M1700 FSC3000™ Fuel Site Controller
Including Fuel Island Terminal Options
Installation, Operation & Maintenance (IOM) Manual
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**OPW Fuel Management Systems**
Visit us at [www.opwglobal.com/opw-fms](http://www.opwglobal.com/opw-fms) or contact us at:
Call 1-877-OPW-TECH (877-679-8324)
For calls outside US and Canada, call +1-708-485-4200
Fax 1-800-421-3297
Monday through Friday, 7:00 am to 6:00 pm, US CST
For installation wiring reference, fuel control field wiring diagrams for the following equipment, including Bennett, Fill-Rite, and Wayne products, can be found on the OPWGlobal.com website (technician login required).

- Bennett 3800 Duo-1
- Bennett 3800 Duo-2
- Bennett 3800 Single
- Bennett Mechanical
- Fill-Rite
- Gasboy 9100 Dispenser
- Gasboy 9100 Duo-1 Pump
- Gasboy 9100 Duo-2 Pump
- Gasboy 9800 Dispenser
- Gasboy Pump
- Gasboy 9850KX
- Wayne Reliance Dual Dispenser
- Wayne Reliance Duo-2
- Wayne Reliance Single Dispenser
- Wayne Reliance Single Pump
- Wayne Select Dual
- Wayne Select Duo-2
- Wayne Select Single Duo-1 Pump
- Wayne Select Single
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Section 1 Safety Alerts

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

**DANGER:** Indicates an immediately hazardous situation, which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.

**WARNING:** Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

**CAUTION:** Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. Caution may also be used to alert against unsafe practices.

**NOTICE:** Indicates a property damage message.

1.1 Electrostatic Sensitive Devices

This product contains devices and circuitry that are Electrostatic Discharge sensitive and can be permanently damaged if not handled properly. Please read the following carefully before handling these devices.

**ATTENTION:** Observe the following precautions when handling electrostatic sensitive devices.

Following the guidelines below can minimize the potential for damage from Electrostatic Discharge (ESD).

1. Observe proper grounding techniques prior to handling any Electrostatic Discharge Sensitive (ESDS) device.
2. If possible, use an ESD Field Service Kit with wrist strap, dissipative mat and grounding cord.
3. Avoid standing on carpeted surfaces while working with ESDS devices.
5. A new component to be installed should be kept in its anti-static packaging as long as possible prior to installation.
6. Handle ESDS components by the edges. Avoid touching any of the circuitry.
1.2 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.

1.3 Installation Codes & Hazardous Areas

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

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)

**CAUTION:** Before proceeding with any work at the fuel site, it is to the discretion of the installer to investigate all/any local codes.

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

**NOTE:** Local codes 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](image1)

![Figure 1-2 Gasoline Dispensers (high hose)](image2)
**CAUTION:** 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.
Section 2 Introduction

This manual covers 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. The three fuel control systems each use the FSC3000 to control the system’s operation. The FSC3000 may be housed in its own enclosure, or may be located inside any of the Fuel Island Terminals.

The 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.

2.1 Terminology

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

- **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 DTC (see below for DTC definition). There are currently three (3) 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.
2.2 Preparation of System Conduit and Wiring Requirements

All wiring and conduit runs must also conform to the National Electrical Code (NFPA No. 70), Automotive and Marine Service Station Code (NFPA No. 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.

Conduit Sealing

Conduit entering the hazardous area must have a seal-off installed 18" (0.46 m) above grade to prevent liquid or fumes from entering the area.

--- WARNING: Shielded cable is not vapor-tight!

When running shielded cable through a seal-off, strip the cable jacket back so about 3" (7.6 cm) of jacketed cable protrudes past each seal-off.

--- CAUTION: Do not damage the shield wire! Any stripped section of the wire must be in the sealed-off area.

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 #: 12-1029.

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

--- WARNING: 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.

Grounding

The OPW fuel control system 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.

**Circuit Breakers**

Power to the FITs and all system hardware (i.e., 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.

**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 #: 12-1025 (two-conductor) or Part #: 12-1026 (four-conductor).

**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.
Section 3 FSC3000 Fuel Site Controller

The Fuel Site Controller (FSC) is the heart of the fuel management as it contains the site configuration by managing all card and pump processes to and from the Fuel Island Terminals (FITs) and Pump Control Terminals (PCTs). The FSC communicates to the FITs and PCT 24/7 using two-wire RS485 communication circuit (i.e., Petro-Net™).

The FSC verifies the card data, collects all fuel transaction data and stores local proprietary card files. The FSC300 is equipped with the released PCI (Payment Card Industry) Security Standards application software; a requirement by most credit card and fleet card processors, which assures merchants and their customers that the FSC3000 Multi-trucking System does not store sensitive credit card data.

3.1 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.

The FSC3000 Fuel Site Controller may be housed in its own remote/desktop enclosure or located inside a FIT. See below for additional information of a remote FSC verses an integrated FSC.

Remote vs. Integrated FSC3000

<table>
<thead>
<tr>
<th></th>
<th>Remote FSC3000</th>
<th>Integrated FSC3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Dimensions (H x W x D)</td>
<td>2.25” x 10” x 8.25” (5.7 cm x 25.4 cm x 21 cm)</td>
<td>See specific FIT specifications</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>85-240 VAC, 50/60 Hz; 25 watts maximum</td>
<td>See specific FIT specifications</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>32°F - 122°F (0°C – 50°C)</td>
<td>See specific FIT specifications</td>
</tr>
<tr>
<td>Eight (8) RJ-45 (RS-232) Max. Length</td>
<td>50’ (15.2 m)</td>
<td>50’ (15.2 m)</td>
</tr>
<tr>
<td>One (1) DIN (RS-485) Petro-Net Max. Length</td>
<td>5,000’ (1,524 m)</td>
<td>5,000’ (1,524 m)</td>
</tr>
</tbody>
</table>
3.2 Components and Diagrams

3.2.1 Main Board Components

![Main Board Components Diagram]

The **power supply** supplies 12 VDC to the main board, which allows the mainboard to run logic and communication circuit devices. The **main board** contains all communication circuits for a back-office PC, Petro-Net communication to the FITs and PCMs, and Ethernet communication, and allows for remote dial-in communication via dial-in socket modem. The main board also manages fleet network host modem, journal printer, pass-thru port communications and USB key operation.

The **SIMM** card contains the application program to operate all ordered options (i.e., card/transaction memory, fleet networks, DPC, etc.) The SIMM card also contains a backup **battery** to maintain all data in memory in the event of a power loss. Remove the battery-insulating strip to activate a SIMM memory module. Gently remove the yellow strip at this time. It is recommended that the SIMM module be reseated.

3.2.2 Parts Listings & Exploded Views

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75-2037</td>
<td>FSC3000 Internal Modem</td>
</tr>
<tr>
<td>2</td>
<td>R20-0380</td>
<td>FSC3000 Main Board</td>
</tr>
<tr>
<td>3</td>
<td>R20-0381-03*</td>
<td>FSC3000 SIMM Module (*requires configuration)</td>
</tr>
<tr>
<td>4</td>
<td>20-1517-05</td>
<td>FSC3000 Printer Cable</td>
</tr>
<tr>
<td>5</td>
<td>20-1613</td>
<td>RJ45 to RJ45 Ethernet Cable</td>
</tr>
<tr>
<td>6</td>
<td>20-1517-01</td>
<td>Network Modem Cable</td>
</tr>
<tr>
<td>7</td>
<td>20-1520-01</td>
<td>PC/CRT Cable</td>
</tr>
<tr>
<td>8</td>
<td>75-0108</td>
<td>USB Key</td>
</tr>
<tr>
<td>9</td>
<td>20-4089</td>
<td>Display Assy. External FSC3000</td>
</tr>
<tr>
<td>10</td>
<td>75-2059</td>
<td>Bluetooth M-7EM</td>
</tr>
<tr>
<td>11</td>
<td>20-4089-01</td>
<td>Internal FSC3000 Display</td>
</tr>
<tr>
<td>12</td>
<td>20-7073</td>
<td>Journal Printer with Cable</td>
</tr>
<tr>
<td>13</td>
<td>20-7078</td>
<td>Network Modem</td>
</tr>
<tr>
<td>14</td>
<td>20-7083</td>
<td>Compact Flash Transaction Recorder</td>
</tr>
<tr>
<td>15</td>
<td>75-2047</td>
<td>Indoor Wireless Modem</td>
</tr>
</tbody>
</table>
Controller Accessories
3.2.3 System Wiring Schematics

Typical System Installation Diagram with Electronic Pump Control
Typical System Installation Diagram with Mechanical Pump Control
3.3 Ports

3.3.1 USB Key
- The USB Key port will allow fuel transactions to be written to the supplied USB key.
- Ideal for using with integrated systems that do not have a PC connection to the FSC for retrieving transaction data. The USB key can then be removed from the FSC3000 and plugged into a PC. The stored transaction data could then be imported into the optional Phoenix software package used to generate reports.
- Also, if the FSC3000 has the optional card update feature, card updates can also be transferred through the USB key.

