GASBOY

MDE-4813D

CFN PLUS

INSTALLATION MANUAL

This document is based on Orpak's Controller Unit (OrCU 3000)

installation manual P/N 817438032

POWERED BY
ORPAK

SAFETY CONSIDERATIONS

Read all warning notes and instructions carefully. They are included to help you in installing the Product safely in the highly flammable environment of the fuel station. Disregarding these warning notes and instructions could result in serious injury or property damage. It is the installer responsibility to install, operate and maintain the equipment according to the instructions given in this manual, and to conform to all applicable codes, regulations and safety measures. Failure to do so could void all warranties associated with this equipment.

Remember that the fuel station environment is highly flammable and combustible. Therefore, make sure that actual installation is performed by experienced personnel, licensed to perform work in fuel station and at a flammable environment, according to the local regulations and relevant standards.

WARNING - EXPLOSION HAZARD

Use separate conduit for the intrinsically safe. Do not run any other wires or cables through this conduit, because this could create an explosion hazard.
Use standard test equipment only in the non- hazardous area of the fuel station, and approved test equipment for the hazardous areas.
In the installation and maintenance of the Product, comply with all applicable requirements of the National Fire Protection Association NFPA-30 "Flammable and Combustible Liquids Code", NFPA-30A "Code for Motor Fuel Dispensing Facilities and Repair Garages", NFPA-70 "National Electric Code", federal, state and local codes and any other applicable safety codes and regulations.
Do not perform metal work in a hazardous area. Sparks generated by drilling, tapping and other metal work operations could ignite fuel vapors and flammable liquids, resulting in death, serious personal injury, property loss and damage to you and other persons.

CAUTION - SHOCK HAZARD

Dangerous AC voltages that could cause death or serious personal injury are used to power the Product. Always disconnect power before starting any work. The Product has more than one power supply connection port. Disconnect all power before servicing.

CAUTION - EXTERNAL WIRING

For supply connections, use wires suitable for at least 90°C.

Signal wiring connected in this box must be rated at least 300 V.

WARNING - PASSING VEHICLES

WARNING

CAUTION

PROPRIETY NOTICE

DISCLAIMER

FCC Compliance Statement

The FCC Wants You to Know:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :
a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and receiver.
c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
d) Consult the dealer or an experienced radio/TV technician.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

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SECTION 1
GENERAL DESCRIPTION

1-1. SCOPE

This manual is provided to assist you in installing a controller unit - CFN PLUS. The CFN PLUS system must be installed as described in this manual to ensure the system reliability and proper operation.

This manual includes a general and functional description of the product, its main components, installation requirements and procedures.

This manual is intended for qualified authorized installers of the CFN PLUS and its components.

1-2. DESCRIPTION

The CFN PLUS is a fuel control and data acquisition system (see Figure 1-1). CFN PLUS system is self-contained in a forecourt compatible and weather-resistant cabinet installed on a wall or any flat surface.

Figure 1-1 CFN PLUS - General View

CFN PLUS is a major component in Gasboy's solution for Home Base Gas Station (Home Base Station). CFN PLUS provides the central function of Site Controller. It also fulfills other essential services on the Island such as Vehicle/Driver Identification System (FuelPoint PLUS), Transaction data storage, Forecourt devices control and more. Its user-friendly operating program enables fast and accurate service for the driver in the refueling site.

CFN PLUS can control up to four mechanical hoses, or up to 64 electronic hoses. The hoses may be linked together or standalone.

CFN PLUS supports personal refueling identification devices such as Vehicle/Driver Identification Unit (FuelPoint PLUS) and FuelOPass.

1-3. SYSTEM OVERVIEW

1-3.1. CFN PLUS System

CFN PLUS is an innovative product that enables refueling in Home Base gas stations for fleets authorized vehicles or drivers. CFN PLUS electronically locks all dispensers and pumps thereby ensuring that only appropriately authorized vehicles and plants receive the required fuel. The system also ensures accurate recording of each transaction (see Figure 1-2).

The heart of the Home Base Station solution is the SiteOmat automation software. SiteOmat runs on an embedded operating system on the OrCU (Orpak Controller Unit). OrCU is an embedded hardware platform designed to survive the harsh gas station environment. It uses a solid-state Flash disk and RTC with backup, along with surge suppressors for transient and noise immunity. The system also includes power fail recovery mechanisms.

1-3.2. Vehicle Identification - FuelPoint PLUS

Vehicle Identification is an important option for maximal control and savings on fuel expenditure. The dispenser is authorized to refuel after a positive identification of the vehicle and only while the nozzle is inside the fuel inlet of the identified vehicle. All transaction information is automatically recorded. A combined vehicle and driver identification is also possible for tight tracking.

1-3.3. Remote Web Access

Remote Web-based capabilities for monitoring, management and maintenance are available. A standard PC with Internet Browser (Explorer) is used for management of the site either locally or remotely (secured). There is no need for special management software; built-in Web server technology is integrated into the station controller and a large variety of communication links is supported - both wired and wireless.

1-3.4. Head Office

Centralized management is provided by the optional Fleet and Fuel Head Office (FHO) server. The Fleet and FHO consolidates the data from multiple sites and generates reports, including exception reports. It also enables control of the limits and restrictions placed on the various fleet vehicles. Furthermore, authorized fleet personnel are able to log in remotely and are always in control. Head office enables authorized users to control and manage wet stock inventory on all stations including orders, deliveries, and reports.

1-3.5. Restrictions and Limits

Control of a fleet's fuel expenses can be maximized by defining limits (day, week, month), maximum number of refueling (day, week, month) and setting restrictions (days of the week, fuel type, stations, time intervals). In case of system configuration for multiple sites, the centralized FHO needs to synchronize the data between all sites so that the limits can be applied to a whole system rather than to an individual site. In case of communication failure, the specific site will be able to refuel for a predefined grace period (parameter) using the most recent limits stored in its database.

1-3.6. *CFN PLUS Capabilities for Forecourt Management*

CFN PLUS provides the following operational features for a comprehensive Forecourt management:

- Supports over 50 different types of dispensers in use in many countries. For UL® listing; this product has only been evaluated for use with UL Listed Dispensers.

- Advanced electronic support of mechanical dispensers, enabling pump with totalized, preset and price update.

- Tank Level Gauging System (TLG) available for several brands. For UL listing; this product has only been evaluated for use with UL listed TLG.

- Support of large variety of communication links: cellular, dial-in modem, VPN, satellite, ADSL, and more.
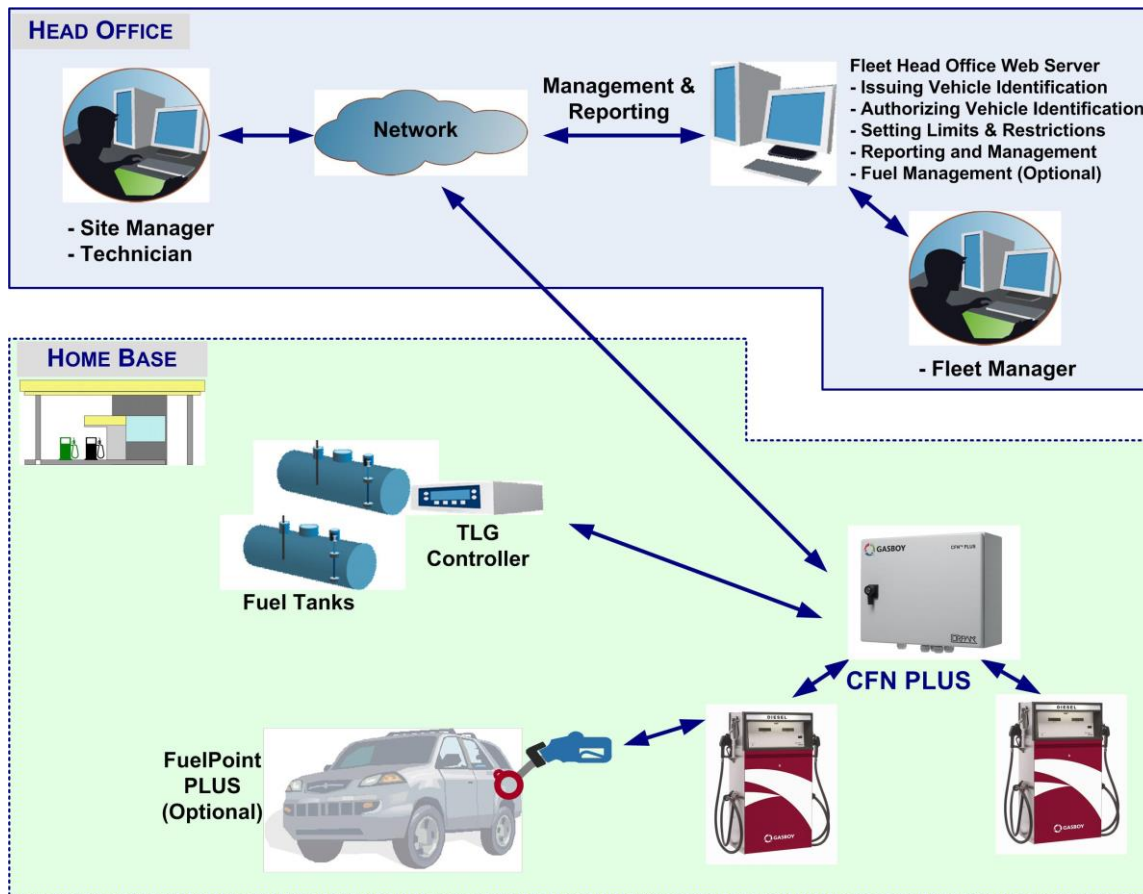
Figure 1-2 CFN PLUS in Home Base Station - General Configuration Diagram

1-3.7. *System Workflow - Example*

The following scenario illustrates an operational workflow for self-service at the Home Base Station:

1-3.7.1. Refueling Scenario with FuelPoint PLUS

A motorist stops for fuel at the station. His authorization device for the fueling transaction is a vehicle identification unit (FuelPoint PLUS) mounted in his car. The client lifts the nozzle and inserts it in the car fuel inlet.

The FuelPoint PLUS information is automatically read and sent to the Site Controller (CFN PLUS) for authentication and approval. Upon approval, the fueling transaction starts; when the refueling is completed, the motorist replaces the nozzle back to the pump. At the end of the process the transaction data is kept internally and transferred to the FHO for future billing.

1-4. *CFN PLUS STRUCTURE*

1-4.1. *Main Components*

Following is a short description of the CFN PLUS main sub units (see Figure 1-3 and Figure 1-4)

Orpak Controller Unit (OrCU)
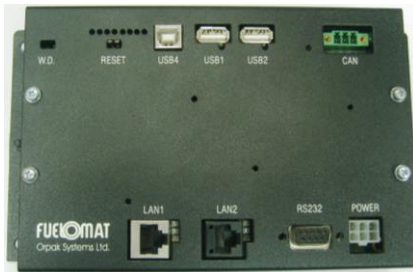
Orpak Controller Unit (OrCU) is a complete forecourt controller with its own embedded operating system. The unit consists of an embedded hardware platform with a solid-state Flash hard disk, Real Time Clock (RTC) with backup, and surge suppressors for transient and noise immunity.

OrCU features two separate and isolated networks (TCP/IP over Ethernet). One network links the CFN PLUS system components. The second network is intended for external remote communication (Head Office, 3rd party systems). This network is protected by SSL security. OrCU includes a built-in server for Web access through an Internet browser (Explorer).

8-Port CommVerter
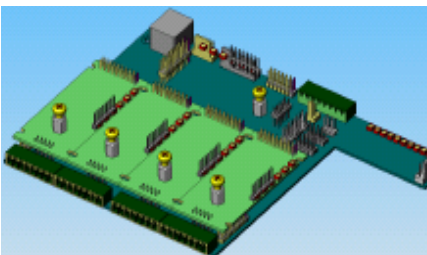
The 8-Port CommVerter consists of a communication board for CFN PLUS electronic units and for the peripheral equipment interface.

The CommVerter includes two MPI-C cards for interface to the mechanical pumps, an Ethernet Switch, RS/485 ports and one RS/232 port. For electronic pump, a different interface card is installed. See Chapter 3 for more details.

The CommVerter communicates with the Site Controller (OrCU) via a LAN (Ethernet) link.

1-4.2. *CFN PLUS Internal Configuration - Mechanical Pump*

The following Figure 1-3 shows a general configuration diagram of the CFN PLUS.
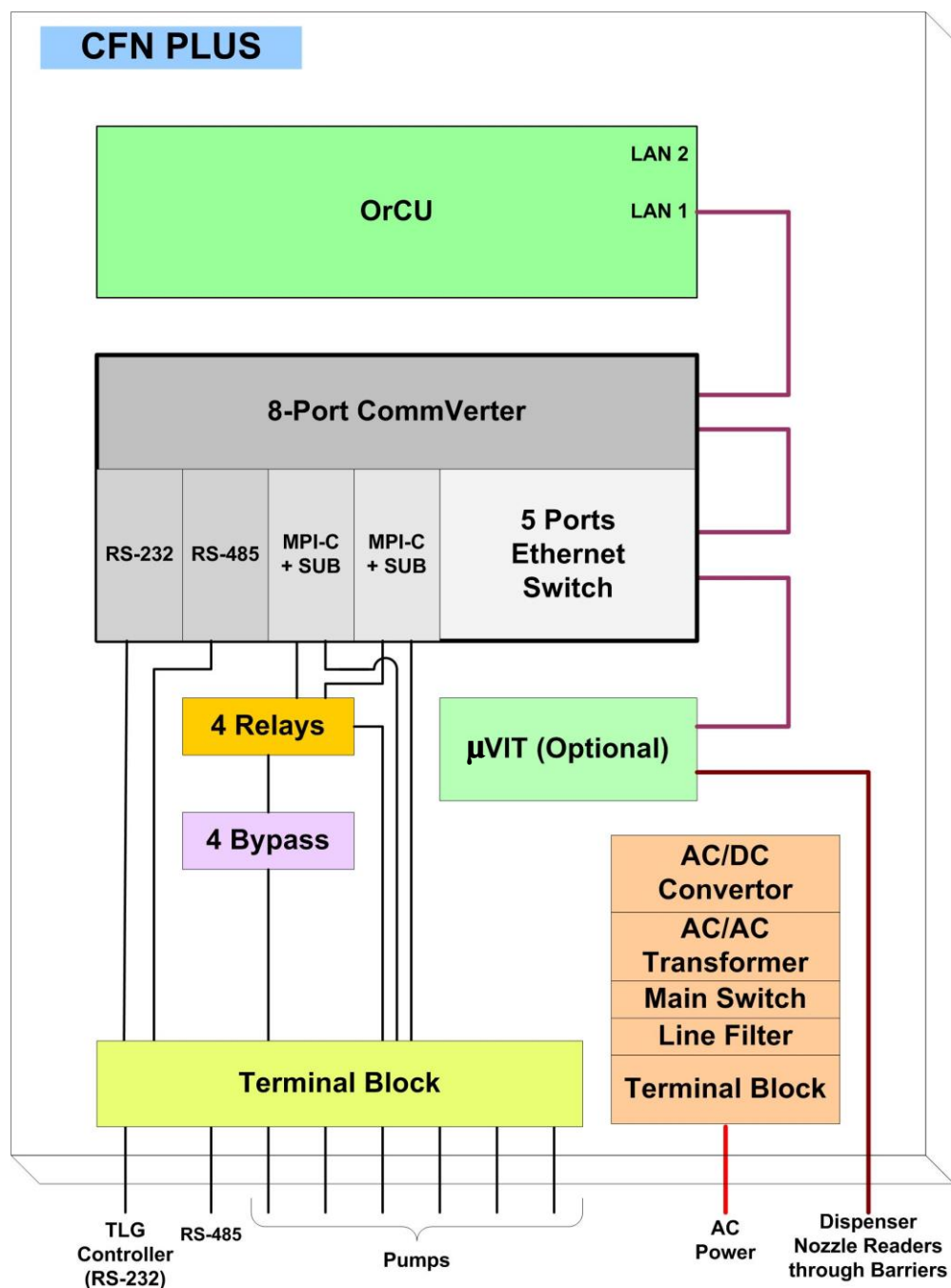
Figure 1-3 Internal Configuration Diagram - Mechanical Pump

1-4.3. *Main Components Location*

CFN PLUS is provided in different configurations, in accordance with the geographical area where it is installed. Figure 1-7 shows the location of the main components of the CFN PLUS.

The shown unit includes a terminal block specially set for barriers connection. The barriers themselves are grouped in an external box installed separately.

AC/DC Convertor
5 Ports Ethernet Switch
RS-485 (optional)
RS-232 (optional)
8-Port CommVerter
MPI-C + SUB (x2)
OrCU

AC/AC High to Low Transformer
Main Switch
Line Filter
Bypass Switches
Terminal Block
Terminal Block for Barriers
Solid State Relay
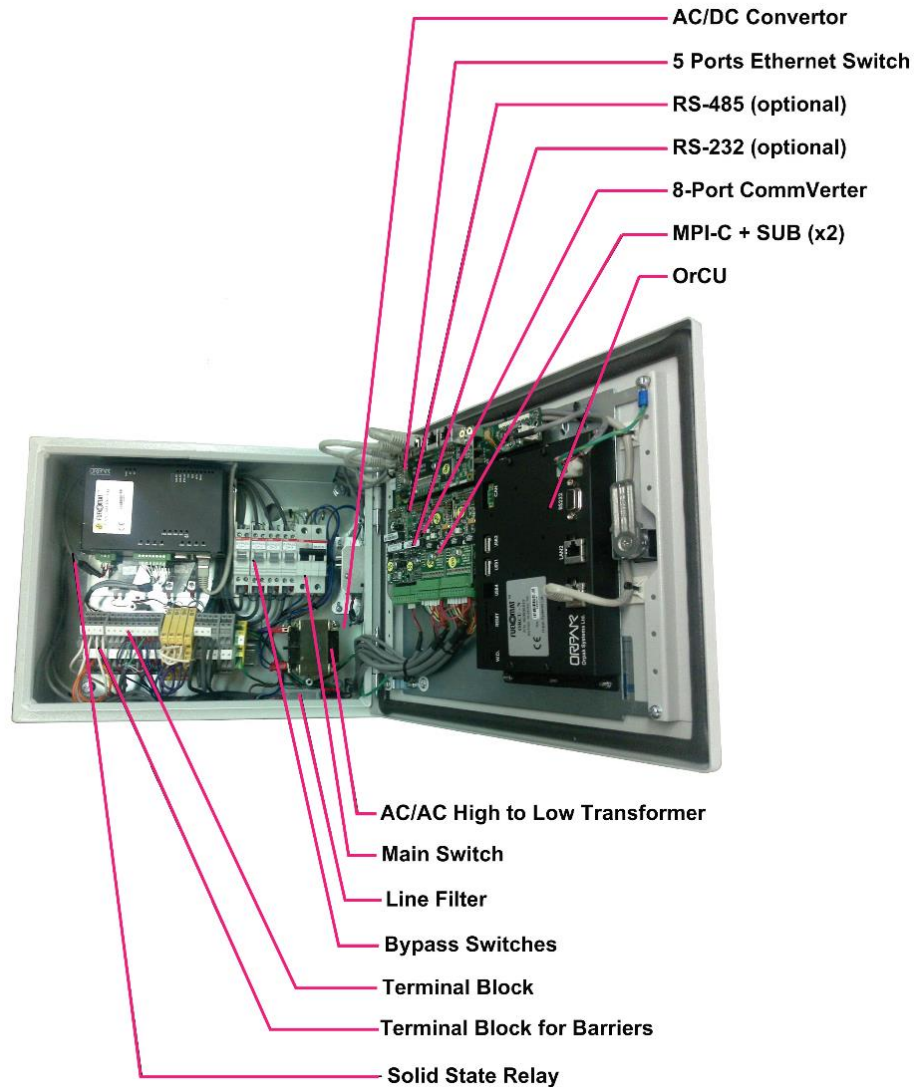
Figure 1-4 Internal Components Location - Mechanical Pump

CAUTION
This unit includes a cover for the Terminal block and the power components. After installation, the barriers cover must be installed. Do not power the unit without the cover in place.

