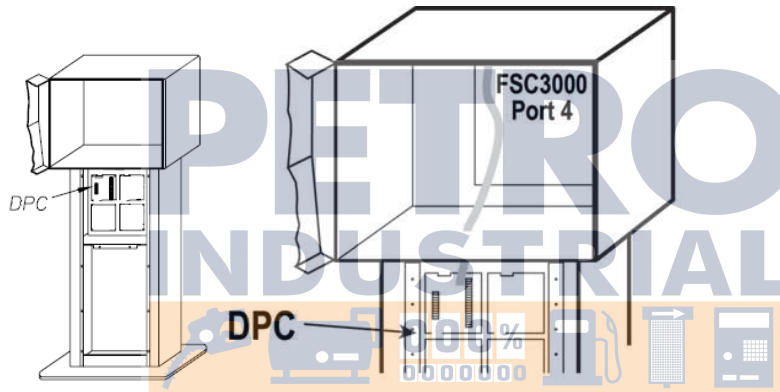
Figure 3-46 DPC Installation in Pedestal

- Run Cable 20-1018 from Port CN4 to port 4 on the FSC3000™ controller
- Attach Pump communication wires to each pump loop on CN5
- Pump directly connected to DPC interface:

- Wayne Data Distribution Box connected to DPC interface:

- Gilbarco Universal D-Box connected to DPC interface:

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Issue Date: January 1, 2012
Supersedes: April 1, 2011
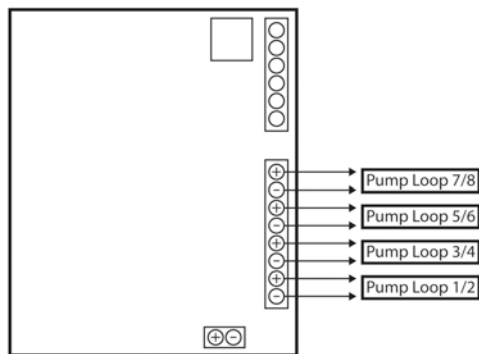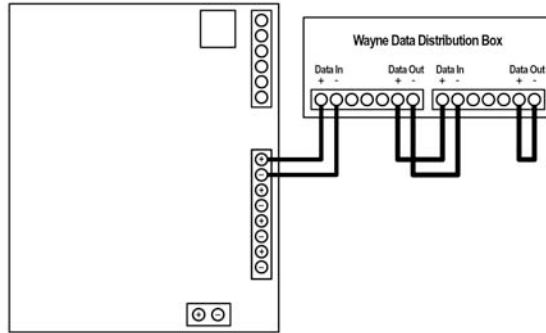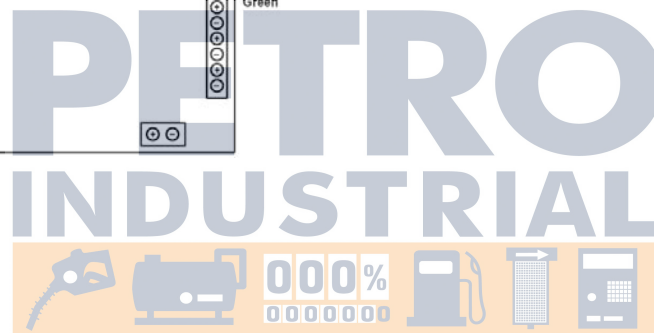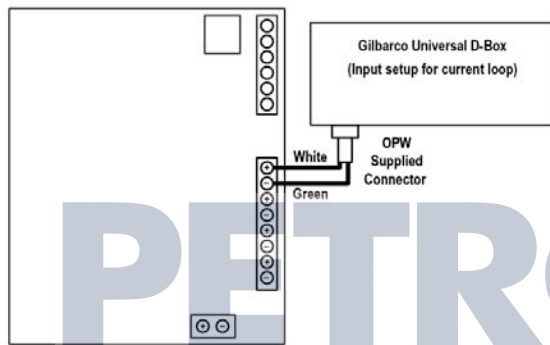
3.8.4 DPC Interface Jumper Setup (for Wayne and Gilbarco only)

- Set up jumpers to match pump type being connected. See Jumper Chart and Diagram.
- When a jumper is set as "ON" this means the jumper will tie both pins together
- When "OFF" the jumper should be set on one (1) pin
- Some jumpers have three (3) pins; when the jumper says "Pins 1-2" this means the jumper should be set on Pins 1 and 2 of the three-pin jumper
- On three-pin jumpers the board is labeled to indicate which pin is number one (1)

Jumper #	Gilbarco	Wayne
J2	OFF	OFF
J3	CN5 Loop 7/8 ON = Bypass OFF = Enabled	
J4	CN5 Loop 5/6 ON = Bypass OFF = Enabled	
J5	CN5 Loop 3/4 ON = Bypass OFF = Enabled	
J6	CN5 Loop 1/2 ON = Bypass OFF = Enabled	
J7	OFF	OFF
J8	ON	ON
J9	OFF	OFF
J10	Pins 1-2	Pins 1-2
J11	OFF	ON
J12	ON	OFF
J17	OFF	OFF
J18	ON	ON
J19	OFF	OFF
J20	OFF	OFF
J22	Pins 2-3	Pins 2-3
J23	Pins 2-3	Pins 2-3
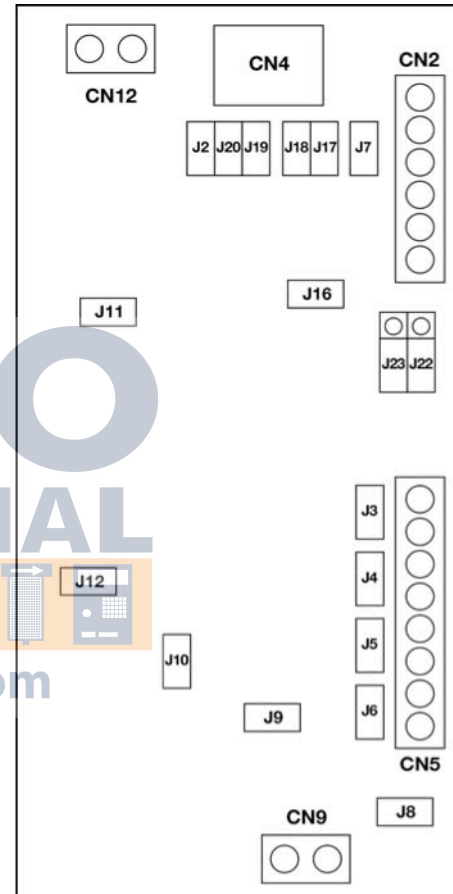
Figure 3-47 Jumper Settings

3.8.5 Installing a Remote DPC Interface (for Gasboy® only)

Gasboy® DPC Parts Kit

Part #	Part Description
N/A	Mounting Plate
N/A	Isolated Converter (RS-232 to RS 422/485)
N/A	Power Supply
20-1518-04	Power Cable (C/OPT or FIT500)
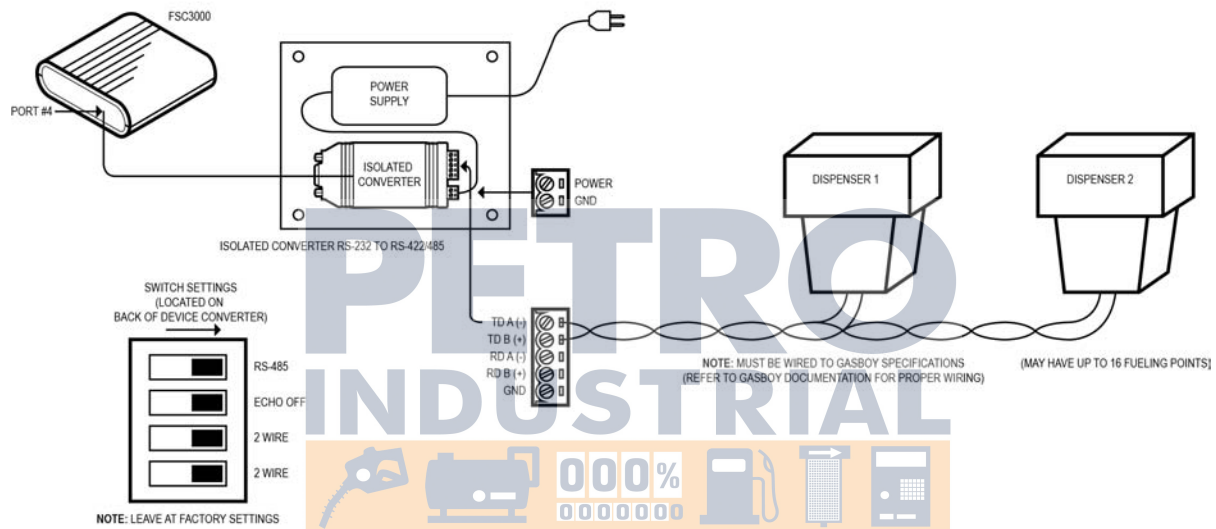
1. Attach the power supply and isolated converter (RS-232 to RS-422/485) to the Velcro® adhered to the mounting plate.
2. Mount the mounting plate with power supply and converter attached within 5' (1.52 m) of the FSC3000™.
3. Plug serial cable (OPW P/N: 20-1519-04) into the isolated converter 9-pin port and then into Port 4 of the FSC3000™.
4. Wire pump communication to converter.

Polarity is important, so please refer to Gasboy® documentation for proper wiring specifications.

5. Ensure the isolated switch settings are set as shown in the diagram above.
6. Plug in the power supply.

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3.8.6 Installing DPC Interface in a Terminal Pedestal (for Gasboy® only)

Gasboy® DPC Parts Kit

Part #	Part Description
N/A	Mounting Plate
N/A	Isolated Converter (RS-232 to RS 422/485)
N/A	Power Supply
20-1518-04	Power Cable (C/OPT or FIT500)
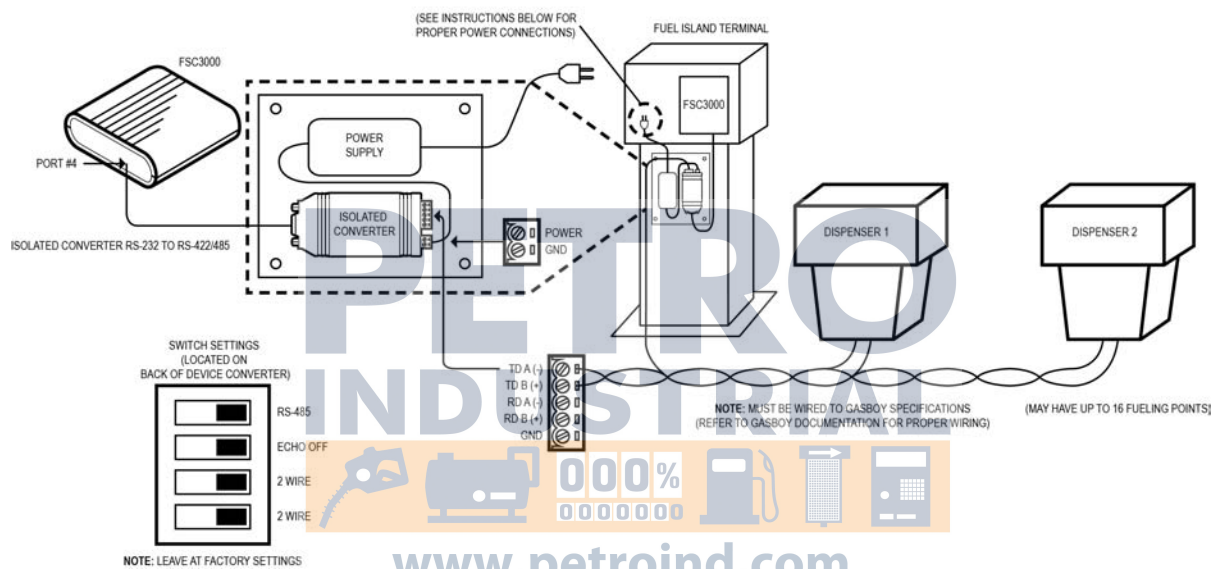
1. Attach the power supply and isolated converter (RS-232 to RS-422/485) to the Velcro® adhered to the mounting plate.
2. Mount the mounting plate with power supply and converter attached inside terminal pedestal.
3. Plug serial cable (OPW P/N: 20-1519-04) into the isolated converter 9-pin port and then into Port 4 of the FSC3000™.
4. Wire pump communication to converter.

Polarity is important, so please refer to Gasboy® documentation for proper wiring specifications.

5. Ensure the isolated switch settings are set as shown in the diagram above.
6. Cut the power cord and wire to C/OPT™ or FIT500™ power terminal block.

3.9 Dispenser Terminal Control (DTC) Installation

DTC (Dispenser Terminal Control) utilizes the dispenser's built-in card terminal in lieu of a fuel island terminal and will emulate the fuel island terminal for each fueling position connected to the system. DTC control requires DPC electronic pump control to function and uses the same conduit wiring.

3.9.1 Terminal Types

DTC can communicate with the Wayne CAT and or Gilbarco CRIND.

The DTC interface utilizes a second remote PCM enclosure.

Wayne CAT (Card Authorization Terminal)

The terminal connects directly to DTC interface.

- The interface is capable of handling up to six (6) dual-sided or 12 single-sided dispensers.

Gilbarco CRIND (Card Reader in Dispenser)

The terminal connects directly to a direct pump control/electronic handle monitor (DPC/EHM) board, which then connects to the DTC interface. If you exceed four (4) pump loops, then it is recommended to connect one (1) pump loop to the Gilbarco Distribution Box (setup for current loop). A DB-9 connector is supplied to connect the DPC interface to the distribution box.

- The interface is capable of handling four (4) double-sided dispensers/pumps without the pump manufacturing distribution box.
- The interface is capable of handling up to six (6) dual-sided or 12 single-sided dispensers when using the pump manufacturer's distribution box.

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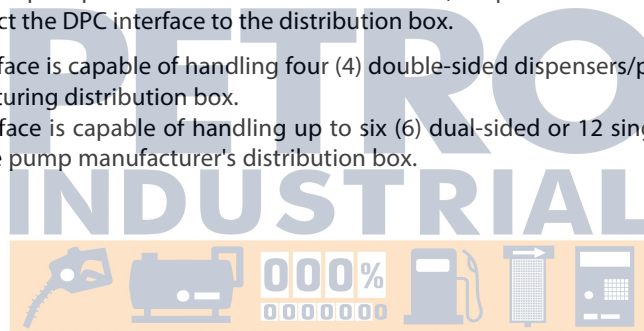
3.9.2 Installing DTC in a Remote Enclosure

- Attach the enclosure to a wall with fasteners (not supplied)

Enclosure needs to be no further than 50' (15.24 m) from FSC3000™ controller.
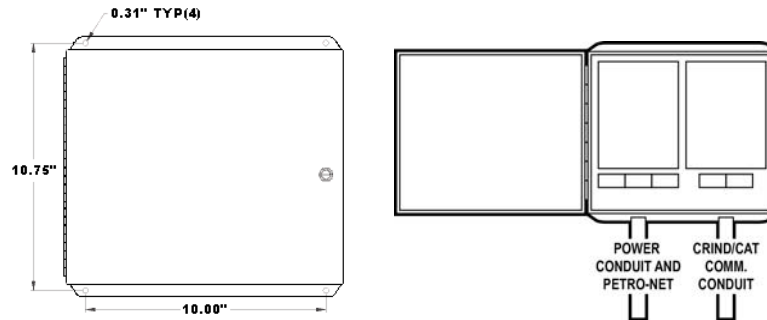
Figure 3-48 DTC Remote Enclosure

- Install the following 1/2" or 3/4" rigid steel conduits and wires, as applicable:
- DTC power source conduit and pull three (3) 14-AWG wires from the breaker panel
- Pump Communication Conduit and pull wires from each dispenser

If there are more than four (4) CRIND loops it is recommended you use the manufacturer's distribution box. Pump communication conduit is not required if manufacturer's distribution box is located near remote DTC enclosure.

- Mount the DTC interface board on the left-side stand-offs within the enclosure.
- Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block
- Connect Petro-Net™ wires to the terminal blocks in the remote enclosure
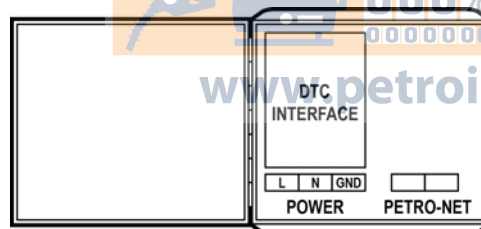
Figure 3-49 DTC Connections

For Wayne CAT - specific
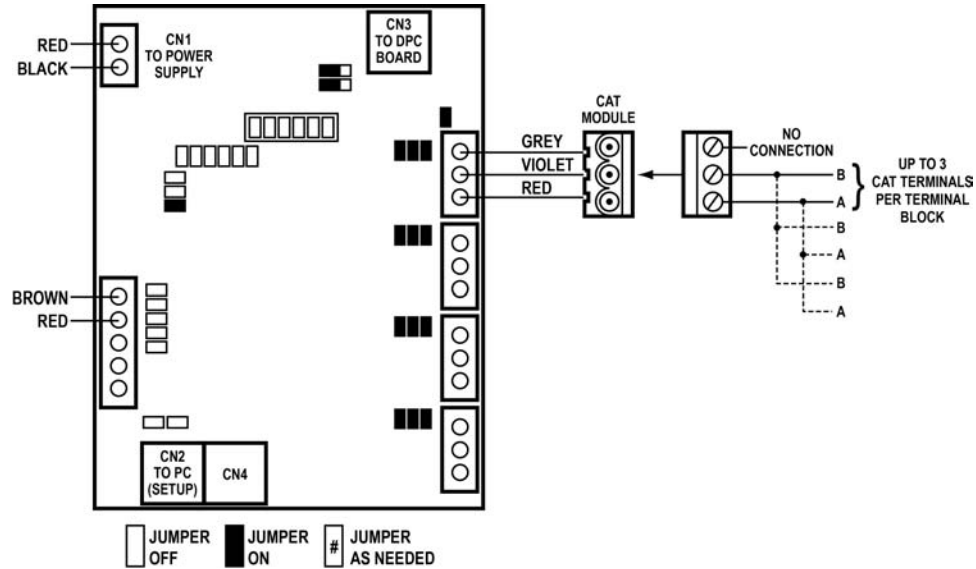
- Connect the red wire from the power supply to the CN1 terminal 1 on the DTC board. Connect the black wire to terminal 2.
- Connect the brown wire from the Petro-Net terminal block to CN1 1 terminal 1 on the DTC board. Connect the red wire to terminal 2.
- Attach CAT communications wire to terminal block CN5 through CN8 using the modules provides. For best performance, connect each dispenser to its own terminal block. If there are 12 CAT dispensers, connect a maximum of 3 dispensers to each terminal block.

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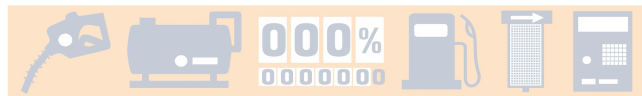
For Gilbarco CRIND - specific

- Direct connect to CRIND loops.
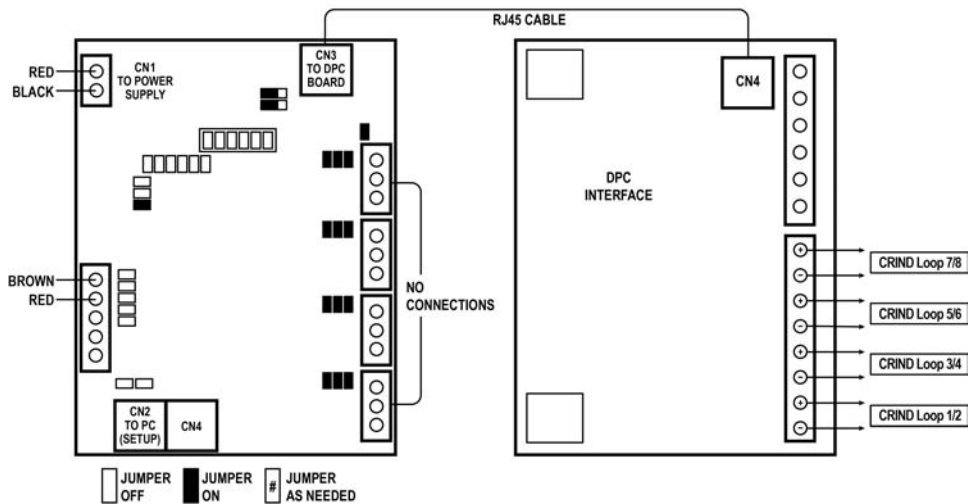
Gilbarco Universal D-Box to DPC interface:

- Ensure the Gilbarco D-Box is set up for current loop.
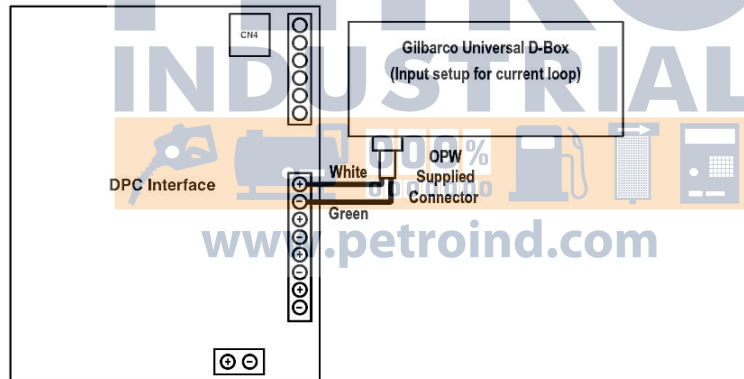
- Install the DPC board in the right side of the enclosure.
- Connect the red wire from the power supply to CN1 terminal 1 on the DTC board. Connect the black wire to terminal 2.
- Connect the brown wire from the Petro-Net terminal block to CN11 terminal 1 on the DTC board. Connect the red wire to terminal 2.
- Connect the short RJ45 patch cable from connector CN3 on the DTC board to connector CN4 on the DPC board.
- Attach the CRIND communication loop wires to terminal blocks CN5 through CN8. If connecting more than four (4) dispensers, connect loop one to the Gilbarco D-Box using the supplied cable.

3.10 FSC3000™ Installation

3.10.1 Integrated FSC3000™

Follow the instructions below if the FSC3000™ is to be installed in one of the FITs.

Skip this step if using the Remote FSC3000™.

Installing the FSC3000™ in a FIT

K800™ Hybrid

- Install four (4) stand-offs on the K800™ Hybrid PV247 mounting plate, two (2) at the top and two (2) at the bottom.
- Install the FSC3000™ board on the four (4) stand-offs with the four (4) screws provided.
- Remove the two (2) screws holding the plastic safety shield on the FSC board.
- Plug in Power, Ground and Petro-Net™ connections to appropriate connectors. (See figure on right)
- Reinstall the plastic safety shield.

Figure 3-50 Installing FSC3000™ in K800™ Hybrid

Figure 3-51 Installing FSC3000™ in C/OPT™

C/OPT™

- Mount the plate that contains the FSC3000™ board on the rear wall of the C/OPT™ unit using the four (4) screws provided.
- Remove the two (2) screws holding the plastic safety shield on the FSC board.
- Plug in Power, Ground and Petro-Net™ connections to appropriate connectors. (See figure on left)
- Reinstall the plastic safety shield.

FIT500™

- Mount the plate that contains the FSC3000™ board using the 3/8" bolts located at the bottom of the FIT500™ unit. These are the same bolts that are used to bolt the head to the pedestal.
- Remove the two (2) screws holding the plastic safety shield on the FSC board.
- Plug in Power, Ground and Petro-Net™ connections to appropriate connectors. (See figure on right)
- Reinstall the plastic safety shield.

Figure 3-52 Installing FSC300 in FIT500

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3.10.2 Remote FSC3000™

The remote FSC3000™ must be placed in an office-like environment. The FSC3000™ Petro-Net™ junction box should be mounted within 6 feet (1.8 m) of the FSC3000™ controller.

3.10.3 SIMM Activation

The FSC3000™ contains a SIMM memory module that must be activated by removing the battery-insulating strip. Gently remove the yellow strip at this time. It is recommended that the SIMM module be reseated.

Figure 3-53 SIMM Battery Strip

3.10.4 Wireless Radio Modem Installation

Wireless radio modems can be installed to eliminate the need for a hard-wired Petro-Net™ connection from the FIT(s) at the fuel island to the FSC3000™ located in a building.

They can also be used to connect between FITs at different fuel islands.

See OPW Manual M00-20-7074 for complete information on the suitability and installation of these modems.

Figure 3-54 Wireless Petro-Net™ Modem

Currently, wireless Petro-Net™ is not supported on PetroLink™-enabled systems.

3.10.5 FSC3000™ Access Connections – Methods

Depending on the type of installation you have, there are multiple methods to connect to the FSC3000™.

Remote FSC3000™/Integrated FSC3000™ Wired Access Options
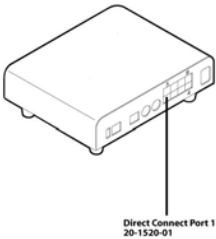
Direct Connection

Direct Connect allows you to access the FSC3000™ by serial port. If your PC lacks a serial port and you are planning on using a USB-to-Serial adapter, please call OPW for the latest recommended USB-to-Serial adapters. Connect 20-1520-01 cable RJ-45 connector into port 1 and the other side into a serial port.
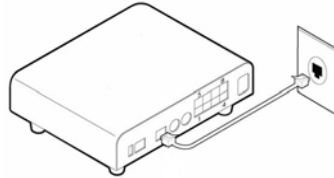
Dial-In Modem Connection (Universal Socket Modem)

A Dial-In modem allows remote access by Phone Line. Connect Phone cord into the Phone Line port and connect to phone jack. Dial-In modem only supports analog Phone Lines.
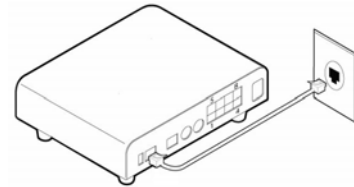
Ethernet Connection

Ethernet connect allows you to connect to the FSC3000™ through the site's network. Connect network cable (not provided) into network jack. Refer to FSC3000™ Ethernet Port Setup section for configuring the Ethernet port.