3.3.2 Ethernet
- The Ethernet port allows a remote PC connection to the FSC3000 using your company’s local area network.
- When using the PCI-compliant application, the Ethernet connection is not allowed for the Admin user account.

Network Connecting via Ethernet

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.

NOTE: Maximum cable distance of 300 feet (100 m).
3.3.3 Phone Line

- **RJ-11 Phone Line** connection only used when the FSC3000 is equipped with an optional internal dial in modem.
- Can only be used with an analog phone line.

**Connecting via Dial-in 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.

3.3.4 RS-485

- **RS-485** port connects to the supplied junction box cover. This is the communication to all Fuel Island Terminals and Pump Control Terminals. The supplied cable (P/N 20-1443) connects the J-box to the FSC3000. This is also referred to as the Petro-Net communication.

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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSC Petro-Net™ Cable</td>
<td>20-1443</td>
</tr>
<tr>
<td>RS-422 Junction Box cover</td>
<td>20-8035</td>
</tr>
</tbody>
</table>

3.3.5 RS-232

- **Port 1**: Is the direct serial connection port to an onsite PC. The PC must be within 50 feet (15.2 m) and use the cable connection (P/N: 20-1520-01).
PC Direct-Connect Serial Communication to FSC

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.

**NOTE:** Maximum cable distance of 50 feet (15 m).

- **Port 3:** Connects to the optional journal printer with the cable connection (P/N: 20-1517-05). All transactions will be printed in real time to this printer.

**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.

Refer to Journal Printer Configuration section for setup of journal printer parameters.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Printer Cable</td>
<td>20-1517-05</td>
</tr>
<tr>
<td>Journal Printer (includes 20-1517-05)</td>
<td>20-7073</td>
</tr>
</tbody>
</table>

- **Port 4:** Is used to connect the FSC3000 to the DPC communication interface.

**DPC Interface Connection (RS-232 port 4)**

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

- **Port 5:** Is used to connect the host fleet network dial-out modem or IP converter.
• **Port 6**: Is used to connect secondary host fleet network modem.

**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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Modem (includes 20-1517-01)</td>
<td>20-8049</td>
</tr>
<tr>
<td>Network Modem Cable</td>
<td>20-1517-01</td>
</tr>
</tbody>
</table>

• **Port 7**: Is used to connect to an optional Price Sign interface. The Price Sign option will allow the FSC300 to interface with the Future Media Price Vision Displays that use Price Vision protocol with version 1.07. Using this option allows the FSC3000 to sent current pricing to the display.

**Future Media Price Sign (RS-232 port 7)**

The FSC3000 has the ability to interface to a Future Media price sign. If purchased, plug a 20-1519-01 cable from port 7 on the FSC3000 to the PriceVision® control unit.

• **Port 8**: Allows a secondary device such as an OPW Automatic Tank Gauge to be communicated with a PC through the FSC3000 Pass-Thru serial port. This eliminates the need for an additional PC connection to the Tank Gauge for sites using the optional Phoenix™ software, polling both the FSC3000 fuel transactions and ATG data for performing site reconciliation.
  - Communication parameters for the ATG connected to the Pass-Thru port must match the FSC3000 communication parameters.

**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.
3.3.6 FSC3000 Additional Connections

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.

An Internet Gateway is used to provide this capability. This same gateway also provides inbound communication, eliminating the need for a second Ethernet connection.

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

1. Connect a serial cable from the host modem port 5 to the IP Gateway serial port 1.
   a. 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.
2. Connect an Ethernet cable (not supplied) from the IP Gateway to the Internet connection point.
   b. To use phone lines as a backup, connect a phone line to the IP Gateway.
3. Power ON and wait for the "status" light to flash green (approximately once every second).
4. 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.
5. Configure the Internet router to "port forward" any traffic for port 8002 to the IP address of the Gateway Converter.
6. Test the "call-in" to the OPW FSC3000 using the external IP address for the site and port 8002.
3.4 Installation
3.4.1 Integrated FSC3000 Communication Conduit

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

NOTE: Skip this step if using the Remote FSC3000.

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.

<table>
<thead>
<tr>
<th>Wires</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Cable</td>
<td>50’ (15.2 m)</td>
</tr>
<tr>
<td>Phone-Line</td>
<td>N/A</td>
</tr>
<tr>
<td>Ethernet Cable</td>
<td>300’ (91.4 m) may be extended with repeaters</td>
</tr>
</tbody>
</table>

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

3.4.2 Remote FSC3000

The remote FSC3000 must be placed in an office-like environment. The FSC3000 Petro-Net junction box should be mounted within 6’ (1.8 m) of the FSC3000 controller.
3.4.3 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.

3.4.4 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.

**NOTE:** Currently, wireless Petro-Net™ is not supported on OPW AVI-enabled systems.

3.4.5 Additional System Options

Prior to Configuration, Startup and Testing, per your specific system parameters, install any applicable FITs or pump control options purchased with your system. Please refer to the appropriate section within this manual for the installation and setup instructions as required.
3.5 Physical Configuration

3.5.1 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.

**NOTE:** 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.

![FSC Access Baud Rates - Switch 1, Positions 1-4](image)

3.5.2 Direct-Connect Serial Communication to PC

Set the communication parameters as follows:
- Baud Rate: Up to 38400
- Data Bits: 7
- Parity: Even
- Stop: 1

3.5.3 PC Connection via Dial-In

This method uses the optional internal modem you remotely connect to the FSC3000 via an analog phone line.

Set the communication parameters as follows:
- Baud Rate: Up to 38400
- Data Bits: 7
- Parity: Even
- Stop: 1

3.5.4 PC Connection via Built-in Ethernet Adapter

The LED status lights indicate the following:
3.6 Startup/Testing

3.6.1 Cold-Start

Once the FSC3000 has been configured for the site-specific components and operating parameters, the entire system operation must be tested. Begin, by cold-starting your FSC3000.

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

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.

Cold starting the FSC3000 forces all of the system parameters to be reset to factory defaults.

**NOTICE:** 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.
3. Plug the power cord back into the FSC3000.
4. Wait for a beep.
5. The system display will show ‘COLD START.’
6. Release the front panel buttons.
7. Check for proper operation.
3.6.2 Software 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, and 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 M00-051.00 Command-Line Configuration Guide is located on the Technical Documentation CD, or it can be downloaded from the OPW-FMS Website (www.opwglobal.com/opw-fms).

3.6.3 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.
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.

![Digi Device Discovery window](image)

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 Digi Device Discovery program identifies the device, 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.

**NOTE:** 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.

**NOTE:** 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.

**IMPORTANT:** The FSC3000’s network port setting is set to 2101 during manufacturing. It might have been changed during the FSC3000’s network setup. Make sure the port settings match.
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:

- It will store transaction data in a format that can be imported into Phoenix™.
- 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.

**NOTE:** 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, perform the following steps.

**Initial Setup**

1. Open Phoenix and select **[Utilities]** from the menu and then select **[Options]**.
2. Click on the **[File Locations]** tab.
3. In the **[Active Database]** frame, click on the text box that shows the **[Default Database Path]**.
4. With the text selected, right click on the text and select **[Copy]**.
5. Open a Windows Explorer window and paste the copied text into the Address bar at the top of the window and press `<Enter>`.
6. Right-click on the PC Desktop and select **[Paste Shortcut]** from the menu. This now provides a direct access path to the Phoenix™ data folder for the following operations.

**Importing Transactions from the USB Key into Phoenix**

1. Using the USB key from the FSC, plug it into the PC, and open a Windows Explorer window to the USB key.
2. Locate the file named: **[K2500.trn]**.
3. Right-click on the file and select **[Cut]** from the menu.
4. Open the shortcut to the Data folder that was created above.
5. From the **[Edit]** menu, select **[Paste]**.
6. Open Phoenix and from the **[Utilities>Transactions]** menu select **[Import Poll File]**.
7. Once the existing poll file is imported you can start again from step 1.
8. 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!
9. Open Phoenix and from the **[Utilities>Transactions]** menu select **[Import Poll File]**.
10. You can now return the USB key to the FSC.

**Loading the Card Update File onto the USB Key**

**NOTE:** This is an optional feature on the FSC3000

1. 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 **[CUxx]** file associated to the site you expect to update, where [xxx] is the FSC3000’s Phoenix site ID.
NOTE: 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, remove the USB key and place it in the FSC to perform the update card.

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.