1-5. *AVAILABLE CONFIGURATIONS*

1-5.1. *General*

CFN PLUS is available in several configurations, in accordance with its intended use and with the components installed. All configurations are manufactured in accordance with specific customer request and receive a Part Number.

The following paragraphs describe the several configurations.

1-5.2. *CFN PLUS Vehicle Identification System*

Two options are available for vehicle identification with the CFN PLUS:

- FuelPoint PLUS - WGT (Wireless Gateway Terminal, P/N PA04000001) is Vehicle identification process performed in a wireless mode. WGT receives DataPass or FuelOPass signals, decrypts their information and transmits it to the Station automation system (OrCU) in a secure manner over an RF signal. This setup enables the RF signal to travel through various routes and bypass possible interferences (such as a big truck/bus). The transmission signal range is 10 meters. The WGT is designed to be installed in a designated external box on the station wall or pedestal. The WGT should be connected to the OrCU box using CAT-5E cable. More than one WGT outdoor unit can be mounted in one station for better RF area coverage. In this case one WGT box is Master and the other(s) are routers. For further details, see *MDE-4815 WGT outdoor unit Installation Guide*.

- No vehicle identification unit: The vehicle identification process will be done manually by the driver with any accepted authorization devices such as cards, tags or manual entry.

1-5.3. *Dispensers*

CFN PLUS can support either mechanical or electronic Dispensers, in accordance with its configuration. Mechanical Dispensers require the installation of MPI-C cards on the 8-port Convertor. Electronic Dispensers (Tokheim®, Current Loop or RS-485) require installation of interface relevant cards on the 8-port Convertor.

In the order form, you are required to define also the P/N for the specific pump card in use (MPI-C, Tokheim, Current Loop or RS-485 - see Table 1-1).

Table 1-1. Dispensers Card Definition			
No.	*Pump Card Description*	*Gilbarco P/N*	*Orpak P/N*
1	Tokheim interface (8P) P.B.	M09680B028	819223420
2	Current Loop interface (8P) P.B.	M09680B029	819223431
3	RS-232 Interface (8P) P.B.	M09680B016	819223451
4	RS-485 Interface (8P) P.B.	M09680B017	819223460
5	MPI-C + Sub Interface (8P) P.B.	M09680B019	819223490

1-5.4. *OrTR (Orpak Tag Reader)*

OrTR (P/N PA04020001) - OrTR (Orpak Tag Reader) receives tag signals for refuel authorization purpose. OrTR transmits the information to the Station automation system (OrCU) over a CAT-5E or RS-485 cable. OrTR is designed to be installed in a nonhazardous location in the station. Two installation alternatives are available:

- External box on the station wall or pedestal. This installation mode requires a dedicated mounting bracket. Such an installation shall be performed within safety distances required for any installation adjacent to dispensers. See Figure 3-1 for instructions.

- Installed beneath CFN PLUS box with mounting bracket.

More than one OrTR can be mounted in one station for improved service. In this case all OrTR shall be connected to the same, single OrCU via RS-485 or Ethernet.

For further details, refer to *MDE-4816 OrTR Installation Guide*.

Figure 1-5 CFN PLUS with OrTR

1-5.5. *CFN PLUS with OrTR and WGT*

In this configuration (see Figure 1-6), CFN PLUS encompasses most types of authorization devices. The Wireless Gateway Terminal (WGT) provides vehicle identification process in wireless mode while Orpak Tag Reader (OrTR) reads Orpak tag signals to complete any transaction.

WGT communicates with CFN PLUS over the LAN (CAT-5E cable) and is powered directly by CFN PLUS. RF transmission of data from WGT enables sending data of all transactions to the Station controller.

Figure 1-6 CFN PLUS with OrTR and WGT

1-5.6. *CFN PLUS / Extension Box*

CFN PLUS is supplied with the OrCU (Orpak Controller Unit) embedded in the unit. In this configuration, CFN PLUS performs as full station controller, providing functions such as authorization unit, central forecourt devices controller, link to the Head Office, etc.

CFN PLUS supports up to four mechanical pumps. If more pumps are needed, an additional extension box is required. Each extension box can support up to four mechanical pumps.

In the Extension Box configuration, the OrCU is removed from the basic CFN PLUS. This Box operates as an authorization terminal and is intended to ease the system operation in large home base stations. In this configuration, the station includes a main CFN PLUS and a second unit in Extension Box configuration.

The Extension Box unit is linked to the main CFN PLUS via a CAT-5E cable (Ethernet®), and communicates with the OrCU and to the Head Office. In this configuration, the OrCU in the CFN PLUS is shared by both units.

1-5.7. *Configurations*

Table 1-2 define all the available product numbers for the different configurations of CFN PLUS:

Table 1-2. CFN PLUS - Standard Models		
Name	*Gilbarco P/N*	*Orpak P/N*
Controller for Electric Pumps	PA039300000	800938653
Controller for Mechanical Pumps - 2 hose	PA039300200	800938655
Controller for Mechanical Pumps - 4 hose	PA039300400	800938657
Extension Box for Mechanical Pumps - 4 hoses	PA03990000	800938656

1-6.   SECURITY AND PROTECTION

1-6.1. General

The transaction activities of the CFN PLUS are secured and protected for transmission and authorization activities.

1-6.2. Network Security

The Ethernet LAN is isolated from the external WAN by the Site Controller (OrCU). In case of remote maintenance, a firewall should be applied either at the router level or preferably at the Home Base Station level.

1-6.3. Maintenance Security

The CFN PLUS maintenance and setup procedures require inserting a user name and password for access. For further information, refer to *MDE-4817 SiteOmat Setup Manual*.

CFN PLUS is locked by key to prevent unauthorized access to the bypass switches and controller electronics.

1-7.   HOUSING

The CFN PLUS system enclosure is made of a metal cabinet in the form of a box. The enclosure is weather-proof in order to prevent humidity and dust penetration, and to sustain the harsh environment of a Home Base Station.

The CFN PLUS box is locked by key for safety and security. The key should be kept in a well-kept, secure and safe place.

1-8.   *SPECIFICATIONS*

The following physical, electrical and environmental specifications are applicable to CFN PLUS:

Supply Voltage:	120 VAC or 240 VAC, 50/60 Hz, manual setting required, by means of two jumpers (Factory set).
Power Consumption:	1A max.
Operating Temperature:	-22 °F to +104 °F (-30 °C to +40 °C)
Storage Temperature:	-22 °F to +158 °F (-30 °C to +70 °C)
Humidity:	80% Non-condensing
Dimensions:	W x H x D: 15 x 11.80 x 6.10" (380 x 300 x 155 mm)
Communication Interface:	RS-485 - 9600 bps, Half-Duplex
	RS-232
	Ethernet RJ-45 - 10 Mbps
Pump Control Maximum Current (4 Solid State Relay Channels):	Motor maximum: ¾ HP at 115 VAC or 1½ HP at 230 VAC. An additional external relay must be used if the pump motor exceeds these limitations.
Power supply output voltage to Pulsar unit	12 VDC +/- 20%, 30 mA max
Pulsar Input High level voltage	9 to 15 VDC
Pulsar Input High level sink current (@15V)	3 mA
In use "ON" level (Input)	100 - 240 VAC, 50/60 Hz, 2 W (20 mA)
In use "OFF" level (Input)	0 to 20 VAC

1-9.   *STANDARDS*

1-9.1. *Communication Standards*

The CFN PLUS communicates, in its different models, over the following standards:

- RS-232 link
- RS-485 link
- TCP/IP over Ethernet

1-10. *MANUAL STRUCTURE*

This manual comprises of the following sections:

Section 1: General Description

This section provides a general description of the CFN PLUS system.

Section 2: Preliminary Installation Procedures

This section provides the preliminary installation requirements and procedures to be performed in the Home Base Station before installing CFN PLUS.

Section 3: CFN PLUS Installation Procedures

This section provides a detailed description of CFN PLUS installation requirements and procedures.

Section 4: Maintenance

This section provides basic maintenance procedures for the CFN PLUS.

Section 5: Glossary

This section includes a glossary of terms employed for the CFN PLUS description.

Appendix A: Site Survey

This section includes the site survey form for the CFN PLUS.

Appendix B: Wiring Diagram

This section includes the Wiring Diagram of the CFN PLUS.

1-11. *USING THIS MANUAL*

This manual includes alerting comments inserted along the document, in order to draw the reader's attention to important issues. The comments are accompanied by symbols for ease of reference. The following comment types are used:

WARNING

An operating procedure, practice, etc.', that if not correctly followed, could result in injury or loss of life.

CAUTION

An operating procedure, practice, etc.', that if not strictly observed, could result in damage to, or destruction of equipment.

TIP

This note is aimed for using the system in better efficiently way.

NOTE

This comment is of importance for emphasizing.

INSIGHT

More detailed technical/ functional information in regard relevant issue.

1-12. REFERENCES

For additional and complementary information regarding the CFN PLUS system, please refer to the following manuals:

- MDE-4812 8-Port CommVerter User's Manual

- MDE-4815 WGT Outdoor Unit Installation Manual

- MDE-4816 Gilbarco's Tag Reader Installation Manual

- MDE-4817 SiteOmat In-House Station Controller Setup and Maintenance Manual

- MDE-4818 SiteOmat In-House Station Controller User's Manual

SECTION 2
PRELIMINARY INSTALLATION PROCEDURES

2-1.   GENERAL

This section provides the general installation procedures for the CFN PLUS.

These procedures include:

- Preliminary instructions

- Wiring and Wire Conduits requirements

2-2.   INSTALLATION SPECIFICATIONS

2-2.1. General

☞	**NOTE** Perform a site survey of the station prior to installation.

Installation procedures and requirements depend, to some extent, on the specific fuel dispenser models and the site layout. Therefore, use the information in this section to develop installation plans for each specific installation. Since installation requirements vary widely from case to case, no installation hardware is supplied by the equipment manufacturer, and installation planners must develop their own requirements.

The customer should provide an installation plan, designed by an authorized engineer, and applicable to all authorities having jurisdiction. This plan design should reflect the existing electric infrastructure of the site.

2-2.2. Precautions and Safety Notes

Prior to actual installation activities, carefully observe the precautions and safety notes below.

⚡	**WARNING** Before installing or servicing equipment, carefully observe the warnings and precautions provided at the beginning of this manual.

- Remember that the Home Base Gas Station environment is highly flammable and combustible. Therefore, make sure that actual installation is performed by experienced personnel, licensed to perform work in Home Base Station and capable of implementing all applicable requirements of the National Fire Protection Association (NFPA) 30

"Flammable and Combustible Liquids Code", NFPA 30A "Code for Motor Fuel Dispensing Facilities and Repair Garages "National Electric Code (NEC®)", federal, state and local codes and any other applicable safety codes and regulations.

● System power may come from more than one source. Disconnect all power sources, including pumps, before attempting to work on the system.

● Install the CFN PLUS in an area in accordance with the safety restrictions as shown in Figure 3-1.

● CFN PLUS site preparation is in the customer's responsibility.

● Do not connect power to the CFN PLUS and other peripherals in the whole system, including pumps, until complete installation is inspected and certified.

● Do not perform any metal work in the hazardous area. Sparks generated by drilling, tapping, and metal work operations could ignite fuel vapors and flammable liquids, resulting in death, serious personal injury, property loss and damage to you and other persons.

● When working in any open area of Home Base Station, beware of passing vehicles that could hit you. Block off the work area to protect yourself and other persons. Use safety cones or other signaling devices.

2-3. CONDUITS LAYOUT/INSTALLATION SPECIFICATIONS

The installation of the CFN PLUS requires preparing beforehand the cables layout in the Home Base Station. This procedure consists of installing conduits within the station, inserting the proper cables and setting the proper power equipment and sensors.

This chapter provides the procedures for infrastructure groundwork. These procedures consist of, in a descending order of performance:

- Wire conduits installation
- Cables routing within the conduits
- Power equipment setup
- Forecourt equipment wiring

2-4. CONDUITS

2-4.1. General

The installation of the CFN PLUS in the station requires digging and setting several conduits in the Station ground. The conduits are required for the routing and protection of the different types of cables in use in a Home Base Station with CFN PLUS.

In sites where the infrastructure is already set up, you can use the existing conduits only if they meet the requirements defined below.

2-4.2. *Conduit Requirements*

Conduits must comply with:

- All conduits must be made and installed according to local regulations.
- High-voltage AC and low-voltage DC must NOT be combined in a common conduit, junction box or wire through.
- RS-485 or LAN communication must not exceed 330 feet (100 m). Cables must be inserted in a separate low voltage conduit, away from AC wires. Communication range can be extended with 3rd party devices.
- RS-232 communication must not exceed 50 feet (15 m). RS-232 communication cable must be inserted in a separate low voltage conduit, away from AC wires. Communication range can be extended with 3rd party devices.
- Antenna wire must not exceed 330 feet (100 m) in case the VIU is in use, and 50 feet (15 m) in case the FuelOPass is used. Antenna wire must be inserted in a separate low voltage conduit, away from AC wires.
- All conduits must be inserted in the CFN PLUS enclosure through the openings provided in the bottom panel (see Figure 2-1). Connect the wiring through optional glands or appropriate metal tubing. For UL/cUL listing, this product has only been evaluated for use without the optional glands. If you must make holes at locations other than those provided, contact Gasboy for approval.
- After completing the installation, all open holes should be sealed.

2-4.3. *Conduits at CFN PLUS*

The bottom panel in the CFN PLUS includes four openings of 3/4-inch diameter for the insertion of cables into the unit (see Figure 2-1). Connect the wiring through optional glands or appropriate metal tubing. For UL/cUL listing, this product has only been evaluated for use without the optional glands. The cables and wires to/from the other units in the forecourt are connected to the Terminal Block. The cables and wires are inserted through the conduits in accordance with their types and routed to their sources.

The conduits serve the following purposes:

- One conduit is intended for high voltage cables, and is located at the rear of the panel.
- Two conduits are intended for low voltage cables.
- One conduit is intended for the Barrier with Intrinsically Safe Signal.
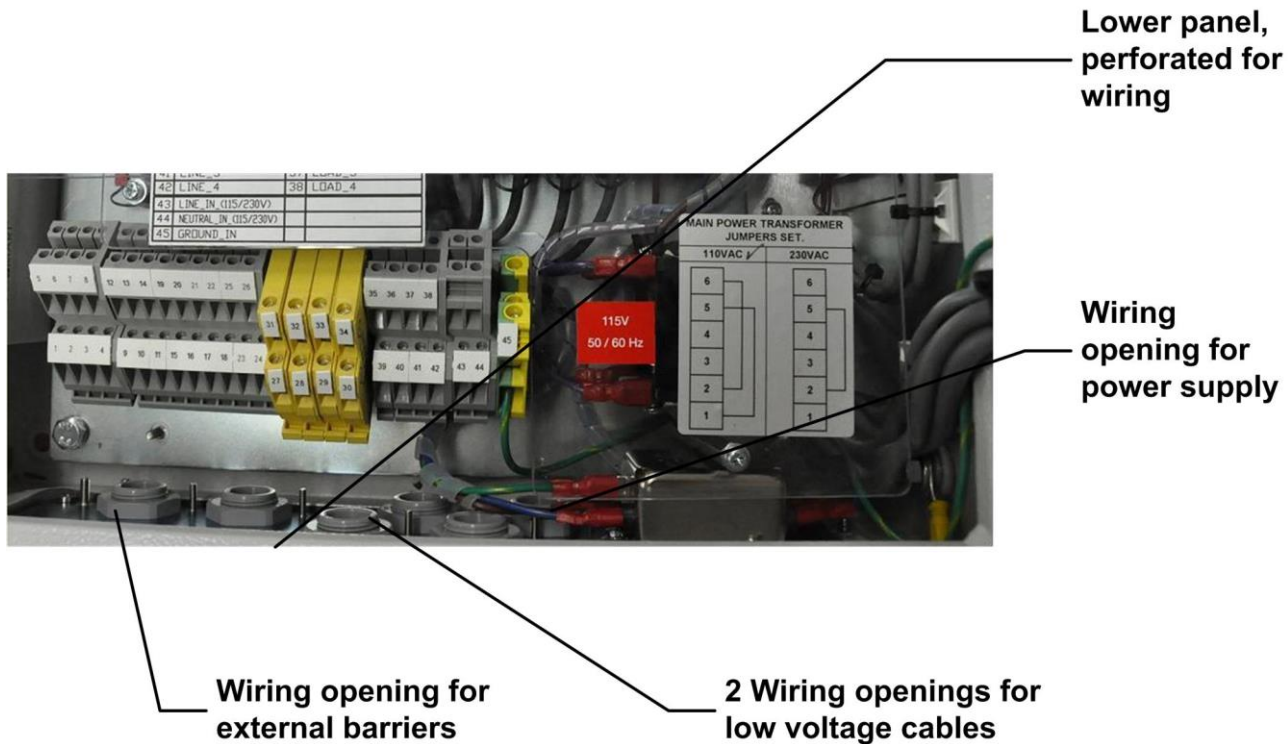
Figure 2-1 CFN PLUS Lower Panel

(*) All glands in picture are optional.