Integrated FSC3000™ Wireless Access Options

Integrated FSC3000™ Only Bluetooth® (Universal Socket Modem)

A Bluetooth® modem allows a PC equipped with Bluetooth® to communicate to the FSC3000™ without a hard-wired connection. Requires Antenna installation.

Integrated FSC3000™ Only Cell Modem (Universal Socket Modem)

A Cellular modem eliminates having to install phone service out to the fuel island. An account with a cellular-service provider is required. Requires Antenna installation

Integrated FSC3000™ Only WiFi (Universal Socket Modem

A WiFi modem allows the FSC3000™ to connect wirelessly to a Local Area Network using standard 802.11b. Requires Antenna installation.

These wireless connections require an antenna to be installed in the top of the cabinet. If an antenna is not currently installed, please refer to the following installation instructions:

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Antenna Installation

The wireless modems above require the installation of an antenna.

- Remove all circuit boards to prevent any physical damage to the electronic components
- Punch or drill a 5/8" hole approximately 1-1/2 inches from the right and rear corners of the cabinet
- Remove all metal particles to prevent any damage to the electronic circuitry
- Insert the antenna, install the hex nut and tighten
- Plug the cable from the antenna into the modem module

Figure 3-55 Wireless Antenna

3.10.6 FSC3000™ Access Connections – Baud Rate Setting

Set Connection baud rate to desired connection rate (default 38400).

Unless needed, it is recommended that the FSC3000™ access baud rate be set to 38400 for maximum ARTWare™ performance.

When using pass-thru port-connected devices, the FSC3000™ access baud rate must be the same as the device that is being connected to the pass-thru port. If possible, set the device to the highest setting the FSC3000™ supports.
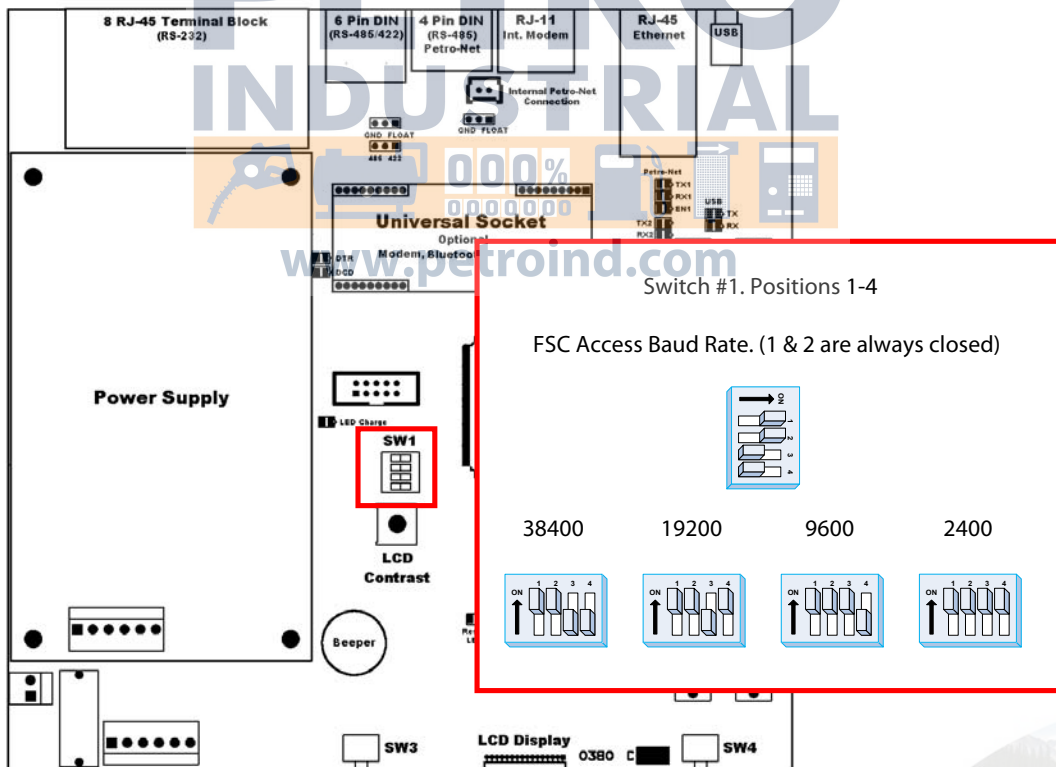
Figure 3-56 Switch 1 Baud Rate Settings

3.10.7 FSC3000™ Additional Connections
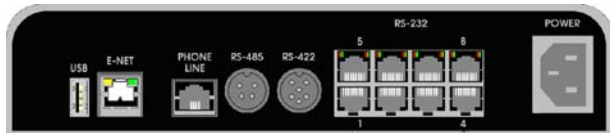
Figure 3-57 FSC3000™ Port Connections

FSC3000™ Petro-Net™ Connection (RS-485 port)

Connect FSC Petro-Net™ cable from FSC3000™ RS-485 port to 4x4 Petro-Net™ junction box cover.

Description	Part #
FSC Petro-Net™ Cable	20-1443
RS-422 Junction Box cover	20-8035
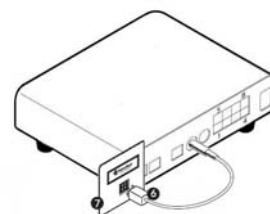
Figure 3-58 Petro-Net™ Connection

FSC3000™ Journal Printer Connection (RS-232 port 3)

All fueling transactions are printed real-time to the journal printer. Midnight totals print at 12:00 a.m. each day. System log will print monthly when enabled.

Connect Journal printer into port 3.

Description	Part #
Journal Printer Cable	20-1517-05
Journal Printer (includes 20-1517-05)	20-7073

Refer to Journal Printer Configuration section for setup of journal printer parameters.
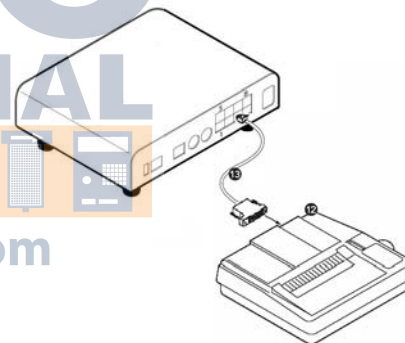
Figure 3-59 Journal Printer Connection

DPC Interface Connection (RS-232 port 4)

The FSC3000™ supports direct port control fro Gilbarco and Wayne pumps. Refer to DPC Installation and Configuration sections for more information.

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FSC3000™ Host (Network) Modem Connection (RS-232 port 5/6)

The FSC3000™ supports a variety of networks. The system can support up to two (2) network modems (Dual Host). Second host port is optional.

Connect Host modem to port 5 for single-host modem installation. Optional second-host modem connection will be in port 6.

Description	Part #
Network Modem (includes 20-1517-01)	20-8049
Network Modem Cable	20-1517-01
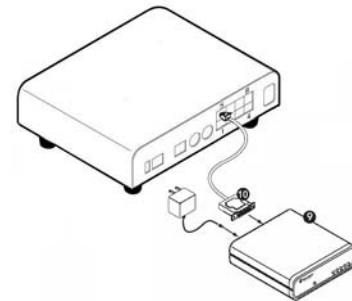
Figure 3-60 Network Modem Connection

Host (Network) IP Gateway Connection (RS-232 ports 1 and 5)

For some networks, the FSC3000™ can use the Internet in place of a dial-up modem for faster and more reliable card authorization.

First, configure the FSC3000™ to communicate on "dial" to the processor as if you were to use a new OPW modem and phone line.

Connect a serial cable from the host modem port 5 to the IP Gateway serial port 1.

- To use the same Internet connection for inbound connections, connect a second serial cable from the COMM port 1 to the IP Gateway serial port 2.
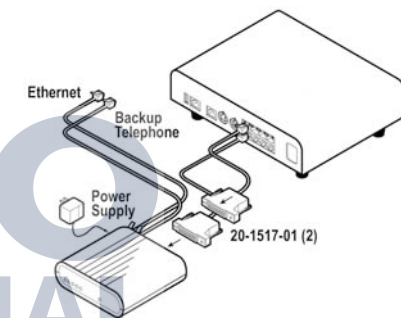
Figure 3-61 IP Gateway Connection

Connect an Ethernet cable (not supplied) from the IP Gateway to the Internet connection point.

- To use phone lines as a backup, connect a phone line to the IP Gateway.

Power ON and wait for the "status" light to flash green (approximately once every second).

Run a test transaction for each processor at the site. If the FSC3000™ fails to process cards, make note of the error received and call OPW Tech Support at 877.697.8324 for assistance.

Configure the Internet router to "port forward" any traffic for port 8002 to the IP address of the Gateway Converter.

Test the "call-in" to the OPW FSC3000™ using the external IP address for the site and port 8002.

Pass-Thru Connection (RS-232 port 8)

The FSC3000™ supports a Pass-thru Connection that allows you to utilize the single-access connection like the modem to access a second device, eliminating the need for the device to have its own phone line, Ethernet, etc., connecting hardware.

4 System Startup & Testing

Double-check the wiring before applying power to the system components. Applying line voltage to low-voltage inputs will damage the system.

4.1 Startup and Testing

The FSC3000™ is the device that controls the entire system. It is best to have all of the other peripheral devices configured correctly before programming the FSC3000™. The configuration parameters for the K800™ Hybrid, PCT, PCM and DPC are set by DIP switches and/or jumpers. While the C/OPT™ and FIT500™ configuration parameters are **soft settings**, meaning they are set through configuration menus instead of switches.

The UPC must be connected to the console or pump controller when started up to synchronize the data between the devices.

> *Use the following sections to Start Up, Configure and Test all of the devices.*
>
> The FSC3000™ performs a **Cold Start** the first time it powers up.

- This initializes the system and sets all of the parameters to their default values
- One of the defaults is to enable FIT 1 and PCT 1 positions 1 and 2 for testing purposes only
- The FSC3000™ must be configured with the site-specific information using ARTWare™ or Command-Line Programming
- Once all of the other devices are tested, proceed to the FSC3000™ Startup, Configuration and Testing section

Follow the appropriate sub-sections below based on the type of devices installed:

- If multiple devices such as FITs and/or Pump Control are used, each device in that group must have a unique address and the same communication parameters
- The default is 9600 baud, 7 Data Bits, even parity
- Use the following **Quick Reference** charts for Petro-Net™ communication-parameter setup

Fuel Island Terminal/PetroLink™				
	K800™ Hybrid	**C/OPT™**	**FIT500™**	**EPC (VIT emulator)**
Address	DIP Switch	Terminal Setup Mode	Terminal Setup Mode	Configuration File
Baud Rate	Fixed 9600	Terminal Setup Mode	Terminal Setup Mode	Configuration File

Pump Control				
	K800™ Hybrid PCT	**PCM**	**UPC**	**DPC**
Address	DIP Switch	DIP Switch	DIP switch (Emulates PCT 1 - 4)	N/A
Baud Rate	Fixed 9600	DIP Switch	Toggle Switch	N/A

> On DIP switch-equipped boards, any change after "power-up" will require a power cycle or reset (if board is equipped).

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4.2 K800™ Hybrid Startup/Configuration

This section describes how to configure and verify that the terminal is functional.

4.2.1 Configuration (DIP Switches & Jumper)

Jumper #1

Set Jmp1 to the AMX position.

Switch #1

Positions 1-4: Place the pump/dispenser in manual override.

Positions 5-8: These are set to match the electrical output of the pulser attached. Active pulsers supply a low-voltage signal to the PCT board. Passive pulsers either contain switch contacts or have **open collector** transistor outputs.

Switch #1 Positions 1-8			
Switch Position	Pump Position	Description	Setting
1	1	Normal Operation	OPEN
		Manual Override	CLOSED
2	2	Normal Operation	OPEN
		Manual Override	CLOSED
3	3	Normal Operation	OPEN
		Manual Override	CLOSED
4	4	Normal Operation	OPEN
		Manual Override	CLOSED
5	1	Active	OPEN
		Passive	CLOSED
6	2	Active	OPEN
		Passive	CLOSED
7	3	Active	OPEN
		Passive	CLOSED
8	4	Active	OPEN
		Passive	CLOSED
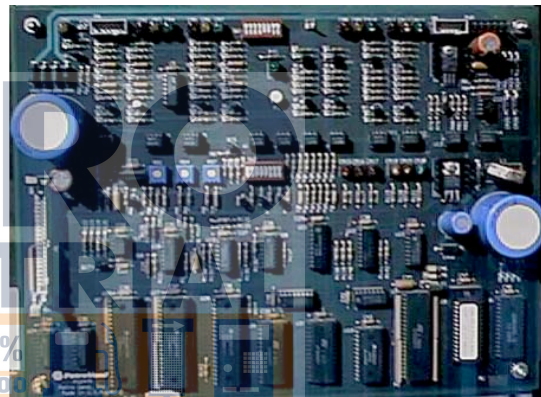
Figure 4-1 K800 Hybrid Switch 1 Settings

Switch #2

Positions 1-3: Determine the Petro-Net™ address for both the FIT and PCT functions of the K800™ Hybrid.

Switch #2 Positions 1-3 (FIT/PCT Address)							
FIT/PCT #1	FIT/PCT #2	FIT/PCT #3	FIT/PCT #4	FIT/PCT #5	FIT/PCT #6	FIT/PCT #7	FIT/PCT #8

Position 4: Defines the type of reader installed on the FIT.

Position 5: Defines if the user will be allowed to enter his card number after three bad reads.

Position 6: Determines which mode the K800™ Hybrid is in Operational or Test

Position 7: Is set to match the type of pulser that is connected. Mechanical pulsers have switches that open and close with each pulse. Electronic pulsers typically have shutter wheels and optical detectors. Mechanical pulsers cannot count as fast and generate more electrical noise. Setting position #7 to "Mechanical" setting filters the input signal.

Position 8: Must always be set to closed.

Switch # 2 Position 4-8			
Switch Position	**Description**		**Setting**
4	Reader Type	ChipKey®	OPEN
		Magnetic Card	CLOSED
5	Manual Card # Entry (after 3 bad reads)	Disabled	OPEN
		Enabled	CLOSED
6	Test Mode	Operational Mode	OPEN
		Test Mode	CLOSED
7	Pulser Type (Pump Positions 1-4)	Mechanical	OPEN
		Passive	CLOSED
8	Must be always CLOSED		CLOSED

4.2.2 Power-Up Test

The K800™ Hybrid terminal displays the software version and reader type, then runs a RAM and EPROM test.

If switch **SW2 position 6** is set to **open**, the system will go into normal operation.

4.2.3 Display Contrast

To compensate for different levels of ambient light, you can adjust the display contrast with controls on the PV247 FIT/PCT board.

Use a small screwdriver to adjust the display contrast potentiometer (middle potentiometer).

4.2.4 FIT Test Mode

The system will enter the test mode upon power-up if the test switch is closed (SW2 position 6). The test mode displays five (5) separate tests.

Press the **<ENTER>** key to select the displayed test or press the **<CLEAR>** key to advance to the next test.

These are the five tests:

- **Keyboard**: Keys pressed are echoed on the display
- **Stop Button**: Test the function of the emergency stop or alpha button
- **Display**: Scrolls characters on the LCD display
- **Reader**: Reads and displays the information coded on the card/key being tested
- **DIP Switch**: shows the state of the eight (8) positions of switch SW2

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4.2.5 PCT Testing

1. Activate the Bypass switch for the first hose position (Switch 1 Position 1).
2. Observe the red "Relay" LED that comes on.
3. Activate the pump/dispenser and watch the yellow "In Use" LED and verify that it comes on after the reset cycle completes and the pump motor/solenoid is energized.
4. Dispense product and watch the green "Pulse" LED. It should flash as product is dispensed.
5. If everything checks out OK, turn off the bypass switch and repeat for each hose position to which the system is connected.

Pump Position 1	Pump Position 2	Pump Position 3	Pump Position 4
Relay LEDs			
Relay ON (RED)	In-Use (Yellow)	Pulse (Green)	
🔴	🟡	🟢	
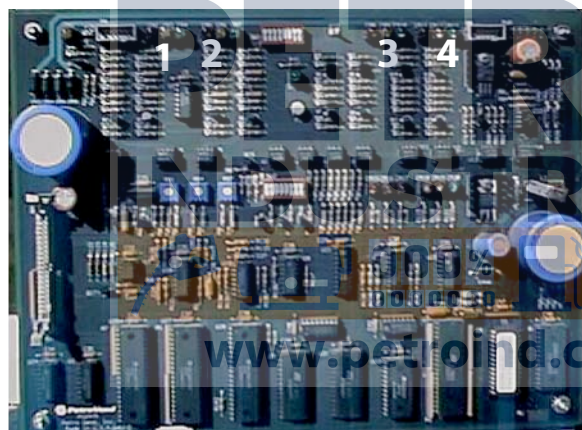
Figure 4-2 Relay Settings

4.3 C/OPT™ Startup/Configuration

This section describes how to configure and verify that the terminal is functional.
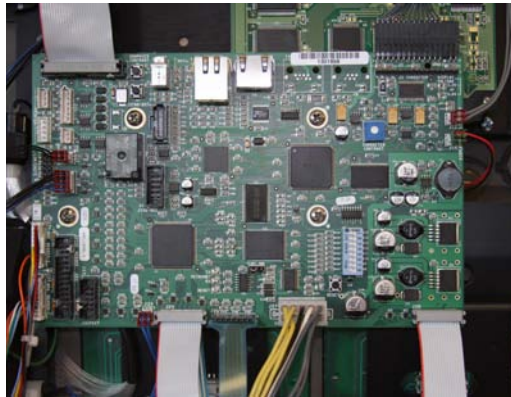
Figure 4-3 Verify C/OPT™ Connections

The configuration parameters for the C/OPT™ are set by placing the unit into the test/setup mode.

Once set, the parameters are retained in non-volatile memory.

- The units are pre-configured at the factory based on the options installed.
- The Petro-Net™ address is set to 1.
- You should not need to change any configuration options unless you have more than one C/OPT™ installed, or you want to change some of the advanced settings.

In which case, refer to the C/OPT™ Setup and Configuration sections to make the necessary changes.

4.3.1 Power-up Test

These tests run automatically after you turn **ON** your C/OPT™. The tests also run before the unit enters test/configuration mode.

Display Initialization. Video RAM test, during which the graphics display shows vertical lines.

System Configuration. In the prompt below, Version is the test/configuration software version.

Keypad type (REG=regular), display type (GRAPH=graphic) and reader type (MOTOR=motorized) are also shown.

Version: 03.01G

REG GRAPH MOTOR

Flash Checksum Test. ROM (read-only memory) test. Display will show:

FlashBoot: ####

Appl: ####

RAM Test. Non-destructive test (that is, when memory is not erased) of the random access memory.

This test takes about 10 seconds; a character "spins" on the display during the test.

- Press **<CLEAR>** to bypass this test.

Depending on how the test ends, you will see one of the following:

BREAK – The (CLEAR) key was pressed.