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

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

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

**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 (i.e., products, restrictions, etc.) |
| Verify Card update process works |
| Verify Polling works |
| Verify if Phoenix™ has reconciliation and equipped ATG can be polled (i.e., Pass-Thru, direct, etc.) |
Section 4 Fuel Island Terminals (FITs)

The FSC3000-based fuel-management system has three (3) types of Fuel Island Terminals available.

Figure 4-1 Fuel Island Terminals (K800 Hybrid, C/OPT and FIT500, respectively)

4.1 Preparation of System Conduit & Wiring Requirements

**CAUTION:** 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.

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.

**NOTICE:** 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.

Local codes may dictate specific installation requirements. Installation is subject to approval by the local authority having jurisdiction at the site.
4.1.1 FIT Power, Petro-Net and HM-485

Separate vs. 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.

<table>
<thead>
<tr>
<th>Table 4.1 Terminal Power Wiring Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Terminal Feed</strong></td>
</tr>
<tr>
<td>Minimum #14 AWG Stranded (Black) – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td><strong>Terminal Neutral</strong></td>
</tr>
<tr>
<td>Minimum #14 AWG Stranded (White) – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td><strong>Terminal Ground</strong></td>
</tr>
<tr>
<td>Minimum #14 AWG Stranded (Green) – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td><strong>Petro-Net (RS-485)</strong></td>
</tr>
<tr>
<td>Two (2) #18 AWG twisted (10 per ft) pair – 600V-rated – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td><strong>HM-485</strong></td>
</tr>
<tr>
<td>Two (2) #18 AWG twisted (10 per ft) pair – 600V-rated – Oil/Gas resistant, Wet Locations</td>
</tr>
</tbody>
</table>

*NOTE: Petro-Net wiring may share terminal power conduit when the Petro-Net cable voltage insulation rating is 600V.

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.

<table>
<thead>
<tr>
<th>Table 4.2 Terminal Communication Wiring Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Petro-Net (RS-485)</strong></td>
</tr>
<tr>
<td>Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td><strong>HM-485</strong></td>
</tr>
<tr>
<td>Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations</td>
</tr>
</tbody>
</table>
Integrated FSC3000 Communication Conduit

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

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.

<table>
<thead>
<tr>
<th>Wires</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Cable</td>
<td>50' (15.2 m)</td>
</tr>
<tr>
<td>Phone-Line</td>
<td>N/A</td>
</tr>
<tr>
<td>Ethernet Cable</td>
<td>300' (91.4 m) may be extended with repeaters</td>
</tr>
</tbody>
</table>

**NOTE:** This conduit is not required when using a stand-alone FSC3000 or wireless communications.
4.2 FIT System Overview

Typical System Diagram of an Integrated FSC3000 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.
Typical System Diagram of an Integrated FSC3000 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.
4.3 K800 Hybrid Fuel Control System

4.3.1 Technical Specifications

Table 4.3 K800 Hybrid Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Dimensions [H x W x D]</td>
<td>12&quot; x 13&quot; x 10&quot; (30.5 cm x 33 cm x 25.4 cm)</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>120/230 VAC; 50-60 Hz; 100 watts max.</td>
</tr>
<tr>
<td>Operating Temp. Range</td>
<td>-40°F - 122°F (-40°C - 50°C)</td>
</tr>
<tr>
<td>Magnetic Stripe Card Access</td>
<td>STD</td>
</tr>
<tr>
<td>ChipKey® Access</td>
<td>OPT</td>
</tr>
<tr>
<td>Proximity Card Access</td>
<td>OPT</td>
</tr>
<tr>
<td>Dual-Card Readers</td>
<td>---</td>
</tr>
<tr>
<td>Bankcard Acceptance</td>
<td>---</td>
</tr>
<tr>
<td>Text Display</td>
<td>STD</td>
</tr>
<tr>
<td>Graphics Display</td>
<td>---</td>
</tr>
<tr>
<td>User-Defined Images</td>
<td>---</td>
</tr>
<tr>
<td>Receipt Printer</td>
<td>---</td>
</tr>
<tr>
<td>Alphanumeric Entry</td>
<td>Single key</td>
</tr>
<tr>
<td>Enclosure &amp; Pedestal</td>
<td>Painted steel</td>
</tr>
</tbody>
</table>

NOTE: The purchase of optional items may result in additional cost.
4.3.2 Exploded View

- K800 Door
- K800 Enclosure
- K800 Pedestal
4.3.3 FIT Installation

FIT Conduit Installation

All conduits in the FIT pedestal should terminate at a point 18" (46 cm) above the ground into a seal-off. Install the following 1/2" (1.3 cm) or 3/4" (1.9) 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 pedestal diagram below.

FIT Pedestal and Enclosure Mounting

1. Remove the access panel from the pedestal; the panels are held on with screws.
2. Install four (4) 3/8" threaded studs in the ground.
3. Install pedestal base plates atop the four (4) studs.
4. Set the pedestal atop the four (4) studs.
5. Secure the pedestal to the studs with the four (4) nuts and lock washers.
6. Set the enclosure atop the pedestal.
7. Secure the enclosure tightly to the pedestal with the supplied bolts and washers.
FIT Flex Conduit Installation

1. Remove knockouts from the base of the FIT enclosure.
2. Install Flex Conduit from the rigid conduit to the knockouts in the FIT enclosure (K800 Hybrid).

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

FIT Power and Communication Wiring

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

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

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

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

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

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

4.3.4 FSC3000 Installation in a K800 Hybrid

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

**Antenna Installation**

The wireless modems above require the installation of an antenna.

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

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.

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Pump Position</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Normal Operation</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual Override</td>
<td>CLOSED</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Normal Operation</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual Override</td>
<td>CLOSED</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Normal Operation</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual Override</td>
<td>CLOSED</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Normal Operation</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual Override</td>
<td>CLOSED</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Active</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>CLOSED</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Active</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>CLOSED</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Active</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>CLOSED</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>Active</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>
Switch #2

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

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Reader Type</td>
<td>ChipKey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnetic Card</td>
</tr>
<tr>
<td>5</td>
<td>Manual Card # Entry (after 3 bad reads)</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td>6</td>
<td>Test Mode</td>
<td>Operational Mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test Mode</td>
</tr>
<tr>
<td>7</td>
<td>Pulser Type (Pump Positions 1-4)</td>
<td>Mechanical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
</tr>
</tbody>
</table>

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.
4.3.6 Testing

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.

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).

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.
4.4 C/OPT Fuel Control System

4.4.1 Technical Specifications

<table>
<thead>
<tr>
<th>C/OPT Technical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Dimensions [H x W x D]</td>
</tr>
<tr>
<td>Power Requirements</td>
</tr>
<tr>
<td>Operating Temp. Range</td>
</tr>
<tr>
<td>Magnetic Stripe Card Access</td>
</tr>
<tr>
<td>ChipKey® Access</td>
</tr>
<tr>
<td>Proximity Card Access</td>
</tr>
<tr>
<td>Dual-Card Readers</td>
</tr>
<tr>
<td>Bankcard Acceptance</td>
</tr>
<tr>
<td>Text Display</td>
</tr>
<tr>
<td>Graphics Display</td>
</tr>
<tr>
<td>User-Defined Images</td>
</tr>
<tr>
<td>Receipt Printer</td>
</tr>
<tr>
<td>Alphanumeric Entry</td>
</tr>
<tr>
<td>Enclosure &amp; Pedestal</td>
</tr>
</tbody>
</table>

NOTE: The purchase of optional items may result in additional cost.
4.4.2 Exploded View
4.4.3 Installation

FIT Conduit Installation

All conduits in the FIT pedestal should terminate at a point 18" (46 cm) above the ground into a seal-off. Install the following 1/2" (1.3 cm) or 3/4" (1.9) 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)

FIT Pedestal and Enclosure Mounting

- Square the baseplate where it will be mounted.
- Mark the four (4) most appropriate locations for the anchor bolts. There are eight (8) mounting holes (see the illustrations above).
- Drill the holes.
- Anchor the pedestal using 3/8" anchor bolts.

**IMPORTANT:** Use a type of anchor bolt that is appropriate for the material in which you will be drilling (e.g. concrete, asphalt etc.).

- Use the provided mounting hardware to mount the enclosure to the pedestal. Align the provided gasket with the mounting holes of the pedestal top plate. Carefully position the enclosure in place so that the open mounting holes are aligned with the mounting holes of the pedestal. Insert the four (4) bolts and secure them using the provided washers and nuts.

FIT Flex Conduit Installation

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

**IMPORTANT:** Any unused knockout holes must be sealed to meet NEC compliance codes.
FIT Power and Communication Wiring

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

![NOTE: Petro-Net communication to other FIT(s) should also be pulled in this conduit.]