2-4.4. *Required Conduits in station*

The types of conduits in the station are a function of the different equipment, and their location in the station. Basically, there are two functional conduits:

- High voltage conduit
- Low voltage conduit

The following conduits are required in the station:

- **High voltage conduits**
    - o AC power for CFN PLUS
    - o Pump control from pumps to CFN PLUS
    - o Pump In-use signal from pumps to CFN PLUS
- **Low voltage conduits**
    - o Internet line from LAN at Office to CFN PLUS
    - o RS-232 communication line from TLG at office to CFN PLUS
    - o RS-485/422/C.L. or Tokheim
    - o Pulser from pumps to CFN PLUS
    - o Barriers/Coils from pumps to CFN PLUS - Non-Intrinsically safe wiring.
    - o With Barrier 4 - Intrinsically safe wiring

- **Grounding**
    - At least 10 mm^2 Grounding cable to pump chassis
    - At least 10 mm^2 Grounding cable to CFN PLUS pole
    - Grounding cable to TLG - in accordance with TLG manufacturer instructions.
- **Tank conduit**
    - TLG probe

2-4.5. *Wiring conduits in CFN PLUS*

CFN PLUS includes four wiring openings, each carrying specific wires, as listed in Table 2-1 and shown in Figure 2-3.

Table 2-1. Conduits into CFN PLUS

No.	*Conduit Type*	*Type*
1	Low voltage	Pulser, TLG, LAN
2	Low voltage	Barrier
3	High voltage	AC power, GND, control
4	High voltage	In-use

2-5. CONDUITS INSTALLATION

2-5.1. *General*

This paragraph describes the infrastructure groundwork necessary to install the conduits in the station (see Figure 2-1).

2-5.2. *Installing Conduits in Station*

Proceed as follows:

1. Determine the location of the CFN PLUS in the station.
2. Dig and prepare passageways for the necessary conduits
3. Route the following conduits to the inspection boxes:
- Low voltage cables inspection box:
    - One conduit to Office (control room)
    - One conduit to each pump
    - Two conduits to CFN PLUS
- High voltage cables inspection box:
    - One conduit to Office (control room)
    - One conduit to each pump
    - Two conduits to CFN PLUS

2-5.3. *Sealing Conduits*

The conduits shall be sealed in accordance with NFPA requirements and local regulations, to prevent the passage of gases through conduits, cables and conductors. The fittings are requested wherever volatile liquids or gases are present in the surroundings (see Figure 2-2).

Figure 2-2 Conduit Fitting
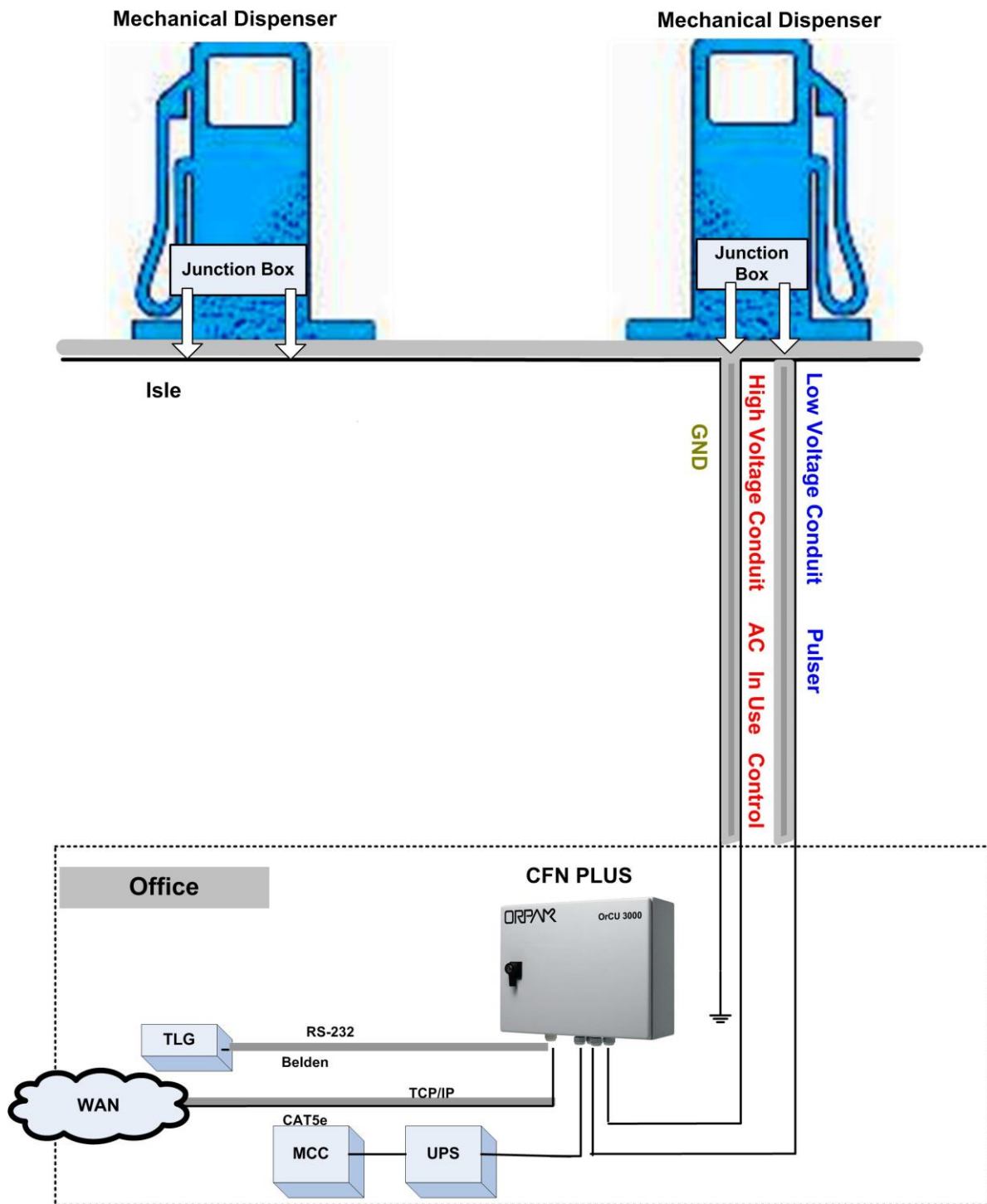
Figure 2-3 Conduits Layout for Mechanical Pump
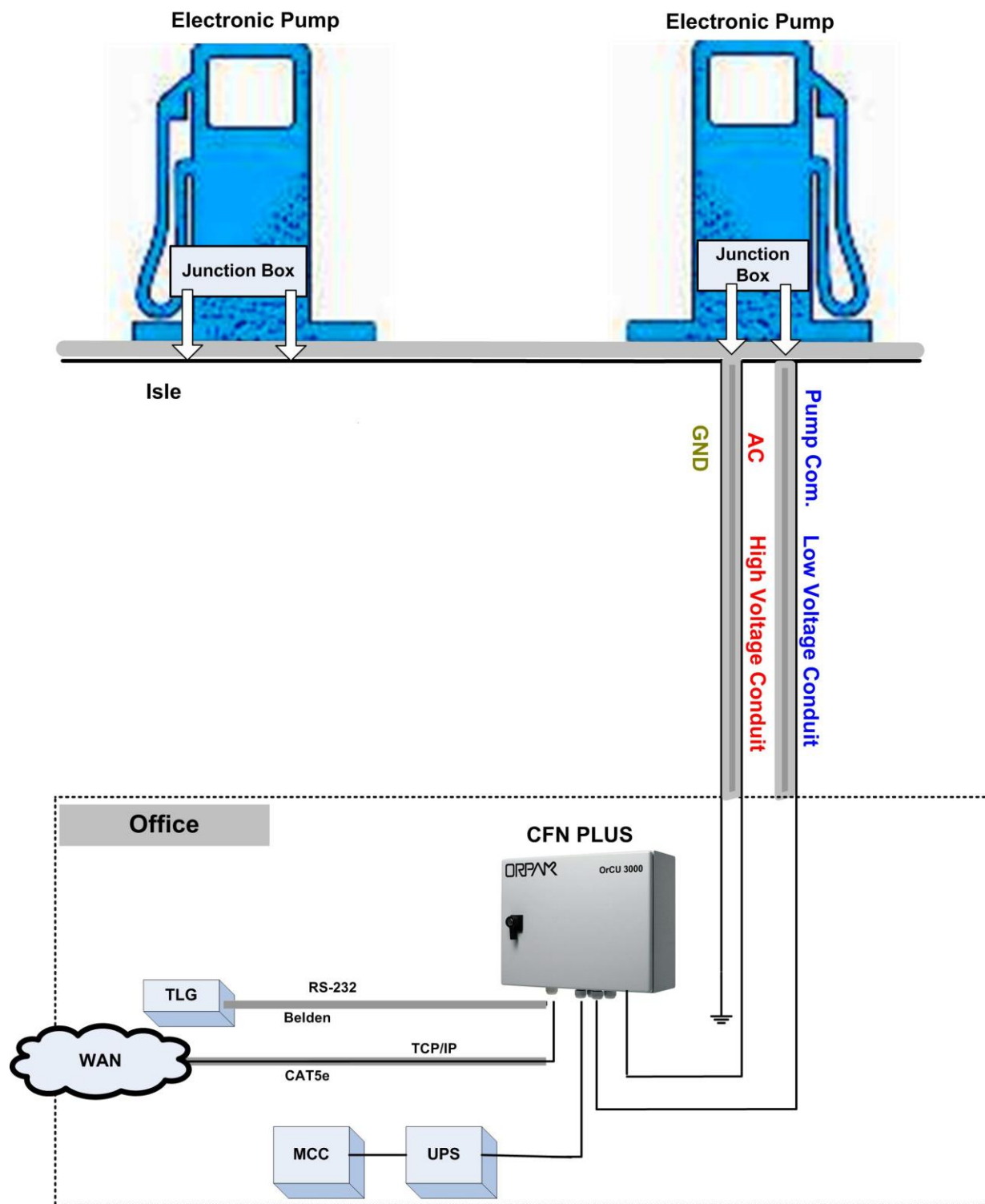
Figure 2-4 Conduits Layout for Electronic Pump

2-6. CABLES

2-6.1. General

This paragraph describes the requirements and procedures for the insertion of cables in the conduits.

> **NOTE**
>
> All devices in the system must be connected to the same electric power phase.

> **NOTE**
>
> The type of cable needed to vary in accordance with the device it connects. The wire used must be stranded and not a solid core. Select a cable specification in accordance with local environment conditions.

> **CAUTION**
>
> For supply connections, use wires suitable for at least 90°C.
>
> Signal wiring connected in this box must be rated at least 300 V.

2-6.2. Types of Cables

Table 2-2 lists the types of cables in use for the wiring of the CFN PLUS system.

	Table 2-2. CFN PLUS, Cable Types	
No.	*Function*	*Type*
1	AC Power from Office	Power cable, 3x1.5 mm^2 NYY (14 AWG), in accordance with local standards
	Control to pumps (valves or engine)	
	In-use signal	
2	Coil (Barrier)	Data communication cable, 300 V RMS, 90ºC, shielded twisted pair, oil resistant, 24 AWG, low capacitance below 60 PF/meter similar to Belden 9729 cable
	Pulser	
	TLG (RS-232)	
3	LAN	CAT-5E, Shielded, 300 V RMS, 90ºC similar to Belden 121700 A
4	GND	Ground cable 0.4'' (10.8 mm^2)

2-6.3. *Cables Routing*

Route the cables from the peripherals and the Office to CFN PLUS as listed in Table 2-3 and shown in Figure 2-3. Proceed as follows:

	Table 2-3. CFN PLUS, Cable Routing			
No.	*Functional Description*	*From*	*Through Insert*	*Cable Type (*)*
1	Power AC	Office	High voltage conduit	1
2	GND	Office	High voltage conduit	4
3	TLG	Office	Low voltage conduit	2
4	LAN	Office	Low voltage conduit	3
5	Control, Pump A	Pump A	High voltage conduit	1
6	In-use, Pump A	Pump A	High voltage conduit	1
7	Pulser, Pump A	Pump A	Low voltage conduit	2
8	Barrier coil, Pump A	Pump A	Low voltage conduit	2

(*) Refer to Table 2-2.

2-6.3.1. LAN Cable Routing

Due to Federal Communications Commission (FCC) requirements, the LAN cable entering the system box should be exposed (near the entry point, inside the box), and the exposed shielded wire of the cable must be connected to the nearest ground point on the bottom plate. Use only LAN cable with RJ-45 metal connector connected to the shield.

2-7. POWER SETUP

2-7.1. General

The power equipment shall be installed in the Main Power Cabinet of the station office. It should include the following:

- Mains Circuit Control Box (MCC)

- Uninterruptible Power Supply (UPS) - Online ("True") UPS

- Power Distribution Box (PDB)

Figure 2-5 shows the requested connections of the power equipment.
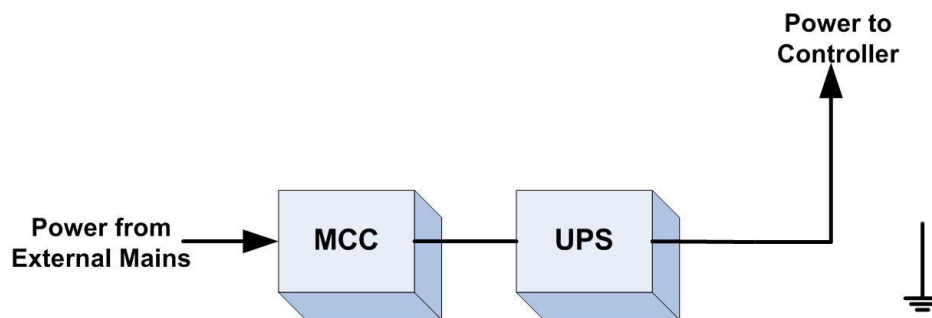
Figure 2-5 Power Equipment Connections

Beside the power equipment, other components shall be connected to the power supply such as the TLG and the dispensers.

2-7.2. Power Distribution and Grounding

Installation of CFN PLUS in station with mechanical pump requires specific power distribution and grounding as shown in Figure 2-6.

Installation of CFN PLUS in station with electronic pump requires specific power distribution and grounding as shown in Figure 2-7.

Power Distribution & Grounding
CFN PLUS & Mechanical Pump
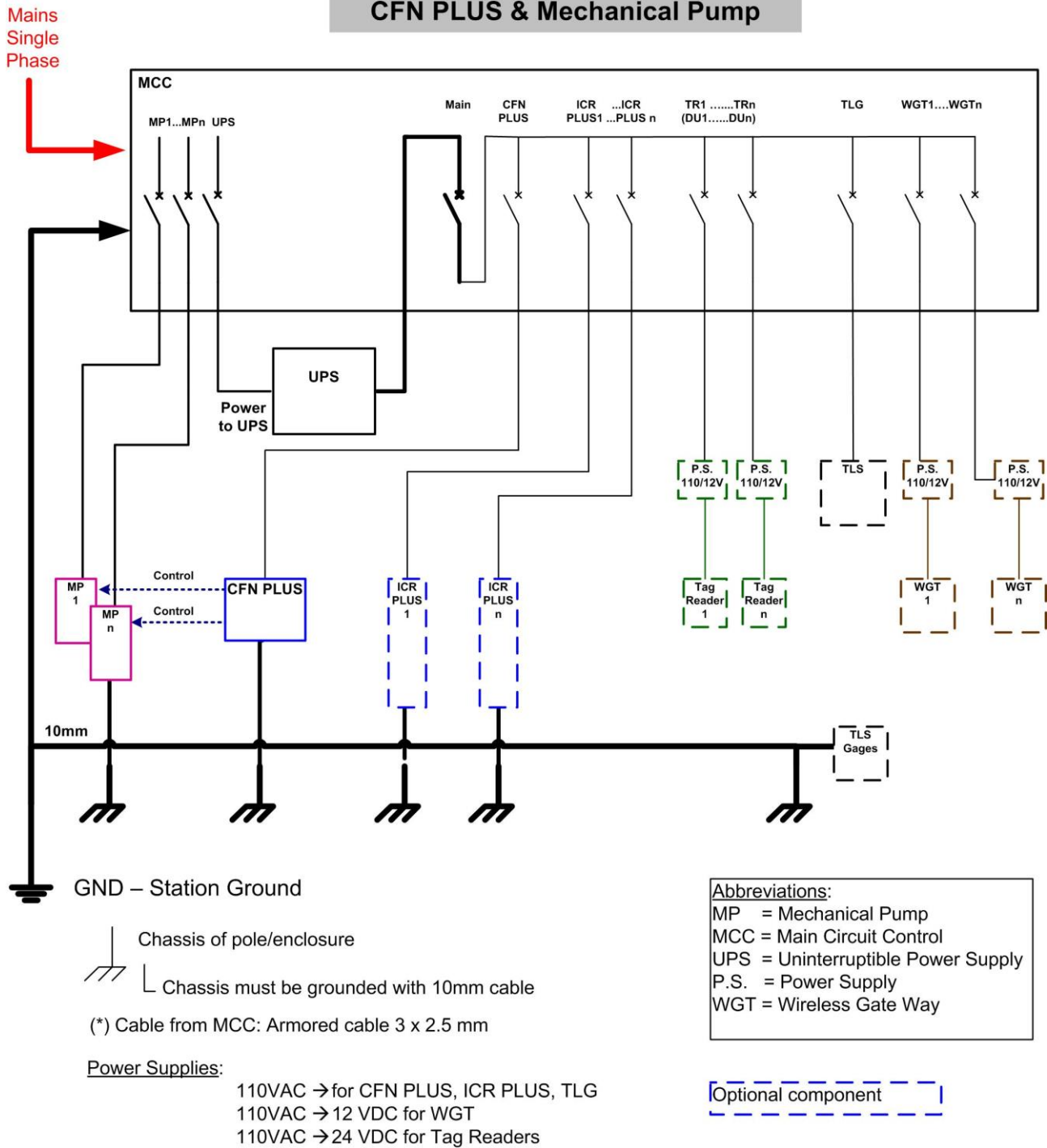
Figure 2-6 Power Distribution and Grounding in Mechanical Pump Station

Power Distribution & Grounding CFN PLUS & Electronic Pump

Mains Single Phase

MCC

| Mains | Main | CFN PLUS | ICR PLUS1 | ...ICR ...PLUS n | EPH1...EPHn | TR1 ....TRn (DU1.......DUn) | TLG | WGT1....WGTn |

UPS

Power to UPS

P.S. 110/12V   P.S. 110/12V   TLS   P.S. 110/12V   P.S. 110/12V

CFN PLUS   ICR PLUS 1   ICR PLUS n   EPH 1   EPH n   Tag Reader 1   Tag Reader n   WGT 1   WGT n

10mm   TLS Gages

GND – Station Ground

Chassis of pole/enclosure

Chassis must be grounded with 10mm cable

(*) Cable from MCC: Armored cable 3 x 2.5 mm

Power Supplies:
- 110VAC → for CGN PLUS, ICR PLUS, TLG
- 110VAC → 12 VDC for WGT
- 110VAC → 24 VDC for Tag Readers

Abbreviations:
EPH = Electronic Pump Head
MCC = Main Circuit Control
UPS = Uninterruptible Power Supply
P.S. = Power Supply
WGT = Wireless Gate Way

Optional component

Figure 2-7 Power Distribution and Grounding in Electronic Pump Station

2-7.3. Connecting the Power Equipment

Proceed as follows:

- External Mains
  - o Connect Mains power to the Mains Circuit Control Box (MCC)
- Uninterruptible Power Supply (UPS)
  - o Connect the MCC to the UPS.
- Power Distribution Box (PDB)
  - o Connect the UPS to the PDB
  - o Check the PDB wiring and insure a separate Mains Circuit Breaker (MCB) for each socket/device that requires power.
  - o Wire one 0.4-inch (10 mm) ground cable from the Mains ground connection to the PDB.
- If any doubt concerning grounding arises, ask for a ground test performed by a qualified electrician.