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```
PASSED - RAM is OK.
ERROR # Test failed at indicated memory location.
```

4.3.2   Display Contrast

To compensate for different levels of ambient light, you can adjust the display contrast with the controls on the upper PC board. Depending on your display type (below) adjust either the **CONTRAST UP/DOWN** switches or the contrast potentiometer.

For systems with the standard graphics display, hold the toggle switch on the lower PC board to the left or right to adjust the contrast. This toggle switch is also used to enter the C/OPT™ Configuration Mode.

If your system has the optional 2 x 20 character display, use a small screwdriver to adjust the potentiometer on the bottom PC board.

4.3.3   C/OPT Receipt Printer Option (p/n 20-4339)

Quantity	P/N	Part
1	75-0124-12V	C/OPT™ Printer 12 VDC
1	20-1679	Modified Data Cable
1	20-1677	Modified Power Cable
1	280-007	Cable Tie
1	50-3203	Adapter Block
2	50-0391	Screw 10-32 x 0.500 PHIL PH ZP
4	50-0229	Screw 8-32 x 5/8 PHIL PANHD
1	54-1106	Thermal Paper 4" Dia. Roll
1	50-2127	Cable Clamp

C/OPT™ Printer Sub-Assembly

OPW P/N 20-6203

*For C/OPT™ Printer (12 VDC)

During receipt-printer installation, please refer to the below image for mounting orientation.

ITEM	PART NUMBER	QTY	DESCRIPTION
1	50-0391	2	SCRW 10-32 X 0.500 PHIL PH ZP
2	50-3203	1	COPT PRINTER ADAPTER BLOCK
3	20-6203	1	COPT PRINTER SUB-ASSY
4	54-1106	1	PAPER THERMAL 4" DIA ROLL
5	50-0229	4	SCRW 8-32 x 5/8 PHIL PANHD
6	50-2127	1	CABLE CLAMP 5/8 INCH
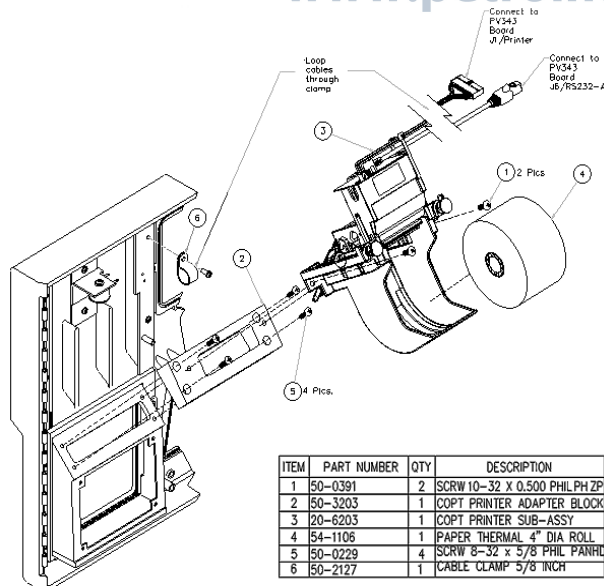
Figure 4-4 C/OPT™ Receipt Printer Assembly

Installing the (optional) C/OPT™ Receipt Printer

1. Position the adapter block on the printer mounting area
2. Screw the adapter block in place using the four supplied 8-32″ x 5/8" PHIL PANHD screws

Observe correct adapter block orientation by referring to Printer Assembly.
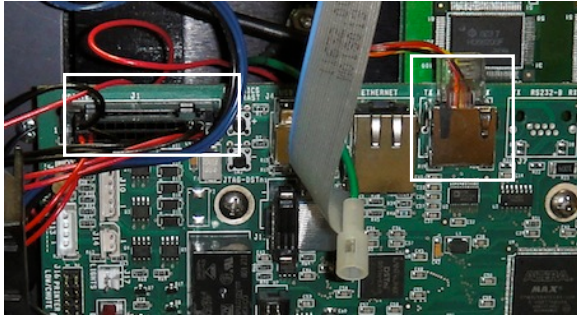
Figure 4-5 Printer Data and Power Cable Connections to PV343 Board

3. Position the printer unit to align with the inner screw holes of the adapter block
4. Mount the printer to the adapter block using the two supplied 10-32″ x 1/2" PHIL PH ZP screws
5. Mount the supplied cable clamp utilizing the screw located above and to the right of the newly installed printer on the enclosure door
6. Route the data cable through the cable clamp and connect the data cable to the PV343 board J1/Printer socket
7. Route the power cable through the cable clamp and connect the power cable to the PV343 board J6/RS232-A socket.
8. Mount the cable clamp securely to the enclosure door using the screw located in Step 5

Receipt Paper Loading Instructions

The optional receipt printer accepts metric-sized thermal paper 2.3″ (58 mm) or 2.4″ (60 mm) width and 4" (101.6 mm) in diameter.

1. Turn ON the C/OPT™ unit by locating the power supply in the left-rear corner of the upper enclosure, via the red toggle switch
2. Remove any packaging material from the roll of paper and place the roll of 4" (101.6 mm) diameter paper in the paper tray

Paper must feed from the TOP of the roll.

3. Feed the paper into the printer by inserting the paper through the paper guide slots. The sensor in the paper guide will detect the paper.
4. Cut off the extra paper appearing in the eject chute by pulling it out
5. Your receipt printer is ready for use

Clearing Paper Jams

In order to clear a paper jam, detach the document that is presently jammed in the eject chute and remove the paper. In order to properly remove the remaining paper in the chute, follow the instructions below:

1. Turn the unit OFF before clearing the paper jam

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2. Press the paper release lever in Figure 4-7 on page 64

Never actuate this lever during printing operation or damage will be caused to the printer head.

3. Manually pull the paper out of the printer chute
4. If paper remains in the print mechanism and the eject chute this can be removed by pulling the right hinge pin (opposite side of the wire routing of the chute sensor)
5. Tilt the printer open
6. Eject the paper by twisting the motor-pinion gear clockwise until the paper is available to be removed manually. See below the image on the left showing the top view of the receipt printer
7. Now that the printer is cleared of the paper jam, tilt and replace the printer mechanism back into normal operating position
8. Secure the printer mechanism by pushing the hinge pin back into its operating position
9. See instructions on loading paper before using the receipt printer
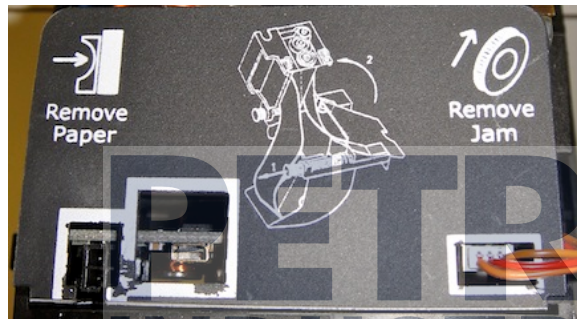
Figure 4-6 Paper Loading Instructions (top view of printer)
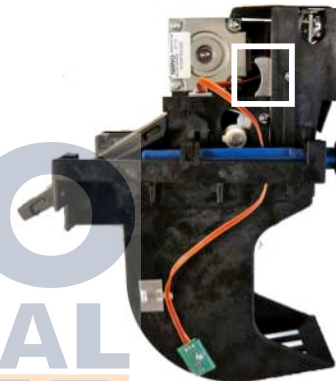
Figure 4-7 Printer Release Lever (side view of printer)

4.3.4 Configuration (Setup/Test Mode)

The C/OPT™ is configured with commands issued through the unit itself. Several of the tests are also self-tests performed automatically at power-up.

When not in Privileged Mode you will only be able to perform a test and/or view settings.

To modify configuration you must be in Privileged Mode.

To easily indentify which commands require Privileged Mode for configuration change, they will be indentified after the command with "Privileged" following it.

1. Password
2. Display
3. Keypad (Configure Optional Alpha Keypad, if installed)
4. Door
5. Reader (Configure Readers Installed)
6. Printer (Configure Receipt Printer)
7. Ports (Configure Petro-Net Communication Parameters)
8. Lights
9. Beeper
10. Poll ID (Configure C/OPT (FIT) Address)
11. Toggle (Configure Miscellaneous Features)
12. Value (Configure Miscellaneous Features)
13. RAM
14. FLASH
15. EPROM
16. VERSION
17. RUN APP
18. FACTORY
19. I/O
20. DEBUG
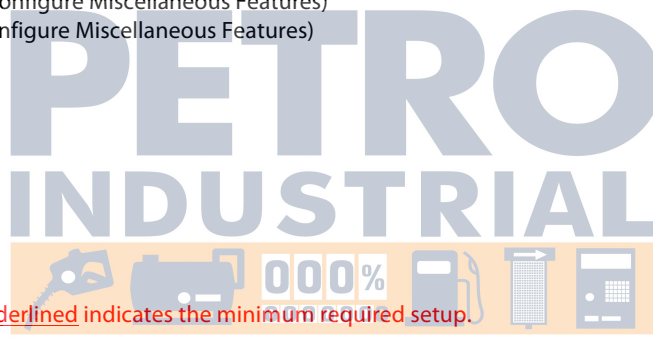
Red & Underlined indicates the minimum required setup.

To Enter Configuration Mode

1. Turn the unit power switch OFF.
2. Hold the CONTRAST UP or DOWN, push button on the PC board.
3. Turn the unit power switch ON.
4. After you hear two beeps, release the button.
5. Unit will cycle through power-up test then show Password screen.

This mode gives you access to the following areas of C/OPT™ operation. Setting most of these functions requires PRIVILEGED access; see "1. PASSWORD" instructions.

1. PASSWORD (Privileged)

You must enter **Privileged Mode** to configure password parameters.

- When the Privileged Mode is ON, the C/OPT™ displays a "P" in the upper-left corner of the display.
- The "P" comes before the title of the menu display.
- When not in Privileged Mode, the Password function prompts for a password entry.
- The factory-set password is **0000,** which you should change as soon as possible.

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- If you enter the wrong password, a 15-digit number appears on the display.
- If you have lost the unit's password, call Petro Vend Tech Support, and supply them with the 15-digit number.
- If you have proper ID, OPW will supply the password for that unit.

In order to **change the password**, you must first enter *Privileged Mode*.

From first powering up, perform the following sequence to change your password.

1.	PASSWORD	press	\<YES\> or \<ENTER\>
2.	Enter: 0000	press	\<ENTER\>
3.	P 1 - PASSWORD	press	\<ENTER\>
4.	PASSWORD Set?	press	\<YES\> or \<ENTER\>
5.	New: (enter up to four (4) digits here}	press	\<ENTER\>
6.	Verify: (re-enter same four (4) digits}	press	\<ENTER\>
7.	Password Changed	press	\<NEXT\>

To leave **Privileged Mode**, you must cycle power to the C/OPT™, or enter the application program with *17 - RUN APP.*

2. DISPLAY

Use this function to adjust the contrast of the display and test the display itself.

Do not change the display SLOPE setting. Press **NO** ONLY!

The C/OPT™ uses three (3) readings to adjust the contrast of the display:

1. The C/OPT™ calculates **Best Contrast** from the display temperature located on the front of the display.
2. The System Contrast is the contrast you set manually by using this Configuration/Test function or by using the switch on the PC Board. The first prompt asks you if you want to manually adjust **System Contrast**:

    ADJUST CONTRAST   press   \<YES\> or \<ENTER\>

    DISPLAY-9

    3=LIGHT 6=DARK

    Adjust contract by pressing 3/Light to brighten or 6/Dark to darken the display.

3. You can also use the graphics contrast SW1 & SW2 to adjust the Graphics Display Contrast or the Character Display Potentiometer on the PC board to adjust the contrast of the Character Display.

    Press \<YES\> or \<ENTER\> to accept entry and move to the Test Fan function.

    FAN OFF

    3 = ON

    6 = OFF

    Press 3/ON to turn ON or 6/OFF to turn OFF the fan.

A small fan can be activated to circulate air around the graphics display to stabilize display contrast.

To enter the [Debug Display] function:

Press **\<YES\>** or **\<ENTER\>** to accept entry. Enabling this feature displays two rows of numbers on the bottom of the graphics display. The numbers (used in troubleshooting the C/OPT)™ are for use by qualified service personnel.

C/OPT™ Debug ON?	press	\<YES\>or \<ENTER\>
To turn OFF the debug display:	enter	\<NO\> at the [Enable Debug?] prompt

Graphic Display ONLY:

You can set the graphics display to show light characters on a dark background, as opposed to the default dark characters on a light background.

Change INVERSE?	press	<YES> or <ENTER>
Disable INVERSE?	press	<NO> or <CLEAR>
To cancel command*	press	<YES>

*The display is now inverted. To invert it again, repeat this procedure.

To enter the [Test Display?] function:

If you press **<YES>** at the *[Test Display?]* prompt, the graphics screen displays all characters of the alphabet, in upper and lower case, along with all punctuation. The characters are written line after line until the screen is filled, at which time the process begins again, overwriting the previous screen.

To end the test, press any key or function button
Then, to move to the **keypad test:** press <NEXT>

3. **KEYPAD (Privileged)**

This test checks the operation of the keys on the standard numeric keypad or the optional alpha keypad (Keypad 2). To begin the test, press **<YES >** or <**ENTER>** at the 3 - KEYPAD prompt.

ALPHA
Change Keypad2? press <YES>

This is telling you an alpha keypad is installed as **KEYPAD 2**, and asking if you want to change it.

To list Alpha, Numeric, Alphanumeric or None: press <NO> or <CLEAR>
When the desired type is shown: press <ENTER> to select it
To test the keys: press <TEST>

Then **press any key** on the keypad **except <ENTER>,** which exits the test mode.

The key you press appears briefly on the display to show you the key is physically and electronically functional.

The top three function buttons appear as F1, F2 or F3. The bottom function button exits the test.

To end the test: press <EXIT> or <CLEAR>
Then, to move to the door test: press <NEXT> or <CLEAR>

4. **DOOR**

This test both checks the operation of the door-position sensors and lets you enable or disable the electromagnetic "catch" that keeps the door open until a transaction is printed or a card is read.

To begin the test: press <YES> or <ENTER> at the *4-DOOR* prompt

P DOOR <YES>
Door flapDoor: OPEN

This is the current position of the door.

Should door stay open: hold 3 for <YES> or 6 for <NO>
Prompt will ask, [Test door?]: Press <YES> to raise and lower door manually, screen

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should show OPEN and CLOSE transition.
To move to the Reader test: press <EXIT> and then <NEXT>

5.   **READER (Privileged)**

This test checks operation of the standard "***push-pull***" card reader. Also, while in **Privileged Mode** you can change what type of reader the C/OPT™ is equipped with.

Use this if you changed from a "***push-pull***" reader to a ChipKey® optical. Use "***push-pull***" for proximity readers.

> P READER YES
> Push-Pull
> Change Reader 1(NO)
>
> **Toggle to Reader2** then press **<YES>**
>
> Push-Pull
> Change Reader? YES

Toggle through types with the **NO** function button, and then press **<ENTER>** to set that type.

If a second reader is not installed, disable Reader 2 by selecting [Reader 2] and type <NONE>.

Part one of this test checks the operation of the two sensors in the card reader:

1.   A front sensor that detects initial card insertion
2.   A back sensor that confirms complete insertion

Check the reader with **no card inserted** and a **card totally inserted**.

To test the sensors and read heads:

> Read SENSORS 1 YES
> Frt = Off Bck = Off EXIT

Or, insert a card into the reader. The status of the sensors should change: **Frt** changes to **ON**; and when the card is all the way in, **Bck** goes **ON** as well.

The prompts are repeated for Reader2 sensors:

> Test READER1 YES
> Testing Reader/
> Insert Card

Insert a card into the reader. The status of each track is displayed:

- **INCORRECT READING** shows a card-read error.
- **CARD ORIENTATION** means no data was obtained from the card—check for proper insertion direction.
- **ORIENTATION** may appear briefly before track data is displayed.

If a good read is done, another screen appears with the data on the card.

Use (1) key (or the LEFT function button) to scroll left. Use (3) key (or the RIGHT function button) to scroll right:

> <- 1 Track 2 ->
>
> 1234567890123456
>
> Press **<ENTER>** (or the EXIT function button) to go to the Reader2 test (if applicable).
>
> Press **<EXIT>** and then **<NEXT>** to move to the Printer test.

6.   **PRINTER (Privileged)**

This test checks the receipt printer:

The first prompt is to *[Change Print?]*

Press **<YES>** or **<ENTER>** to begin the printer configuration.

The next prompt you see is *[Enable Print?]* (Requires Privileged Access)

To disable the printer (prevent it from printing receipts), press **<NO>** or **<CLEAR>** to toggle the status.

Press **<YES>** or **<ENTER>** to accept.

If the printer is enabled, a sample receipt is printed:

Print Test Receipt

```
SYSTEM CONFIGURATION

S/W Ver: 04.02.L
Lib Ver: 01.02I
H/W FPGA 1: 4
H/W FPGA 2: 2
H/W Read 1: 7
H/W Read 2: 7
Rd1: Push-Pull
Rd2: None
KP1: Regular
KP2: Alpha
Display: GRAPHIC
Dsp Cntrst: -11
Dsp Volts : 793
Dsp Temp  : 1023
ID:65, 0x41, A
: 9600,7,E, 1,-,T
Prn Cntrst: -1
Chute: Enabled
Prn Chute : 250
Chute AtoD: 973
Prn Head  : 624
Toggle : ABCD EFGH IJKL MNOP
         1010 1010 1110 1010
Value A:     0    N: 0300
Value B:     0    O:   0
Value C:     0    P:   0
Value D:     0    Q:   0
Value E:     0    R:   0
Value F:     0    S:   0
Value G:     0    T:   0
Value H:     0    U: ****
Value I:     0    V: ****
Value J:     0    W: ****
Value K:     0    X: ****
Value L:     0    Y: ****
Value M: 0 Z: ****
Beeper:4150 Freq4 Duration
Cheksum:9ecd Boot pass431 Appl pass
```

Change Chute

In order to enable or disable the sensor in the printer chute, Privileged Access is required.

Current status is shown with prompt *[To Change?].*

Press **<Yes>** to change status.

Sensors

This part of the test checks the current condition of the three sensors mounted on various parts of the printer assembly. Follow the keystrokes and display sequence below:

Test SENSORS? YES

Paper-Low: YES or NO

If **YES**, the sensor is not seeing enough paper.

Test the sensor by raising and lowering the paper roll from its holder. The reading should change from **NO** to **YES**. Reloading paper in the printer should change the reading to **NO**.

Press **<ENTER>** to move to the next test.

Paper-Out: YES or NO

If **NO**, this sensor sees paper. To test, press the paper release switch and remove the paper from the printer.

Press **<ENTER>** to move to the next test.

Chute: EMPTY or FULL

If chute sensor is disabled, you see **[CHUTE N/A].**

If the sensor is enabled and you see **[EMPTY]** the sensor is not seeing a receipt in the discharge chute.

Push paper from the roll into the receipt chute. The sensor status should change to **FULL**.

Press **<ENTER>** to move to the next test.

Error Message Codes

2	Paper Blocking Printer Chute
4	Temperature Error - Print Head Overheated
8	Printout Lost - Some Error Occurred During Printing Causing a Failure
16	Paper Jam Detected
18	Paper in Chute and Jam Detected
64	Paper Out
72	Paper Out and Print Lost
88	Paper Jam, Printout Lost and Paper Out Detected Conditions
90	Chute Blocked, Paper Jam, Printout Lost and Paper Out Detected Conditions

7. **PORTS (Privileged)**

Use this function to configure COM 1 (Petro-Net™) and to actively test communication flow into and out of the port.

COM 1 DEFAULTS **(SYSTEM2):** 9600, 7, E, 1, --, T

Perform the following sequence to set up the COM 1. (The values shown are system defaults.)

To exit from a screen with no "Exit" key, press **<YES>,** and then answer **<NO>** to the *[Save?]* Prompt.

P PORTS YES or ENTER

COM1   Set?

9600, 7, E, 1,

Press **<YES>** to move from Baud Rate, to Data Bits, to Parity, to Stop Bits, to CTS and, finally, to RTS (each is explained below).

COM1   Baud

9600, 7, E, 1,

Press **<NO>** to toggle through **Baud Rates**. Press **<YES>** to accept value and go to **Data Bits**.

COM1   Data

9600, 7, E, 1,

Press **<NO>** to toggle between 7 and 8 **Data Bits**. Press **<YES>** to accept value and go to **Parity**.

COM1   Parity

9600, 7, E, 1,

Press **<NO>** to toggle through **Parity Choices**. Press **<YES>** to accept value and go to **Stop Bits**.

COM1   Stop

9600, 7, E, 1,

Press **<NO>** to toggle between 1 and 2 **Stop Bits**. Press **<YES>** to accept value and go to **TX-RTS**.

COM1   TX-RTS

9600, 7, E, 1,

Press **<NO>** to enable or disable **TX line control** of RTS signal. Press **<YES>** to accept value. This is the final parameter.

Press **<YES>** or **<ENTER>** to Save; press **<NO>** to Cancel.

The **[TEST?]** prompt will appear. To test communication port press **<YES>;** otherwise, press **<NO>** to exit.

Unit must be disconnected from Petro-Net™ wiring for test to successfully run.

Press **<NEXT>** or **<ENTER>** to move to the next function.

8.   **LIGHTS**

This function selects **[Pocket Light OFF]** or **[Pocket Light ON]**. The pocket light is the light over the keypad. This function also tests the lights.

In **Privileged Mode**, use the following key sequence:

P   LIGHTS YES

LIGHTS: HIGH

3 = HIGH   6 = LOW

HIGH is ON   LOW is OFF

Press function button **<HIGH>** or **<3>**; **<LOW>** or **<6>** to turn light ON or OFF. Then press the **<EXIT>** function button.

Finally, press **<NEXT>** to move to the **[9 - Beeper]** test.

9. **BEEPER (Privileged)**

This function lets you listen to the beeper tone, or change the tone to suit your own preferences. The tone occurs each time a key is pressed.

To confirm operation, a beeper test plays a song through the beeper, or speaker, that is attached to the SPKR connector on the C/OPT™ board.

To set the beeper tone:

> BEEPER YES
>
> Set? YES
>
> Frq: 4150 Dur: 4

These are the current beeper frequency (in Hz) and duration (in system ticks, 61 ticks equals one second).

Enter a new frequency (from 65 Hz to 5000 Hz) and duration (from 1 to 32 ticks). Then press <YES>.

Press the **<TEST>** function key to play a song to test the beeper. When the tune has finished playing, press **<EXIT>** to exit the beeper test and go to the **[Poll ID]** test.

10. **POLL ID (Privileged)**

This function gives the C/OPT™ a unique polling address for access by your fuel site controller.

The FSC3000™ recognizes C/OPT™ Poll IDs according to the following table:

C/OPT™ #	Poll ID
1	65
3	67
4	68
5	32
6	33
7	34
8	35

To change the **Poll ID**, do the following:

> P 9 - POLL ID YES or ENTER
>
> POLL ID Set?
>
> {nnn} , {hhhh} , a YES or ENTER

The "nnn" is a three-digit number. The "hhhh" is the hex-equivalent of the number. The "a" is the ASCII character represented by the three-digit number:

> ASCII #:

Here, enter a number from 000 to 255 and press **<YES>** or **<ENTER>**. The number, hex number and ASCII characters appear.

> {nnn} , { hhhh} Save?

<YES> or **<ENTER>**, and then **<EXIT>** or **<CLEAR>** to move to the **[Toggle]** function.

11. **TOGGLE (Privileged)**

The C/OPT™ has 16 toggles with letters A-P used for special functions. Below is a table defining each toggle's function.

Only system programmers should use toggle functions.

Each toggle can be set **ON** or **OFF**. The default is all switches are set to **OFF**.

To change switch settings:

P 8 – TOGGLE <YES> or <ENTER>

A: Off

To turn Switch A ON, press function button **<SET?>** or **<ENTER>.**

Then, press **<NO>** or **<CLEAR>** to change OFF to ON. Next, press **<YES>** or **<ENTER>** to confirm your choice.

Repeat this process for all required toggle changes, with the process described for Switch A. When done, press **<NEXT>** or to go to the *[Value]* function.

VALUE	DEFAULT	FUNCTION
A	OFF	Remove current date on receipt – Proprietary cards only
B	OFF	Remove current time on receipt – Proprietary cards only
C	OFF	Send Magnetic Card Track 1 data to the fuel site controller
D	OFF	Enable Read/Write ChipKey® support
E	OFF	Enable replace Track 2 with Track 1 function. When enabled, C/OPT™ will only read Track 1 data and modify it to match Track 2 format. All alpha characters are stripped from the data, the STX is converted from a % to ";", and the field separators are changed from "^" to "=".
F	OFF	Enable advance multi-receipt algorithm
G – P	OFF	Not Used – Leave "0"

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12. VALUE (Privileged)

The C/OPT™ has 26 numbers (values) used for addition functions. As the table below indicates, each value is assigned a letter from A to Z.

VALUE	DEFAULT	FUNCTION
A	0	Graphics ID "0" = Standard "1" = Chevron "2" = Irving
B	0	Receipt Copies "0" or "1" = 1 copy "2" thru "x" = 2 to x copies
C	0	Number of Bad Reads before keyboard entry is permitted
D	0	Receipt Symbol "0" or "36" = American Dollar "156" = British Pound
E – F	0	*Not Used – Leave "0"*
G	0	Dedicated Pump Number "0" = prompt for pump #
H	0	Door Delay (seconds)
I – J	0	*Not Used – Leave "0"*
K	0	Time-Out for next receipt (seconds) – Chute sensor must be enabled
L – M	0	*Not Used – Leave "0"*
N – T	0	Network number
U – Z	0	Hidden Network Number

The value can be an integer from 0 to 65535. Codes "N" through "Z" are daily password-protected and additionally codes "U" through "Z" are hidden.

Use <PREV> and <NEXT> to move through the letters.

If a value between N and Z is selected, a 15-digit number appears. Call the OPW Technical Service Department and give them the 15-digit number. They will decode the number and give you the daily system password. Altering these VALUES must be approved by OPW.

> P - VALUE <YES> or <ENTER>
>
> 400 SET?

Press **<YES>** or **<ENTER>**.

> Enter A:

Enter an integer from 0 to 65535, then press the **<ENTER>** key.

> Set?

Press **<YES>** or **<ENTER>**, then press **<NEXT>** or **<ENTER>**. To abort, press **<CANCEL>** or **<CLEAR>.**

> B: 0   etc....

Enter new values as desired. To skip a letter press **<NEXT>**. To leave this mode press **<CANCEL>**.

13. **RAM**

This test performs a non-destructive test of the C/OPT™ random access memory.

To run the RAM test, press **<YES>**. A character spins around to show you the test is in progress. The test lasts about 15 seconds.

When the test is complete you should see **PASSED**, press **<EXIT>** and then **<NEXT>** to move to the *[ROM (BOOT)]* test. If you see **BREAK**, the **CLEAR** key was pressed, interrupting the test. If you see the following **[ERROR {followed by a memory address}]** the RAM test failed.

14. **FLASH**

It performs a *checksum test* of C/OPT™ flash memory. The flash memory test is a checksum test of the boot program and application program.

To check the ROM, press <**YES**>. The test should not take longer than two seconds.

When test is complete, press <**EXIT**> and then <**NEXT**> to move to the [**EPROM**] test.

15. **EPROM**

This test checks the C/OPT™ program by doing a non-destructive test on the erasable programmable read-only memory.

To check the application program, press **<YES>.** The *[Memory is OK]* prompt should appear; the test should not take longer than two (2) seconds.

When test is complete, press **<EXIT>** and then **<NEXT>** to move to the next test.

16. **VERSION**

Displays the version of the test/configuration firmware in the C/OPT™, along with the current system configuration: **keypad type**, **display type** and **card reader type**.

To check the C/OPT™ version, press <**YES**>. Press <**EXIT**>, and then <**NEXT**> to go to *[Run App]* option.

17. **RUN APP**

This function can exit the test mode, and launches the C/OPT™ application program. Or, if using **Privileged Access**, this function is used to allow downloading of the C/OPT™ application software.

For the procedure to download application software, contact OPW Tech Support.

18. **FACTORY (Privileged)**

Restores factory default values to the entire C/OPT™ configurable parameters.

> FACTORY YES
>
> Restore data to factory settings?

Press **<YES>** or **<ENTER>** to restore factory settings, or press **<NO>** to abort. From here, the procedure differs depending on your C/OPT™ software level.

Cycle C/OPT™ power to initiate factory defaults.

19. **I/O**

This is a troubleshooting tool, for OPW service personnel only.

20. **DEBUG**

This is a troubleshooting tool, for OPW service personnel only.

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4.4 FIT500™ Startup/Configuration

This section describes how to configure and verify that the terminal is functional.

The configuration parameters for the FIT500™ are set by putting the unit into the test/setup mode. Once set, the parameters are retained in non-volatile memory.

The units are pre-configured at the factory based on installed options. The Petro-Net™ address is set to 1.

You should not need to change any configuration options unless you have more than one FIT500™ installed, or you want to change some of the advanced settings. In this case, refer to the FIT500™ Setup and Configuration sections to make the necessary changes.
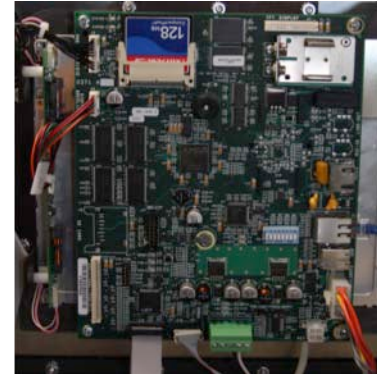
Figure 4-8 Verify FIT500™ Connections

4.4.1 Power-up Test

These tests run automatically after you turn ON your FIT500™. The tests also run before the unit enters test/configuration mode.

- **System Beep:** when unit is first powered-up the system will beep
- **System Windows® CE Boot-Up:** the system will display a quick Windows® CE boot-up screen
- **Boot-Up:** a car with a stoplight will appear for 1 second
- **Download Mode:** the system will then display the download screen and will display the following information: Loading (version)
  FIT(address)(baud rate)

4.4.2 Receipt Printer Paper

The optional receipt printer accepts metric-sized thermal paper.

Maximum paper roll diameter is 4" (102 mm). A prompt displaying *[low paper]* will appear when the diameter of the paper roll is lower than 1.6" (40 mm). Paper-roll width must be 2.3" (59 to 60 mm).

The following figures show how to load a new roll of paper in the printer, followed by step-by-step instructions:
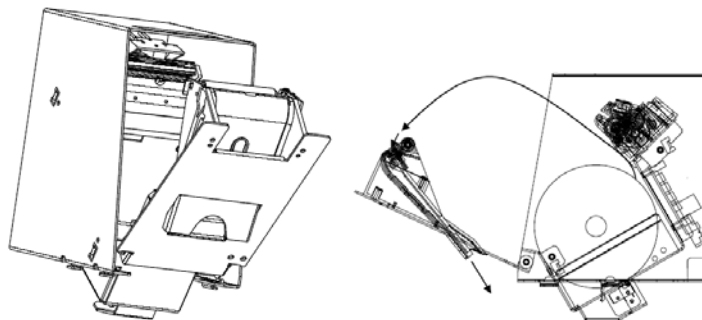
Figure 4-9 FIT500 Receipt Printer

These instructions assume the unit is *open* and turned *ON*. Before first use, remove packing material from around the printer.

1. Pull open the receipt printer door.
2. Remove the core of the preceding roll, if necessary.
3. Place the new roll.
4. Set the paper end through the door chute over the platen.
5. Close the door, keeping the paper end tight to avoid a possible paper loop.

6. Pull the paper end to cut it; the paper is loaded.

4.4.3 FIT500™ Configuration (Setup Mode)

The FIT500™ is configured with commands issued through the unit itself, so there is no need for an external terminal connection to one's fuel site controller to program for most FIT500™ functions.

In order to enter the *Test Mode*, SW1 Pos 1 must be **OFF**.

> **Off** = Test Mode

> **On** = Normal

The terminal displays the software version and reader type, and then runs a RAM and EPROM test. If switch SW2 Pos 6 is set to **Open**, the system will go into *normal operation*.

Petro-Net™

Allows one to configure the FIT500™ address and RS-485 communication parameters.
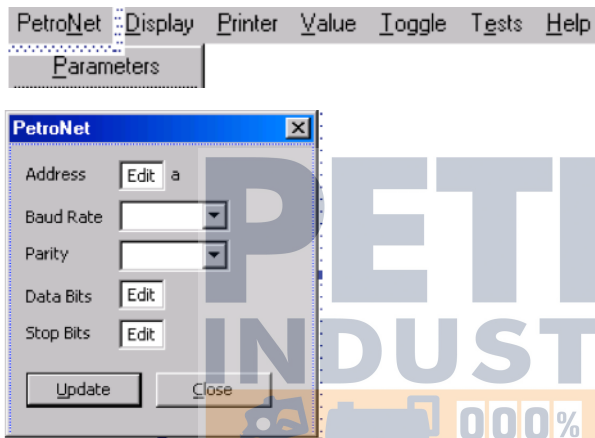
Use table below to set the proper address:

FIT #	Address
1	65
2	66
3	67
4	68
5	32
6	33
7	34
8	35

Set Petro-Net™ communication parameters to match FSC3000™.

Baud	Parity	Data Bits	Stop Bits
9600	Even	7	1

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Display

Allows one to adjust background contrast and display brightness.

Default Display Brightness:

Day: 25

Night: 50

Background (color) will only apply to screens without graphic images.
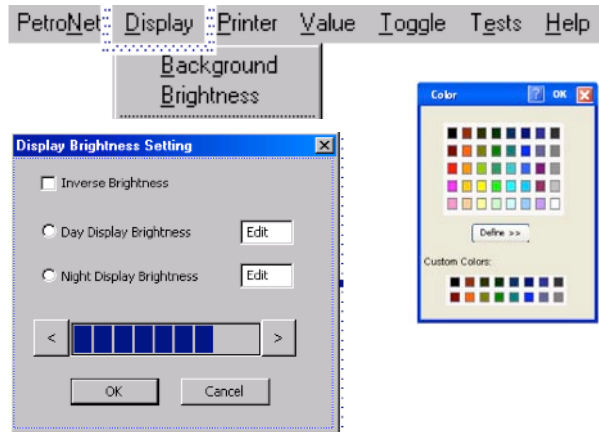
Printer

This function configures the printer.
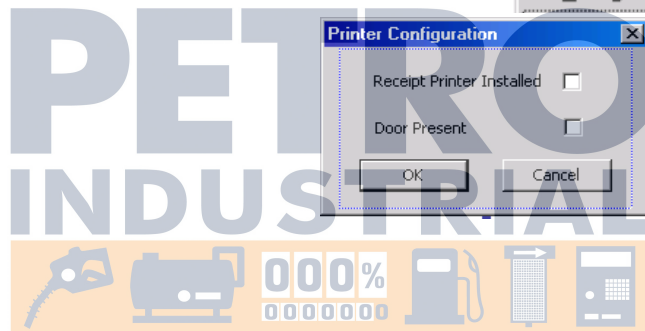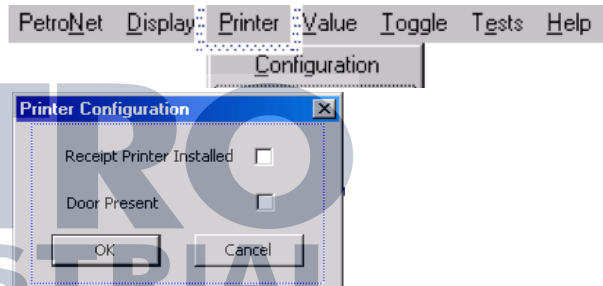
Value

The FIT500™ has 26 values used for special functions.

Below is a table defining each value's function.

All values default to zero.

Value	Function
A	
B	Receipt Copies 0,1 = 1 copy 2-up = that number of copies
C	# of bad reads before permitting keyboard entry of card # 0 = disabled
D	Receipt Symbol 0,36 = $, 156 = £
E - F	Leave 0
G	Dedicated pump number 0 = disable
H – M	Leave 0
N-T	Network Number
U-Z	Network Number (Hidden)
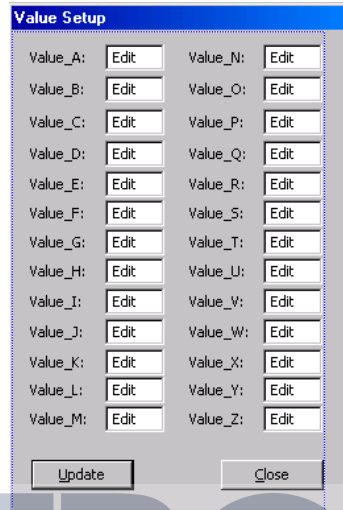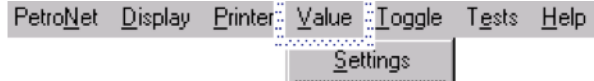
Toggles

The FIT500™ has 16 toggles used for special functions.

Below is a table defining each toggle's function.

All values default to zero.

Value	Function
A	Remove current date on receipt (Proprietary Cards Only)
B	Remove current time on receipt (Proprietary Cards Only)
C	Send Track 1 to FSC3000™
D	Not Used - leave unchecked
E	Leave 0
F-P	Not Used - leave unchecked

Modify toggles as needed.

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4.4.4 Test Mode

The system will enter the test mode upon power-up if the test switch is closed (SW2 position 6). The test mode displays five separate tests. Press the **<ENTER>** key to select the displayed test or press **<CLEAR>** key to advance to the next test.

The FIT500™ has a variety of tests to troubleshoot the system. From this main menu you will be able to select from the following test below:

Display Test

This test checks the operation of the display.

1. Click **Tests→ Display**, from the main menu
2. The system will run through a variety of display tests
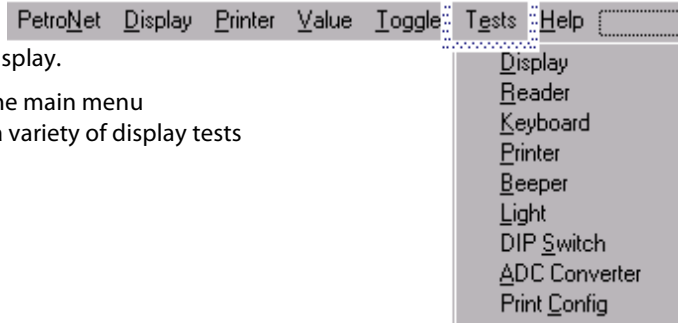
Reader Test

This test checks the operation of the Magnetic reader.

1. Click **Tests→ Reader**, from the main menu
2. Data from Tracks 1 & 2 will be displayed when a card is swiped

Keyboard Test

This test checks the operation of the keys on the standard numeric and/or option alpha keypads.

1. Click **Tests→ Keyboard**, from the main menu
2. When key is pressed the key will be displayed
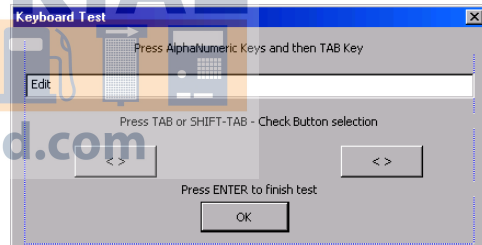
Receipt Printer Test

This test checks the operation of the printer.

1. Click **Tests→ Printer,** from the main menu
2. Press enter to print test receipt
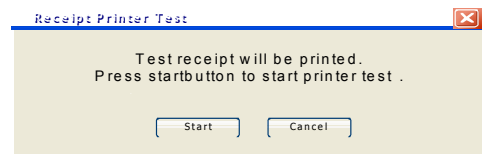
Beeper Test

This test checks the operation of the beeper.

1. Click **Tests→ Beeper**, from the main menu
2. Press enter to turn beeper on for one second
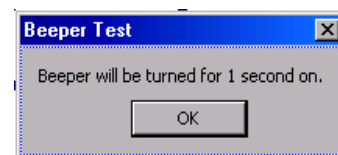
Light Test

This test checks the operation of the card reader and receipt-printer illumination.

1. Click **Tests→ Light**, from the main menu
2. The lights will turn on for two seconds

Light Test

System Lights will be turned for 2 seconds on

Press START button to start the test

Start   Cancel
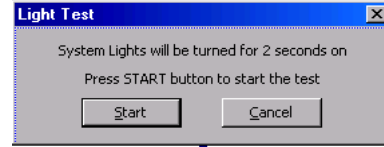
DIP Switch Test

This test checks the operation of the DIP switch SW1 on the main board.

1. Click **Tests→DIP** Switch, from the main menu
2. Displays current switch settings, and when DIP switch is moved, the associated position will change

DIP Switch Test

DIP Switch SW1:

Position 1:   *****   *
Position 2:   *****
Position 3:   *****
Position 4:   *****
Position 5:   *****
Position 6:   *****
Position 7:   *****
Position 8:   *****

OK

* Change of this state causes a system reset
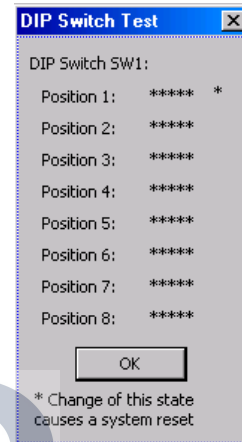
ADC Converter Test

This test checks the operation of the ADC converter.

1. Click **Tests→ ADC Converter**, from the main menu

ADC Converter

Voltage: 3,3 V -->   3,30
Voltage: 5,0 V -->   5,00
Voltage: 24,0 V --> 24,00
Voltage: CPU -->   1,80
Voltage: Battery -->   9,00

System Temperature: 45,55 C

OK

Verify Print Config Test

This test prints the system configuration

1. Click **Tests→ Print Config**, from the main menu
2. The FIT configuration will print out