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

![CAUTION: Petro-Net communication wires can share the conduit with the power wiring provided the wires have the same voltage-insulation rating as the power wires.]

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

![NOTE: Petro-Net is connected internally on integrated units. There is no need to connect to the Petro-Net terminal block unless there are additional FITs or other devices to connect.]
4.4.4 FSC3000 Installation in a C/OPT

1. Mount the plate that contains the FSC3000 board on the rear wall of the C/OPT unit using the four (4) screws provided.

2. Remove the two (2) screws holding the plastic safety shield on the FSC board.

3. Plug in Power, Ground and Petro-Net connections to appropriate connectors. (See figure below).

4. Reinstall the plastic safety shield.
4.4.5 Accessories

C/OPT Receipt Printer Option

During receipt-printer installation, please refer to the C/OPT Receipt Printer Assembly image below for mounting orientation.

After the main C/OPT circuit board has been upgraded, the old receipt printer removed and the new door electro-magnet bracket has been installed, use the procedure below to install the new C/OPT receipt printer option.
Installing the C/OPT Receipt Printer

1. Position the C/OPT Printer Adapter Block (P/N 50-3203) on the printer mounting block as shown in the illustration above.

2. Use the four (4) supplied screws (P/N 50-0229 - 8-32 x 5/8" Phillips Pan Head) to secure the adapter block in place.

**IMPORTANT**: Make sure the block is oriented correctly as in the illustration.

3. Position the printer to align with the inner screw holes of the adapter block.

4. Use the two (2) supplied screws (P/N 50-0391 - 10-32 x 1/2" Phillips PH ZP) to secure the printer to the adapter block. Install the left screw first to hold the printer in place.
5. Place the right screw through the ring terminal end of the supplied Ground Cable (P/N 20-1506-01) and fasten the screw, cable and printer to the remaining adapter block screw hole.

6. To complete the connection, connect the open end of this ground cable to the open end of the factory-installed dual-tail ground cable (P/N 20-1506 – Part A Grounding Cable Assembly) as shown in the photo above.
7. Connect the data cable to the PV343 board J1 Printer Socket.
8. Connect the Power Cable to the PV343 board J6 RS232-A socket.
9. Route these cables through the supplied Cable Clamp and secure using the screw as illustrated above.

**Receipt Printer Paper Loading**

The optional receipt printer accepts metric-sized thermal paper 58 mm or 60 mm width and 102 mm in diameter.

10. 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.
11. Remove any packaging material from the roll of paper.
12. Place the roll of paper in the paper tray.

**NOTE:** Paper must feed from the TOP of the roll.

13. 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 and activate the printer to automatically load the receipt paper.

**IMPORTANT:** If the printer activates, but does not automatically load the paper, press the paper release lever while feeding the receipt paper until the paper advances.

14. Cut off the extra paper appearing in the eject chute by pulling it out.
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, perform the following steps.

1. Turn the unit OFF before clearing the paper jam.
2. Press the paper release lever as see in the following images.
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 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.

Antenna Installation

The wireless modems above require the installation of an antenna.

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

**NOTE:** Never actuate this lever during printing operation or damage will be caused to the printer head.
4.4.6 Physical Configuration

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

The configuration parameters for the C/OPT are set by placing the unit into 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.

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

### Startup

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

![NOTE: If your system has the optional 2x20 character display, use a small screwdriver to adjust the potentiometer on the bottom PC board.]

Configuration (Setup 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.

![NOTE: To modify configuration you must be in Privileged Mode.]

To easily identify which commands require Privileged Mode for configuration change, they will be identified 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.
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.

NOTE: This mode gives you access to the following areas of C/OPT operation. Setting most of these functions requires PRIVILEGED access; see “1. PASSWORD (Privileged)” instructions.

1. PASSWORD (Privileged)

You must enter Privileged Mode to configure password parameters.

1. When the Privileged Mode is ON, the C/OPT displays a "P" in the upper-left corner of the display.
2. The "P" comes before the title of the menu display.
3. When not in Privileged Mode, the Password function prompts for a password entry.
4. The factory-set password is 0000, which you should change as soon as possible.
5. If you enter the wrong password, a 15-digit number appears on the display.
6. If you have lost the unit’s password, call Petro Vend Tech Support, and supply them with the 15-digit number.
7. 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. P1 – 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.

**IMPORTANT**: 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 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.

**NOTE**: 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>

**NOTE**: 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 Flap: OPEN

NOTE: 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 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.

**NOTE:** Use if updated from "push-pull" reader to a ChipKey® optical. Use "push-pull" for proximity readers.

P READER YES
Push-Pull
Change Reader 1(NO)
Toggle to Reader 2, then press <YES>
Push-Pull
Change Reader? YES

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

**NOTE:** 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:

- A front sensor that detects initial card insertion
- 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 ->
12345678901234568
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

1. **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.

2. **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.

3. **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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Paper Blocking Printer Chute</td>
</tr>
<tr>
<td>4</td>
<td>Temperature Error - Print Head Overheated</td>
</tr>
<tr>
<td>8</td>
<td>Printout Lost - Some Error Occurred During Printing Causing a Failure</td>
</tr>
<tr>
<td>16</td>
<td>Paper Jam Detected</td>
</tr>
<tr>
<td>18</td>
<td>Paper in Chute and Jam Detected</td>
</tr>
<tr>
<td>64</td>
<td>Paper Out</td>
</tr>
<tr>
<td>72</td>
<td>Paper Out and Print Lost</td>
</tr>
<tr>
<td>88</td>
<td>Paper Jam, Printout Lost and Paper Out Detected Conditions</td>
</tr>
<tr>
<td>90</td>
<td>Chute Blocked, Paper Jam, Printout Lost and Paper Out Detected Conditions</td>
</tr>
</tbody>
</table>

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).

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

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

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

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

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.

NOTE: 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 5,000 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:

<table>
<thead>
<tr>
<th>C/OPT #</th>
<th>Poll ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>34</td>
</tr>
<tr>
<td>8</td>
<td>35</td>
</tr>
</tbody>
</table>

To change the Poll ID, complete the following steps:

1. P 9 - POLL ID YES or ENTER
2. 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.

**IMPORTANT:** 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.

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

<table>
<thead>
<tr>
<th>VALUE</th>
<th>DEFAULT</th>
<th>FUNCTION</th>
</tr>
</thead>
</table>
| 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     | 0       | Not Used – Leave "0" |
| M     | 0       | Maximum line length of receipt values from 30 to 40 |
| 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.

**NOTE:** 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 the test is in progress. The test lasts approximately 15 seconds.

Once the test is complete, the screen will show PASSED. Press <EXIT> and then <NEXT> to move to the [ROM (BOOT)] test. If the screen shows BREAK, then the CLEAR key was pressed and the test was interrupted. If the following [ERROR (followed by a memory address)] the RAM test failed.

14. FLASH
This test 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 performing 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 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.

**NOTE:** 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 the C/OPT software level.

**NOTE:** 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.
4.5 FIT500 Fuel Control System

4.5.1 FIT500 Technical Specifications

<table>
<thead>
<tr>
<th>FIT500 Technical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet Dimensions [H x W x D]</td>
</tr>
<tr>
<td>Power Requirements</td>
</tr>
<tr>
<td>Operating Temp. Range</td>
</tr>
<tr>
<td>Magnetic Stripe Card Access</td>
</tr>
<tr>
<td>ChipKey® Access</td>
</tr>
<tr>
<td>Proximity Card Access</td>
</tr>
<tr>
<td>Dual-Card Readers</td>
</tr>
<tr>
<td>Bankcard Acceptance</td>
</tr>
<tr>
<td>Text Display</td>
</tr>
<tr>
<td>Graphics Display</td>
</tr>
<tr>
<td>User-Defined Images</td>
</tr>
<tr>
<td>Receipt Printer</td>
</tr>
<tr>
<td>Alphanumeric Entry</td>
</tr>
<tr>
<td>Enclosure &amp; Pedestal</td>
</tr>
</tbody>
</table>

NOTE: The purchase of optional items may result in additional cost.
4.5.2 Exploded View
4.5.3 Installation

FIT Conduit Installation

All conduits in the FIT pedestal should terminate at a point 18" (46 cm) above the ground into a seal-off. Install the following 1/2" (1.3 cm) or 3/4" (1.9) 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 pedestal diagram below.