2-7.4. AC Power Supply Setup

CFN PLUS can be fed either 110 VAC or 220 VAC. The Mains cable is first connected to the terminal block. Between the terminal block and transformer, the system uses a Line Filter in order to attenuate conducted radio frequencies - RFI, electromagnetic interference (EMI) - between the line and the equipment (see Figure 2-8). AC power is then supplied to an AC/AC High to Low Transformer - 110/220 VAC to 25 VAC. The transformer requires jumpers setup for either 110 VAC or 220 VAC Mains input, as shown in Figure 2-9. A settings label is also found on top of the transformer.
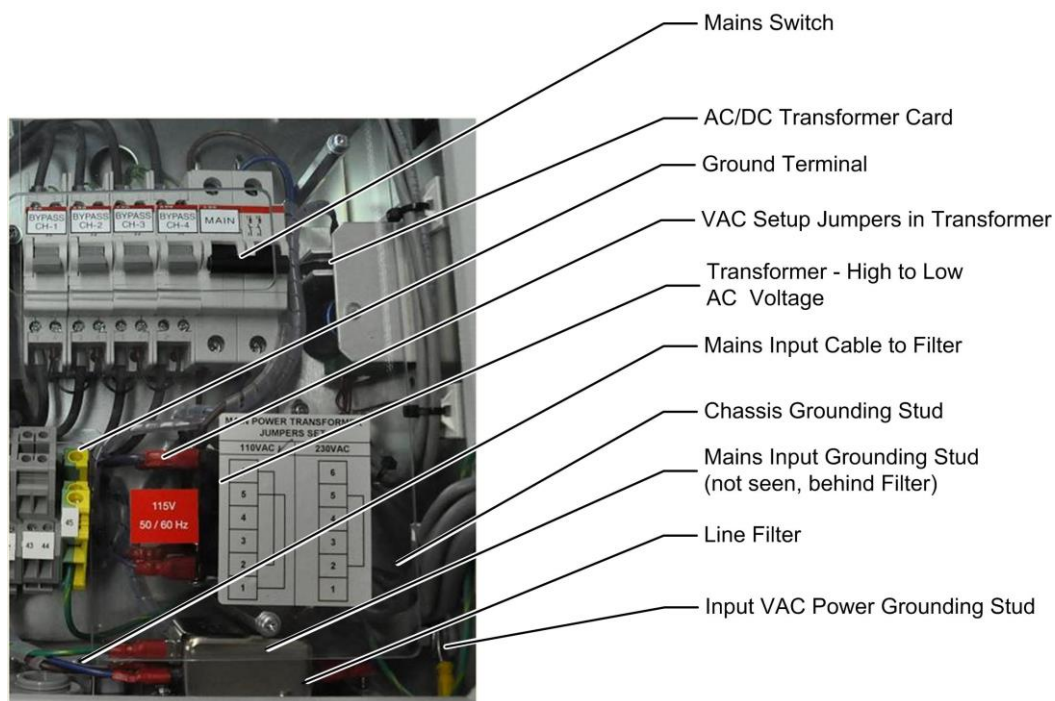
Figure 2-8 CFN PLUS - Power Supply Components and Grounding Studs

> **WARNING**
>
> CFN PLUS is shipped configured for 110 VAC Mains power supply. Take care to set it according to your local Mains power supply specifications. Failure to do so may result in damages.

Note: Transformer is installed with two jumpers, in any configuration (for 220 VAC, one jumper is inactive).
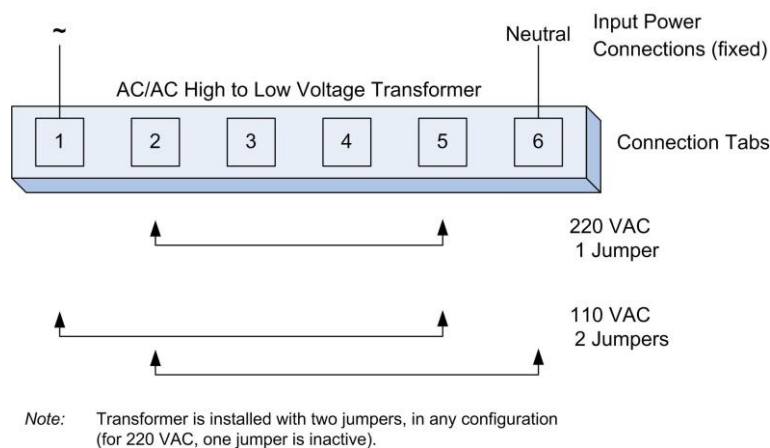
Figure 2-9 VAC Power Supply - Jumpers Setup

2-7.5. Grounding

Proper system grounding is an extremely important part of the system installation. As with the AC power, the grounds for all system components should return to the same circuit breaker panel. This helps you assure a common ground throughout the system, necessary for protection of the RS-485 data loop circuitry. Ground for all system devices should be wired to the breaker panel ground bus bar, which in turn should be grounded to a ground rod. A conduit ground does not provide sufficient ground. It is recommended that the neutral and ground bus bars be bonded together when it is not prohibited by local codes.

See Figure 2-6 and Figure 2-7 for grounding requirement diagrams of station with mechanical pump and with electronic pump, accordingly.

CFN PLUS includes several grounding studs (see Figure 2-8) in order to comply with the grounding requirements. The Mains power ground wire should be attached to the stud close to the Line Filter.

2-8. WIRING THE PERIPHERALS

2-8.1. Pump Wiring

CFN PLUS is capable of directly driving pump motors up to 3/4 HP at 115 VAC or 1-1/2 HP at 230 VAC. A separate circuit breaker should be supplied for each dispenser. Wire the pump as follows:

- Wire one Mains AC cable from the UPS-PDB to the pump enclosure, for electronic pump head.

- For an electronic pump, wire RS-485 / Current Loop / Tokheim communication cable from the CFN PLUS to the pump head.
- Wire one 0.4-inch (10 mm) ground cable from the Mains ground connection to the pump chassis.
- The communication cable shield must be connected to ground at one end-side *only*, preferably at the controller installation side (see Figure 2-10).
- For mechanical pumps, wire the control cable, in-use cable, pulser cable, and barrier cable according to Table 2-2.
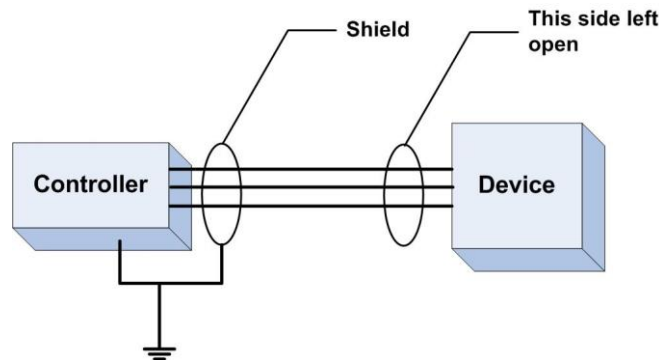
Figure 2-10 Communications Cable Wiring

2-8.2. *TLG wiring*

RS-232/LAN is used for communication between the TLG and CFN PLUS. Follow these installation requirements when installing the RS-232/LAN communications lines:

> **NOTE**
> These requirements shall be compatible with the recommendations of the TLG manufacturer.

- **Distance**: the following distances must be adhered to when installing the communication lines:
  - **RS-232**: 1-50 feet (1-15 m) for direct connection to a TLG device.
  - **LAN**: 1-330 feet (100 m) for direct connection to a TLG device.
- **Conduit**: All directly connected RS-232/LAN cables must be in a separate low voltage conduit away from any AC wires.
- **Cable**: The type of cable required should be according to the device it is connected to. The wire used must be stranded and not a solid core. Select a cable specification in accordance with local environment conditions.

SECTION 3
CFN PLUS INSTALLATION PROCEDURES

3-1. *GENERAL*

This section provides the installation procedures for the CFN PLUS.

These procedures include:

- CFN PLUS installation

- Wiring

- Post installation check

3-2. *INSTALLATION SPECIFICATIONS*

3-2.1. *General*

	NOTE
☞	Perform a site survey of the station prior to installation

Installation procedures and requirements depend, to some extent, on the specific fuel dispenser models and the site layout. Therefore, use the information in this section to develop installation plans for each specific installation. Since installation requirements vary widely from case to case, no installation hardware is supplied by the equipment manufacturer, and installation planners must develop their own requirements.

The customer should provide an installation plan, designed by an authorized engineer, and applicable to all authorities having jurisdiction. This plan design should reflect the existing electric infrastructure of the site.

3-2.2. *Precautions and Safety Notes*

Prior to actual installation activities, carefully observe the precautions and safety notes detailed in paragraph 2-2.2 and at the opening pages.

3-2.3. *Safety Distances*

Figure 3-1 shows the safety distances required for the installation of the CFN PLUS adjacent to the dispensers. CFN PLUS will be installed in a nonhazardous location. When mounting the CFN PLUS, a minimum clearance of 18 inches between the unit and any of the pumps or the dispensers must be maintained. This clearance allows room for the wiring and maintenance of the system.

CFN PLUS is designed and approved for installation and use at a convenient location at or near fuel Island in the appropriate hazardous (classified) location:

- Where hazardous location is classified as Class 1, Division 2 and it does not extend higher than 18 inches (0.5 m) from surface and
- A minimum safety separation of 18 inches (0.5 m) from any nearest pump/dispenser.
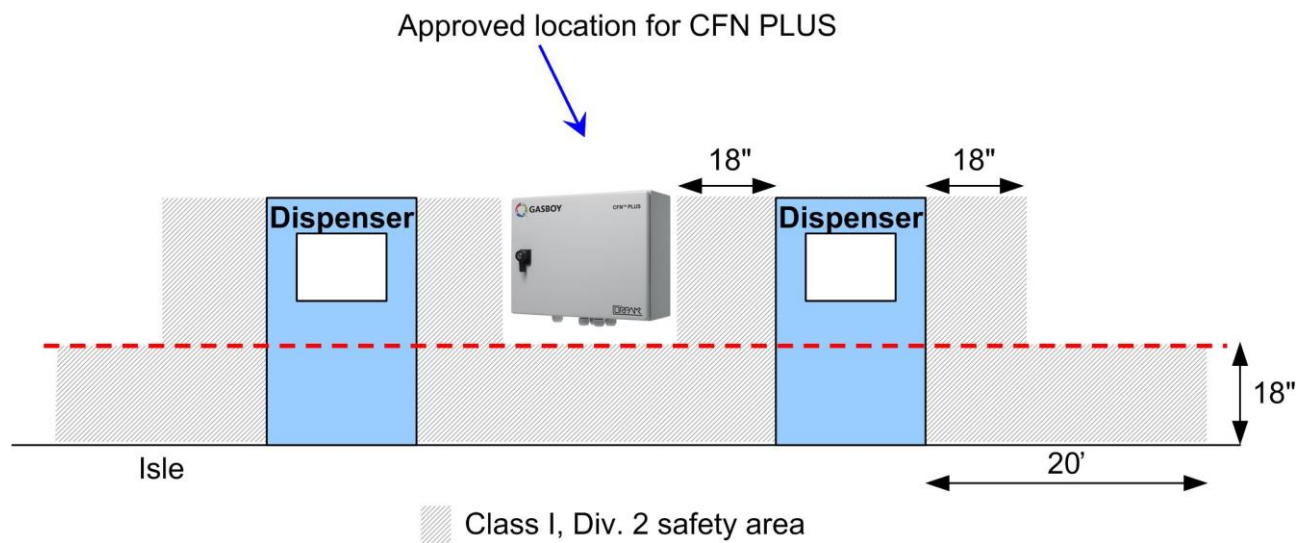
Figure 3-1 CFN PLUS - Installation Control Drawing

3-3.   HOME BASE STATION - OVERVIEW

3-3.1. General

Prior to installation, you are required to obtain an overview of the Home Base Station functional architecture. This overview is required in order to draw an architecture diagram with all components and their communication links.

Figure 3-2 shows a functional diagram of the links within the Home Base Station with mechanical pumps. Figure 3-3 shows a functional diagram of the links when operating with electronic pumps.

3-3.2. Home Base Station Architecture

The Home Base Station functional architecture consists of the following levels:

- Main Power Cabinet and Home Base Station forecourt
- Head Office Center

3-3.2.1. Main Power Cabinet

The Main Power Cabinet includes the following components:

- Mains Circuit Control Box (MCC)
- Uninterruptible Power Supply (UPS)
- Power Distribution Box (PDB)
- TLG Controller

3-3.2.2. Home Base Forecourt

The Home Base Forecourt includes the following components:

- CFN PLUS
- Dispenser(s) - up to four mechanical nozzles for each CFN PLUS. For UL listing, this product has only been evaluated for use with UL Listed Dispensers.
- One or more Underground gas tanks
- TLG probe for each gas tank. For UL listing, this product has only been evaluated for use with UL-listed TLGs.

3-3.2.3. Head Office System (Optional)

The Head Office system consists of fully integrated management hardware and software tool that supports Home Base Station and small gas stations with their sale management of products including inventory management and reporting.

The Head Office Center is a remote-control center that stores, processes and analyzes all the transactions at the Home Base Station. The Head Office Station provides an integrated retail solution.
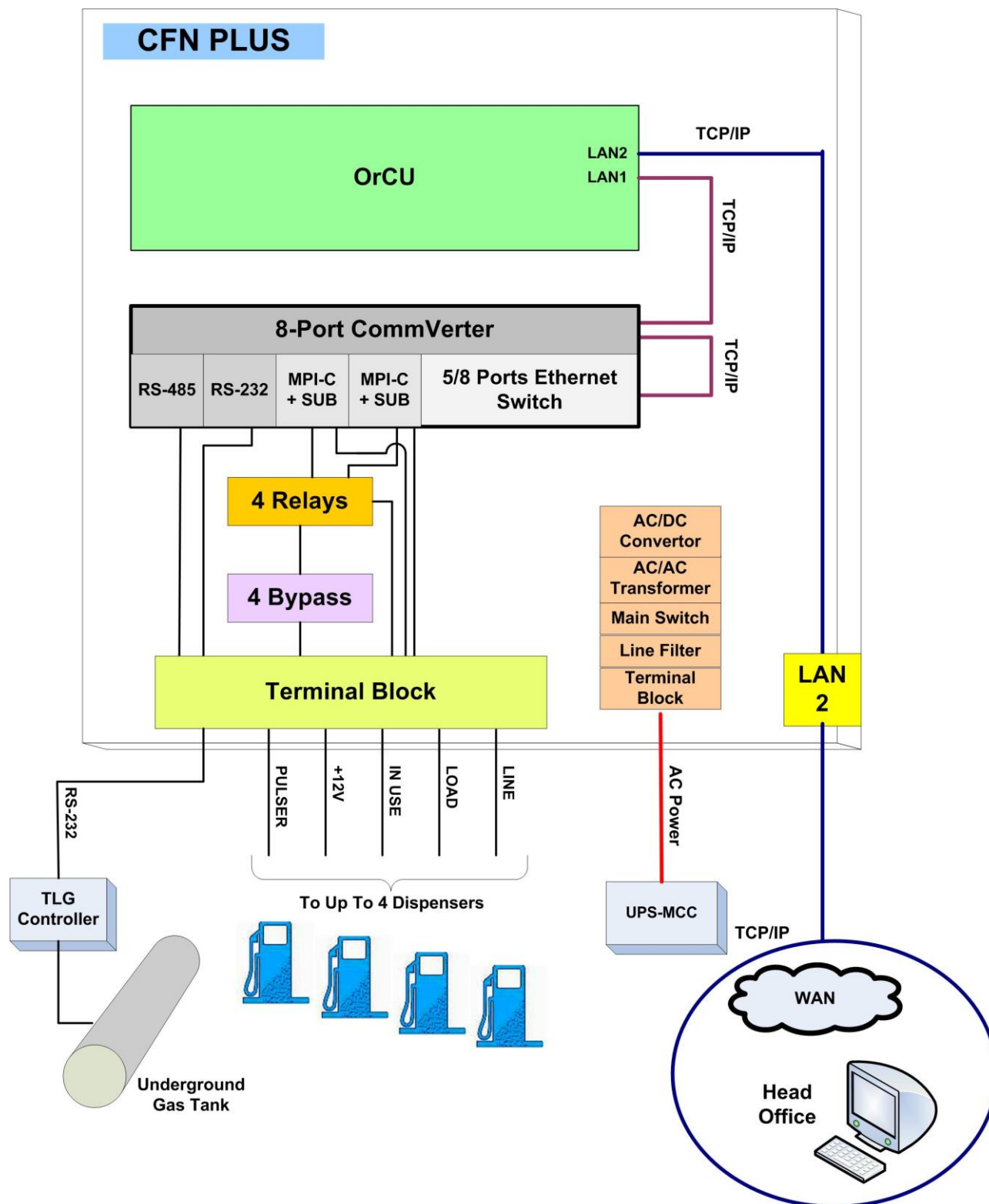
Figure 3-2 Home Base Station with Mechanical Pumps - System Diagram

CFN PLUS

OrCU

TCP/IP

8-Port CommVerter

| RS-485 | RS-232 | Electronic Pump Interface | Electronic Pump Interface | 5/8 Ports Ethernet Switch |

TCP/IP

TCP/IP

AC/DC Convertor

AC/AC Transformer

Main Switch

Line Filter

Terminal Block

Terminal Block

LAN 2

RS-232

Pump Com Line 3

Pump Com Line 2

Pump Com Line 1

AC Power

TLG Controller

To Up To 64 Dispensers

UPS-MCC

TCP/IP

Underground Gas Tank

WAN

Head Office

Figure 3-3 Home Base Station with Electronic Pumps - System Diagram

3-4. MAPPING THE SITE- EXAMPLE

3-4.1. *General*

This paragraph shows an example of the mapping of a site. This procedure consists of the following steps:

- Locating and mapping all objects of the site.
- Assigning logical identifications (Id.) to the devices.
- Assigning the Ethernet and Serial addresses of devices linked to the network.
- Obtaining a functional and physical Map of the devices in the site.

3-4.2. *Locating all objects of the site*

- Locate the roads around the site.
- Locate the islands and their dispensers.
- Locate the fuel tanks.
- Locate the intended position of the CFN PLUS.
- Draw a basic map of the site with all the objects.