```
OPT2   CONFIG

Software Versions:
Windows CE.NET Build 4.20.1088
OPT2 Platform          1.01A
OPT2 - Windows CE       1.01B
CYGNAL Application     01.00I
Supervisor              1.01B
Production Package     01.01F
SVstructures            1.01A
OPTPicture             01.00C
startup                 1.01C
OPT2 Configurator       1.01E
OPT2 Application       01.01R
Cygnal Serial Driver   01.01A
Cygnal Driver           1.01C

System Configuration:
Address:               65 A
Baud Rate:             9600
Data Lenght:           7 bit
Parity:                Even
Stop Bits:             1 bit

System Conditions:
Vcc 24 V:              24,07V
Vcc  5 V:               5,06V
Vcc 3.3 V:              3,30V
Vcc CPU:                1,09V
Vcc Battery:           21,72V
Temperature:           26,40C
```

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4.5 PCM Startup/Configuration

This section describes how to configure and verify that the PCM is functional.

Please reference the following images during PCM board configuration:
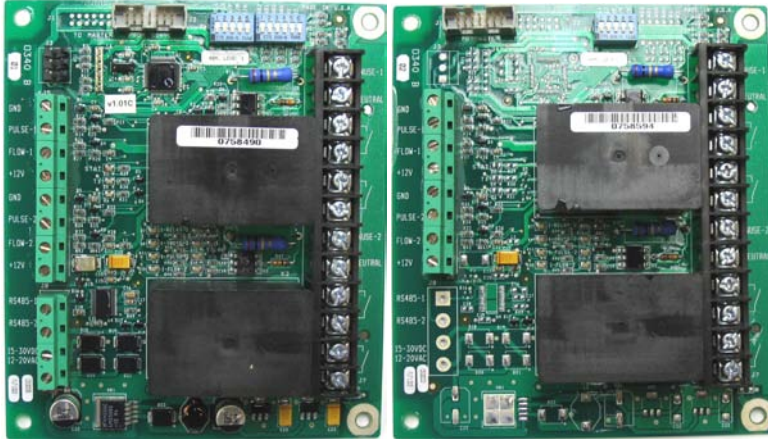
Figure 4-10 PCM Master (left) and Slave (right) Boards

4.5.1 Configuration (DIP Switches)

Switch # 1 Positions 1-5 (Master/Slave Boards)
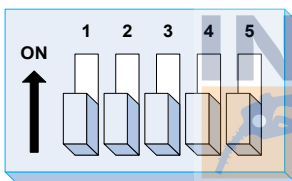
Operation Mode (SW1 Position 1-2): This setting allows the PCM to be placed into one of two operational states. Switch 1 Pos 1 is for Pump Pos 1; and Pos 2 is for Pump Pos 2 of the PCM board.

- During **Normal Operation** relays are energized by the FSC3000
- During **Manual Override** relays are energized by the PCM, which allows the pumps to fuel without FSC3000™ control

Pulser Type (SW 1 Position 3): This setting is set to match the electrical output of the pulser attached. The PCM supports two types of pulsers:

- **Active Pulsers** supply a low-voltage signal to the PCM board
- **Passive Pulsers** either contain switch contacts or have "open collector" transistor outputs

The setting applies to the pulsers for pump positions of the PCM; therefore, both pulsers must be of the same type.

Pulser Filter (SW 1 Position 4): This setting is set to match the type of pulser attached. Mechanical pulses cannot count as fast and generate more electrical noise. By setting the Pulser Filter to Mechanical, the input signal is filtered.

- **Electronic Pulsers** typically have shutter wheels and optical detectors
- **Mechanical Pulsers** have switches that open and close with each pulse

The setting applies to the pulsers for pump positions of the PCM; therefore, both pulsers must be of the same type.

In-Use Sense (SW 1 Position 5): This setting is based on how the pump is wired to inform the PCM that the pump is authorized. The PCM is capable of two types of "in-use" sense.

- **Voltage Sense** is the most common method as it uses a line-voltage return wire from the solenoid valve (or pump motor) wired to the "in-use" terminal on the high-voltage side of the PCM
- **Handle Sense** is the alternate method that uses a contact closure input wired to the "Flow" terminal on the low-voltage side of the PCM

The setting applies to both pump positions of the PCM; therefore, both pumps' "in-use" sense must be the same.

Switch #1 Positions 1-5 (Master/Slave)					
Switch Position	Description	Pump Position		Description	Setting
		Master	Slave		
1	Operational Mode	1	3	Normal Operation	OPEN
				Manual Override	CLOSED
2	Operational Mode	2	4	Normal Operation	OPEN
				Manual Override	CLOSED
3	Pulser Type	1 and 2	3 and 4	Active	OPEN
				Passive	CLOSED
4	Pulser Filter	1 and 2	3 and 4	Electronic	OPEN
				Mechanical	CLOSED
5	In-use Sense	1 and 2	3 and 4	Voltage	OPEN
				Handle Sense	CLOSED

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Switch # 2 Positions 1-6 (Master Board)
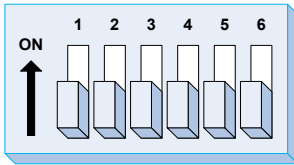
Address (SW 2 Position 1-3): This setting sets the address of the PCM board.

Baud Rate (SW 2 Position 4): This switch allows you to set the Petro-Net™ baud rate.

All devices on Petro-Net™ must be set to the same baud rate.

Factory (SW 2 Position 5-6): Factory use only and must be set to open.

Switch # 2 Positions 1-3 (Master) — PCM (PCT) Address							
PCT #1	PCT #2	PCT #3	PCT #4	PCT #5	PCT #6	PCT #7	PCT #8

Switch #2 Positions 4-6 (Master)		
Switch Position	Description	Setting
4	Baud Rate	9600	OPEN
		1200 PCM Part #20-44-01 thru 20-4404-04 2400 PCM Part #20-44-05 thru 20-4404-08	CLOSED
5	Must be set to OPEN	OPEN
6	Must be set to OPEN	OPEN

4.5.2 PCM Testing

1. Apply power to the FIT powering the PCM board(s) or to the PCM Remote cabinet
2. Activate the bypass switch for the first hose (Switch 1, Position 1) on the Master PCM
3. Observe the red "Relay" LED come on
4. Activate the pump or dispenser and watch the yellow "In Use" LED
   a. It should light when the reset cycle is complete and the pump motor or solenoid valve is activated
5. Dispense product and watch the green "Pulse" LED
   a. It should flash as product is being dispensed
   b. If equipped with a flow switch, the yellow "Flow" LED should light at the same time
6. Turn off the bypass switch
7. Repeat the same process for the second hose on the Master PCM by turning on its bypass switch (Switch 1, Position 2)
8. Repeat the same process for the two hoses on the Slave board
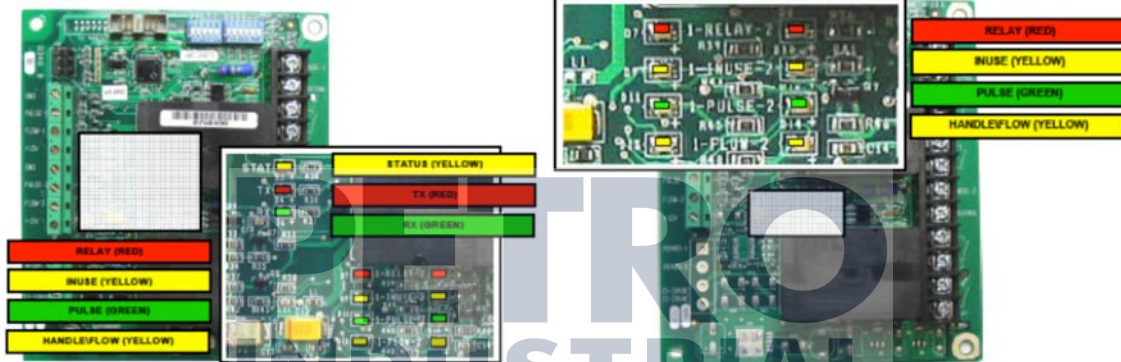
Figure 4-11 Master PCM Board LEDs   Figure 4-12 Slave PCM Board LEDs

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4.6 UPC Startup/Configuration

This section describes how to configure and verify that the UPC is functional.

4.6.1 Configuration (DIP, Toggle Switches, Consoles)

Figure 4-13 UPC Board

Petro-Net™ Baud Rate (Toggle Switch)

Set Toggle to the correct Petro-Net™ Baud setting.

Switch # 1 Battery (Slide Switch)

Set Switch # 1 to ON to activate battery, which preserves UPC data during power failure.

Switch # 2 Positions 1-4, 8 (Gilbarco and Wayne)
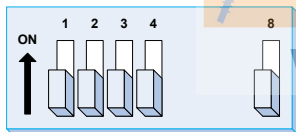
PCT Emulation (SW2 Position 1-4): This setting allows the UPC to emulate 1 to 4 PCT positions simultaneously.

- The first-lowest PCT number emulated will map to the first eight (8) positions (1-8) of the console
- The next-lowest PCT emulated will map to the next eight (8) positions (9-16) of the console

Any K800™ Hybrid PCM must not be set up with the address as the emulated PCT.

- **UPC Light Test** (SW 2 Position 8): Tests the lights on the UPC. Be sure to disconnect UPC from Petro-Net™ when performing this test or the entire Petro-Net™ will be non-operational

Switch # 2 Positions 5-7 (Gilbarco-specific)

Unused (SW 2 Position 5): Not used and must be set to *Open*.

Method of Payment (SW 2 Position 6): This setting defines the Method of Payment with the 2400 Plus console.

- **Cash (Open):** Transactions use cash pricing
- **Credit (Closed)**: Transactions use credit pricing

Unused (SW 2 Position 7): Not used and must be set to Open

Switch # 2 Positions 5-7 (Gilbarco-specific)	
MOP CASH	MOP CREDIT
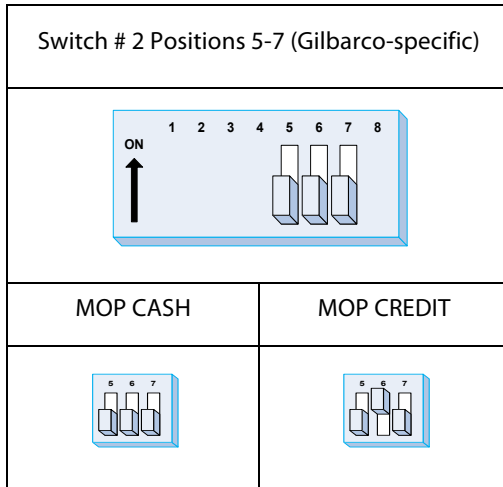
The TS-1000 works with up to 16 products in four (4) modes for a total of 64 grades. Each grade can have its own price; each product can have up to four (4) unit prices.

Configure the FSC3000™ to have the same prices, names and measuring units as used in the Gilbarco product table.

FSC3000™ "*fuel type*" is equivalent to a Gilbarco "*grade*."

The values for *"pump number*," "fuel type" and "maximum fueling quantity per transaction" must also be programmed for the FSC3000™.

During a *cold start*, the UPC polls the pump map of the TS-1000 controller to determine which products are assigned to which pumps and fueling positions.

Gilbarco TS-1000 Configuration

Use Function 86 to program the TS-1000 options as described below. Options not listed are not used for UPC operations.

DEAUTHORIZATION TIME OUT	If the Pump Handle Timer is not pro-grammed, the timer on the UPC is used
MEMORY MODE	Single memory
PRINTER ON AUTO DEMAND	On demand
REMOTE COMM SECRET CODE	Change to '12345'
PREARM ALERT	Disabled
REMOTE COMM BAUD RATE	1,200 baud
GALLONS/LITERS	Can be either
3RD PAYMENT KEY PRICE LEVEL	Can be either
CONSOLE CASH KEY	Local
CONSOLE CREDIT KEY	LOCAL
CONSOLE 3RD PAYMENT KEY	DISABLED

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Gilbarco UPC Status Lights

LED	INDICATION	"NORMAL" STATE
RESET	UPC RESETTING	ON BRIEFLY AT POWER-UP; OTHERWISE OFF
PETRO-NET™ RTS	REQUEST TO SEND DATA	FLASHING
PETRO-NET™ DATA	TRANSMITTING	FLASHING
CONSOLE TX	TRANSMITTING	FLASHING
CONSOLE RX	RECEIVING	FLASHING
CONSOLE RTS	REQUEST TO SEND DATA	ON
CONSOLE CTS	CLEAR TO SEND DATA	FLASHING SLOWLY
STATUS 1	CPU OPERATION	FLASH AT POWER-UP; OTHERWISE OFF
STATUS 2	CPU OPERATION	FLASH AT POWER-UP; OTHERWISE OFF

Switch # 2 Positions 5-7 (Wayne-specific)

Power Fail Recovery (SW 2 Position 5): This setting sets how the console will handle a transaction during a power failure.

Console Cleared (Open): Transactions in progress during a power failure will remain unpaid until cleared on the console.

Manual Override (Closed): Transaction in progress during a power failure will be cashed out automatically after power is restored.

Method of Payment (SW 2 Position 6): This setting defines the Method of Payment with the 2400 Plus console.

Cash (Open): Transactions use cash pricing and are stored in the cash Outdoor card payment Terminal bin.

Credit (Closed): Transactions use credit pricing and are stored in the credit Outdoor card payment Terminal bin.

Operation Mode (SW 2 Position 7): Used for factory use only and must be set to Open.

Attended (Open): UPC is set up for attended operations, which will allow transactions to be authorized by the FSC3000™ or Wayne console.

Unattended (Closed): UPC is setup for unattended operations, which will allow transactions to be authorized only by the FSC3000™.

Switch # 2 Positions 5-7 (Wayne-specific)							
PF Cleared MOP Cash Attended	PF Cleared MOP Cash Unattended	PF Cleared MOP Credit Attended	PF Cleared MOP Credit Unattended	PF Override Cash Attended	PF Override Cash Unattended	F Override MOP Credit Attended	PF Override MOP Credit Unattended

Configuring Blended Pumps: In order to include blending pumps, use a console to assign the tank-to-fueling point, blend ratio-to-grade and grade-to-position for the blending pumps. For Decade 2400, use Modes 03, 17 and 18, respectively. For PLUS/2 or PLUS/3, use the appropriate selections in the Pump Control Menu.

PCT Position Configuration: Assign Wayne grades to FSC3000™ hoses in the same order as the Wayne system positions. If the pump has fewer than four (4) grades, leave the remaining FSC3000™ hoses undefined. Note that unused Wayne positions should be skipped.

Transaction Pricing: Wayne prices are displayed at the pump. If the FSC3000™ is programmed with different prices, the total cost recorded by the FSC3000™ will be different than the total cost displayed at the pump. This may violate local weights and measures regulations.

Do not use "stacked" sales on the Wayne console.

Wayne UPC Status Lights

LED	INDICATION	"NORMAL" STATE
RESET	UPC RESETTING	ON BRIEFLY AT POWER-UP; OTHERWISE OFF
PETRO-NET™ RTS	REQUEST TO SEND DATA	FLASHING
PETRO-NET™ DATA	TRANSMITTING	VERY FAST FLASHING
CONSOLE TX	TRANSMITTING	FLASHING – DURING TRANSACTION
CONSOLE RX	RECEIVING	FLASHING – DURING TRANSACTION
CONSOLE RTS	REQUEST TO SEND DATA	ON
CONSOLE CTS	CLEAR TO SEND DATA	FLASHING SLOWLY.
STATUS 1	CPU OPERATION	FLASH AT POWER-UP; OTHERWISE OFF
STATUS 2	CPU OPERATION	FLASH AT POWER-UP; OTHERWISE OFF

Power-up Test: Plug the UPC power cord into an AC wall socket. The POWER switch is on the back of the unit.

Battery Activation: Be sure Switch 1 inside the UPC is **ON**. This activates the battery, preserving UPC data during a power failure.

Cold Start: Switch 3 is the "cold start" button. If this button is held in while the UPC power is turned on,

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the UPC polls the FSC3000™ for pump and product data. This is a "cold start."

You must cold start the UPC when it is first powered up and anytime pumps are added, deleted or reassigned. When cold-starting the UPC, the battery must be on, the console must be powered up and all pumps must be inactive (handles off and not authorized).

Continue pressing Switch 3 until the front panel status lights begin to flash.

Unattended Fueling Operation with the UPC: For unattended fueling, a customer inserts a card into the reader of the Petro Vend System, enters optional data at the keyboard (PIN, and/or odometer reading) and selects a pump.

If the selected pump is available, then it is authorized by the UPC. If the customer selects a pump that is in service or out of order, they are requested to select another pump [**Pump Handle, Re-Enter**].

The customer cannot preset a limit for the fuel. The pump cannot be reauthorized until the UPC transaction terminates.

When the transaction terminates, it is recorded by the FSC3000™. The FSC3000™ fuel price is used to calculate the cost of the transaction.

Attended Fueling Operation with the Console: When the pump nozzle is removed and the pump handle lifted, the corresponding light and beeper on the console signal the cashier to authorize the pump. Fueling cannot begin until authorization is granted.

If the pump is pre-authorized (pre-paid) by the console, it is not available to the FSC3000™ customer.

The FSC3000™ records only the transactions it authorizes.

Pump Handle, Re-Enter: Message: The FSC3000™ usually displays [**Pump Handle, Re-Enter**] when a customer tries to select a pump and the UPC cannot authorize the dispenser. The following are some possibilities why the pump would not authorize.

- Dispenser is not in an "idle" state
- Console has all pumps in emergency stop or all stop
- Authorization amount (dollar or volume) is too large – exceeds console limit
- Authorization amount (dollar or volume) is too small
- Invalid dispenser number
- Console setup Preset post-pay (not allowed)
- Pump has Invalid price setting (e.g., $0.00)
- Pump already Pre-authorized
- Preset Sales is disabled on pump controller/console

4.7 DPC Startup/Configuration

DPC configuration was completed during installation. Verify configuration is correct by referencing the DPC installation section. There is no preliminary testing that can be done with the DPC. The DPC will only be able to be verified when configuration of the FSC3000™ is complete.

4.8 FSC3000™ Configuration and Testing

4.8.1 Cold Start

The FSC3000™ performs a **COLD START** the first time it powers up. This initializes the system and sets all the parameters to their default values. One of the defaults is to enable FIT 1 and PCT 1 positions 1 and 2 for testing. The FSC3000™ must then be configured with the site-specific information using ARTWare™ or Command Line Programming.

4.8.2 Forced Cold Start

The FSC3000™ can be restored back to factory defaults any time by performing a forced cold start.

All card records and transaction data will be erased. Be sure this is the desired outcome before executing this procedure.

1. Remove the power cord from the back of the FSC3000™.
2. **Press and hold** both front panel buttons while simultaneously plugging the power cord back into the FSC3000™.
3. Wait for a beep. Release panel buttons. The display will show **COLD START**.
4. Verify the system is operational.

4.8.3 Configuration

ARTWare™

ARTWare™ is a Windows® PC-based configuration utility that simplifies the programming of the FSC3000™. ARTWare™ can be used in an online or off-line mode. In the online mode, changes to the configuration are made immediately. In the off-line mode, changes will be downloaded to the FSC3000™ when a connection is established.

ARTWare™ also creates backup data files for the configuration parameters, which are useful if the FSC3000™ ever needs to be restored.

ARTWare™ supports a direct serial-wired connection, a remote modem connection or an Ethernet connection.

Command Line Configuration

You can also program the FSC3000™ using the Command Line Configuration Guide. Use HyperTerminal or another terminal emulation program to establish communication with the FSC3000™. Next, type in the desired commands. The Command Line Configuration Guide is located on the Documentation CD, or it can be downloaded from the OPW Global Website (www.opwglobal.com).

4.8.4 FSC3000™ Ethernet Port Setup

Before connecting to the FSC via its Ethernet adapter for card management and polling, you must configure the Ethernet device.

Connecting the FSC to the Network

1. Before attempting to run the configuration utility, connect the FSC to the network using a standard CAT5 network cable
2. Remove the FSC power cable
3. Connect one end of the cable to the device that provides an entry point into the network
4. Connect the other end to the port label "E-NET" on the back of the FSC

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5. Plug the FSC power cable into the controller

Configuring the FSC IP Address

Included on the ARTWare™ installation CD is the software needed to configure the IP address of the Fuel Site Controller's network adapter.

1. Insert the CD and open a Windows® Explorer window to the folder on the CD called "Digi".