FIT Pedestal and Enclosure Mounting

1. Remove the access panel from the pedestal; the panel slides up and out.
2. Install four (4) 3/8" threaded studs in the ground.
3. Set the pedestal atop the four (4) studs.
4. Secure the pedestal to the studs with the four (4) nuts and lock washers.
5. Set the enclosure atop the pedestal.
6. Secure the enclosure tightly to the pedestal with the supplied bolts and washers.
FIT Flex Conduit Installation

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

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

FIT Power and Communication Wiring

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

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

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

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

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

**NOTE:** Petro-Net is connected internally on integrated units. There is no need to connect to the Petro-Net terminal block unless there are additional FITs or other devices to connect.
4.5.4 **FSC3000 Installation in a FIT500**

1. 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.
2. Remove the two (2) screws holding the plastic safety shield on the FSC board.
3. Plug in Power, Ground and Petro-Net connections to appropriate connectors. (See figure below.)
4. Reinstall the plastic safety shield.
4.5.5 Accessories

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:

![Loading instructions](image)

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.

Antenna Installation

The wireless modems above require the installation of an antenna.

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

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

The configuration parameters for the FIT500 are set by placing the unit in 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 Configuration (Setup Mode) section to make the necessary changes.

Startup

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 one second.
- **Download Mode:** The system will then display the download screen and will display the following information:
  - Loading (version)
  - FIT (address) (baud rate)

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:

<table>
<thead>
<tr>
<th>FIT #</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>34</td>
</tr>
<tr>
<td>8</td>
<td>35</td>
</tr>
</tbody>
</table>

Set Petro-Net communication parameters to match FSC3000.

<table>
<thead>
<tr>
<th>Baud</th>
<th>Parity</th>
<th>Data Bits</th>
<th>Stop Bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600</td>
<td>Even</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>
Display

Allows one to adjust background contrast and display brightness.

Default Display Brightness:

Day: 25
Night: 50

**NOTE:** Background (color) will only apply to screens without graphic images.

Printer

This function configures the printer.
The FIT500 has 26 values for special functions.

Below is a table defining each value’s function.

<table>
<thead>
<tr>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| 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) |

**NOTE:** All values default to zero.
## Toggles

The FIT500 has 16 toggles for special functions.

![Toggle List](image)

Below is a table defining each toggle’s function. Modify toggles as needed.

**NOTE:** All values default to zero.

<table>
<thead>
<tr>
<th>Value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Remove Current Date on Receipt</td>
</tr>
<tr>
<td></td>
<td>(Proprietary Cards Only)</td>
</tr>
<tr>
<td>B</td>
<td>Remove Current Time on Receipt</td>
</tr>
<tr>
<td></td>
<td>(Proprietary Cards Only)</td>
</tr>
<tr>
<td>C</td>
<td>Send Track 1 to FSC3000</td>
</tr>
<tr>
<td>D</td>
<td>Not Used - Leave Unchecked</td>
</tr>
<tr>
<td>E</td>
<td>Leave 0</td>
</tr>
<tr>
<td>F-P</td>
<td>Not Used - Leave Unchecked</td>
</tr>
</tbody>
</table>
4.5.7 Testing

The system will enter the test mode upon power-up if the test switch is closed (SW2 Pos 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.

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. When the DIP switch is moved, the associated position changes.

ADC Converter Test

This test checks the operation of the ADC converter.

1. Click Tests→ADC Converter, from the main menu.
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.
Section 5 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; thereby, allowing 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. The remote PCM enclosure can contain one master and one slave PCM to control up to four (4) mechanical dispensers, and is weatherproof and suitable for outdoor mounting.

**Electronic Pump Control**

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

- **UPC (Universal Pump Control)** allows the FSC3000 to control pumps by the manufacturer’s console/pump controller box (PIB, PAM or DHC).
- **DPC (Direct Pump Control)** allows the FSC3000 to directly control electronic pumps using the manufacturer’s dispenser protocol.

### 5.1 PCT (Pump Control Terminal)

**K800 Hybrid PCT (Pump Control Terminal)** allows control of mechanical pumps by using up to two (2) hose kits; thereby, allowing four (4) fueling points for each FIT board. This option is only available if K800 Hybrid terminals are used.

#### 5.1.1 Technical Specifications

- Relay Contact Rating: 240 VAC; 20A; 3/4 HP
- “In-Use” Detection: Current Sense (100 mA)
- Pulser Type: Single-Channel
- Pulser Output: Mechanical (Contact); Electronic (5-12 VDC)
- Pulser Divide Rate: 1:1 – 1,000:1 (1-Pulse Increments)
- Maximum Pulse Speed (50% Duty Cycle): 6,000 Mechanical; 100,000 Electronic
5.1.2 PCT Installation

**NOTICE:** 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.

### PCT Pump Control & Pulser (Mechanical Control) Conduit Requirements

#### Pump Control Conduit

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.

<table>
<thead>
<tr>
<th>Wires (per fueling point)</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump Control</strong></td>
<td>Four (4) wires - must meet pump manufacturer’s specification for pump being controlled</td>
</tr>
<tr>
<td><strong>Pulser Wire</strong></td>
<td>Two- or four-wire cable shielded– 600 V-rated – Oil/Gas resistant, Wet Locations UL-style 2567</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>Current Sense (100 mA) (motor/solenoid control)</td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>Auxiliary (reset control)</td>
</tr>
<tr>
<td>D</td>
<td>Pulser Cable Shield Ground</td>
</tr>
<tr>
<td>C</td>
<td>Pulser Power 12V</td>
</tr>
<tr>
<td>B</td>
<td>Pulser Signal</td>
</tr>
<tr>
<td>A</td>
<td>Pulser Common</td>
</tr>
</tbody>
</table>

Self-Contained Dispenser, Power Reset
Dispenser, Power Reset

**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:

**Wire Passive Veeder-Root Pulser**

- White
- Black
- Cable Shield

**Wire Active Veeder-Root Pulser**

- White
- Black
- Red
- Cable Shield
5.1.3 Physical Configuration

5.1.4 Software Configuration

For software configuration, please refer to the *M00-051.00 FSC3000 Command-Line Configuration Guide* located on the OPW website at [www.opwglobal.com/opw-fms](http://www.opwglobal.com/opw-fms).

5.1.5 Testing

7. Activate the Bypass switch for the first hose position (Switch 1, Position 1).
3. Observe the red “Relay” LED that comes on.
4. 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.
5. Dispense product and watch the green “Pulse” LED. It should flash as product is dispensed.
6. If everything checks out OK, turn off the bypass switch and repeat for each hose position to which the system is connected.

<table>
<thead>
<tr>
<th>Pump Position 1</th>
<th>Pump Position 2</th>
<th>Pump Position 3</th>
<th>Pump Position 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay LEDs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay ON (RED)</td>
<td>In-Use (Yellow)</td>
<td>Pulse (Green)</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Red LED" /></td>
<td><img src="image" alt="Yellow LED" /></td>
<td><img src="image" alt="Green LED" /></td>
<td></td>
</tr>
</tbody>
</table>

**PCT Test Checklist**

For PCT testing checklist, refer to *Appendix A: Pump Control Test Checklist* of this document.
5.2 PCM (Pump Control Module)

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. The remote PCM enclosure can contain one master and one slave PCM to control up to four (4) mechanical dispensers, and is weatherproof and suitable for outdoor mounting.

5.2.1 Technical Specifications

- Cabinet Dimensions \([H \times W \times D]\) (Remote PCM): 10” x 12.5” x 5.69” (25.4 x 32 cm x 14.4 cm)
- Power Requirements (Remote PCM): 115/230 VAC; 50/60 Hz; 1.0/0.06 A
- Operating Temperature Range (Remote PCM): -40°F - 122°F (-40°C - 50°C)
- Relay Contact Rating: Voltage Sense 120-240 V or Handle Sense
- “In-Use” Detection: Current Sense (100 mA)
- Pulser Type: Single-Channel
- Pulser Output: Mechanical (Contact); Electronic (5-12 VDC)
- Pulser Divide Rate: 1:1 – 1, 000:1 (1-Pulse Increments)
- Maximum Pulse Speed (50% Duty Cycle): 6,000 Mechanical; 100,000 Electronic
5.2.2 PCM Installation

**NOTE:** C/OPT and FIT500 terminals can support two master/slave PCMs for a total of eight (8) fueling points.

The PCMs may be installed in the C/OPT, FIT500 or in the remote PCM cabinet.

---

**PCM Installation Locations**

- PCM Installation in a C/OPT or FIT500 Pedestal
- PCM Installation in a Remote Cabinet
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.
- 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:
Installing PCM(s) in a 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.