3-4.3. *Assigning Logical IDs*

3-4.3.1. To each fuel tank

- Assign the tank sequential number (coordinated with the station manager).
- Assign its fuel code and name.
- Assign its TLG Probe (AP) Id.

3-4.3.2. To each Dispenser Unit

- Assign an id. to every dispenser name and Pump Server.
- Assign an id. to every dispenser pump (P).
- Assign an id. to every pump CPU addresses if any.
- Assign an id. to its nozzles (N).
- Assign to each nozzle the tank (T) Id. to whom it is linked.

3-4.3.3. To CFN PLUS

- Assign the CFN PLUS its id. after installation on a flat surface.

3-4.4. *Mapping*

- Draw a map of the site.
- Use the map methodology and Ids. For later setup configuration.

3-5. CONNECTIONS TO CFN PLUS

All connections to the CFN PLUS must be performed to the Terminal Block located at the bottom of the CFN PLUS pedestal by (see Figure 3-4). The required connections are:

1. Dispenser wiring connections:

    - Pulser (Low Voltage)

    - In Use signal (High voltage)

    - Valve (High voltage)

2. Communications

    - RS-232 to TLG Controller to Gas Tank

    - RS-485 for peripheral device

    - Pump communication line (e.g. Current Loop, RS-485, Tokheim, RS-422)

3. Mains AC Power and Ground

4. Barrier

5. LAN connection.
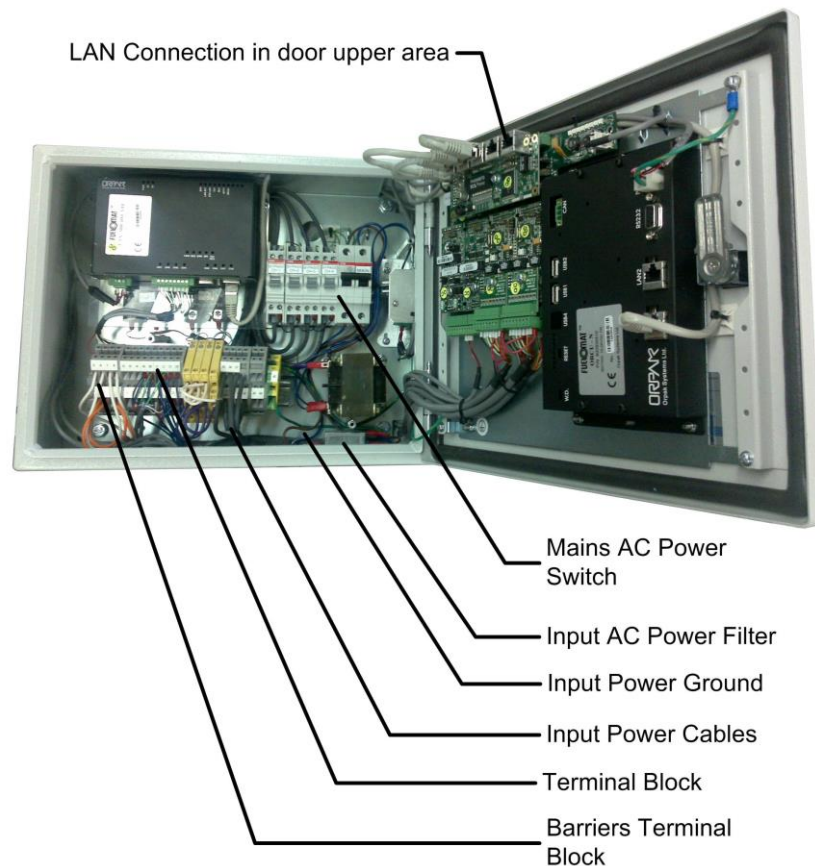
Figure 3-4 CFN PLUS Terminal Block, Power and LAN Connections

3-6. INSTALLING THE CFN PLUS

3-6.1. General

CFN PLUS is mounted in the safe area of the Home Base Gas Station on a wall or any flat surface up from ground (panel, billboard).

CFN PLUS is installed with wall mounting brackets that provide a wall distance of 10 mm. The brackets are attached to four holding padded holes in the inner rear wall of CFN PLUS.

3-6.2. Installation Procedure Steps

Installation of CFN PLUS consists of the following general steps:

- Installing CFN PLUS on a wall

- Running cables through the conduits to CFN PLUS

- Wiring CFN PLUS

3-6.3. Site Preliminary Setup Procedures

Proceed as follows:

1. Determine the spot for CFN PLUS installation.

2. Run cable conduits for each type of cables to the spot:

   - One High Voltage conduit from the dispenser

   - One Low Voltage conduit from the dispenser

   - One Low Voltage conduit from the Office

   - One High Voltage conduit from the Mains Distribution Box

3. Run the cable conduits to the hole.

3-6.4. Installation Procedures

Proceed as follows:

Note: If the wall mount is already installed, go to step 4.

1. Open CFN PLUS enclosure.

2. Turn CFN PLUS enclosure (1 in Table 3-1) so you face its rear panel (see Figure 3-5).

3. Attach to each support hole in the rear panel a wall bracket (see, 2 in Table 3-1), with nut, M8 x 20 screw and flat washer (3/4/5 in Table 3-1). Set the bracket so that they fit to the proper installation, as shown in Figure 3-6. The wall bracket dimensions are provided in Figure 3-7.

4. Set the CFN PLUS enclosure (with wall brackets) in the spot and mark the four holes locations from brackets for drilling. Select a place that allows you to open completely the CFN PLUS door.

5. Drill four holes in the installation spot (fit for M4 screws).

6. Insert four wall anchors (or equivalent) in the holes.

7. Set the CFN PLUS enclosure on the spot so that its installation holes fit with the anchors.

8. Insert four M4 screws (6 in Table 3-1) and M4 flat washers (7 in Table 3-1) and secure CFN PLUS enclosure. Verify that CFN PLUS enclosure is firmly held, and provides a distance from wall.

9. Take care that all power and communication cables pass through the holes in the bottom panel.
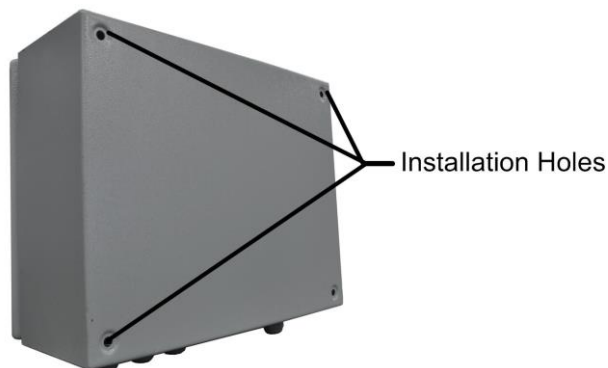
Figure 3-5 Rear Panel Support Holes

Figure 3-6 Wall Bracket, Installation Example
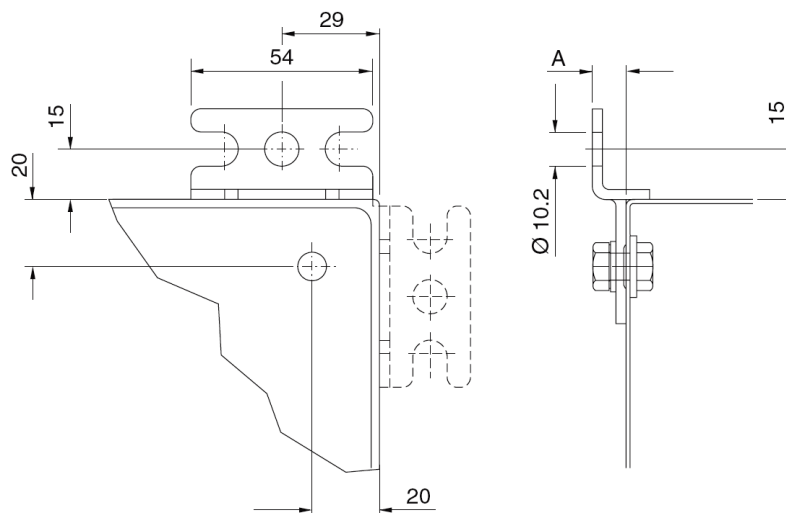
Figure 3-7 Wall Bracket, Dimensions (mm)

3-6.5. *Sealing Conduits*

The conduits shall be sealed in accordance with NFPA requirements and local regulations, to prevent the passage of gases through conduits, cables, and conductors. The fittings are requested wherever volatile liquids or gases are present in the surroundings (see Figure 3-8).

Figure 3-8 Conduits Sealing

3-7. WIRING

3-7.1. General

After completing the installation procedure, perform the following wiring procedures. The wiring is performed in the CFN PLUS Terminal Block *only*.

The wires should be pulled from the conduits that protrude from the Installation Base, or in the opposite direction, from the Terminal Block to the device in the Home Base Station.

3-7.2. Types of Wiring

The wiring in the Terminal Block differs in accordance with the type of pump installed in the Home Base Station. There are two types of pumps:

- Mechanical Pump

- Electronic Pumps

The following paragraphs provide the wiring requirements for each type of pump.

3-7.3. Wiring Requirements

For any type of pump and wire, prior to inserting a wire, proceed as follows:

1. Insert all wires with a terminal lug *only*.

2. Use the proper Terminal Crimper to attach the lug to the wire.

3. For UL Listing, the Terminal Lug must be a UL-recognized component.

Figure 3-9 Terminal Lug

	TIP
	Mark each cable at both ends with a number or sign that will identify its functionality in the future.

3-7.4. Types of Cable

The following cables are required for the CFN PLUS installation:

- Power cable - In accordance with local regulations

- LAN cable – CAT-5E

- RS-232/485/422/Tokheim/Pulser - Communication cable, twisted pair, separately shielded, low capacitance

> **NOTE**
>
> The shield should be connected to Ground in one side of the cable only, preferably on the CFN PLUS side.

- Antenna cable - Communication cable, Twisted pair, separately shielded, low capacitance

3-8. *MECHANICAL PUMP - WIRING*

3-8.1. *General*

The wiring for mechanical pumps is provided in two modes:

- Figure 3-11 lists the wiring in the sequential order of the terminals. This table provides the signal name and a functional description of the signal.

- Figure 3-11 shows the wiring list for connection to the Terminal, as published in the Wiring Label added to the power protective window (see Figure 3-12). The Wiring Label follows the physical location of the wires in the Terminal Block, as shown in Figure 3-11.

3-8.2. *Mechanical Pump - Terminal Block - Pin-Out Connections*

The CFN PLUS Terminal Block connections for a Mechanical Pump are listed in the following table.

Table 3-1. CFN PLUS Terminal Block - Mechanical Pump - Connections Definition		
Terminal No.	*Signal Name*	*Functional Description*
1	BARRIER 1 (-)	Connection to Safety Barrier for Nozzle 1 (1st wire)
2	BARRIER 2 (-)	Connection to Safety Barrier for Nozzle 2 (1st wire)
3	BARRIER 3 (-)	Connection to Safety Barrier for Nozzle 3 (1st wire)
4	BARRIER 4 (-)	Connection to Safety Barrier for Nozzle 4 (1st wire)
5	BARRIER 1 (+)	Connection to Safety Barrier for Nozzle 1 (2nd wire)
6	BARRIER 2 (+)	Connection to Safety Barrier for Nozzle 2 (2nd wire)
7	BARRIER 3 (+)	Connection to Safety Barrier for Nozzle 3 (2nd wire)
8	BARRIER 4 (+)	Connection to Safety Barrier for Nozzle 4 (2nd wire)

Table 3-1. CFN PLUS Terminal Block - Mechanical Pump - Connections Definition		
Terminal No.	*Signal Name*	*Functional Description*
9	TX-RS-232	Transmit (optional RS-232 connection)
10	GND-RS-232	RS232 Ground (optional RS-232 connection)
11	RX-RS-232	Receive (optional RS-232 connection)
12	RS-485 (+)	(+) RS-485 (optional equipment interface)
13	RS-485 (-)	(-) RS-485 (optional equipment interface)
14	RS-485 GND	(GND) RS-485 (optional equipment interface)
15	Pulser 1	Pulser Input - Nozzle 1
16	Pulser 2	Pulser Input - Nozzle 2
17	Pulser 3	Pulser Input - Nozzle 3
18	Pulser 4	Pulser Input - Nozzle 4
19	GND 1 P	Nozzle Grounding - Nozzle 1
20	GND 2 P	Nozzle Grounding - Nozzle 2
21	GND 3 P	Nozzle Grounding - Nozzle 3
22	GND 4 P	Nozzle Grounding - Nozzle 4
23	+12 V 1 P	+12 VDC Output to Pulser - Nozzle 1
24	+12 V 2 P	+12 VDC Output to Pulser - Nozzle 2
25	+12 V 3 P	+12 VDC Output to Pulser - Nozzle 3
26	+12 V 4 P	+12 VDC Output to Pulser - Nozzle 4
27	IN USE 1 A (AC)	Handle Up - AC In Use signal input - Nozzle 1
28	IN USE 2 A (AC)	Handle Up - AC In Use signal input - Nozzle 2
29	IN USE 3 A (AC)	Handle Up - AC In Use signal input - Nozzle 3
30	IN USE 4 A (AC)	Handle Up - AC In Use signal input - Nozzle 4
31	IN USE 1 B (-) (Return)	Handle Up - AC In Use signal return - Nozzle 1
32	IN USE 2 B (-) (Return)	Handle Up - AC In Use signal return - Nozzle 2
33	IN USE 3 B (-) (Return)	Handle Up - AC In Use signal return - Nozzle 3
34	IN USE 4 B (-) (Return)	Handle Up - AC In Use signal return - Nozzle 4
35	LOAD 1	Pump control output - Nozzle 1
36	LOAD 2	Pump control output - Nozzle 2
37	LOAD 3	Pump control output - Nozzle 3
38	LOAD 4	Pump control output - Nozzle 4
39	LINE 1	Pump control 120/240 VDC Input - Nozzle 1
40	LINE 2	Pump control 120/240 VDC Input - Nozzle 2
41	LINE 3	Pump control 120/240 VDC Input - Nozzle 3

Table 3-1. CFN PLUS Terminal Block - Mechanical Pump - Connections Definition		
Terminal No.	**Signal Name**	**Functional Description**
42	LINE 4	Pump control 120/240 VDC Input - Nozzle 4
43	LINE IN (115/230 V)	Input AC voltage
44	NEUTRAL IN (115/230 V)	Neutral line
45	GROUND IN	Ground
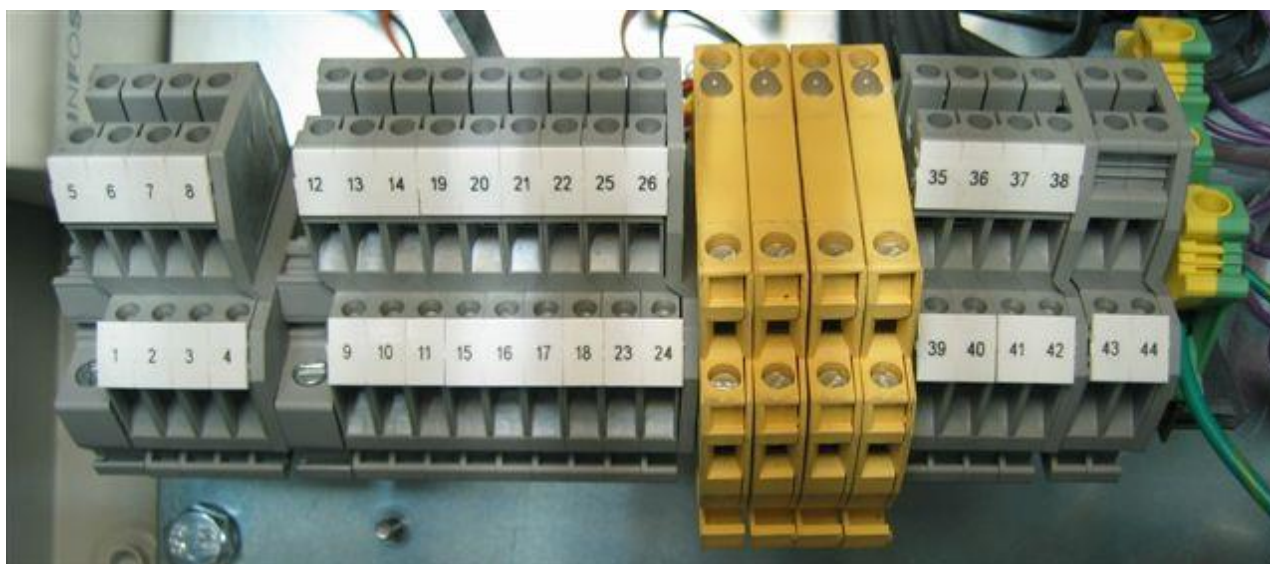
Figure 3-10 Terminal Block

TERMINAL BLOCK CONNECTION

#		#	
1	BARRIER 1 (-)	5	BARRIER 1 (+)
2	BARRIER 2 (-)	6	BARRIER 2 (+)
3	BARRIER 3 (-)	7	BARRIER 3 (+)
4	BARRIER 4 (-)	8	BARRIER 4 (+)
9	TX-RS232	12	RS485 (+)
10	GND-RS232	13	RS485 (-)
11	RX-RS232	14	RS485 GND
15	PULSER_1	19	GND_1_P
16	PULSER_2	20	GND_2_P
17	PULSER_3	21	GND_3_P
18	PULSER_4	22	GND_4_P
23	+12V_1_P	25	+12V_3_P
24	+12V_2_P	26	+12V_4_P
27	IN_USE_1_A(AC)	31	IN_USE_1_B(RETURN)
28	IN_USE_2_A(AC)	32	IN_USE_2_B(RETURN)
29	IN_USE_3_A(AC)	33	IN_USE_3_B(RETURN)
30	IN_USE_4_A(AC)	34	IN_USE_4_B(RETURN)
39	LINE_1	35	LOAD_1
40	LINE_2	36	LOAD_2
41	LINE_3	37	LOAD_3
42	LINE_4	38	LOAD_4
43	LINE_IN_(115/230V)		
44	NEUTRAL_IN_(115/230V)		
45	GROUND_IN		

Figure 3-11 Terminal Block - Mechanical Pump - Wiring List Label
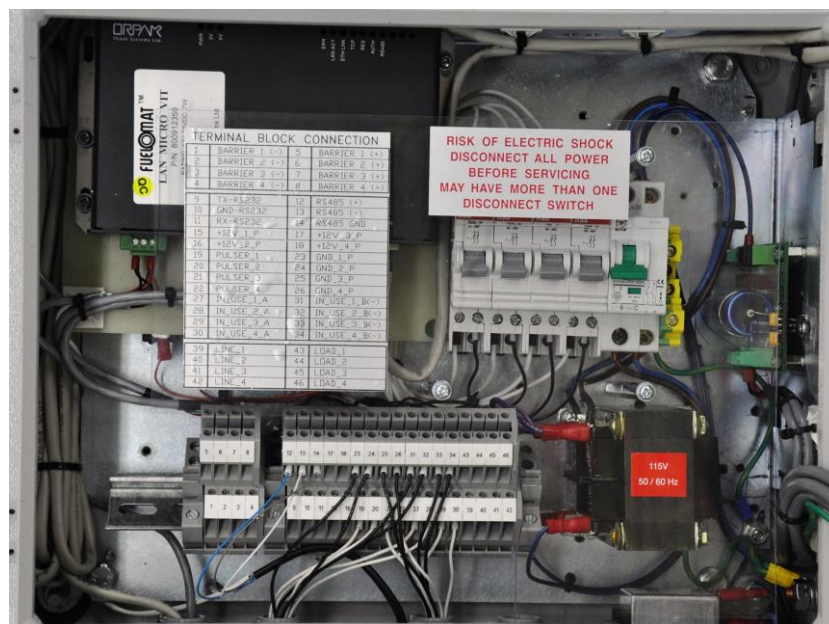
Figure 3-12 Terminal Block -Wiring List Label Installed on Protective Cover

3-8.3. *Mechanical Pump - Required Connections*

This paragraph describes the required wiring connections between the mechanical pump and the CFN PLUS. Figure 3-13 and show a schematic diagram of the connections between the CFN PLUS and the mechanical pump components. Figure 3-15 shows a detailed wiring diagram between the CFN PLUS terminal block and the pump components.