2. In this folder is the program called "digiserve.exe".
3. Run this application to configure the device's IP address.
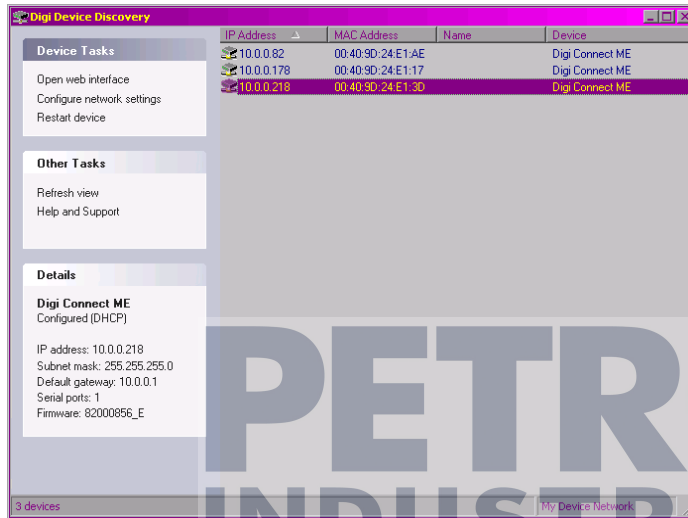
Figure 4-14 Digiserve.exe Window

If an error occurs when attempting to run the application the machine may not have all the files necessary to run the program. In this case, you can run an installation program to install the application. The install can be found in the folder called "Full Install" under the current "Digi" folder.

4. Run the digiserve.exe application. You will see the window shown here.
5. If the device is not seen, click the [**Refresh View**] link in the "Other Tasks" section every couple of seconds until the device appears in the list.
6. Once the device is identified by the Digi Device Discovery program, you can choose to configure the device to have a static IP address or to automatically obtain an address from the DHCP server.
7. With the Digi device selected, click the [**Configure network settings**] option in the [**Device Tasks**] section of the program to configure the IP address.

Because the OPW applications used to configure and manage the FSC require that a specific IP address and port number be entered, OPW recommends configuring the FSC to a static IP, or the DHCP server should be configured to always assign the same IP address to the MAC Address shown.

4.8.5 Bluetooth®, WiFi, Cell Modem Setup

When accessing the FSC3000™ display, verify the proper socket device is installed as indicated:

> 1 = Bluetooth
> 2 = Cell Modem
> 3 = WiFi

Bluetooth® (socket device #1)

1. Notice there are two yellow status lights. The first light will be ON when the FSC3000™ is ready to accept a connection.
2. Set your PC to search for the device. The FSC3000™ will be seen as "FSC3000."
3. Enter the default password "HELLO" to link the FSC3000™ to the PC.
4. Once linked, the second yellow light will turn on and communication will be possible.

Cell Modem (socket device #2)

Not currently available.

WiFi (socket device #3)

1. Connect to the FSC300™ using either a direct-connect serial cable or via the Ethernet port.
2. From the command line, type Set WiFi. The FSC will respond with "WiFi Modem Enabled" and then prompt for the access point name.
3. Enter the name of the WiFi router.
4. The next prompt is the security method, make sure this matches the router, then enter in the security key or pass phrase.
5. The choose DHCP (for dynamic IP) or enter the static IP address.
6. Reset the FSC3000™. The WiFi will automatically connect.

If connection could not be established, double-check router name and security settings.

7. Verify connection by, using a PC connected on the same network, login to the FSC3000™ using a terminal emulation program with the IP address of the socket modem.
8. Once your WiFi connection has been established and verified, you have completed the WiFi setup.

4.8.6 USB Memory Key Operation

A USB memory key can be inserted into the USB port on the FSC3000™. The key can be used for two purposes:

1. It will store transaction data in a format that can be imported into Phoenix™
2. It will process a card update file created by Phoenix™ (This is an optional feature)

FSC3000™ USB Key Setup

The FSC3000™ must be set up to function with the USB key using ARTWare™, or set manually by using the *[Set Journal]* command.

The default Phoenix™ site ID is 000. This setting disables the USB key from recording transactions.

Set the Phoenix™ site ID to the desired number. This number will be stored with each transaction record and imported into Phoenix™ for reporting purposes. Each site should have a unique number to identify where the transaction took place.

USB Key Card Update Operation

The FSC3000™ detects when a key is inserted and displays the message *[USB Key Inserted]*. The FSC3000™ checks to see if the key contains a card update file with a matching site ID. If so, the message *[Processing Card Updates]* will be seen while the FSC is updating the positive card file.

When complete, the card update file is deleted and the display will show *[Card Update Complete – Remove Key]*.

The Key must then be removed. It can be reinserted, or a different key can be inserted to begin storing transaction data.

USB Key Transaction Recording Operation

The FSC3000™ detects when a key is inserted and displays the message *[USB Key Inserted]*. If no card update file is present on the key, the FSC3000™ will use the key to store transactions. If there is an existing transaction file, new transactions will be appended to the file. If no transaction file exists, one will be created. In either case, the message *[USB Key Logging Transactions]* will be displayed.

Removing a USB Key with Recorded Transactions

Never remove the USB key without following these steps first; corrupted data could result.

1. Press one of the function buttons on the FSC3000™ until the *[USB Key Inserted]* message is displayed
2. Press the function key one more time to display the message *[Log All Transactions Now?]*
3. Press the **<No>** (Left) function button to select. The message *[Remove Key?]* is displayed.
4. Select **<Yes>** and wait while the system writes the end-of-file marker to the key. The message *[Please Remove Key]* will be displayed and three beeps will be heard.

Transactions may still take place while the key is removed. The system will store these transactions in the main system buffer until a new key is inserted.

Using a USB Key with Phoenix™

When using Phoenix™ with the USB key features of the FSC3000™, OPW suggests the following procedures:

1. Initial Setup
   a. Open Phoenix™ and select *[Utilities]* from the menu and then select *[Options]*
   b. Click on the *[File Locations]* tab
   c. In the *[Active Database]* frame, click on the text box that shows the *[Default Database Path]*
   d. With the text selected, right click on the text and select *[Copy]*
   e. Open a Windows® Explorer window and paste the copied text into the Address bar at the top of the window and press **Enter**. Or, locate the data folder as shown in the *[Default Database Path]*
   f. Once the path to the Phoenix™ data folder is found, right-click on the Data folder itself and select *[Copy]* from the menu
   g. Right click on your Desktop and select *[Paste Shortcut]* from the menu. This now provides you a direct access path to the Phoenix™ data folder for the following operations.

2. Importing transactions from the USB key into Phoenix™

   a. With the USB key from the FSC plug into your PC, open a Windows® Explorer window to the USB key itself
   b. Locate the file named: *[K2500.trn]*
   c. Right Click on the file and select *[Cut]* from the menu
   d. Open the Shortcut to the Data folder that was created above
   e. From the *[Edit]* menu, select *[Paste]*

> If Windows® prompts you to overwrite this file, answer <**No**> and follow the steps below. Otherwise, skip to step 6.

   f. Open Phoenix™ and from the *[Utilities>Transactions]* menu select *[Import Poll File]*
   g. Once the existing poll file is imported you can start again from step 1
   h. If an error occurs during the import process you must resolve these before moving the new poll file from the key. If not, fueling data may be lost!
   i. Open Phoenix™ and from the *[Utilities>Transactions]* menu select *[Import Poll File]*
   j. You can now return the USB key to the FSC

Loading the Card Update File onto the USB Key

> This is an optional feature on the FSC3000™.

1. As normal, under Phoenix™ select the [**Update Cards**] option from the *[Utilities]* menu. After the update files are created and the [**Update Cards**] dialog box appears allowing you to select the site for update, click *[Cancel]*.
2. Connect the USB key you want use for card updates to your PC
3. Open the Shortcut (created above) to the data and locate the **[CUxxx]** file associated to the site you expect to update, where [xxx] is the FSC3000™'s Phoenix™ site ID

> This Site ID must match the Site ID programmed into the FSC3000™.

4. Right-Click on the desired **[CUxxx]** file and select *[Cut]* from the menu
5. Open a Windows® Explorer Window to the USB key and select *[Paste]* from the [Edit] menu
6. Once the file is copied and can remove the USB key and place it in the FSC to perform the update card

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4.8.7 Journal Printer Setup

The optional Epson Journal Printer comes set correctly from OPW. These are the configuration settings if they ever need to be reset.

Menu Option	Setting	Menu Option	Setting
Page length for tractor	11" (28 cm)	Parity	Even
Skip over perforation	Off	Data length	7 bit
Auto tear off	Off	Parallel I/F mode	Off
Auto line feed	Off	Packet mode	Off
Print direction	UNI-D	Character table	Italic
Software	ESC/p	International character set	USA
0 slash	On	Manual feed wait time	1.5 seconds
High speed draft	Off	Buzzer	Off
I/F mode	Serial	Auto CR	Off
Auto I/F wait time	10 seconds	IBM character table	Table 1
Baud rate	1200	N/A	N/A

4.8.8 System Testing

Once the FSC3000™ has been configured for the site-specific components and operating parameters, the entire system operation must be tested.

FSC3000™	
Verify all connection methods to be utilized by site are functional (direct, modem, Bluetooth®, etc.)	
Verify all FITs, PCMs, UPCs, ePCs are communicating on Petro-Net™.	
Verify all FSC3000™ options required are enabled - (Networks, DPC, transaction/card limits, etc.)	
Verify card buffer is set up to customer needs	
Verify Journal Printer print transactions	
Verify Printer has required information	
Verify system allows/disallows fueling when printer is off	
Verify USB records transaction	
Verify system allows/disallows fueling when USB is removed	
Verify if device is installed on Pass-thru port it is accessible	
Verify if equipped, Price Sign shows correct price	

FIT(s) (K800™ Hybrid, C/OPT™, FIT500™)	FIT #							
	1	2	3	4	5	6	7	8
Verify hardware – Keypad(s), Reader(s), receipt printer work								
Verify receipt Header/Trailer OK								
Verify receipt Body Format - Proprietary Only								
Body Text & position (Set up in FSC3000™)								
Date/Time Stamp (C/OPT™ & FIT500™ setup)								
Verify display Brightness								
Verify display Messages (Set up in FSC3000™)								
Verify FIT if setup is restricted to certain pumps								

Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 1 POS #							
	1	2	3	4	5	6	7	8
Write down associated pump number								
Verify proper pump turns on								
Verify pump timers are set up as required								
Verify maximum quantity is set up as required - Using card with no quantity restriction setup verifies pump turns off when maximum quantity is reached.								
Verify pump records proper amount								

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Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)								
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity								
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag								

Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 2 POS #							
	1	2	3	4	5	6	7	8
Write down associated pump number								
Verify proper pump turns on								
Verify pump timers are set up as required								
Verify maximum quantity is set up as required - Using card with no quantity restriction setup verifies pump turns off when maximum quantity is reached								
Verify pump records proper amount								
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)								
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity								
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag								

Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 3 POS #							
	1	2	3	4	5	6	7	8
Write down associated pump number								
Verify proper pump turns on								
Verify pump timers are set up as required								
Verify maximum quantity is set up as required - Using card with no quantity restriction setup verifies pump turns off when maximum quantity is reached								
Verify pump records proper amount								
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)								
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity								
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag								

| Pump Control | PCT 4 POS # | | | | | | | |
(K800™ Hybrid PCT, PCM, UPC, DPC)	1	2	3	4	5	6	7	8
Write down associated pump number								
Verify proper pump turns on								
Verify pump timers are set up as required								
Verify maximum quantity is set up as required - Using card with no quantity restriction setup verifies pump turns off when maximum quantity is reached								
Verify pump records proper amount								
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)								
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity								
Verify if pump is equipped with PetroLink nozzle reader that pump can be authorized with tag								

| Pump Control | PCT 5 POS # | | | |
(K800™ Hybrid PCT, PCM, UPC, DPC)	1	2	3	4
Write down associated pump number				
Verify proper pump turns on				
Verify pump timers are set up as required				
Verify maximum quantity is set up as required - Using card with no quantity restriction set up verifies pump turns off when maximum quantity is reached				
Verify pump records proper amount				
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)				
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity				
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag				

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Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 6 POS #			
	1	2	3	4
Write down associated pump number				
Verify proper pump turns on				
Verify pump timers are set up as required				
Verify maximum quantity is set up as required - Using card with no quantity restriction set up verifies pump turns off when maximum quantity is reached				
Verify pump records proper amount				
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)				
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity				
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag				

Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 7 POS #			
	1	2	3	4
Write down associated pump number				
Verify proper pump turns on				
Verify pump timers are set up as required				
Verify maximum quantity is set up as required - Using card with no quantity restriction set up verifies pump turns off when maximum quantity is reached				
Verify pump records proper amount				
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)				
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity				
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag				

Pump Control (K800™ Hybrid PCT, PCM, UPC, DPC)	PCT 8 POS #			
	1	2	3	4
Write down associated pump number				
Verify proper pump turns on				
Verify pump timers are set up as required				
Verify maximum quantity is set up as required - Using card with no quantity restriction set up verifies pump turns off when maximum quantity is reached				
Verify pump records proper amount				
Verify Product restriction is set up properly – Set up test card for each product restriction and verify card can only turn on proper pump(s)				
Verify Quantity restriction is set up properly – Set up test card for each quantity restriction and verify card can only pump the restricted quantity				
Verify if pump is equipped with PetroLink™ nozzle reader that pump can be authorized with tag				

Network-enabled systems	
Verify network card can authorize pump	
Verify transaction is recorded correctly	
Verify with network transaction is captured correctly	
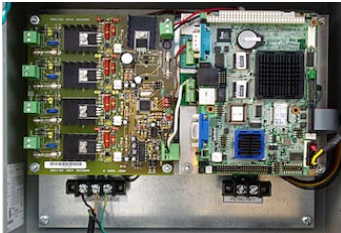
Phoenix™-equipped systems	
Verify Phoenix™ can connect to FSC3000™	
Verify FSC3000™ transaction string is set correctly for polling	
Verify Phoenix™ tables match FSC3000™ tables (products, restrictions, etc.)	
Verify Card update process works	
Verify Polling works	
Verify if Phoenix™ has reconciliation and equipped tank gauge can be polled (Pass-Thru, direct, etc.)	

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5 PetroLink™ Fuel Control System

The PetroLink™ option provides the ultimate in security and accountability by removing driver intervention from the fueling process. A PetroLink™-equipped nozzle reads the vehicle identification when it is inserted into the fill pipe, thus eliminating the need for cards or keys. The vehicle's mileage and/or hours of use are also captured if the vehicle is equipped with a vehicle meter. This information is sent wirelessly to the FSC3000™ to be authenticated. The pump is then automatically activated if the vehicle is identified and the fuel type is correct.

5.1 System Technical Specifications

PetroLink™ Component Specifications

	WCU	Nozzle Reader	Stand-Alone Power Supply for WCU
Cabinet Dimensions	12" H x 13" W x 12" D (30.5 cm x 33 cm x 30.5 cm)	N/A	N/A
Power Requirements	12 VDC	Battery-Powered	115/230 VAC; 50/60 Hz; 50 W Max
Operating Temp. Range	+5°F to +104°F (-15°C to +40°C)	+5°F to +104°F (-15°C to +40°C)	+5°F to +122°F (-15°C to +50°C)
Operating Frequency	2.4 GHz	433.9 MHz	N/A

ePC Specifications

	Pedestal-Mounted ePC	Remote ePC
Cabinet Dimensions	See C/OPT™ or FIT500™ FIT specifications	10" H x 12-1/2" D x 5-11/16" W (25.4 cm x 31.8 cm x 14.4 cm)