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

**NOTICE:** 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.

**NOTE:** The Pump Control Modules use voltage sense to know when the pump is running.
PCM Board Terminal Identification

PCM Master

PCM Slave
PCM Connections

<table>
<thead>
<tr>
<th>Low-voltage Connections</th>
<th>High-voltage Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gnd – Ground for pulser and flow switch</td>
<td>In-Use – Feedback from solenoid or motor</td>
</tr>
<tr>
<td>Pulse – Pulser input</td>
<td>Neutral – Neutral return for In-Use signal</td>
</tr>
<tr>
<td>Flow – Flow switch or pump handle input</td>
<td>Relay Contacts – Reset control</td>
</tr>
<tr>
<td>+12 V – Supply for pulser</td>
<td>Relay Contacts – Motor control</td>
</tr>
</tbody>
</table>

Self-contained Pump, Power Reset

Dispenser, Power Reset

**NOTE**: Two (2) dispensers controlled by a single PCM Master or Slave must be of the same type.
Veeder-Root Pulser Wiring

Remote PCM/EPC Power, Petro-Net and HM-485

Remote PCM

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.

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

*NOTE: Petro-Net communications wire may share terminal power conduit when the Petro-Net cable voltage insulation rating is 600 V.
Remote PCM Petro-Net Communication Conduit

Remote PCM Communication Wiring Requirements

<table>
<thead>
<tr>
<th>Wires</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petro-Net (RS-485)</td>
<td>Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations</td>
</tr>
<tr>
<td>HM-485</td>
<td>Two (2) #18 AWG twisted (10 per ft) pair – Oil/Gas resistant, Wet Locations</td>
</tr>
</tbody>
</table>

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.

PCM Pump Control & Pulser (Mechanical Control) Conduit Requirements
Pump Control Conduit

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.

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

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

Pump Pulser Conduit

<table>
<thead>
<tr>
<th>Wires (per fueling point)</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulser Wire</td>
<td>Two- or four-wire cable (shielded recommended, but not required)</td>
</tr>
</tbody>
</table>

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.
5.2.3 Physical Configuration

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

**IMPORTANT**: This 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

**IMPORTANT**: This setting applies to the pulsers for pump positions of the PCM; therefore, both pulsers must be of the same type.

(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

**IMPORTANT**: This setting applies to the pulsers for pump positions of the PCM; therefore, both pulsers must be of the same type.
<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Description</th>
<th>Pump Position</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Master</td>
<td>Slave</td>
<td>Normal Operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
<td>Manual Override</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>4</td>
<td>Normal Operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>4</td>
<td>Manual Override</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 and 2</td>
<td>3 and 4</td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td></td>
<td>Pulser Filter</td>
<td>1 and 2</td>
<td>3 and 4</td>
<td>Electronic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mechanical</td>
</tr>
<tr>
<td></td>
<td>In-Use Sense</td>
<td>1 and 2</td>
<td>3 and 4</td>
<td>Voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Handle Sense</td>
</tr>
</tbody>
</table>

**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 & 5): This switch allows you to set the Petro-Net™ baud rate.

**IMPORTANT:** 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 4-6 (Master) – 20-4404-01 to 20-4404-04 Software Version 1.07G or HIGHER

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Baud Rate</th>
<th>Test Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9600</td>
<td>2400</td>
</tr>
<tr>
<td>4</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>5</td>
<td>OPEN</td>
<td>CLOSED</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Must be set to OPEN (Used for bulk plant application)*

For software versions before 1.07G, see Appendix B of this document.

![PCM Switch Settings Diagram](image-url)

Figure 5-1 54-0419 PCM Switch Settings Label
5.2.4 Software Configuration

For software configuration, please refer to the M00-051.00 FSC3000 Command-Line Configuration Guide located on the OPW website at www.opwglobal.com/opw-fms.

5.2.5 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.

   **NOTE:** Override is located in two (2) different locations.

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.

**PCM Test Checklist**

For PCM testing checklist, refer to *Appendix A: Pump Control Test Checklist* of this document.
Master LEDs

Slave LEDs
5.3 UPC (Universal Pump Control)

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

The UPC emulates up to four (4) PCTs for a maximum of 32 fueling points [eight (8) fueling points per emulated PCT]. Please note that when installing UPCs there may be hardware/software limitations that may prevent multiple UPCs; contact OPW Technical Support for UPC installation specifications.

5.3.1 UPC Technical Specifications

- **Power Requirements:** 115 VAC; 50/60 Hz
- **Operating Temperature Range:** 32°F - 122°F (0°C - 50°C)
- **Dispenser Compatibility:** Wayne, Gilbarco and Tokheim

5.3.2 UPC Installation

**Console Compatibility Requirements**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Compatibility Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilbarco</td>
<td>TS-1000</td>
<td>The TS-1000 console must be equipped as follows:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The TS-1000 must have software version 21.2 (or later)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The TS-1000 must have the MEM #2 Kit installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The console must have software version 11.0 (or later)</td>
</tr>
<tr>
<td>Wayne</td>
<td>2400, PIB or HyperPIB</td>
<td>The Wayne 2400+ Site Controller must be equipped with main and companion CPU boards with software revision 49-23 (or later)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The Plus/2 software must be version 4.20 (or later).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For Plus/3, contact your OPW distributor for the correct version.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Data-Link dispensers are compatible with UPC operation except:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- (1) DL0 dispensers; (2) variable-ratio blenders with more than four grades.</td>
</tr>
<tr>
<td>Tokheim®</td>
<td>MEMS IV, V, DHC Vision 100, 200</td>
<td>The Tokheim MEMS or DHC must be version 06.xx.xx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The UPC will not work with a 98 power center containing an older F8 board (ROM version 36 or earlier)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- All versions of Vision software are supported.</td>
</tr>
</tbody>
</table>
Petro-Net Communication
1. Run a conduit from the FSC3000 Petro-Net junction box to where the UPC will be located.
2. Attach the UPC's Petro-Net junction box within three feet of the UPC.
   a. The UPC must be within three (3) feet of the console or pump controller.
3. Connect Terminals 1 and 2 on the junction box cover to the corresponding Petro-Net wiring.
4. Secure the junction box cover to the box.
5. Insert the four-pin Petro-Net plug into the socket of the junction box.

Console Connection Requirements
The UPC is shipped with a personality kit that is specific to the manufacturer of the console or pump controller to be controlled.
1. Connect the six-pin socket of the RS-232 cable to the 6" personality cable supplied with the UPC.
2. Plug the personality cable into the console as follows:

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Personality Cable</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilbarco</td>
<td>TS-1000 (12 or 24 fp models)</td>
<td>20-1436-GIL2</td>
<td>PIB Plus</td>
</tr>
<tr>
<td>Wayne</td>
<td>2400, PIB or HyperPIB</td>
<td>20-1436</td>
<td>J-103 Gossip Port on Console</td>
</tr>
<tr>
<td>Tokheim</td>
<td>MEMS IV, V, DHC, Vision 100/200</td>
<td>20-1436-TOK</td>
<td>J2 or J4 (must be configured for 1200)</td>
</tr>
</tbody>
</table>

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.
1. Remove the cover to the UPC and plug the EPROM into its socket on the UPC circuit board.

![EPROM Socket](image)

2. Align the notch on the EPROM with the notch outline on the circuit board and make sure all of the pins are properly inserted.
3. Do not replace the cover to the UPC. The switches will be set in the configuration section.
ATTENTION: 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.

5.3.3 Physical Configuration

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.

NOTE: 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

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.

---

**NOTE:** 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.

<table>
<thead>
<tr>
<th>Gilbarco TS-1000 Programmable Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEAUTHORIZATION TIME OUT</td>
</tr>
<tr>
<td>MEMORY MODE</td>
</tr>
<tr>
<td>PRINTER ON AUTO DEMAND</td>
</tr>
<tr>
<td>REMOTE COMM SECRET CODE</td>
</tr>
<tr>
<td>PREARM ALERT</td>
</tr>
<tr>
<td>REMOTE COMM BAUD RATE</td>
</tr>
<tr>
<td>GALLONS/LITERS</td>
</tr>
<tr>
<td>3RD PAYMENT KEY PRICE LEVEL</td>
</tr>
<tr>
<td>CONSOLE CASH KEY</td>
</tr>
<tr>
<td>CONSOLE CREDIT KEY</td>
</tr>
<tr>
<td>CONSOLE 3RD PAYMENT KEY</td>
</tr>
</tbody>
</table>

Gilbarco UPC Status Lights

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
<th>“NORMAL” STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESET</td>
<td>UPC RESETTING</td>
<td>ON BRIEFLY AT POWER-UP; OTHERWISE OFF</td>
</tr>
<tr>
<td>PETRO-NET RTS</td>
<td>REQUEST TO SEND DATA</td>
<td>FLASHING</td>
</tr>
<tr>
<td>PETRO-NET DATA</td>
<td>TRANSMITTING</td>
<td>FLASHING</td>
</tr>
<tr>
<td>CONSOLE TX</td>
<td>TRANSMITTING</td>
<td>FLASHING</td>
</tr>
<tr>
<td>CONSOLE RX</td>
<td>RECEIVING</td>
<td>FLASHING</td>
</tr>
<tr>
<td>CONSOLE RTS</td>
<td>REQUEST TO SEND DATA</td>
<td>ON</td>
</tr>
<tr>
<td>CONSOLE CTS</td>
<td>CLEAR TO SEND DATA</td>
<td>FLASHING SLOWLY</td>
</tr>
<tr>
<td>STATUS 1</td>
<td>CPU OPERATION</td>
<td>FLASH AT POWER-UP; OTHERWISE OFF</td>
</tr>
<tr>
<td>STATUS 2</td>
<td>CPU OPERATION</td>
<td>FLASH AT POWER-UP; OTHERWISE OFF</td>
</tr>
</tbody>
</table>
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.