Pulse Input Wires:	The dispenser outputs pulses to the system by means of the Pulser unit, installed inside the pump head. The Pulse rate per volume (liter/gallon) is determined by the Pulser unit. It is programmed as a "factor" by the Head Office controller.
Handle Status Input Wires:	The handle signal is used to signal the system that the pump is "In Use" mode. When the dispenser handle is lifted this contact will close. This should signal the system that the pump is "In Use" or that the transaction ended.
Authorization Output Wires:	The dispenser requires an authorization signal from the CFN PLUS to start a sale transaction. Without this authorization signal, the electric valve (or pump) will not open and the sale transaction will not begin. The CFN PLUS sends the authorization signal in the form of an AC power signal to the valve. When the dispenser receives the authorization signal, fuel is flow.

SINGLE DISPENSER, V-R RESET
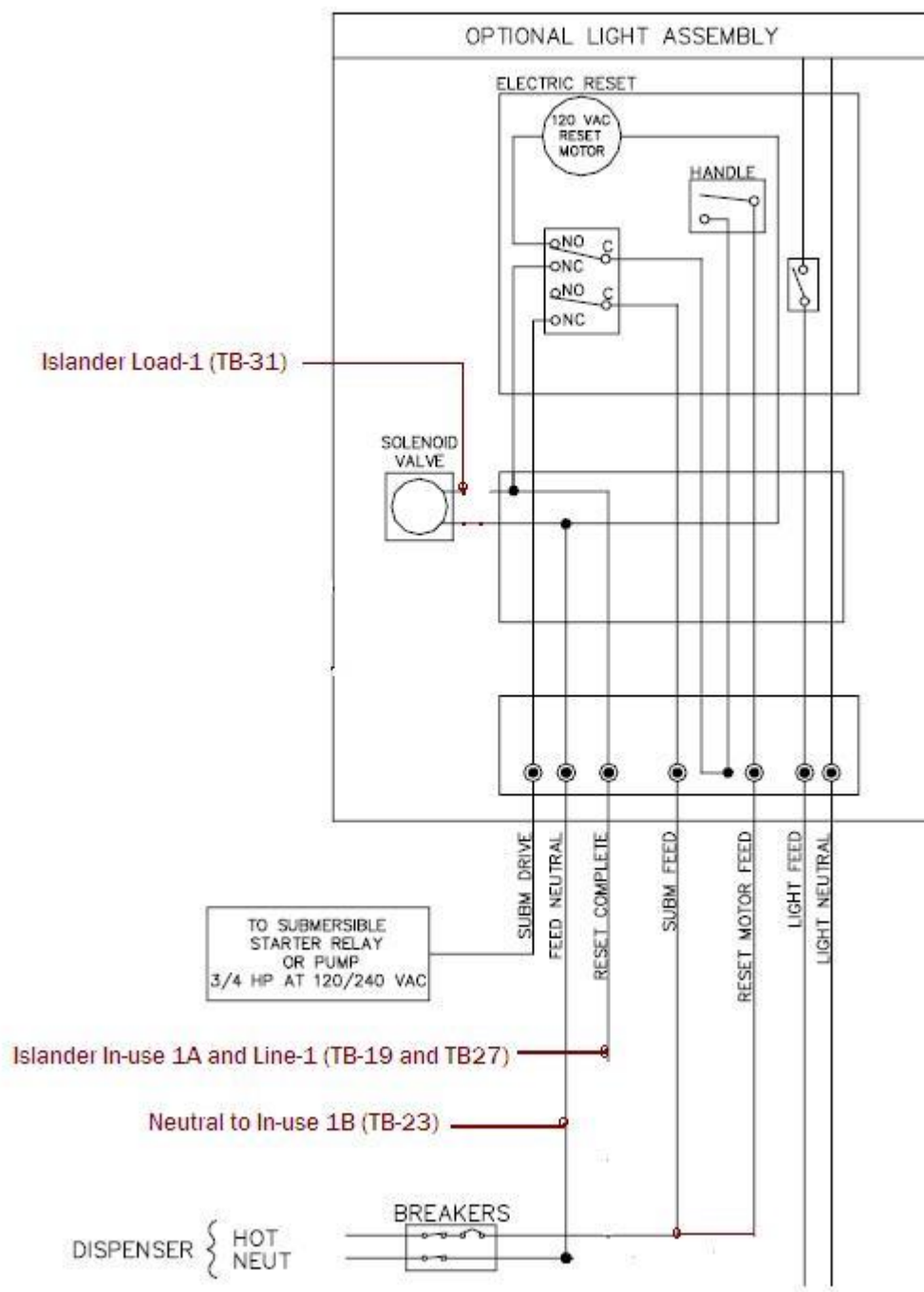
Figure 3-13 Mechanical Pump - Single Dispenser Connections
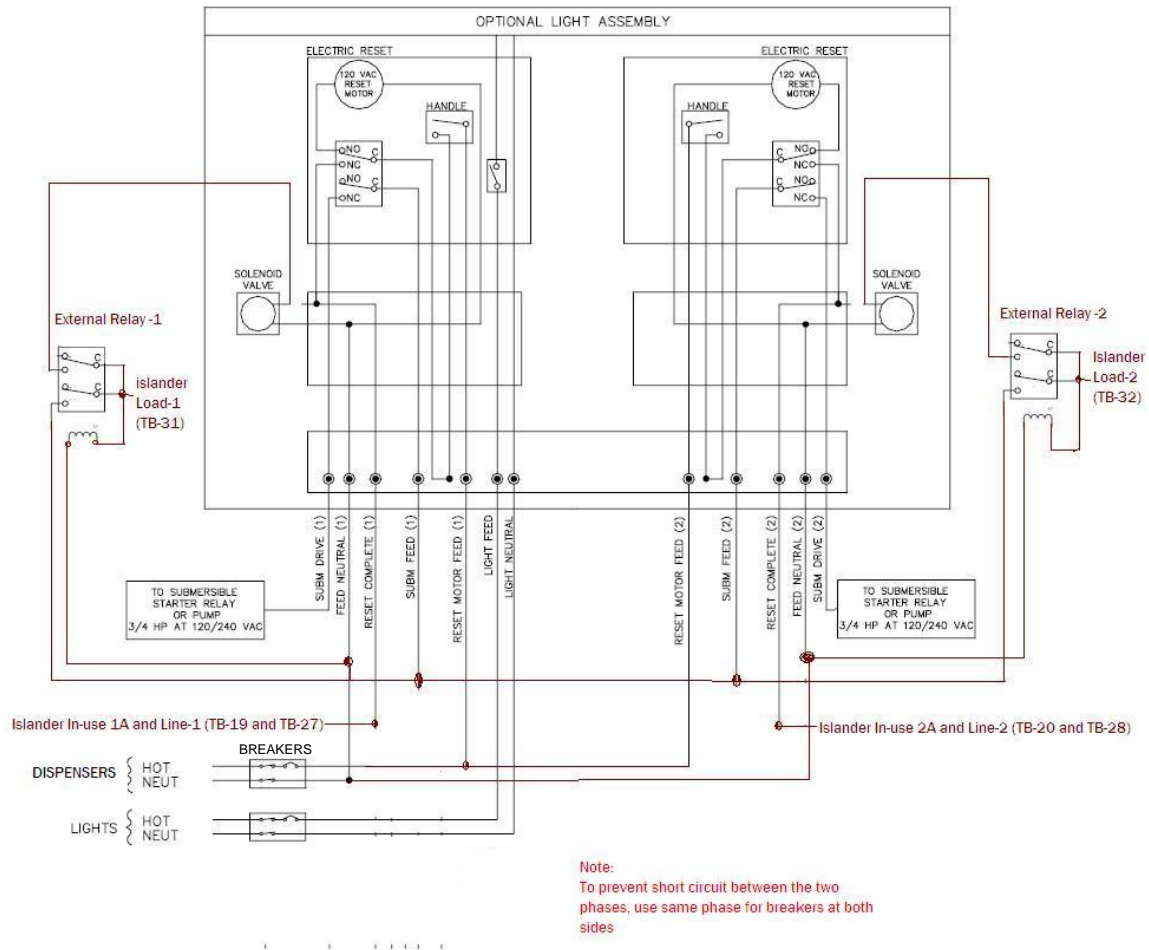
Figure 3-14 Mechanical Pump - Twin Dispenser Connections

MDE-4813D CFN PLUS Installation Manual · February 2018
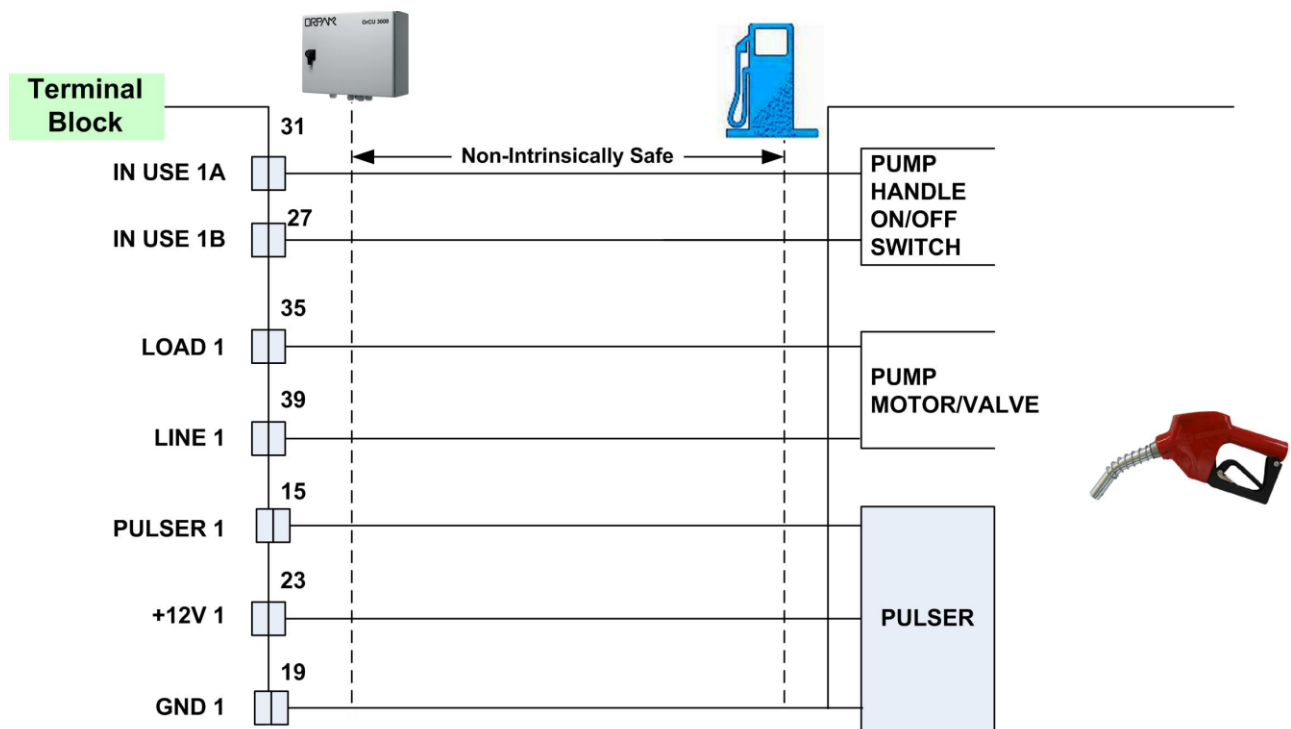
Figure 3-15 CFN PLUS and Mechanical Pump - Terminal Block Detailed Connections

3-8.4. *Mechanical Pump - Pulser Connections*

This paragraph describes the required wiring connections between the Pulser in the mechanical pump and the CFN PLUS. The system can accept many types of pulsers, please contact Gasboy for more information. Two types of pulser can be found in trucks:

- Electronic pulser
- Mechanical pulser

Connect the CFN PLUS to the Pulser in accordance to its characteristics.

☞

NOTE
Pulser should be installed in accordance with the pulser manufacturer's instructions. Some pulsers do not have a barrier, in that case you must add a pulser barrier! Barriers and nozzle rings are not provided with CFN PLUS. Barriers and nozzle rings must be installed on dispensers as UL Listed by Report Retrofit kits prior to the installation of the CFN PLUS.

3-8.4.1. Electronic Pulser

- Three-Wire Pulser, that requires an external power source (12 V) in order to operate

Figure 3-16 shows a schematic diagram of the connections between the Terminal Block and a three-wire Pulser.
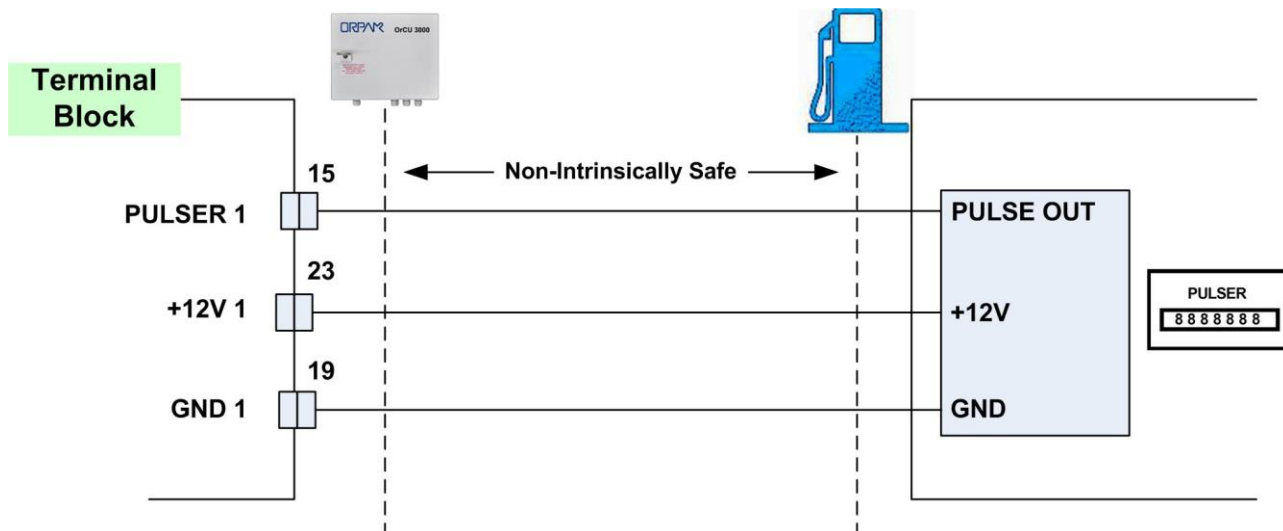
Figure 3-16 Terminal Block and 3-Wire Pulser - Wiring Connections

3-8.4.2. Mechanical Pulser

- Two-Wire Pulser, powered by the CFN PLUS.

Figure 3-17 shows a schematic diagram of the connections between the Terminal Block and a two-wire Pulser.
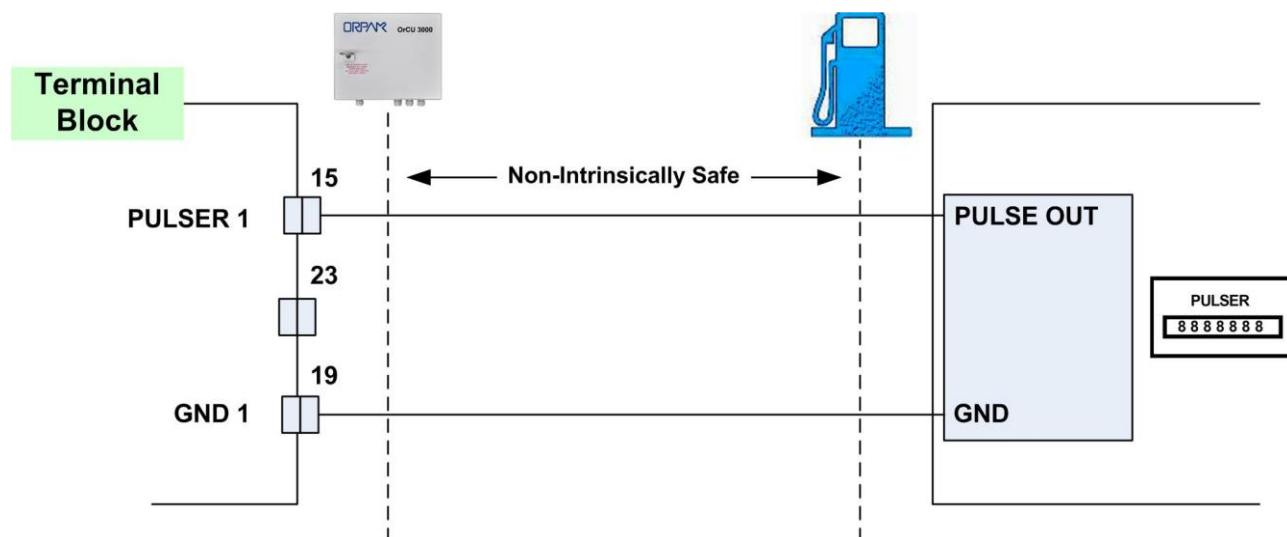
Figure 3-17 Terminal Block and Two-Wire Pulser - Wiring Connections

3-9. ELECTRONIC PUMP - WIRING DESCRIPTION

3-9.1. General

The wiring in the Terminal Block differs in accordance with the type of electronic pump installed in the Home Base Station. There are several types of electronic pumps. The wiring of some of the major one are described below. The major pumps are:

- Tokheim

- Current Loop

- RS-485

- RS-422

See Figure 3-18 for the wiring list label applied within the inner wall of the unit. This label consists of a wiring list table for the Terminal block. You are requested to connect the Forecourt equipment to OrIC in accordance with this table:

- The rows are the connection ports in the Terminal Block, in an ascending order.