Power Requirements	115/230 VAC; 50/60 Hz; 50 W Max	115/230 VAC: 50/60 Hz; 50 W Max
Operating Temp. Range	+5°F to +122°F (-15°C to +50°C)	+5°F to +122°F (-15°C to +50°C)

Handle Monitor Specifications		
	Pedestal-Mounted Mechanical/Electronic	**Remote Mechanical/Electronic**
Cabinet Dimensions	See C/OPT™ or FIT500™ FIT specifications	10" H x 12-1/2" D x 5-11/16" W (25.4 cm x 31.8 cm x 14.4 cm)
Power Requirements	115/230 VAC; 50/60 Hz; 1.0/.06 A	115/230 VAC; 50/60 Hz; 1.0/.06 A
Operating Temp. Range	-40°F - 122°F (-40°C - 50°C)	-40°F - 122°F (-40°C - 50°C)

5.2 PetroLink™ Overview

The PetroLink™ system consists of several components.

The *WCU (Wireless Communication Unit)* is the wireless device that communicates with the *nozzle receivers* and *vehicle meters*. Though most installations require only one (1), up to four (4) WCUs may be installed in large installations.

The *Handle Monitor* informs the *Embedded PetroLink™ Controller (ePC)* to activate the *Nozzle Antenna* (using the WCU) to start searching for an installed *vehicle tag*. The ePC is the PetroLink™ interface to the FSC3000™.

> The **MHM**, or **Mechanical Handle Monitor**, is used with mechanical pumps controlled by K800™ Hybrid PCTs and/or PCMs
>
> - Each MHM can monitor up to four (4) pumps
> - Up to eight (8) MHMs may be installed, allowing a maximum of 32 pumps to be controlled by PetroLink™

The **DPC/EHM**, or **Direct Pump Control/Electronic Handle Monitor**, is used with electronic pumps and performs the function of the handle monitor for electronic pumps, as well as the direct pump control.

> - One DPC/EHM can control and monitor a maximum of 32 pumps

The PetroLink™ option can only handle one type of Handle Monitor (Mechanical or Electronic). On systems with both types of pumps, PetroLink™ can still be used, but it would be limited to the mechanical pumps or electronic pumps.

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5.2.1 PetroLink™ System Overview using Mechanical Handle Monitor
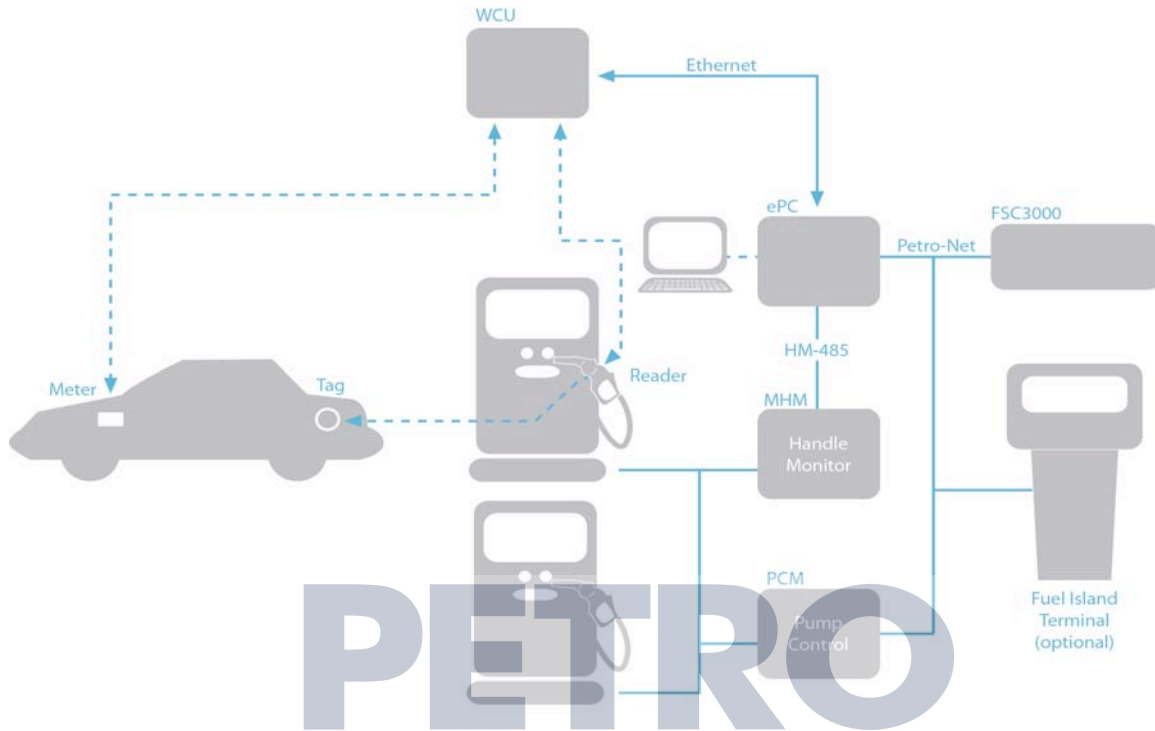
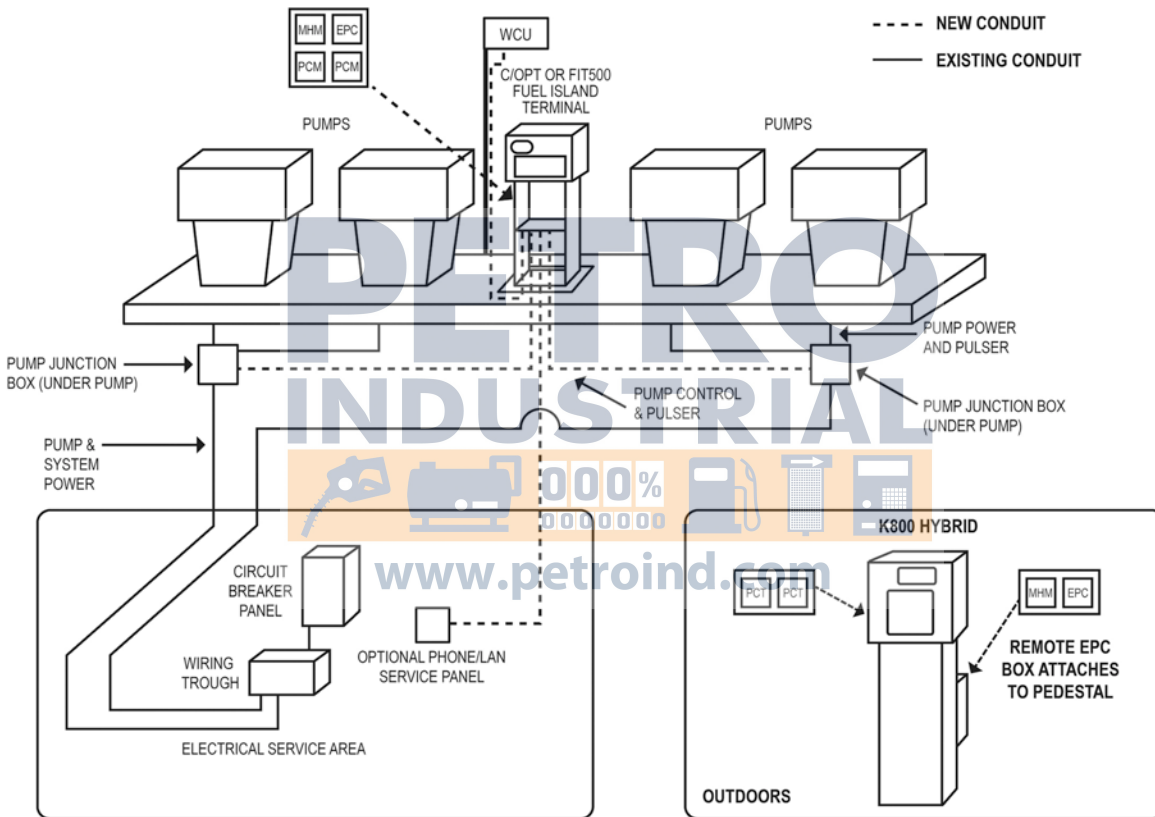### 5.2.2 PetroLink™ System Overview using Electronic Handle Monitor
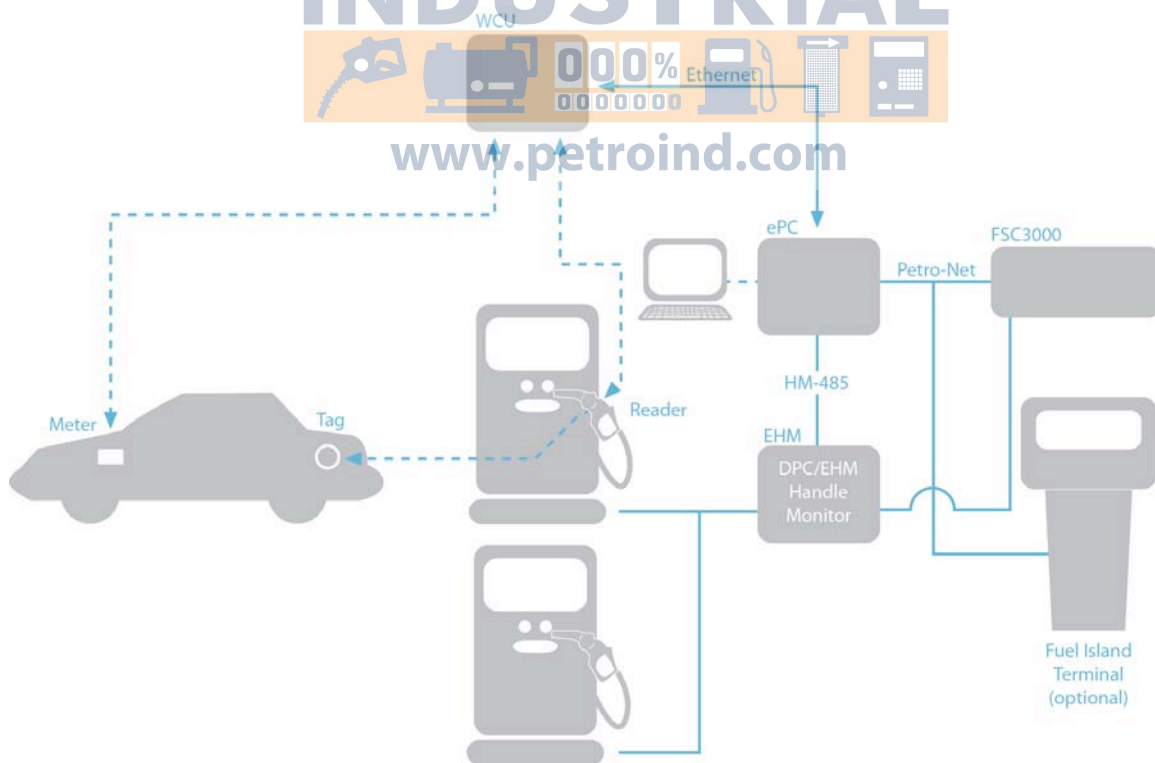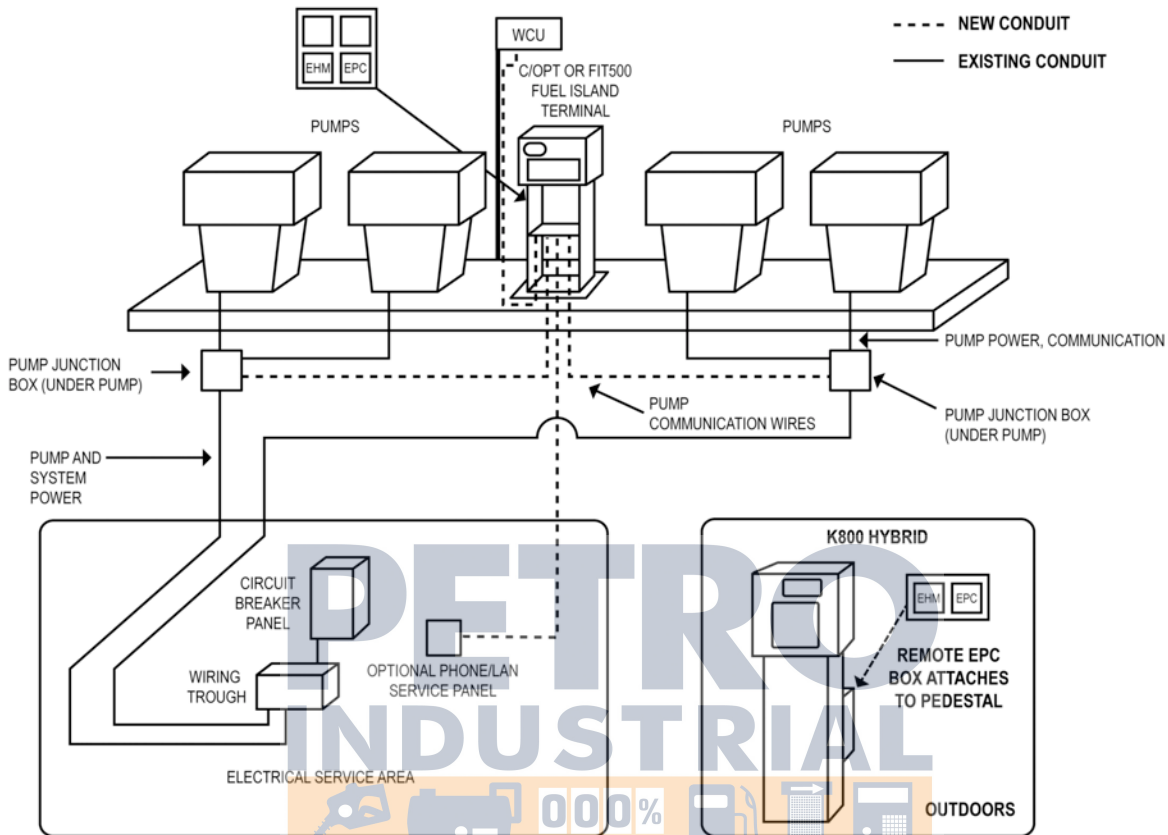
5.3 PetroLink™ Installation

The following diagrams are examples of typical PetroLink™ system installations. Additionally, these may be used as reference in atypical situations as guidelines for PetroLink™ conduit installation.

1. Installation with Integrated FSC3000™ with Mechanical Pump Control and PetroLink™
2. Installation with Integrated FSC3000™ with Electronic Pump Control and PetroLink™
3. Installation with Remote FSC3000™ with Mechanical Pump Control and PetroLink™
4. Installation with Remote FSC3000™ with Electronic Pump Control and PetroLink™

5.3.1 Typical Installation Diagram with Integrated FSC3000™ with Mechanical Pump Control and PetroLink™

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5.3.2 Typical Installation Diagram with Integrated FSC3000™ with Electronic Pump Control and PetroLink™

5.3.3 Typical Installation Diagram with Remote FSC3000™ with Mechanical Pump Control and PetroLink™

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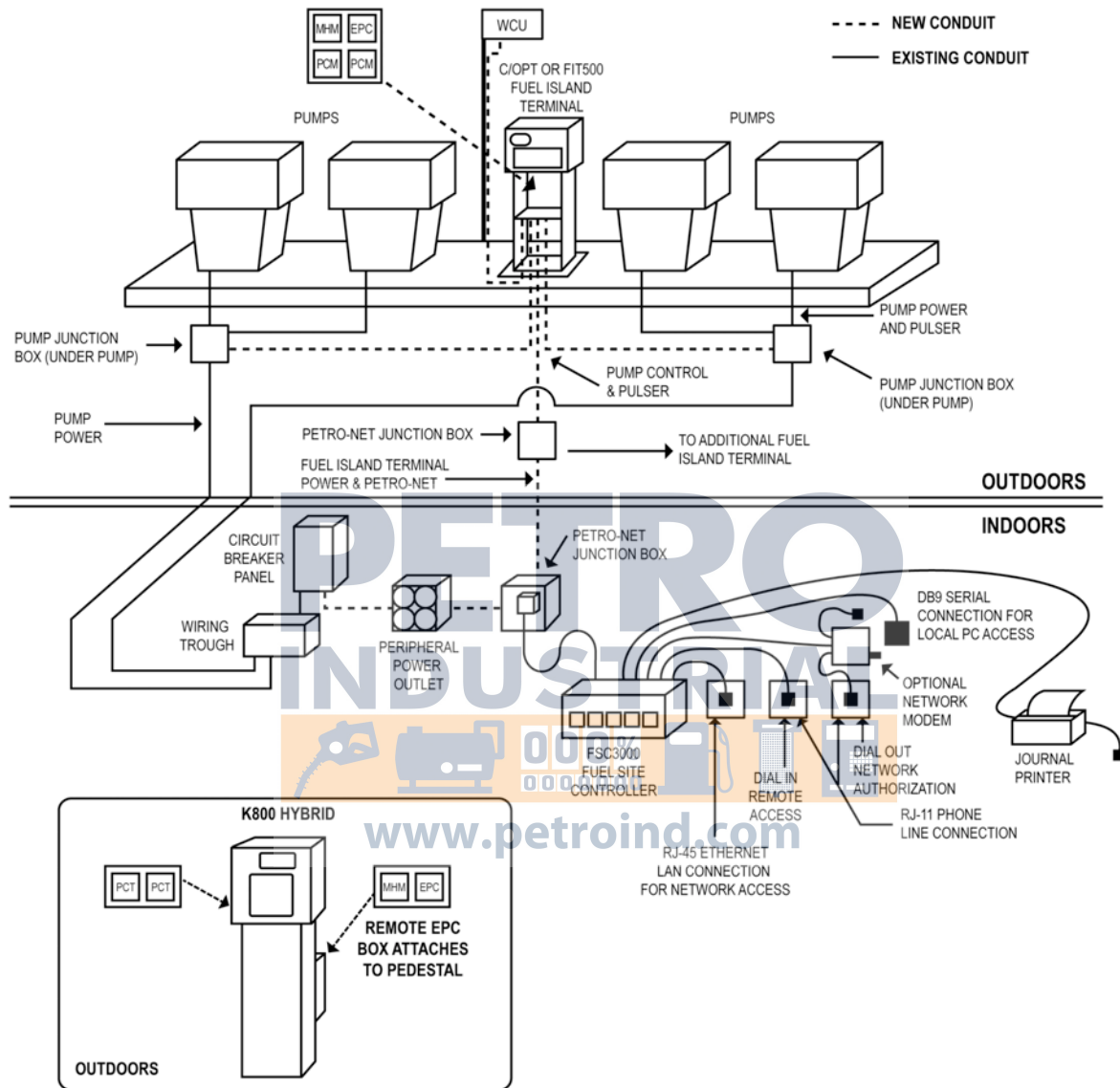
5.3.4 Typical Installation Diagram with Remote FSC3000™ with Electronic Pump Control and PetroLink™
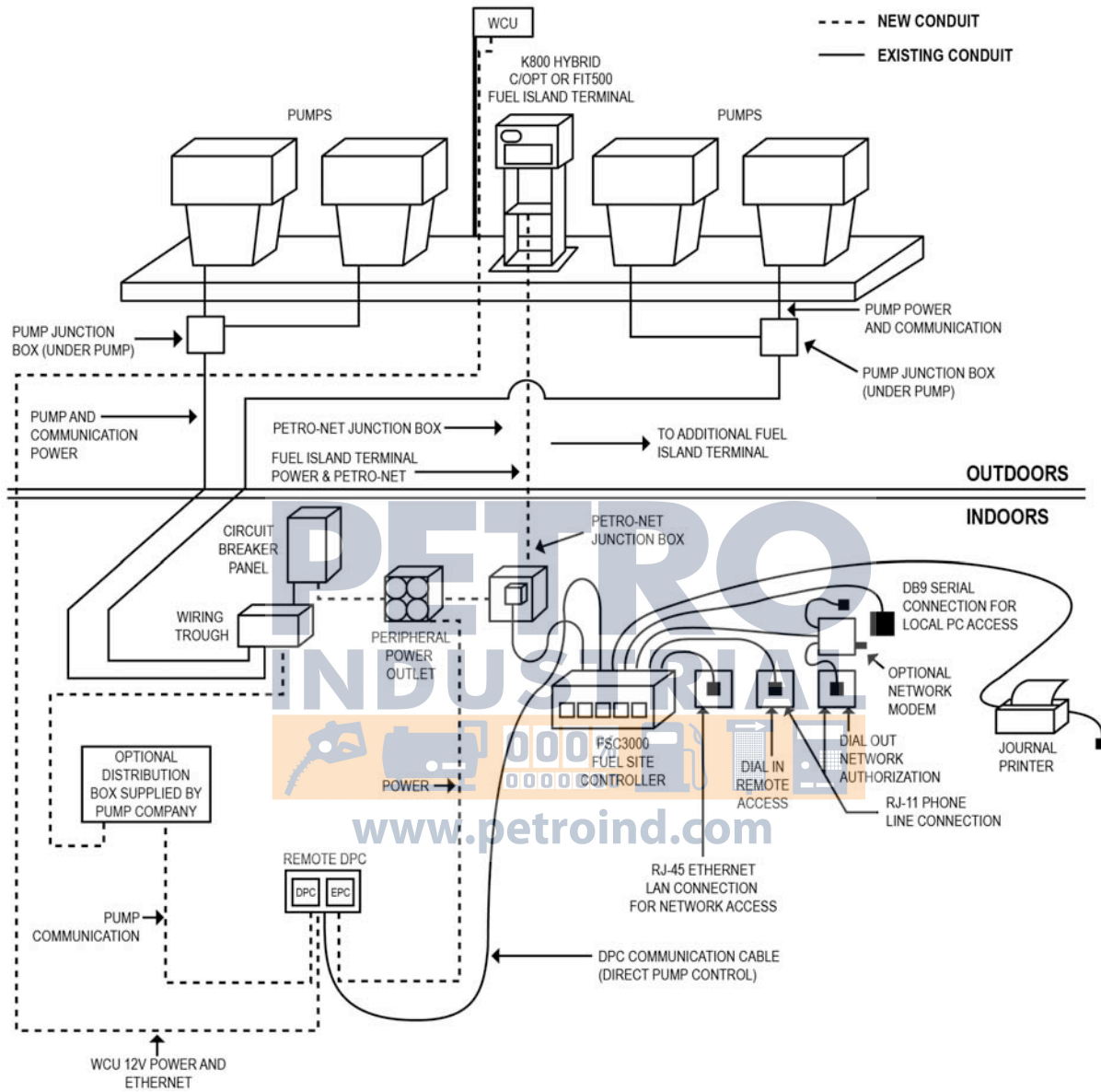
5.3.5 Wiring Requirements

HM-485 Wiring

The Mechanical/Electronic Handle communicates to the ePC using RS-485 protocol called HM-485. HM-485 wiring uses the same wire as Petro-Net™, a twisted-pair of 18-AWG wires that must be twisted together to provide immunity to electrical noise. You can order Petro-Net™ wire from OPW as part number 12-1029.

HM-485 wiring can run a maximum of 5,000' (1,524 m).

WCU Ethernet Wiring

The WCU communicates to the ePC using TCP/IP protocol. The WCU requires CAT5e cable from each WCU and when using more than one WCU will require a 5-port switch (customer supplied). WCU Ethernet cable is limited to 300' (91.4 m); if a longer cable run is required, use repeaters.

WCU Power Wiring

The WCU requires +12 VDC power for each WCU. The WCU power-wire length is limited to the distance defined below:

Wire Sizes	Maximum Wire Length
18 AWG	55' (16.8 meters)
16 AWG	85' (25.9 meters)
14 AWG	135' (41.2 meters)
12 AWG	225' (68.6 meters)
10 AWG	350' (106.7 meters)

For some WCU installations, the use of additional ePC power supplies may be required.

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5.3.6 WCU Installation

WCU Power, Ethernet
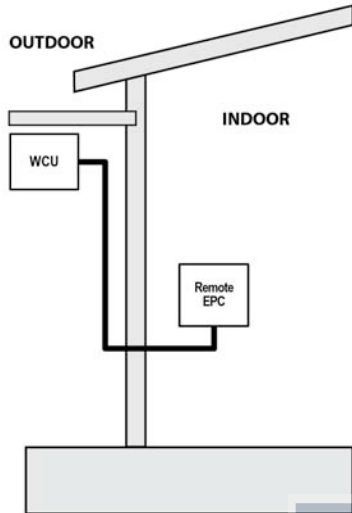
Figure 5-1 Remote ePC   Figure 5-2 Pedestal-mounted ePC   Figure 5-3 Remote ePC (outside)
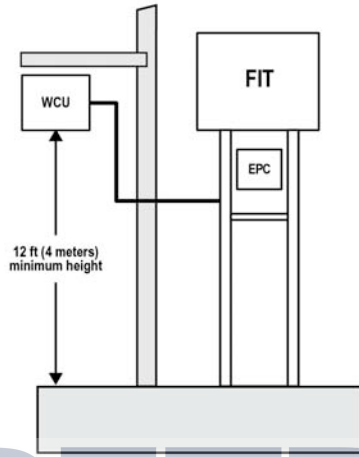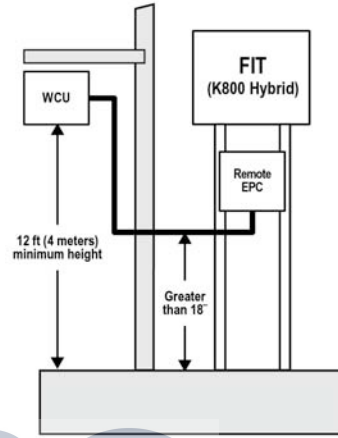
WCU Power/Communication Conduit Requirements

This conduit should run from the ePC to each WCU and may be looped from WCU to WCU. This conduit should only contain the WCU power and Ethernet cable.

Wires	Wire Requirements
WCU Power +12 VDC	Minimum #18 AWG Stranded (Red) – Oil/Gas resistant, Wet Locations*
WCU Power GND	Minimum #18 AWG Stranded (Black) – Oil/Gas resistant, Wet Locations*
WCU Ethernet	CAT5e (one required for each WCU)

See WCU Power Wiring in Section 5.3.5 for proper wire size for wire length.
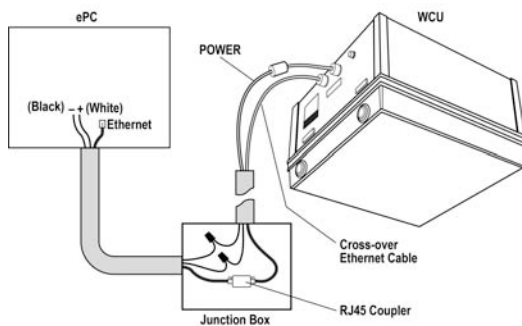
Figure 5-4 WCU Wiring

Determine the WCU Location

The WCU must be installed within 300' (91.4 m) of the ePC. To determine the optimal WCU location, use the following guidelines:

- Install centrally located to all dispensers it will be controlling
- Ensure line-of-sight to the pumps or dispensers
- Install horizontally
- Install approximately 10'-16' (3.1 m - 4.9 m) above the ground
- Install under the station canopy if applicable, otherwise install on a secure 13-foot (4 m) tall pole

WCU Coverage

The diagram below shows the communication range for the WCU.

- For dimension clarification, it is highly recommended to contact OPW Tech Support to determine the optimal mounting location for frequency read
- The distance will vary at each individual site based on the quality of line-of-sight and other environmental conditions
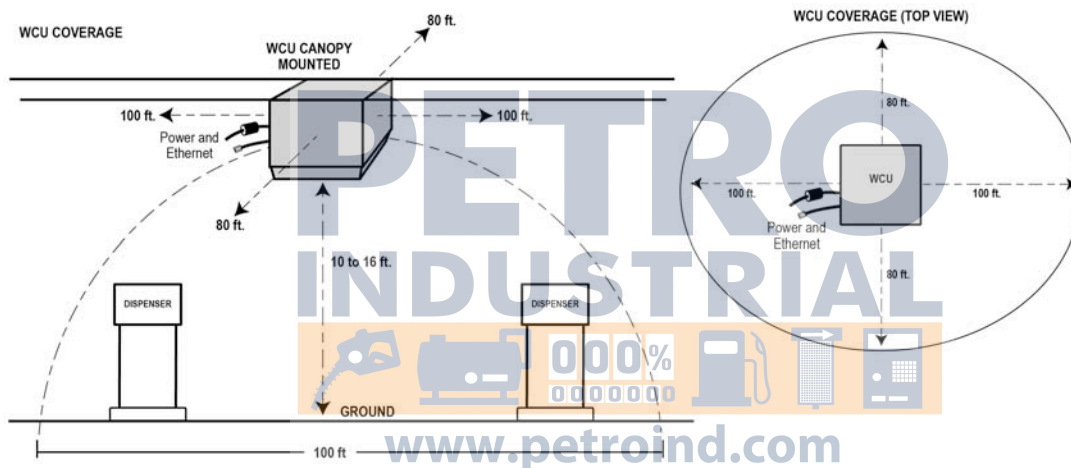
Figure 5-5 WCU Communication Range

The range of reception is greater on the wire-side of the WCU where the wires exit. Orientate the enclosure accordingly.

WCU Mounting

Mount the WCU using the four (4) M4 mounting screws and standard mounting brackets provided.

WCU Conduit Installation

1. Install a 3/4" (1.9 cm) rigid conduit from the WCU junction box to the ePC location (FIT or Remote PCM cabinet). This conduit must be less than 300' (91.4 m) long.
2. From the WCU, insert the CAT5e Ethernet cable and two (2) low-voltage power wires (see wiring conduit/wiring requirement section for proper AWG) into the 3/4" knockout of the junction box. Be sure to use a suitable cable gland.
3. Connect wires to the WCU as shown using the RJ45 Coupler as indicated in Figure 5-4

The Ethernet cable supplied with the WCU is a crossover cable. Do not remove this cable.

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5.3.7 ePC and Handle Monitor Installation

The ePC and Handle Monitor are typically located in the C/OPT™ or FIT500™ pedestal using two of the PCM positions.

1. If the island terminal is a K800™ Hybrid, or if there are more than four (4) mechanical pumps being controlled, the ePC and Handle Monitor can be installed in a remote PCM cabinet.
   - The PetroLink™ power supply is also installed in the same location. It is mounted behind the ePC board.
2. If necessary, mount the Remote PCM cabinet in a convenient location at the island.
   - The cabinet may be mounted to the back of the FIT pedestal by drilling appropriate mounting holes.

Install appropriate conduit from the Remote PCM cabinet to the FIT.

Figure 5-6 ePC with MHM in Remote Cabinet

Figure 5-8 ePC with MHM in Pedestal
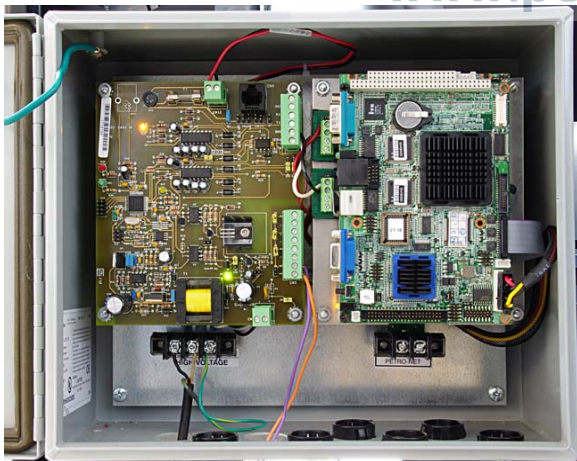
Figure 5-7 ePC with DPC/EHM in Remote Cabinet

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5.3.8 Mechanical Handle Monitor (MHM) Installation Methods

The Mechanical Handle Monitor is used exclusively for the FSC3000™ system with PetroLink™.

The purpose of the Mechanical Handle Monitor is to detect when a fueling hose is removed from its receptacle and the pump handle (if any) is switched to the ON position. It then reports the status back when requested by the EPC.

Each Mechanical Handle Monitor interface can monitor up to four (4) positions, with the system capable of handling eight (8) Handle Monitor interfaces, giving the system the total capability to monitor 32 fueling positions.

The Mechanical Handle Monitor may be installed three (3) possible ways:

- **Remote ePC:** The Mechanical Handle Monitor is installed in the same enclosure as the remote ePC. Using more than four (4) mechanical inputs will require additional MHMs to be installed in a Remote PCM cabinet.
- **Remote MHM**: Mechanical Handle Monitor is installed in Remote PCM cabinet. Normally used when the system pedestal PCM slots are full. Each Remote PCM can handle two (2) MHM boards for up to eight (8) inputs (fueling points).
- **Pedestal MHM:** Mechanical Handle Monitor is installed in pedestal of C/OPT™ or FIT500™. If more than two (2) PCM mounting positions have been utilized then use of Remote HMH will be required.

When using Remote PCMs with only master PCM, Mechanical Handle Monitor may be mounted next to PCM.

Parts Required

Part #	Part Description	Remote ePC (shared)	Remote MHM	Pedestal MHM
20-4409	Remote ePC enclosure	Yes	No	No
20-8225	Remote PCM enclosure	No	Yes	No
20-0611	Mechanical Handle Monitor (MHM)	Yes	Yes	Yes
20-1618	Power Cable (C/OPT™ or FIT500™)	No	No	Yes

Installing MHM (Mechanical Handle Monitor) in an ePC or Remote Enclosure
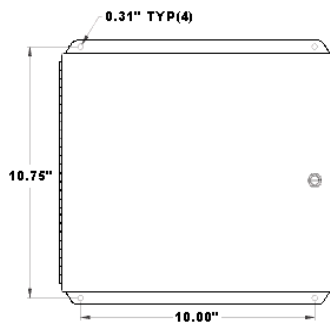
Figure 5-9 Remote Enclosure
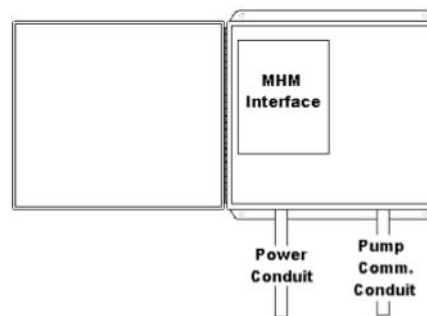
Figure 5-10 MHM Wire Conduit

The MHM must be installed in proximity of the Mechanical Pump control.

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- K800™ Hybrid – on pedestal
- C/OPT™ – on pedestal (use pedestal MHM, if possible)
- FIT500™ – on pedestal (use pedestal MHM, if possible)
- Remote PCM – mount on wall next to remote peripheral equipment cabinet

When enclosure is mounted on pedestal, the enclosure and its conduits must be out of the hazardous area.

1. Install the following 1/2" or 3/4" rigid steel conduits and wires, as applicable:
    a. MHM power source conduit and pull three (3) 14-AWG wires from the breaker panel or terminal power connection
    b. MHM Communication conduit and pull two (2) 18-AWG twisted pair from ePC wires can share MHM power conduit if 600 V-rated
    c. MHM pump handle monitor wire conduit and pull two (2) 18-AWG wires per handle position
2. Mount the MHM on the left-side stand-offs in the enclosure with the four (4) inputs on the left side
3. Remove Connector from CN7 MHM Interface (Mechanical Handle Monitor) board and attach output wiring from the power supply to the connector
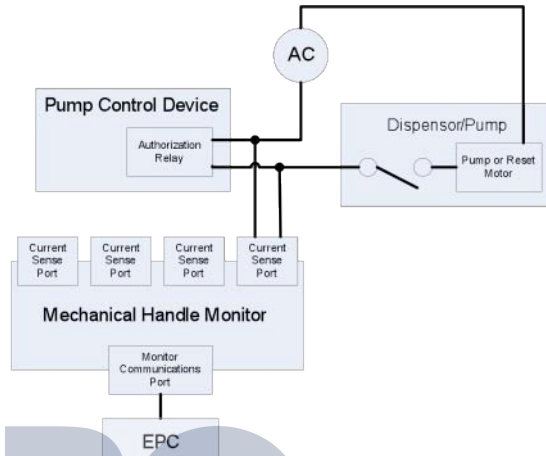
Figure 5-11 MHM Functional Diagram
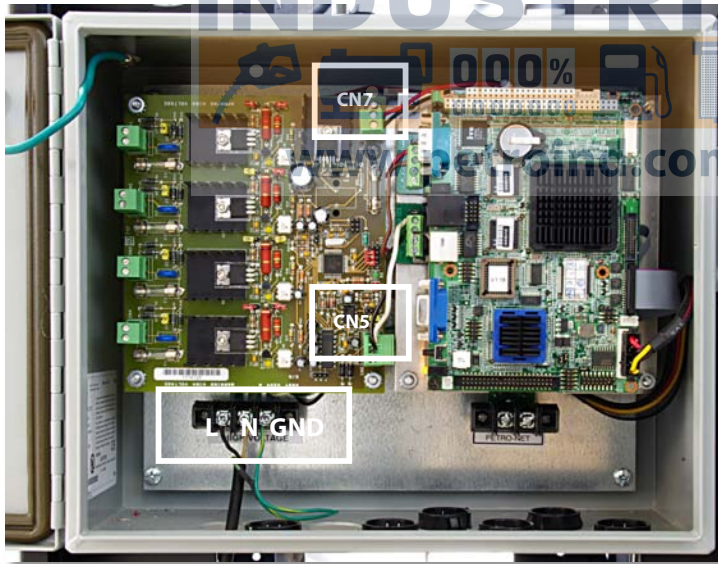
Figure 5-12 MHM in Remote Enclosure

Please note polarity +12 VDC and ground DC.

4. Reconnect connector to CN7 on the MHM Interface
5. Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block
6. Attach MHM communication wires to CN5
7. Attach handle monitoring wires
8. Power ON unit

Installing MHM Interface (Mechanical Handle Monitor) in Terminal Pedestal

During an installation where the FSC3000 is integrated into the terminal, the MHM can be mounted in one of the PCM pedestal mounts.
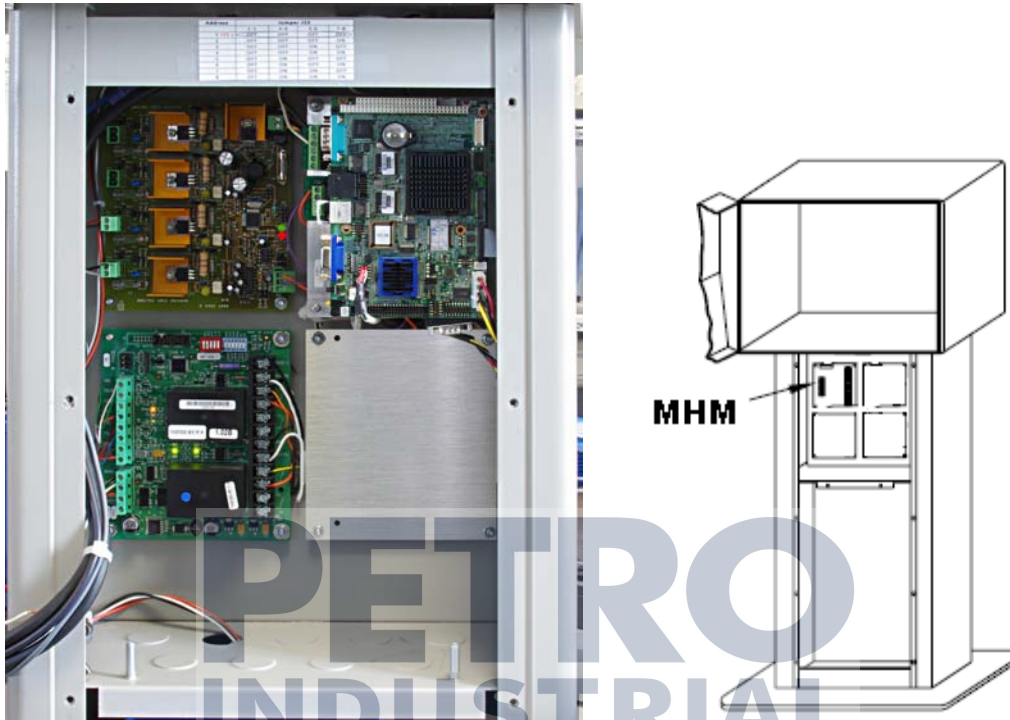
Figure 5-13 MHM in Pedestal

1. Mount the Mechanical Handle Monitor as shown in the above pedestal drawing
2. Remove Connector from CN7 MHM Interface (Mechanical Handle Monitor) board and attach output wiring from the power supply to the connector

Please note polarity +12 VDC and ground DC.

3. Reconnect connector to CN7 on the MHM Interface
4. Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block

Petro-Net™ wires are not used and should be capped.

5. Attach MHM communication wires to CN5
6. Attach handle-monitoring wires
7. Power ON system

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Mechanical Handle Monitor Interface Jumper Setup

Set up jumpers to match type of handle sense being connected.

When a jumper is set as ON, this means the jumper will tie both pins together.

When OFF, the jumper should be set on one pin. Some jumpers have three pins, when the jumper says pins 1-2 this means the jumper should be set on pin 1 and 2 of the three-pin jumper. On three-pin jumpers the board is labeled with which pin is number 1.

Set Jumpers for Address and Communication Parameters as shown below:

Address	Jumper J15			
	1-2	3-4	5-6	7-8
1	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON

Communication	Jumper	
	J22	J23
RS-485	Pins 2-3	Pins 2-3
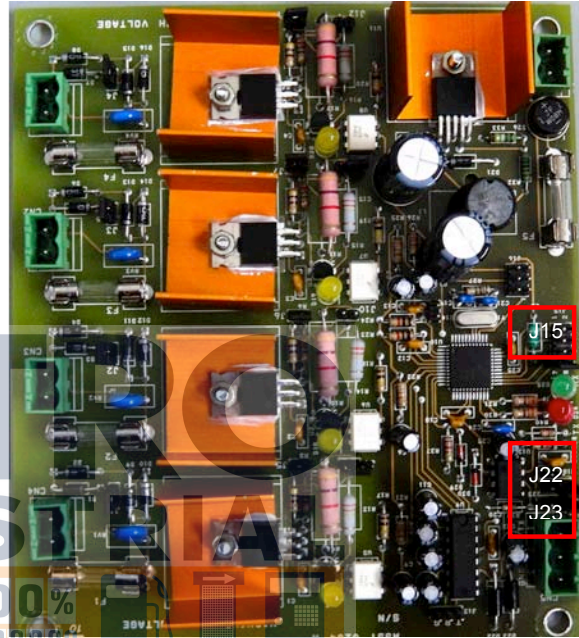
Set Jumpers for Handle Sense

Jumper			OFF	ON
J1	Operation	CN4	DC	AC
J2	Operation	CN3	DC	AC
J3	Operation	CN2	DC	AC
J4	Operation	CN1	DC	AC
J5	Current Source	CN4	10 mA	15 mA
J6	Current Source	CN3	10 mA	15 mA
J7	Current Source	CN2	10 mA	15 mA
J8	Current Source	CN1	10 mA	15 mA
J9	Voltage Range	CN4	90-240	12-90
J10	Voltage Range	CN3	90-240	12-90
J11	Voltage Range	CN2	90-240	12-90
J12	Voltage Range	CN1	90-240	12-90

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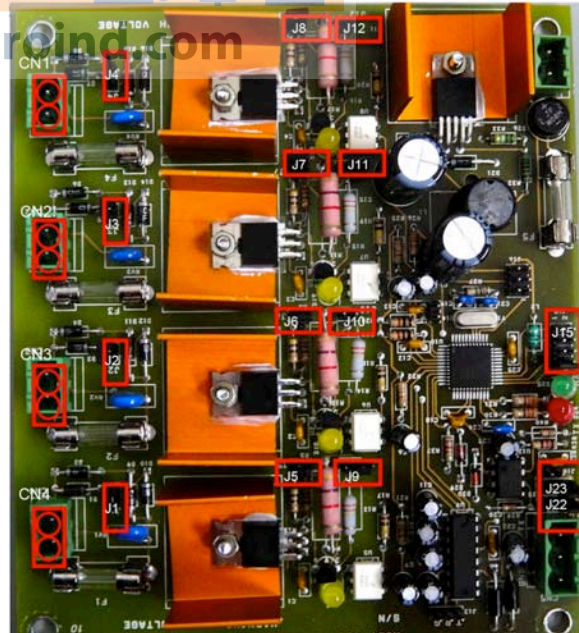
5.3.9 DPC/EHM Installation Methods

Please see DPC section for installation in remote cabinet, installation in a fuel island terminal and jumper settings.
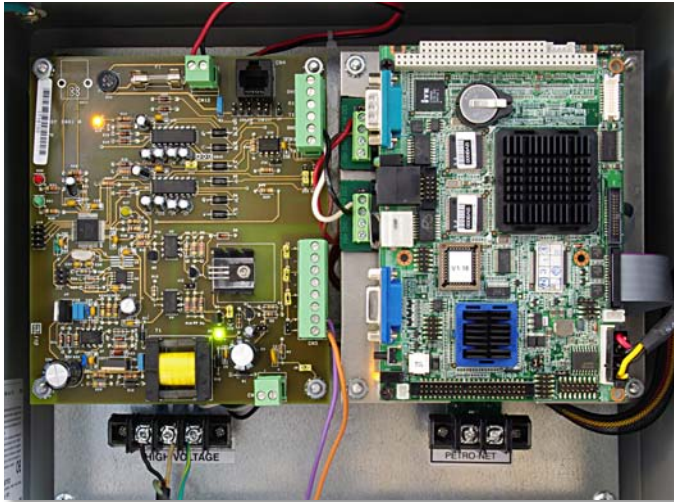
Figure 5-14 DPC/EHM (left) with ePC (right)

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5.3.10 PetroLink™ Component Wiring

Power Connections

Pull and connect two (2) line-voltage power wires and a ground wire to the PetroLink™ power supply.

Low-voltage Power Connections

Connect the output from the PetroLink™ Power Supply to the WCU and the Handle Monitor board(s) at connector CN7. Please refer to Figure 5-12 for connection reference.

Plug the pre-wired power connection into the ePC.

WCU Ethernet Connection

Plug the WCU Ethernet connection into the ePC.

ePC Serial Connections

Connect the top serial port to the Handle Monitor Board at connector CN5.

Connect the bottom serial port to Petro-Net™.

Mechanical Handle Monitor Connections

Connect the Mechanical Handle Monitor input for each pump position to the K800™ Hybrid or PCM

5.3.11 Nozzle Reader Installation

Figure 5-15 Nozzle Reader   Figure 5-16 Nozzle Insulator   Figure 5-17 Nozzle Reader & Insulator Installed on Nozzle

Record the Serial Numbers and pump association for later programming.

1. Insert the Nozzle Reader into the insulator; make sure the side marked "FRONT" faces the spout.
2. When the two (2) protrusions are in place, place the battery case inside the insulator pouch
3. Install the insulator on the nozzle

Figure 5-18 Nozzle Reader Install Step 1   Figure 5-19 Nozzle Reader Install Step 2   Figure 5-20 Nozzle Reader Install Step 3

5.4 PetroLink™ Startup/Configuration

This section describes how to configure an installed PetroLink™ system and verify that the system is functional. Begin by connecting a PC laptop to the ePC board for configuration setup:

1. Connect the supplied Ethernet adapter cable to the 10-pin connector on the ePC board
2. Connect the Ethernet crossover cable from the adapter to your PC's Ethernet network port
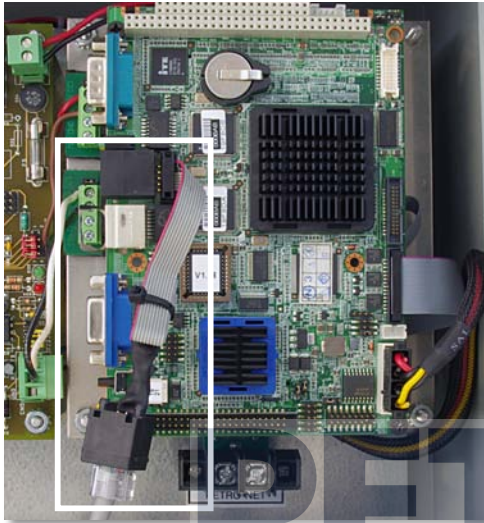
Figure 5-21 ePC Board with Ethernet Adapter Cable

There are two (2) programs that run on the ePC that have configuration parameters:

- The **PPI Service** is the interface between the PetroLink™ to the FSC3000™. You will need to configure the type of handle monitor (mechanical or electronic) and the number of mechanical hand monitors (if applicable) in the PPI Service.
- The **AVI Manager** is the PetroLink™ configuration tool. You will need to configure the number of WCUs and assign nozzle readers to the WCUs in the AVI Manager.

To run the PPI Service and AVI Manager, you will need to use Windows® Remote Desktop.

1. Double -click the Remote Desktop icon in your PC's Accessories folder
2. Enter IP Address **192.168.0.105** or **192.168.0.106**
3. Enter the password: **Petrolink** (case sensitive)
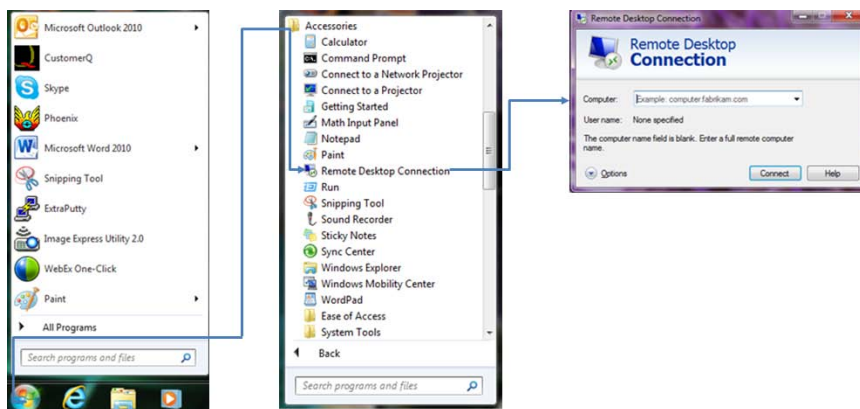
Figure 5-22 Remote Desktop Connection

5.4.1 PPI Configuration - Launch PPI Setup

First, the ePC must set up the configuration file for the PPI Service. This Service serves as the coordinator between the PetroLink™ hardware/service and the FSC3000™ controller.

Below is a sample configuration file. Using WordPad, modify as needed.

Before performing any changes to the PPI Service, you must first **stop** the Window Service by performing the following actions:

Click Start > Control Panel > Administrative Tools > Services Shortcut > PPI Service, and click Stop or Start.

The file location can be accessed at: C:\Program files\Petro Vend\PetroLink\PPI.Service.exe.config