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

<table>
<thead>
<tr>
<th>LED</th>
<th>INDICATION</th>
<th>“NORMAL” STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESET</td>
<td>UPC RESETING</td>
<td>ON BRIEFLY AT POWER-UP; OTHERWISE OFF</td>
</tr>
<tr>
<td>PETRO-NET RTS</td>
<td>REQUEST TO SEND DATA</td>
<td>FLASHING</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>PETRO-NET DATA</td>
<td>TRANSMITTING</td>
<td>VERY FAST FLASHING</td>
</tr>
<tr>
<td>CONSOLE TX</td>
<td>TRANSMITTING</td>
<td>FLASHING – DURING TRANSACTION</td>
</tr>
<tr>
<td>CONSOLE RX</td>
<td>RECEIVING</td>
<td>FLASHING – DURING TRANSACTION</td>
</tr>
<tr>
<td>CONSOLE RTS</td>
<td>REQUEST TO SEND DATA</td>
<td>ON</td>
</tr>
<tr>
<td>CONSOLE CTS</td>
<td>CLEAR TO SEND DATA</td>
<td>FLASHING SLOWLY</td>
</tr>
<tr>
<td>STATUS 1</td>
<td>CPU OPERATION</td>
<td>FLASH AT POWER-UP; OTHERWISE OFF</td>
</tr>
<tr>
<td>STATUS 2</td>
<td>CPU OPERATION</td>
<td>FLASH AT POWER-UP; OTHERWISE OFF</td>
</tr>
</tbody>
</table>

**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, the UPC polls the FSC3000 for pump and product data. This is a “cold start.”

---

**IMPORTANT:** 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.

---

**NOTE:** 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 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

### 5.3.4 Software Configuration

For software configuration, please refer to the **M00-051.00 FSC3000 Command-Line Configuration Guide** located on the OPW website at [www.opwglobal.com/opw-fms](http://www.opwglobal.com/opw-fms).

### 5.3.5 Testing

**UPC Test Checklist**

For UPC testing checklist, refer to **Appendix A: Pump Control Test Checklist** of this document.
5.4 DPC (Direct Pump Control)

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

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

The DPC interface can connect to the EPC (OPW AVI) to provide handle status – refer to *M1701 OPW AVI Fuel Control System Installation and Configuration Manual* for more information. Meanwhile, DPC installations without OPW AVI will only require jumpers to be set up.

Wayne and Gilbarco

The DPC interface utilizes the Electronic Handle Monitor board to provide the DPC interface for Wayne and Gilbarco. It provides isolation and converts the RS-232 output from the FSC3000 into the current loop communication required by the dispensers.

Wayne dispensers can connect directly to the interface board or the Wayne distribution box can be used. Either way, up to eight (8) dispensers can be connected for controlling a maximum of 16 fueling points if the dispensers are double-sided, eight (8) fueling points if they are all single-sided, or any combination in between.

Gilbarco dispensers can connect directly to the interface board, or the Gilbarco distribution box can be used. If connecting directly to the interface board, up to eight (8) dispensers can be connected for controlling a maximum of 16 fueling points if the dispensers are double-sided, or eight (8) fueling points if they are all single-sided or any combination thereof. If the dispensers are double-sided, this can be eight (8) double-sided dispensers, 16 single-sided dispensers, or any combination thereof.

Gasboy

Gasboy dispensers use an RS-232 to RS-485 converter board to provide isolation and the proper interface. The dispensers all wire in a 2-wire multi-drop configuration. Up to 16 fueling points may be controlled. This can be any combination of single- and dual-sided dispensers.

5.4.1 Technical Specifications

- Cabinet Dimensions [H x W x D] (Remote PCM): 10” x 12.5” x 5.69” (25.4 x 32 cm x 14.4 cm)
- Power Requirements (Remote PCM): 115/230 VAC; 50/60 Hz; 1.0/0.06 A
- Operating Temperature Range (Remote PCM): -40°F - 122°F (-40°C - 50°C)
- Dispenser Brands Supported: Gilbarco, Wayne and Gasboy
5.4.2 DPC Installation

Parts Required

<table>
<thead>
<tr>
<th>Part #</th>
<th>Part Description</th>
<th>Remote DPC</th>
<th>Pedestal DPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-8225-DPC</td>
<td>Remote Peripheral Assembly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>20-0612</td>
<td>Electronic Pump Handle Monitor Assy. (DPC Interface)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>12-3004</td>
<td>Cable RJ45 to RJ 45 Stranded 10-15 ft.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>20-1618</td>
<td>Power Cable (C/OPT or FIT500)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Wires (per fueling point)</th>
<th>Wire Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Control*</td>
<td>Two wires – must meet pump manufacturer’s specification for the controlled pump</td>
</tr>
</tbody>
</table>

*NOTE: When using manufacturer’s D-Box, only two wires need to be pulled to the D-Box for all pumps.

For Four (4) or Less Dispensers

FIT DPC (direct)  
Remote DPC (direct)  
Remote DPC (D-Box)

For More Than Four (4) Dispensers

Depending upon your specific site installation requirements and type/brand of dispenser, please refer to the appropriate DPC installation instructions.
Installing DPC Interface in a Remote Enclosure (for Wayne and Gilbarco)

1. Attach the enclosure to a wall with fasteners (not supplied). Enclosure needs to be no further than 50' (15.24 m) from FSC3000 controller.

2. Install the following 1/2” or 3/4” rigid steel conduits and wires, as applicable.

3. DPC power source conduit and pull three (3) 14-AWG wires from the breaker panel.

4. Pump communication conduit and pull wires from each dispenser.

5. Mount the DPC interface board on the right-side stand-offs in the enclosure.

6. Remove connector from CN12 DPC interface board and attach wiring (grey and orange) from the power supply cable (P/N: 12-3004) to the connector. (Polarity is NOT important.)

7. Reconnect connector to CN12 on the DPC interface.

8. Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block.

9. Attach pump communication wires to each pump loop on CN5.

10. Connect Wayne/Gilbarco dispenser directly to the DPC interface.

**NOTE:** For more than four (4) pump loops use the manufacturer’s distribution box. Pump communication conduit is not required if manufacturer’s distribution box is located near remote DPC enclosure.
Wayne D-Box Connection to DPC Board
Wayne Data Distribution Box connected to DPC interface.

Gilbarco D-Box Connection to DPC Board
Gilbarco Universal Distribution Box connected to DPC interface. Ensure that the Gilbarco is setup for current loop.

11. Run cable (P/N: 12-3004) from Port CN4 to port 4 on the FSC3000 controller. Please note that the cable can be extended up to 50’ (15.2 m).
Installing DPC Interface in a Terminal Pedestal (for Wayne and Gilbarco)

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

1. Mount the DPC interface as shown in the drawing of the pedestal.
2. Remove connector from CN12 DPC interface board and attach wiring (grey and orange) from the power supply cable (P/N: 20-1618) to the connector. (Polarity is NOT important.)
3. Reconnect connector to CN12 on the DPC interface.
4. Run cable from pedestal into C/OPT or FIT500 enclosure.
5. Connect 4-pin connector into C/OPT power supply or FIT500 main board.

**NOTE:** Petro-Net wires are not used and should be capped.

DPC Installation in Pedestal

6. Run cable (P/N: 12-3004) from Port CN4 to port 4 on the FSC3000 controller.
7. Attach pump communication wires to each pump loop on CN5.
8. Connect Wayne/Gilbarco dispenser directly to the DPC interface.
Wayne D-Box Connection to DPC Board
Wayne Data Distribution Box connected to DPC interface.

Gilbarco D-Box Connection to DPC Board
Gilbarco Universal Distribution Box connected to DPC interface. Ensure that the Gilbarco is setup for current loop.
Installing a Remote DPC Interface (for Gasboy®)

Gasboy-DPC Parts Kit

<table>
<thead>
<tr>
<th>Part #</th>
<th>Part Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Mounting Plate</td>
</tr>
<tr>
<td>N/A</td>
<td>Isolated Converter (RS-232 to RS 422/485)</td>
</tr>
<tr>
<td>N/A</td>
<td>Power Supply</td>
</tr>
<tr>
<td>20-1518-04</td>
<td>Power Cable (C/OPT or FIT500)</td>
</tr>
</tbody>
</table>

Gasboy-DPC Installation

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 (P/N: 20-1519-04) into the isolated converter 9-pin port and then into Port 4 of the FSC3000.
4. Install pump communication wiring to converter.