- Each column is dedicated for a specific pump.

- Each cell defines the signal attached to the Terminal Block port.

The wiring of some of the major pumps is described below.

OrCU 3000 TERMINAL BLOCK ELECTRONIC PUMP								
1	BARRIER 1+							
2	BARRIER 2+							
3	BARRIER 3+							
4	BARRIER 4+							
5	BARRIER 1-							
6	BARRIER 2-							
7	BARRIER 3-							
8	BARRIER 4-							

TB#	P#	RS-485	RS-232	TOKHEIM	CURRENT L.	RS-422	NUOVO	PUMA	CETIL
9	P1-1	+	TX	TTD	+	R+	RX1+	RX	Y1
10	P1-2	-	RX	TTC	-	R-	RX1-	TX	Z1
11	P1-3	G	DI/O	COM	G	T+	TX1+	G	E
12	P1-4		G	G		T-	TX1-	E	
13	P1-5	+	TX	TTD	+	G	RX2+	RX	Y2
14	P1-6	-	RX	TTC	-		RX2-	TX	Z2
15	P1-7	G	DI/O	COM	G		TX2+	G	E
16	P1-8		G	G			TX2-	E	
17	P2-1	+	TX	TTD	+	R+	RX1+	RX	Y1
18	P2-2	-	RX	TTC	-	R-	RX1-	TX	Z1
19	P2-3	G	DI/O	COM	G	T+	TX1+	G	E
20	P2-4		G	G		T-	TX1-	E	
21	P2-5	+	TX	TTD	+	G	RX2+	RX	Y2
22	P2-6	-	RX	TTC	-		RX2-	TX	Z2
23	P2-7	G	DI/O	COM	G		TX2+	G	E
24	P2-8		G	G			TX2-	E	
25	P3-1		TX						
26	P3-2		RX						
27	P3-3		DI/O						
28	P3-4		G						
29	P3-5		TX						
30	P3-6		RX						
31	P3-7		DI/O						
32	P3-8		G						
33	P4-1	+							
34	P4-2	-							
35	P4-3	G							
36	P4-4								
37	P4-5	+							
38	P4-6	-							
39	P4-7	G							
40	P4-8								

41	LINE							
42	NEUTRAL							
43	GND							

NOTE: CONNECTION TO THE PUMPS SHALL BE PER ACTUAL PUMP INTERFACE LOCATION

Figure 3-18 CFN PLUS Terminal Block - Wiring List Label

3-9.2. *Tokheim Electronic Pump*

The wiring for the Tokheim electronic pump is provided as follows:

- Figure 3-19 shows the specific wiring connections between CFN PLUS and the Tokheim pump nozzle, and the terminals that differ from the Mechanical Pump.

- Figure 3-18 shows the wiring list for connection to the Terminal, as published in the Wiring Label added to the inner door. The Wiring Label follows the physical location of the wires in the Terminal Block, as shown in Figure 3-10.
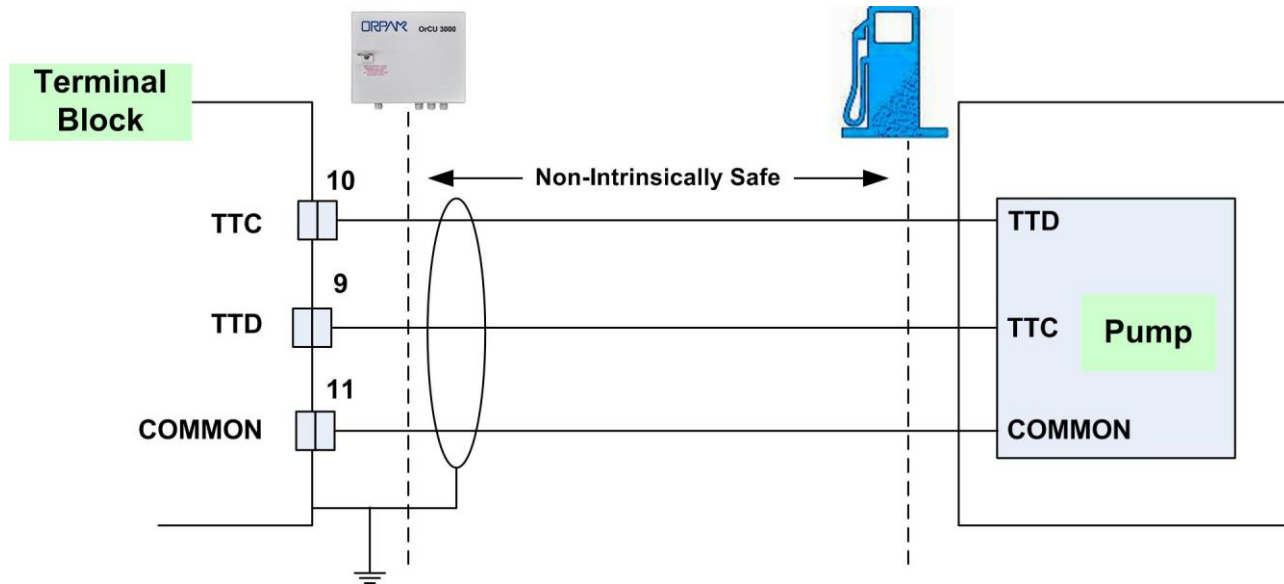
Figure 3-19 Tokheim Electronic Pump - Wiring Diagram

3-9.3. *Current Loop Electronic Pump*

The wiring for the Current Loop electronic pump is provided as follows:

- Figure 3-20 shows the specific wiring connections between CFN PLUS and the Current Loop pump nozzle, and the terminals that differ from the Mechanical Pump. The figure shows the serial connection between two Current Loop pumps and the Terminal Block.

- Figure 3-18 shows the wiring list for connection to the Terminal, as published in the Wiring Label added to the inner door. The Wiring Label follows the physical location of the wires in the Terminal Block, as shown in Figure 3-10.
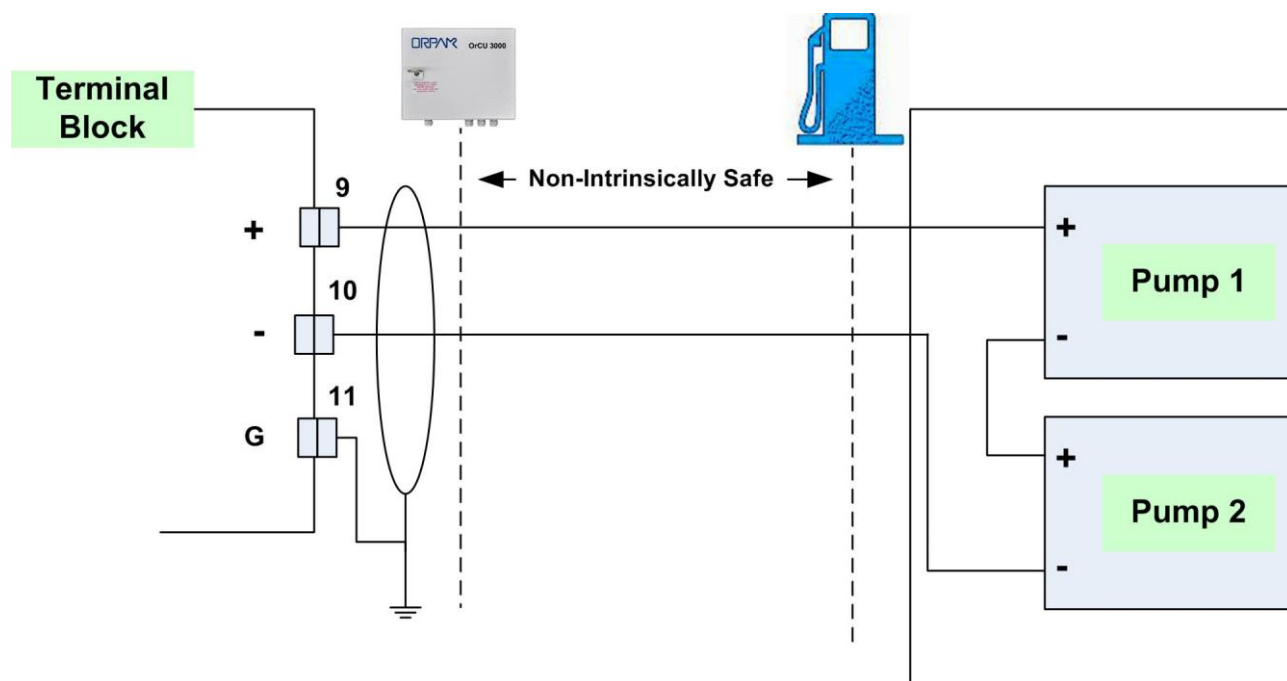
Figure 3-20 Current Loop Electronic Pump - Wiring Diagram

3-9.4. *RS-485 Electronic Pump*

The wiring for the RS-485 electronic pump is provided as follows:

- Figure 3-21 shows the specific wiring connections between CFN PLUS and the RS-485 pump nozzle, and the terminals that differ from the Mechanical Pump. The figure shows the parallel connection between two RS-485 pumps and the Terminal Block.

- Figure 3-18 shows the wiring list for connection to the Terminal, as published in the Wiring Label added to the inner door. The Wiring Label follows the physical location of the wires in the Terminal Block, as shown in Figure 3-10.
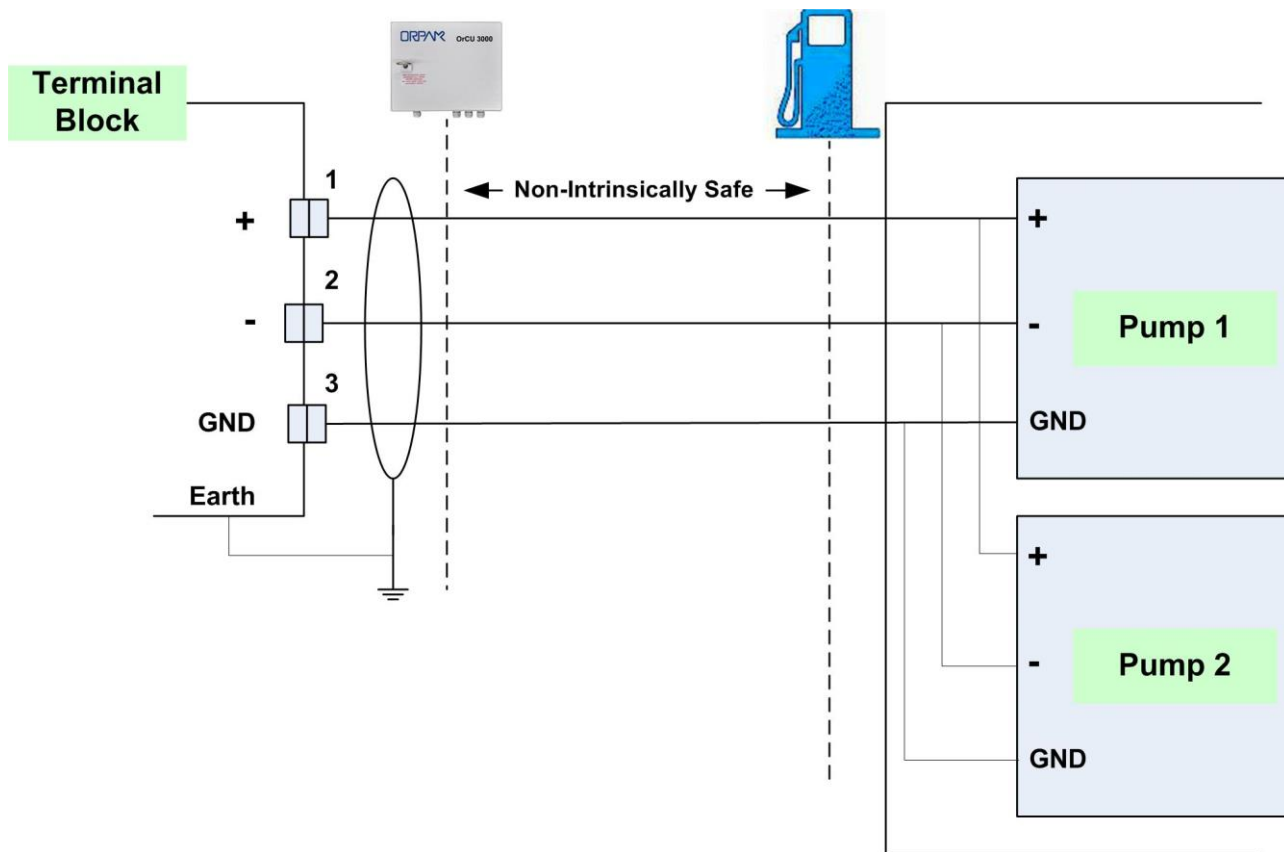
Figure 3-21 RS-485 Electronic Pump - Wiring Diagram

3-10. WIRING TO GENERAL COMPONENTS

3-10.1. General

The following paragraphs show the specific wiring between the CFN PLUS Terminal Block and components common in both types of Home Base Stations, either with mechanical or electronic pump.

3-10.2. Connection to TLG Controller

Figure 3-22 shows the required connection between the TLG controller in the gas tank and the Terminal Block (RS-232 type).
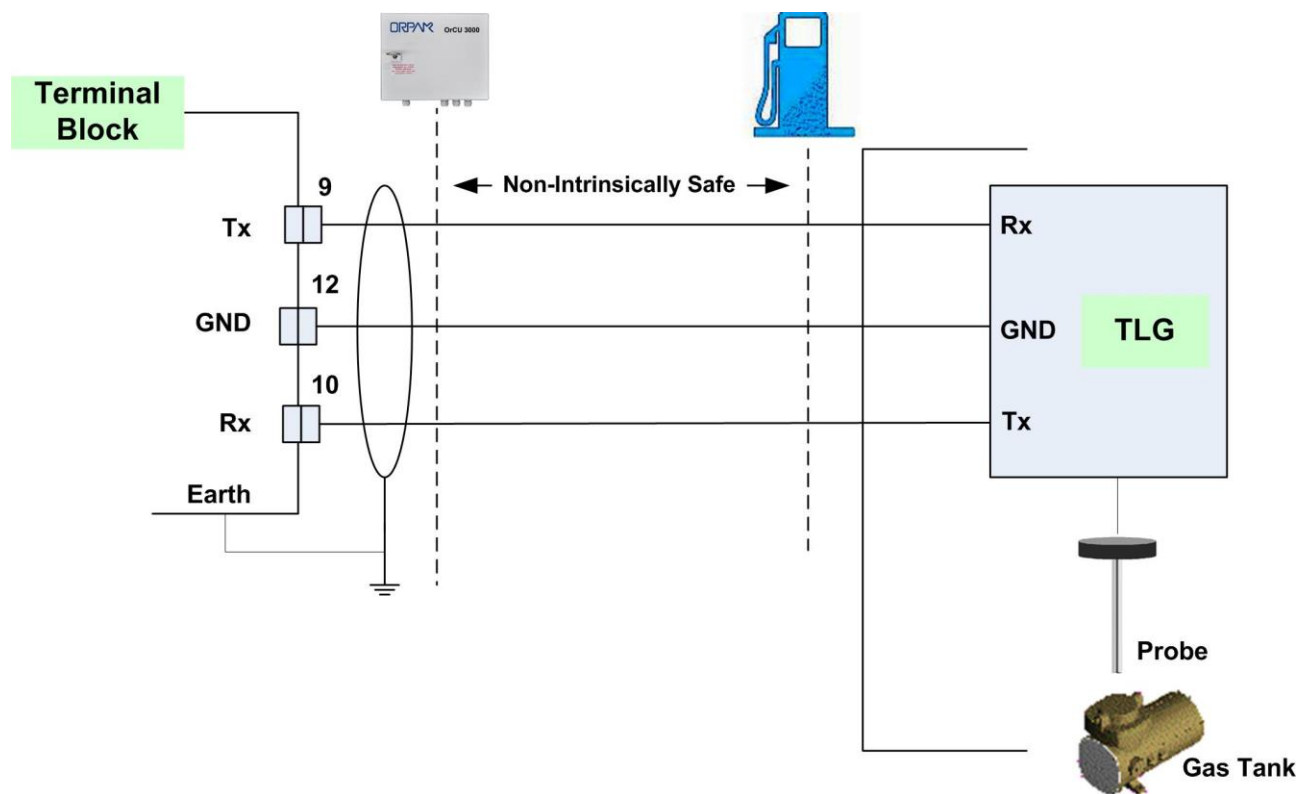
Figure 3-22 Terminal Block - TLG Wiring Link

3-11. POST-INSTALLATION CHECKLIST

After completing the installation procedure, inspect carefully the connection between the CFN PLUS and the external power mains and the data sources.

In particular, pay attention to the following issues:

- Correct wiring

  - Is all the wiring inserted in metal conduits?
  - Is the AC and the DC wiring inserted in separate conduits, throughs and so on.
  - Is the system/peripheral equipment powered on a separate dedicated breaker?
  - Is the system grounded properly?
  - Are the cables correctly routed in the station?
  - Are the communication lines under the maximum allowable distance?
    - RS-232: 50 feet (15 m)
    - RS-485: 330 feet (100 m)
    - Antenna wire:
      - 330 feet (100 m) for VIU
      - 50 feet (15 m) for FuelOPass

- Clean dirt and wire remnants

In case problems are detected after installation or during operation, repeat the post-installation checks listed above.

3-12. CFN PLUS SETUP

Refer to the *MDE-4817 SiteOmat Setup Manual*.

SECTION 4
MAINTENANCE

4-1. *GENERAL*

This section provides general maintenance instructions for the CFN PLUS as well as a comprehensive troubleshooting guide.

4-2. *TROUBLESHOOTING*

The next paragraphs provide a list of common pump/system problems that may be encountered when using the CFN PLUS system, as well as corrective action instructions, covering the following problems related to the system and its peripherals:

- CFN PLUS (see paragraph 4-2.1)

- Communication to peripherals (see paragraph 4-2.2)

4-2.1. *CFN PLUS Troubleshooting*

The CFN PLUS troubleshooting procedure and consequent corrective actions are described in Table 4-1.

Table 4-1. CFN PLUS Troubleshooting			
Fault	**Probable Cause**	**Checks**	**Corrective Action**
System is down			
No communication	CFN PLUS main switch is OFF		Turn main switch ON.
OrCU LEDs are not lit	No 115 VAC feed to the unit	1. Check power at Distribution Box. 2. Check cabling from Distribution Box to the unit. 3. Verify that power cable is properly. connected to unit terminal block. 4. Is 115 V measured at the power input terminal block?	Correct wiring problems if 115VAC is not measured.