```xml
<?xml version="1.0"?>
<configuration>
<configSections>
<section name="log4net" type="log4net.Config.Log4NetConfigurationSectionHandler,log4net"/>
</configSections>


<appSettings>
  <add key="Service.Log" value="false"/>
  <add key="AVI.SERVER.IPADRESS" value="127.0.0.1"/>
  <add key="AVI.SERVER.PORT" value="6003"/>

  <add key="AVI.CLIENT.IPADRESS" value="127.0.0.1"/>
  <add key="AVI.CLIENT.PORT" value="6001"/>
  <add key="AVI.DELAY" value="600"/>

  <add key="VIT.COM" value="COM2"/>
  <add key="VIT.BAUDRATE" value="9600"/>
  <add key="VIT.DATABITS" value="7"/>
  <add key="VIT.DELAY" value="5"/>

  <add key="HM.COM" value="COM3"/>
  <add key="HM.BAUDRATE" value="9600"/>
  <add key="HM.DATABITS" value="8"/>

  <add key="HM.CONTINUOUSSIGNAL" value="false"/>

  <add key="HM.PLC0" value="false"/>
  <add key="HM.PLC1" value="false"/>
  <add key="HM.PLC2" value="false"/>
  <add key="HM.PLC3" value="false"/>
  <add key="HM.PLC4" value="false"/>
  <add key="HM.PLC5" value="false"/>
  <add key="HM.PLC6" value="false"/>
  <add key="HM.PLC7" value="false"/>

  <add key="HM.VERSION" value="1.x"/>
</appSettings>

<log4net debug="true">
 <root>
  <level value="ALL"/>
  <!-- FATAL, ERROR, WARN, INFO, DEBUG, ALL-->
  <appender-ref ref="PPIError"/>
```

Setup for Electronic Dispensers:

When using any kind of electronic dispensers, program as follows:

`<add key="HM.CONTINUOUSSIGNAL" value="true"/>`

Setup for Mechanical Dispensers:

When using any kind of mechanical dispensers, program as follows:

`<add key="HM.CONTINUOUSSIGNAL" value="true"/>-`
Is always looking for an AC or DC signal from the MHM and will terminate the transaction when signal drops from MHM or other settings in the FSC3000™, e.g., timers in the FSC3000™ or other restrictions.

`<add key="HM.CONTINUOUSSIGNAL" value="false"/>-`
It will be looking for a temporary AC or DC signal from the MHM that gets generated from the motor reset and the transaction will be terminated by a timer in the relay board on the FSC or other programming setting on the FSC3000™.

`<add key="HM.PLCX" value="XXXXX"/>`
This will be changed based on the number of MHM boards installed at the site.

If only one MHM is on site then set as follows:
`<…PLC" value="true"/>`

If more than one MHM board is on site then set as follows:
`<…PLC0" value="true"/>`
`<…PLC1" value="true"/>`
`<…PLC2" value="true"/>`