**IMPORTANT:** 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.
Installing DPC Interface in a Terminal Pedestal (for Gasboy)

Gasboy-DPC Parts Kit

<table>
<thead>
<tr>
<th>Part #</th>
<th>Part Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Mounting Plate</td>
</tr>
<tr>
<td>N/A</td>
<td>Isolated Converter (RS-232 to RS 422/485)</td>
</tr>
<tr>
<td>N/A</td>
<td>Power Supply</td>
</tr>
<tr>
<td>20-1518-04</td>
<td>Power Cable (C/OPT or FIT500)</td>
</tr>
</tbody>
</table>

Gasboy-DPC Installation

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. Install pump communication wiring to converter.

**IMPORTANT**: 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.
5.4.3 Physical Configuration

- Set up jumpers to match pump type being connected. See the Wayne/Gilbarco Jumper Settings illustrations below.
- 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 Pins 1 and 2 of the 3-pin jumper.
- On 3-pin jumpers the board is labeled to indicate which pin is number one.

DPC Interface Jumper Setup (for Wayne and Gilbarco)
5.4.4 Software Configuration
DPC configuration was completed during installation.

5.4.5 Testing
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.

UPC Test Checklist
For UPC testing checklist, refer to *Appendix A: Pump Control Test Checklist* of this document.
Section 6 Dispenser Terminal Control (DTC)

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.

6.1 Technical Specifications

- Cabinet Dimensions: 10” H x 12.5” W x 5.7” D (25.4 cm x 31.8 cm x 14.5 cm)
- Power Requirements: 115/230 VAC; 50/60 Hz; 1.0/0.06 A
- Operating Temperature Range: -40°F to 122°F (-40°C to 50°C)

6.1.1 Terminal Types

DTC can communicate with the Wayne CAT, Gilbarco CRIND or Gasboy ICR. The DTC interface utilizes a second remote PCM enclosure.

DTC 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/Gilbarco/Gasboy) 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. For Gasboy ICR-DTC installation please refer to the M00-20-8225-DTC-ICR Gasboy Island Card Reader Installation Supplement located on the OPW website (www.opwglobal.com/opw.fms).

Wayne CAT (Card Authorization Terminal)

The DTC board has RS-485 ports to communicate directly to the Wayne CATs. Up to 12 fueling points can be controlled. This can be six (6) dual-sided dispensers, 12 single-sided dispensers, or any combination thereof.

Gilbarco CRIND (Card Reader in Dispenser)

In addition to the DTC board, Gilbarco requires a second Electronic Handle Monitor (EHM) board to provide the isolation and to convert the RS-232 output from the DTC board into the current-loop communication required by the CRINDs.

CRINDs can connect directly to the Electronic Handle Monitor board or the Gilbarco distribution box. If connecting directly to the interface board, up to eight (8) dispensers can be connected and a maximum of 12 fueling points can be controlled. For example, the system can control six (6) dual-sided dispensers (12 fueling points), eight (8) single-sided dispensers (8 fueling points), or a combination thereof, such as four (4) dual-sided and four (4) single-sided dispensers (12 fueling points).

If the distribution box is used, then a maximum of 12 fueling points may be connected. This can be six (6) double-sided dispensers, 12 single-sided dispensers, or any combination thereof.

Gasboy ICR (Island Card Reader)

The Gasboy DTC (Dispenser Terminal Control) allows the FSC3000 to control Gasboy Island Card Readers (ICRs). This option does not work with the Gasboy Pump Control Unit (PCU). Pump control is provided using either the PCM for mechanical dispensers or the DPC for electronic dispensers.
6.2 Diagrams

6.2.1 Wayne DTC
For Four (4) or Less Dispensers

Remote DPC with DTC (direct)

For More than Four (4) Dispensers

Remote DPC with DTC (D-Box)

6.2.2 Gilbarco DTC
For Four (4) or Less Dispensers

Remote DPC with DTC (direct)

For More than Four (4) Dispensers

Remote DPC with DTC (D-Box)
6.3 DTC Installation

6.3.1 Installing DTC in a Remote Enclosure

1. Attach the enclosure to a wall with fasteners (not supplied). Enclosure needs to be no further than 50' (15.24 m) from FSC3000 controller.

DTC Remote Enclosure

2. Install the following 1/2" or 3/4" rigid steel conduits and wires, as applicable.

3. DTC power source conduit and pull three (3) 14-AWG wires from the breaker panel.

4. Pump Communication Conduit and pull wires from each dispenser.

NOTE: 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.

5. Mount the DTC interface board on the left-side stand-offs within the enclosure.

6. Attach Line, Neutral and Ground wires from the breaker panel to the power-connection block.

7. Connect Petro-Net wires to the terminal blocks in the remote enclosure.

DTC Connections
6.4 Physical Configuration

6.4.1 Wayne CAT-specific

DTC Installation for Wayne (CAT)

1. Connect the red wire from the power supply to the CN1 terminal 1 on the DTC board. Connect the black wire to terminal 2.

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.

3. Attach CAT communications wires to terminal blocks CN5 through CN8. 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.

4. Make sure the jumpers are set according to the diagram as indicated above. The jumpers marked with “#” connect termination resistors on the dispenser communication lines. Install these jumpers only if you experience COMM errors with the dispensers.
6.4.2 Gilbarco CRIND-specific

1. Direct connect to CRIND loops.

DTC Installation Gilbarco (CRIND)

2. Gilbarco Universal distribution box (D-Box) to DPC interface.

3. Ensure the Gilbarco D-Box is setup for current loop.

Gilbarco D-Box Connections to DPC Board

4. Install the DPC board in the right side of the enclosure.
5. Connect the red wire from the power supply to CN1 terminal 1 on the DTC board. Connect the black wire to terminal 2.

6. 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.

7. Connect the short RJ45 patch cable from connector CN3 on the DTC board to connector CN4 on the DPC board.

8. Attach the CRIND communication loop wires to terminal blocks CN5 through CN8. If connecting more than four (4) dispensers, connect loop one (1) to the Gilbarco D-Box using the supplied cable.

6.5 Software Configuration

Section 7 Maintenance & Troubleshooting

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.

7.1 FSC3000 (Remote Only) Maintenance

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

7.2 Fuel Island Terminal Maintenance

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 ChipKeys always verify with multiple ChipKeys – 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.

**NOTE:** 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.
7.3 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! It is allowable to 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.

7.4 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:
- Safety goggles
- Protective gloves
- Cotton cleaning swabs
- Duster can (HFC-134a)
- Isopropyl or denatured alcohol
- Moist wipes
- 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 from 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.
Warranty

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

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

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

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

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

TERMS

Ex-works our factory, Hodgkins, Illinois, USA
Installation not included.
All trade names are registered. Patents pending.
Subject to engineering improvement and/or other changes.
### Appendix A: Pump Control Test Checklist

**Pump Control (K800 Hybrid PCT, PCM, UPC, DPC)**

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<tr>
<th></th>
<th>Pump Control 1 POS #</th>
<th>Pump Control 2 POS #</th>
</tr>
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<tbody>
<tr>
<td>Write down associated pump number</td>
<td>1 2 3 4 5 6 7 8</td>
<td>1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>Verify proper pump turns on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify pump timers are set up as required</td>
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<td>Pump Control (K800 Hybrid PCT, PCM, UPC, DPC)</td>
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(K800 Hybrid PCT, PCM, UPC, DPC)

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Appendix B: Switch #2 Positions 4-6 for S/W Versions Before 1.07G

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<th>Switch Position</th>
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<td>1200 PCM Part #20-44-01 thru 20-4404-04 CLOSED</td>
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<td>2400 PCM Part #20-44-05 thru 20-4404-08 CLOSED</td>
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<tr>
<td>5</td>
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<td>Must be set to OPEN OPEN</td>
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<tr>
<td>6</td>
<td></td>
<td>Must be set to OPEN OPEN</td>
</tr>
</tbody>
</table>
**OPW Global Operations**

1. OPW Corporate Headquarters
2. OPW Fuel Management Systems
3. OPW Retail Fueling
4. OPW Engineered Systems
5. Midland Manufacturing
6. Civacon
7. PDQ Manufacturing Inc.
8. OPW Mexico
9. OPW Latin America
10. Poland/Petro Vend of Poland, Inc.
11. OPW EMEA Headquarters
12. OPW EMEA Czech Republic
13. OPW FTG Europe
14. OPW India
15. OPW Asia Pacific
16. OPW Russia