	Power failure	Does the unit shut down immediately after being turned ON?	1. Check for shorts in the power line cable. 2. Check grounding.
	Circuit breaker is off	Is breaker OFF or tripped?	Turn breaker ON, if OFF
		Is 115 V being switched through breaker?	Replace breaker if 115 V is not being switched.
		Is 115 V measured at the power input terminal block?	Correct wiring problems if 115 V is not measured.
		Does the breaker turn OFF immediately after being turned ON?	Check for loads or shorts in the power line.
	Internal fuse blown	Check the two pico fuses (red wires) at the bottom of the power supply using an ohmmeter.	Replace the fuse if it is blown.
	Power supply failure	Verify that green LED on power supply is lit.	1. Replace mini fuse. 2. Replace power supply.
Mechanic pump does not refuel			
Pump does not supply fuel	Device is not allowed to refuel	1. Open the pump from SiteOmat Status screen. 2. Verify that the vehicle/device has no limitation in FHO setup.	Enable the device to refuel.
Pump does not supply fuel	Pump setup is incorrect	Check pump setup: • Pump server • Buses • Prices • Pulse rate	1. Set pump parameters. 2. Save and reload. 3. Check again.

Fault	Probable Cause	Checks	Corrective Action
Mechanic pump does not refuel (Continued)			
Pump does not supply fuel	Faulty connection to pump	Check Control cables from CFN PLUS to pump.	Make good electrical connection.
	8-port failure	Verify that Power LED is lit.	If it is off, use a voltmeter to check power supply to the unit: If power supply is OK, then replace the 8-port board. If power supply is faulty, replace the power supply.
		Verify that Control red LED on MPI-C board is lit.	1. Replace MPI-C board. 2. Replace 8-port board.
	Pump malfunction	Turn the CFN PLUS bypass switch on, lift the nozzle and check that the pump supplies fuel.	If the problem persists: 1. Check Handle-On Switch. 2. Repair pump.
	Handle-on switch problem	Is the In Use red LED in MPI-C board lit when nozzle is lifted?	1. Check In Use cable and repair, if necessary. 2. Check Terminal wires and repair, if necessary. 3. Check the In Use Switch in the pump and repair, if necessary.
Pump is authorized but Call state is not detected (nozzle icon in SiteOmat Status screen does not display Call state)	Faulty In Use switch in pump	Power off the pump, using an ohmmeter to measure the switch in ON and OFF states.	Replace pump switch in cases where no short was detected.

Fault	Probable Cause	Checks	Corrective Action
Mechanic pump does not refuel (Continued)			
	Faulty In Use terminal block		Replace In Use terminal block.
	Faulty MPI-C board	Verify that the Call red LED is lit when nozzle is lifted.	If the red LED is not lit, replace MPI-C board. If the LED is lit, the problem is external to the controller.
	Faulty 8-Port		Replace 8-Port.
Pump is authorized, pump motor is running, but no fuel is supplied	Faulty solenoid valve Faulty pump	Does the pump solenoid valve produce a clicking sound?	1. Replace valve. 2. Repair pump.
Payment device (card, key, tag, Fuel Ring) is not accepted	Communication fault between OrTR and SO	1. Check LAN cable. 2. Check OrTR setup. 3. Check SO setup.	1. Replace LAN cable, if necessary. 2. Set OrTR parameters properly. 3. Set SO parameters properly.
	Communication fault between FHO and SO	1. Check connection path with FHO. 2. Verify that the station is available and synchronized with FHO in FHO Stations Status screen.	Repair communication between FHO and SO, providing a reliable communication line.
	Device was not defined/incorrectly defined in FHO	1. Log in to FHO as Fleet manager. 2. Check that the device is defined. 3. Check device parameters. 4. Check that device rules do not limit refueling.	Define the device parameters in FHO properly.

Fault	Probable Cause	Checks	Corrective Action
Mechanic pump does not refuel (Continued)			
	Device limit was passed	Verify that the device is within the limits of its rule.	For testing only, remove any rule associated to this device.
	Device was set as Driver	1. Log in to FHO and go Devices Management. 2. Select the specific device and check if it was configured as Driver.	Change the device setting to Vehicle.
Payment device (card, key, tag, Fuel Ring) is not accepted	Device is blocked	1. Log in to FHO and go to Devices Management. 2. Check the status of the device in the Status column in the Devices grid (blocked/unblocked).	Change device status to Unblocked.
Pump is Authorized and refueling but volume remains zero			
Pump is refueling but volume remains zero	Pulse factor is zero	Check SO pump setup.	Change Pump Settings to correct the factor for the relevant pump.
	Faulty MPI-C board Faulty pulser	Disconnect the pulser and short the pulse-in wires to simulate pulses.	If pulses are received during refueling, replace pump pulser. If not, replace MPI-C board.
No control on refueling			
Pump is refueling without any control	Pump is in bypass	Verify that CFN PLUS bypass switch is OFF.	Turn bypass switch OFF, if ON.
	Faulty SSR		Replace the relevant SSR unit inside the CFN PLUS.
	If an external relay is used to control the pump/valve, it may be stuck due to a small current leak.		Add a snubber (capacitor + resistor) in parallel to relay input.

4-2.2. *Communication Troubleshooting*

The troubleshooting procedure for problems related to communication to peripherals and consequent corrective actions are described in Table 4-2.

Table 4-2. Communication Troubleshooting			
Fault	**Probable Cause**	**Checks**	**Corrective Action**
No communication between FHO and SO controller			
No connection to the station from FHO Stations screen	Cabling issue	Visually inspect the network cable to LAN2.	1. Verify that LAN2 Port LED is blinking. 2. Unplug the cable and plug it back in. 3. Replace LAN cable, if necessary. 4. If the cable is in good condition, contact the IT department to confirm that the switch/router connected to the LAN cable is properly set. 5. Check the Controller network settings (IP addresses, mask, gateway, etc.).
No communication to the pumps (8-port CommVerter)			
"Warning" signs displayed for all pumps on the SiteOmat Status screen	Incorrect 8-port CommVerter setup	Check the physical connection of the 8-port CommVerter to the local network (5-port switch activity).	1. If no activity on the LAN port connected to the 8-port CommVerter, replace the short Ethernet cable or/and change the LAN port to confirm normal operation.

		Table 4-2. Communication Troubleshooting	
Fault	**Probable Cause**	**Checks**	**Corrective Action**
No communication to the pumps (8-port CommVerter) (Continued)			
All pumps are showing "warning" signs on the SiteOmat Status screen	Incorrect 8-port CommVerter setup	Check network connectivity by performing a "ping" command locally or remotely, through PuTTY application.	2. Check the status of the LEDs on the 8-port (upper right corner of the board): the first and the third LED should be lit to confirm power and network connection, while second LED should blink to confirm network activity. The last two LEDs (from left to right) should be blinking constantly, to confirm communication with controller. 3. In cases where all LEDs are lit periodically (every 30 seconds), the unit is resetting due to connection loss to the controller. 4. Reset the IP and reconfigure the Pump Server (PS) in controller setup.
No communication to nozzles (Wireless Gateway)			
Can't read the vehicles and/or no authorization at the pumps	1. No communication to Wireless Gateway 2. Incorrect nozzle reader setup	Check the physical connection of the Wireless Gateway to the local network (5-port switch). Check the Wireless Gateway network settings.	1. If no activity on the LAN port, check the cable and/or change the port on the 5-port switch. 2. Remove the top cover to access the Wireless Gateway and check the status of the LEDs.

Table 4-2. Communication Troubleshooting (Cont'd)			
Fault	**Probable Cause**	**Checks**	**Corrective Action**
No communication to nozzles (Wireless Gateway) (Continued)			
Can't read the vehicles and/or no authorization at the pumps		Check the programming of the WNRs.	3. Connect to the Wireless Gateway through the 9-pin serial port and open HyperTerminal (115200, 8, None, 1, None), reset the Wireless Gateway and follow the startup messages to find the IP address.
No communication to the TLS			
"Warning" signs displayed for all tanks on the SiteOmat Tank Status screen	Incorrect TLS communication and/or physical network setup	Ping the TLS from controller (PuTTY). Check network/ RS-232 port on the TLS.	1. If no response to the ping command from controller, check the IP address of the TLS. Contact the IT department in cases where there is no communication to the unit (if connected over the WAN). 2. Check the physical layer (Ethernet cable) and port activity to the TLS (if connected over the LAN).
"Warning" signs displayed for all tanks on the SiteOmat Tank Status screen			3. Connect to the TLS network interface through telnet ("telnet XXX.XXX.XXX.XXX 9999") and check the configuration. Confirm proper network settings and serial port settings (should be 9600, 8, None, 1, None and D6 as connection type). By default, the port is set to 10001 - confirm similar setting of the TLS bus in the controller setup.

4-3. CLEANING

The CFN PLUS itself as a standalone unit should be cleaned periodically at short intervals, due to the harsh environment of the Home Base Station where they operate.

The following instructions are valid for the CFN PLUS box and for OrTR (Optional).

- Clean the OrTR front panel with a damp cloth only.

- Clean the box and other devices with a damp cloth only.

☞
CAUTION
DO NOT use any solvents such as thinner or benzene.

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SECTION 5
GLOSSARY

5-1. *FUELOMAT GLOSSARY*

ComVerter	LAN/232/485/422/C.L./Tokheim Communication Converter
DataPass	Vehicle Data Transceiver
FHO	Fleet and Fuel Head Office
MPI	Mechanical Pump Interface
MPI-C	Mechanical pumps Interface Card
NIS	Non-Intrinsically Safe
NR	Nozzle Reader (Wireless Nozzle Reader unit)
OrCU	Orpak embedded Controller Unit
OrCU 3000	Orpak site Controller Unit
OrIC	Orpak Island Controller
OrIT	Orpak Island Terminal
OrPT	Orpak/Outdoor Payment Terminal (display, Keyboard, key reader, magnetic card reader, LED's, buzzer; install in fueling area)
OrTC	Orpak Tanker Controller
OrTR	Orpak Tag Reader
POS	Point of Sale
SAM	Security Application Module (security card in the VIT/UPI)
TLS	Tank Level System (measuring fuel tank level in station)
VBIS	Vehicle Bus Information System
VIS	Vehicle Information System
VIT	Vehicle Information Transceiver
VIU	Vehicle Identification Unit (VIU3/35/45)
WGT	Wireless Gateway Terminal

5-2. *COMMUNICATION GLOSSARY*

Access Point   An internetworking device that seamlessly connects wired and wireless networks together.

Ad Hoc   A peer- to-peer wireless network without Access Point. A group of wireless clients consistent with an independent wireless LAN.

Backbone   The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

BSS   Basic Service Set. An Access Point associated with several wireless stations.

DES   LANs with high level of security. A method of data encryption.

DHCP   Dynamic Host Configuration Protocol.

ESS   Extended Service Set. More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

ESSID   Extended Service Set Identifier. The length of the ESSID information is between 0 and 32 octets. A zero-length identifier indicates the broadcast SSID.

Ethernet   A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10/100 Mbps transmission rate over shielded coaxial cable or over shielded twisted pair telephone wire.

Infrastructure   An integrated wireless and wired LAN is called an infrastructure configuration.

LAN   Local Area Network

Roaming   A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.

TCP/IP   Communication protocol used in Ethernet/Internet.

Triple DES   A method of data encryption.

WAN   Wide Area Network

WEP   Wired Equivalent Privacy. The optional cryptographic confidentiality algorithm specified by IEEE 802.11 used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network (LAN) medium that does not employ cryptographic techniques to enhance privacy.

WG   Wireless Gateway

APPENDIX A
SITE SURVEY
STATION INFORMATION FORMS
(To be filled during site survey)

Home Base Station

Date: _____

Prepared by:

    Name: _____ e-mail: _____ Phone: _____

Gas station info:

Company Name _____ Tel: _____

Contact Person : _____ Mobile Phone : _____

Fax : _____

A. *STATION INFORMATION*

- Power line ☐ 110VAC ☐ 220VAC ☐ Other____
- Power stabilizer/UPS available? _____ Spec _____
- Station name _____
- Location _____
- FCC Tel. No._____ / Direct connect _____
- Internet connectivity method (Modem, GPRS, cable, frame relay, SAT, ADSL etc.) _____
- Number of dispensers (to be connected to FCC): _____
- Number of nozzles (to be connected to FCC): _____
- Number of Authorizers required _____
- TLS type_____

B. *STATION MODE OF OPERATION*

How do the pumps being authorized?

- o Console

- o Preset Money, Preset Volume

- o From office

- o Auto-authorized (free mode)

Do they provide receipts? Y/N (attach samples)

C. *DISPENSER INFORMATION (CONNECTED TO FCC)*

- Dispenser No._____

- Manufacturer_____

- MODEL_____

- TYPE:

    - ☐ Mechanical: have electronic pulse out? _____ Pulses/liter factor_____

    - ☐ Electronic (protocol communication) _____

- Pump link - Current Loop, RS-485, Other _____

- Type of wire used for pump link; is it shielded? _____

- Number of CPU Heads per dispenser _____

- Number of Nozzles _____

- Decimal Point: Price_____ Volume _____ Total _____

- How many different dispenser TYPES in the station? _____

D. *NOZZLE EQUIPMENT*-1

- HOSE SIZE: ☐ 3/4"   ☐ 1"   ☐ other_____
- Hose Length _____
- Break Away: ☐ Yes   ☐ No   Location on the hose: _____
- Vapor Recovery: ☐ Yes   ☐ No
- NOZZLE/HOSE THREAD: ☐ INCH (NPT) ☐ MILLIMETER (DSP)
- HOSE THREAD: ☐ Male   ☐ Female
- MANUFACTURER: _____
- MODEL: _____
- DIAMETER OF NOZZLE SPOUT: _____

E. *NOZZLE EQUIPMENT*-2

- HOSE SIZE: ☐ 3/4"   ☐ 1"   ☐ other_____
- Hose Length _____
- Break Away: ☐ Yes   ☐ No   Location on the hose: _____
- Vapor Recovery: ☐ Yes   ☐ No
- NOZZLE/HOSE THREAD: ☐ INCH (NPT) ☐ MILLIMETER (DSP)
- HOSE THREAD: ☐ Male   ☐ Female
- MANUFACTURER: _____
- MODEL: _____
- DIAMETER OF NOZZLE SPOUT: _____

F. *CONDUIT*

Exists _____   Can be used _____   Sealed _____

Need new conduit _____ Type of surface _____

G. Tanks

Is tank gauge reading required ☐ Yes   ☐ No

How many tanks and what type? _____

Do they use a TLS, what type? _____

How do they read tanks today? _____

H. Site inspection (draw the station and attach photos):

Pay attention to the following:

- Photos of: Nozzle, Hose, Pump, Isle, Station

- Distances

- Location of office (to install FCC), Pumps, Tanks, Isles etc.

- Broadcast antennas, Power line cables/tower, Generators etc.

APPENDIX B
WIRING DIAGRAM

This appendix provides the wiring diagram of the CFN PLUS, as follows:

- Figure B-1 CFN PLUS - Wiring Diagram (Mechanical Pump)

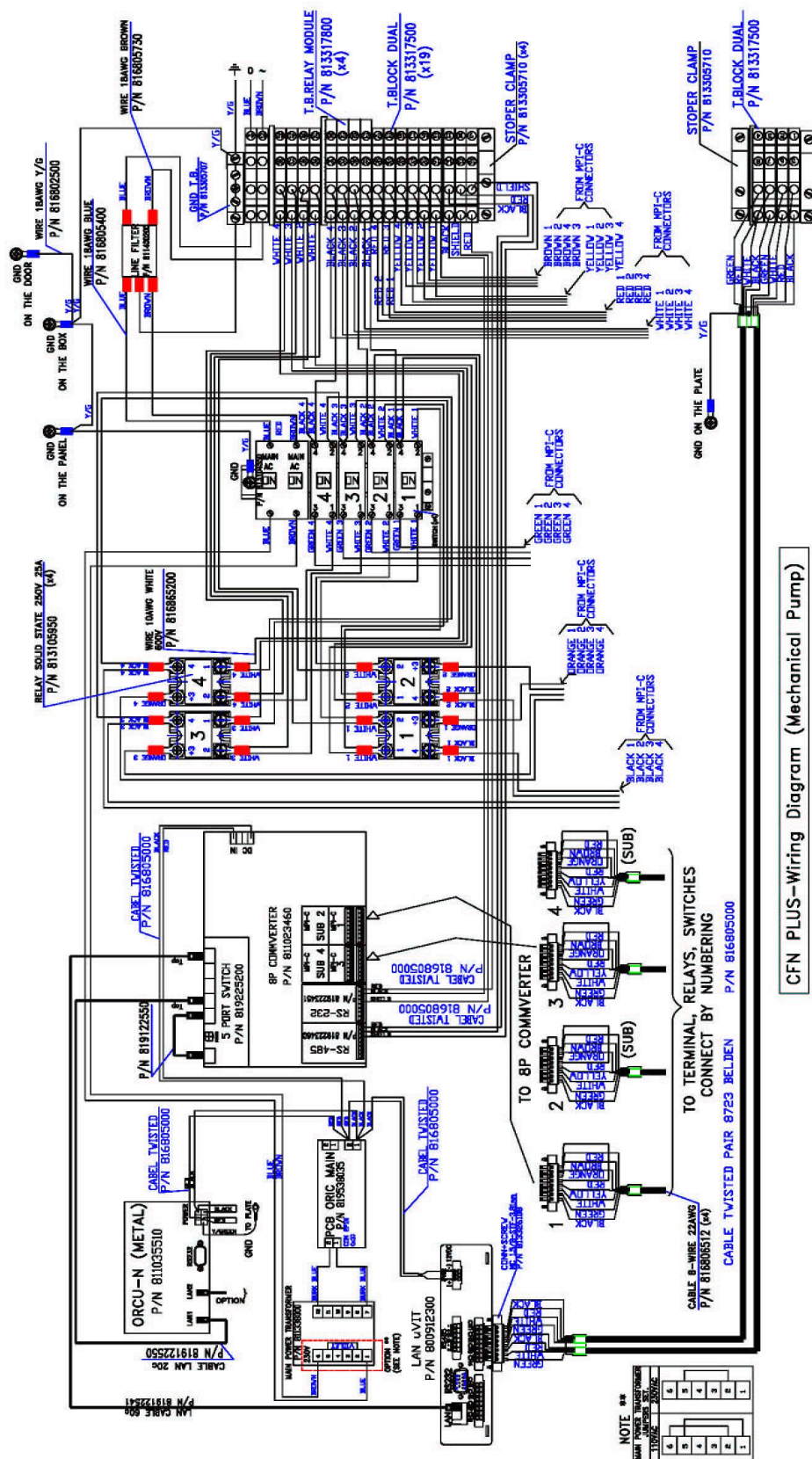- Figure B-2 CFN PLUS - Wiring Diagram (Electronic Pump)

Figure B-1 CFN PLUS - Wiring Diagram (Mechanical Pump)

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Figure B-2 CFN PLUS - Wiring Diagram (Electronic Pump)

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