```
        <appender-ref ref="PPIConsole"/>
    </root>
<appender name="PPIError" type="log4net.Appender.RollingFileAppender">
    <file type="log4net.Util.PatternString" value=".\\logs\\%date{yyyyMMdd}.log"/>
    <staticLogFileName value="false"/>
    <appendToFile value="true"/>
    <rollingStyle value="Size"/>
    <maxSizeRollBackups value="30"/>
    <datePattern value="yyyyMMdd"/>
    <maximumFileSize value="10MB"/>
    <layout type="log4net.Layout.PatternLayout,log4net">
      <param name="ConversionPattern" value="%d{yyyy/MM/dd hh:mm:ss} [%t]%-5p %c - %m%n %exception
%n"/>
    </layout>
  </appender>
  <appender name="PPIConsole" type="log4net.Appender.ConsoleAppender,log4net">
    <layout type="log4net.Layout.PatternLayout,log4net">
      <param name="ConversionPattern" value="%d{yyyy/MM/dd hh:mm:ss} [%t]%-5p %c - %m%n %exception
%n"/>
    </layout>
  </appender>
 </log4net>
<startup><supportedRuntime version="v2.0.50727"/></startup></configuration>
```

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Issue Date: January 1, 2012
Supersedes: April 1, 2011
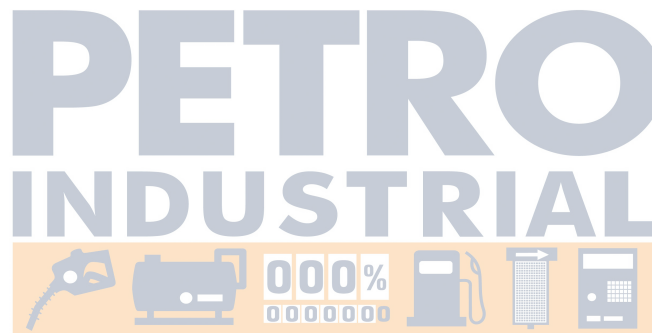
5.4.2 AVI Configuration - Launch AVI Manager Service

The ePC must be configured from a laptop/PC using the AVI Manger application.

For remote PC connection, please reference Figure 5-22 Remote Desktop Connection.

AVI Manager Operation Notes

- The OPW PetroLink™ AVI Service runs as part of the PC operating system when the PC is turned on and does not depend on any particular user logging in.
- You will have shortcuts on the desktop, as well as the Start Menu. A screen-like icon on the right side of the taskbar will turn from gray to green when the AVI Manager is connected to the Service application.
- After not being used for 30 minutes, the AVI Manager will automatically disconnect from the Service.
- To hide the AVI Manager window without disconnecting from the Service, close the window via the "X" button located at the top right-hand corner on the window.
- To disconnect the AVI Manager from the Service without terminating the AVI Manager application, right-click on the taskbar icon and choose **Disconnect**.
- When the AVI Manager window is closed, right-click on the taskbar icon and choose **Open**. You may also double-click the AVI Manager icon.
- In order to reconnect the AVI Manager when it is disconnected (either automatically or by user-command), right-click on the taskbar icon and choose **Connect**.

Using the AVI Manager: Graphic Interface Icon Legend

	Nozzle Reader
	GPC
	WCU (GRT)
	Forecourt Server (FS)
	Add component
	Remove component
	Component is in maintenance

Title	Status
Ready, connected	Component is active
Disconnected	Component is disconnected
Disabled	Component is disabled
Trying to Connect	The PC is establishing a connection With the WCU

The following Device Options will be available to open by right-clicking any of the system components.

Device Settings	Used to change device configuration settings
Add/Remove Device	Used to add/remove device
Device Properties	Used to view current device properties, like software version and last connection time and date
Disable/Enable	Used to disable/enable a device

System Information is available on the GPC Home Page: System Version, GPC version, Service Version and System Status (***Running***).
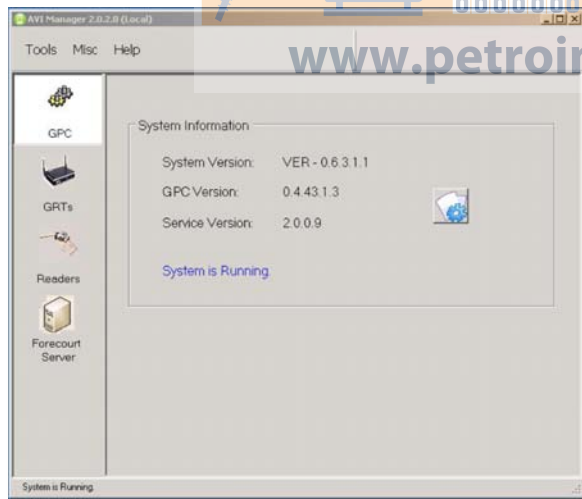
Figure 5-23 Configuration Screen

The [icon] icon on the right side of the main screen leads to the Configuration Screen.

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Use the scroll bar on the right to view the entire System Configuration.
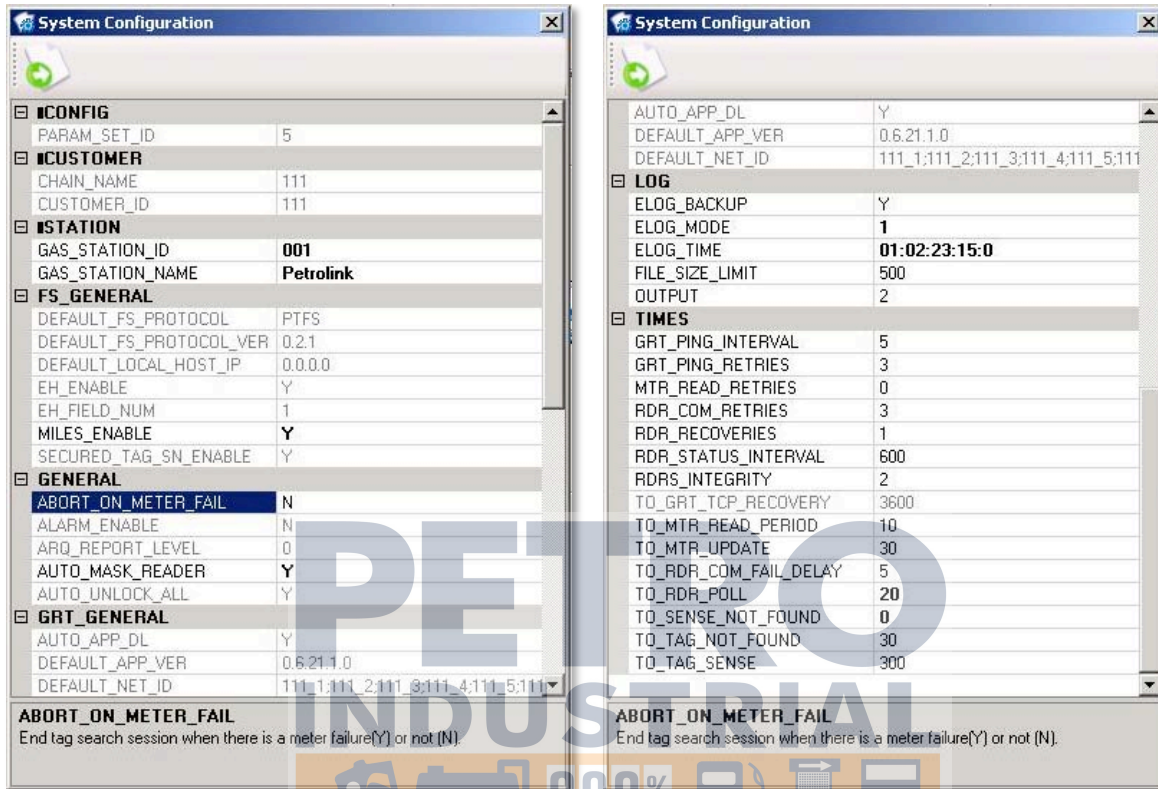
Figure 5-24 System Configuration

Grayed type indicates that that line item is **read only**. Black type indicates that the line item is **read/write.**

Adding a New WCU (GRT)

Click the **Add WCU** icon [icon] and enter the following configuration settings:

- **Alias:** A free text field used to describe the WCU. It is recommended to use a sequential number, such as **One**, or a similar type of identifying nomenclature.
- **Net ID:** Choose the WCU's Net ID from the dropdown list. Up to 12 WCUs may be added. Select **111_1** for the first WCU installed.
- **IP Address:** The WCU IP number is located on the WCU enclosure on a printed label. Enter the WCU default IP address **192.168.0.100**.
- **App Version:** The application firmware version is checked and automatically updated by AVI Manager software.
- **Host IP:** Leave unchecked. This feature is not supported by OPW-FMS.
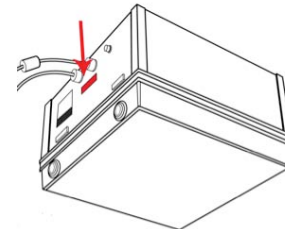
Figure 5-25 IP Address/Serial Number Location

Click **Add.** The newly configured WCU status bar will appear on the screen.

Right-click on the new WCU status bar and choose **Enable**. The WCU status will change to **Trying to Connect** while it establishes a connection; the status will change to **Ready** once a connection to the hardware unit has been established.
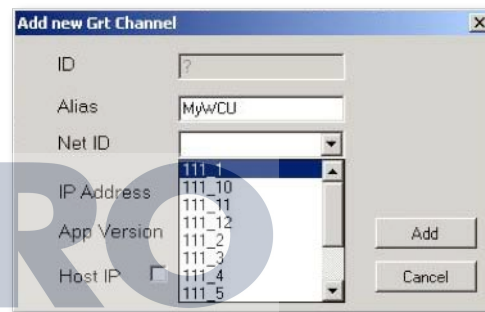
Figure 5-26 Adding a WCU

Adding Additional WCUs

If you have multiple WCUs installed, they will need to be configured, as well. In order to configure additional WCUs, begin by unplugging the network switch of the just-configured WCU.

You must complete this step inorder to configure additional WCUs; two WCUs cannot share the same Net ID.

Right-click on the configured WCU status bar and select **Change IP Address...** By default the IP address of the configured WCU is **192.168.0.100**. This number conflicts with the IP address of the WCU, as each WCU must have it's own assigned IP address.

Change the IP address to **192.168.0.101**, so that it is different than the default WCU IP address. Click **OK** to accept this numerical change. A message box confirming that the "IP Address Changed" will appear. Click **OK** to accept.

On the WCU's main configuration screen, the WCU status bar will display "Trying to Connect." Meanwhile, enter the WCU settings by right-clicking the WCU status bar and select **WCU Setting...**

- Change the Alias to a different name. If using a sequential numerical order, change to **Two.** It is recommended to maintain numerical consistency when adding each WCU.
- Change the Net ID to **111_2**.
- Update the IP Address to **192.168.0.101**.

Click **Update** to accept the changes made to the WCU's settings.

Once the WCU status bar, displays a **Ready** status, reconnect the network switch to the previously disconnected WCU.

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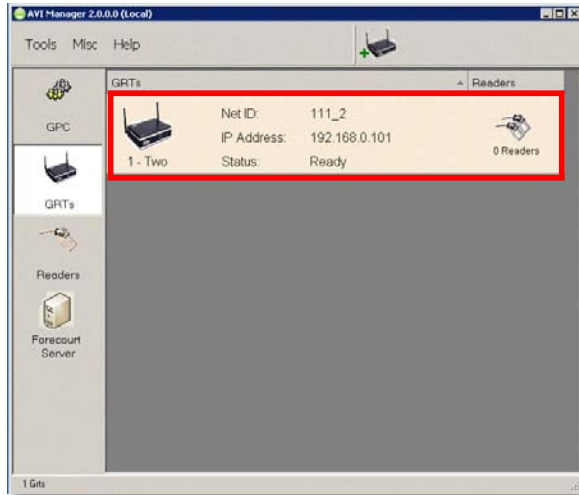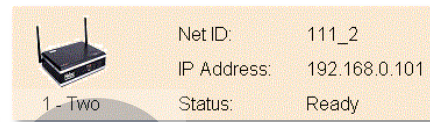Issue Date: January 1, 2012
Supersedes: April 1, 2011

Figure 5-27 WCU Status Bar

The number **1** represents a hard-coded, software-assigned number. This number is irrelevant. Make note that the **Two** was defined in the previous steps as the second configured WCU and matches the newly assigned Net ID **111_2**.

The configured WCU no longer conflicts with the next WCU we are about to configure. Now, click the **Add WCU** icon and enter the following configuration settings:

- **Alias:** A free text field used to describe the WCU. It is recommended to use a sequential number, such as **One**.
- **Net ID:** Choose the WCU's Net ID from the dropdown list. Note that up to 12 WCUs may be added. Select **111_1**.
- **IP Address:** The WCU IP number is located on the WCU enclosure on a printed label. Enter the WCU default IP address **192.168.0.100**.
- **App Version:** The application firmware version is checked and automatically updated by AVI Manager software.
- **Host IP:** Leave unchecked. This feature is not supported by OPW-FMS.

Click **Add.** The newly configured WCU status bar will appear on the screen.
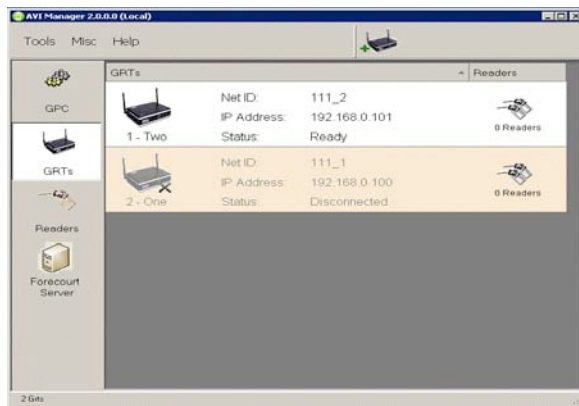
Figure 5-28 Second WCU Added

Right-click on the newly added WCU, select **Enable**. Wait for the WCU to establish a connection. The WCU status bar will be show "Downloading (%)". The status will change to **Ready** once a connection to the hardware unit has been established

When adding WCUs, always move the WCU with the default IP Address to a number that is not taken. Repeat the **Adding Additional WCUs** process to add additional WCUs.

In order to access the WCU Device Properties, right-click on the WCU status bar and select **Device Properties**. Here you will be able to perform the following actions:

- **Grt Setting:** Allows you to edit the WCU settings, i.e., IP address, Alias, Net ID, etc.
- **Add New Reader:** Configure a new Nozzle Reader to the chosen WCU
- **Scan Readers:** Scan the chosen WCU's Nozzle Readers to verify communications. During a scan this icon changes into the **Abort Scan** icon.
- **Device Properties:** View the WCU configuration and last communication with the hardware unit
- **Change IP Address:** Change the WCU hardware unit's IP address
- **Disable**: Disable the WCU connection to the AVI Manager
- **Remove WCU:** Remove the WCU
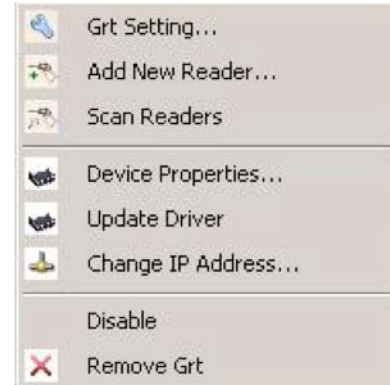
Figure 5-29 WCU Setting Options

A WCU cannot be removed if it has Nozzle Readers linked to it.
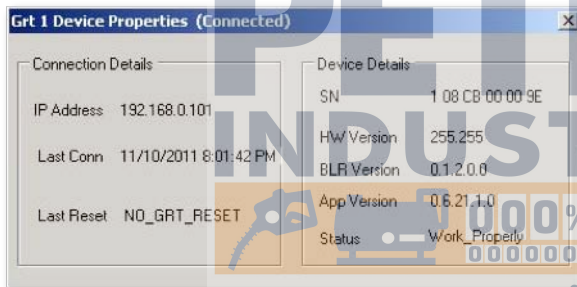
Figure 5-30 WCU Device Properties

WCU Status Legend

Init Parameter Change	Appears when the WCU is downloading a version update or changing Net ID
Trying to Connect…	Appears when the application is establishing communications with the WCU unit, when the connection is interrupted or momentarily after choosing **Enable**
Disconnected…	Appears when the WCU is either physically disconnected or disabled, or both

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Adding a Nozzle Reader

Since all Nozzle Readers' parameter values must be completed, it is not possible to set up a Nozzle Reader if there are no WCUs in the system. Once all WCUs have been added to the AVI Manager the Nozzle Readers may be configured to the WCUs.

Beginning with the WCU that has the *Net ID 1*, Click the *Add Reader* icon and enter configuration settings.

- **Reader No.:** Pre-defined hardware serial number that appears on the Nozzle Readers. Enter the Nozzle number.
- **Reader ID:** It is recommended to enter a consecutive number within the system that should always be consistent with the Position. Here we will enter *1*.
- **Position:** The Nozzle Reader's installation position correlates to the VIT position. Please see the *M051.00 FSC3000 Configuration Guide* for further details. To maintain consistency with the Reader ID, we will enter the number *1*.

Figure 5-31 Adding a Reader

- **WCU ID:** One WCU that exists in the system, from the given dropdown ID list. Here we will use WCU ID: *One*
- **FS:** FS active checkbox. Choose one of the FSs defined in the system or *None* if working without a fuel server. Here we will select *1-Petrolink*.

Click *Add*, and the new Nozzle Reader will appear on the Nozzle Reader main status screen. The Nozzle Reader's ID and position will appear on this screen.
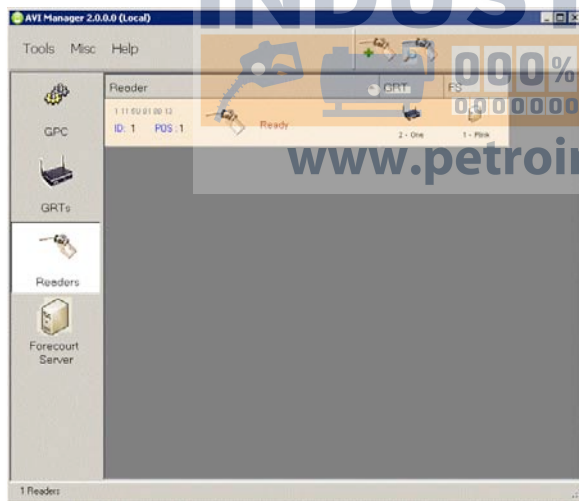
Figure 5-32 Nozzle Reader Status Bar

Figure 5-33 Scanning Readers

Navigate back to the WCU main status screen, click the *Scan Readers* icon, or right-click the WCU with Alias *One* and choose *Scan Readers*.

On the Readers main status screen, the Nozzle Reader's status should display the *Ready* status.

The Nozzle Reader's default status will be *enabled.*

Adding Additional Nozzle Readers

Click on the **Add Nozzle Reader** icon at the top of the Nozzle Reader's main status screen, and enter the following configuration settings:

- **Reader No.:** Pre-defined hardware serial number that appears on the Nozzle Readers. Enter the Nozzle number.
- **Reader ID:** It is recommended to enter a consecutive number within the system that should always be consistent with the Position. Here we will enter **2**.
- **Position:** The Nozzle Reader's installation position in the FS's mapping of the station. To maintain consistency with the Reader ID, we will enter the number **2.**
- **WCU ID:** One WCU that exists in the system, from the given dropdown ID list. Here we will use WCU ID: **One**. Always link nozzle readers to the primary WCU.
- **FS:** FS active checkbox. Choose one of the FSs defined in the system or **None** if working without a fuel server. Here we will select **1-Petrolink**.
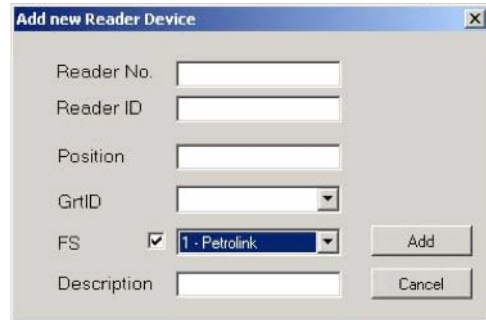
Figure 5-34 Adding Additional Nozzle Readers

Click **Add**. Once the Nozzle Reader device has been successfully added, a message box will ask, "Do you wish to add another reader?" Select **Yes** in order to add additional Nozzle Readers and repeat the **Adding Additional Nozzle Readers** process again for each Nozzle Reader added. Select **No** if you are done adding Nozzle Readers.

When you have finished adding Nozzle Readers, note that on the Nozzle Reader main status page all additional readers added display a "Not Initialized" status.

Navigate back to the WCU main status screen, right-click the WCU with Alias **One** and choose **Scan Readers**.

The Nozzle Reader status page should show, in this case, two Nozzle Readers. Once the Nozzle Reader's status is displayed as Ready, we can move the **Nozzle Reader 2** connection to the second configured **WCU Two**.

Navigate back to the Nozzle Reader main status screen, right-click on **Nozzle Reader 2** and select **Update Driver**.

Figure 5-35 Two Nozzle Readers Linked to One WCU

- Select the **Net ID** of the WCU to which you wish to link the Nozzle Reader. In this case we want to configure **Nozzle Reader 2** with **WCU 111_2**.

- A message box will ask, "Are you sure about downloading?" Click **Yes**.

- Wait patiently as Nozzle Reader 2 updates. Click **OK** to confirm that the update was a success.

The Nozzle Reader 2 status bar should display a "Not Initialized" status. Right-click the Nozzle Reader
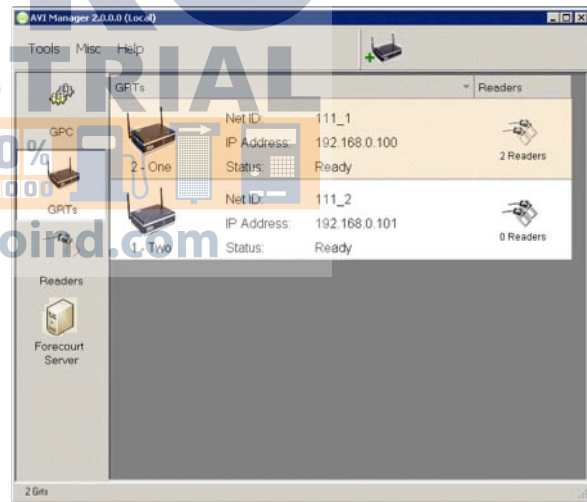

Figure 5-36 Reading Settings

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status bar and select **Reader Setting...** This allows you to view of the Nozzle Reader's configuration (Net ID) and communication log (last communication with the WCU).

Change the WCU ID to **WCU 111_2**, then click **Update**.

Navigate back to the WCU main status screen and right-click on **WCU 111_2** and select **Scan Readers**.

Once the status of the Nozzle Reader is displayed as **Ready** the Nozzle Reader is operational.

Reader Status Legend

Not initialized (new)	The Nozzle Reader has not been able to connect to the WCU
Not initialized	The Nozzle Reader was configured but is currently not communicating with the WCU
Ready	The Nozzle Reader is communicating. All actions are enabled.
Ready!	Communication is temporarily disrupted

Updating Nozzle Readers Firmware

After you have finished configuring your nozzle readers in the AVI Manager, new software updates may be available. For proper nozzle reader function, you will need to update the nozzle reader firmware approximately every 6 months.

1. To do this, go to the **Tools > System Drivers...** in the main toolbar of the AVI Manager.

2. Select **Load Drivers...**

3. Select the desired file location. Click **Open** to confirm.

4. A message stating **Loading Driver Success** will display, click **OK** to confirm.
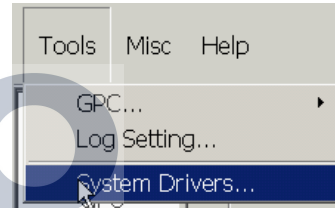
Figure 15 -37 System Drivers

Figure 17 -38 Load System Drivers
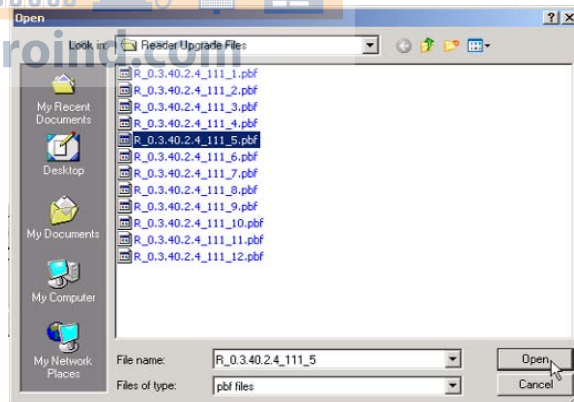
Figure 16-39 Confirm Driver File Location

Routine Operation - Entering the Technician Screen

Use **Tools > AVI > Show AVI Console** to enter to the AVI Technician screen. This screen will show every configuration action that is performed while logged in to the AVI Manager.
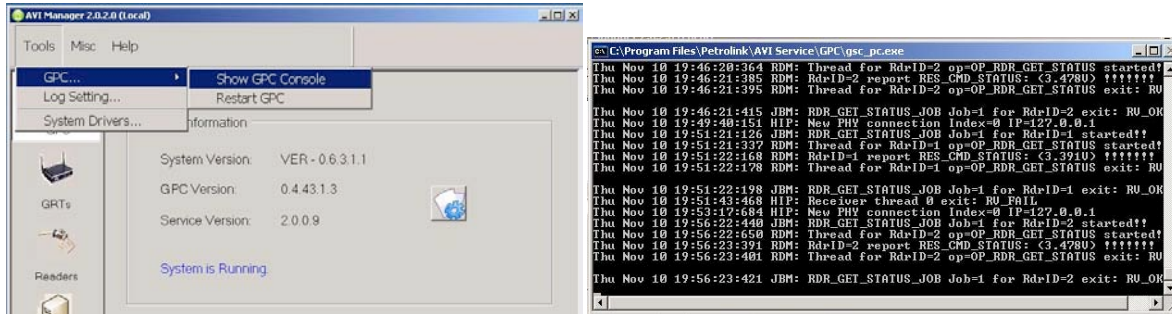

Figure 5-40 AVI Technician Screen

Use **Tools > AVI > Hide AVI Console** to hide the AVI Technician Screen.

Routine Operation - Changing the WCU IP Address

1. Check to ensure that WCU is connected and enabled
2. Right-click on the WCU tab and choose **Change IP Address**
3. Enter the desired IP address, if different than the default **192.168.0.100** as with the case of multiple WCUs
4. The WCU will disconnect and perform the IP change
5. The application will inform the user that the IP change has been successfully completed
6. Change the WCU settings to match the new IP

Figure 5-41 Changing the IP Address

Routine Operation - Configuring Log Reporter Settings

1. Use Tools > Log Settings to configure **Log Reporter Settings**
2. By default, the Log Reporter is inactive. Click the checkbox labeled **Active** in the top left-hand corner of the window to activate the screen.
3. In order to send logs to a server and to configure sending time and pathway, enter relevant parameters, i.e. FTP Settings
4. Check Log Reporter Setting configuration by clicking **Run Now** and logging on to the target server to receive the uploaded files
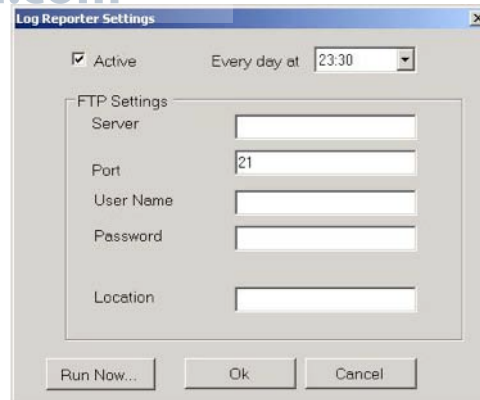5. Click **OK** to confirm

Figure 5-42 Log Reporter Settings

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6   System Maintenance

Though the FSC3000™-based card systems are designed for years of trouble-free use, you should perform the following routine maintenance items at the intervals shown to maximize their service life.

6.1   FSC3000™ (Remote Only)

Make sure FSC cables are secure and FSC3000™ has adequate ventilation.

6.2   K800™ Hybrid, C/OPT™, FIT500™ Terminals

Cabinet and Door

Wipe down terminals with warm water, a mild detergent (dish soap) and a non-abrasive cloth. DO NOT power-wash or even use a garden hose to rinse off the system! You can apply a retail car wax to protect the finish of the Terminal cabinet and pedestal.

Display

Do not use harsh detergents or any kind of petroleum-based cleaner on the display.

Recommended cleaners: AR Kleener, Diamond Glaze Anti-Reflective Cleaner.

Keypad

Wipe down terminals with warm water, a mild detergent (dish soap) and a non-abrasive cloth. If Keypad is damaged, replace it.

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 (All Terminals):** Magnetic card readers contain magnetic heads like those on a tape recorder. Depending on usage and environment (dusty), you should clean the heads daily or every other day to reduce the number of bad reads. The heads require periodic replacement.
- **ChipKey® (K800™ Hybrid, C/OPT™):** ChipKey® readers are a non-maintenance reader. When not reading ChipKey®s always verify with multiple ChipKey®s – then replace the reader, if needed.
- **Proximity (K800™ Hybrid, C/OPT™):** Proximity readers are a non-maintenance reader. When not reading cards always verify with multiple cards – then replace reader if needed.

Receipt Printer

Inspect receipt printer paper supply as needed. Verify Printer is printing on a routine basis.

Heaters

For units equipped with heaters, it is recommended to verify that they are working when cold weather arrives.

In harsh environments (dusty, heavy snow, etc.) it is recommended that the optional weather-shield be purchased for the K800™ Hybrid terminals. The C/OPT™ comes standard with a weather-shield. Currently, FIT500™ terminals do not offer a weather-shield option.

6.3 Remote PCM/EPC

Cabinet and Door

For outside units, wipe down PCM/EPC cabinets with warm water, a mild detergent (dish soap) and a non-abrasive cloth. DO NOT power-wash or even use a garden hose to rinse off the system! You can apply a retail car wax to protect the finish of the PCM cabinet.

Door Locks

For Outside units, lubricate door locks every six months or as needed. Use graphite or molybdenum disulfide ("Moly-B") dry lubricant. DO NOT apply too much lubricant.

6.4 PetroLink™

WCU

Inspect WCU mechanical mounting every six months and re-secure as needed.

Nozzle Reader & Insulators

Inspect Nozzle Readers & Insulators weekly for physical damage and replace nozzle reader and/or insulator as needed.

6.5 Journal Printer

Preventative Maintenance

Because printers generate paper dust and ink droplets in everyday operations, periodic cleaning and adjustments are required to maintain good performance and increase their life cycle. We recommend cleaning the journal printer every six months for optimal performance. To maintain a dot-matrix printer, please refer to the following procedures:

Equipment Needed:

1. Safety goggles
2. Protective gloves
3. Cotton cleaning swabs
4. Duster can (HFC-134a)
5. Isopropyl or Denatured alcohol
6. Moist wipes
7. Dry cloth or paper towels

The following procedure is suggested every six months:

1. Turn off power switch and unplug the printer
2. Remove top dust cover, printer ribbon and paper from guides
3. From a safe distance, use the compressed-air can to remove dust particles form inside the printer area
4. Physically move the print head to the center of the rail
5. Moisten the cotton swab with the alcohol and clean the rail on both sides
6. Dry the rail with a dry towel or cloth
7. Moisten the towel and clean the rubber roller while manually turning the knob in one direction
8. Dry the rubber roller completely before securing the printer ribbon and paper
9. Add the dust cover, apply power and conduct the self-test

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