GASBOY

Gilbarco's Tag Reader (Tag Reader)

INSTALLATION MANUAL

SAFETY CONSIDERATIONS

Read all warning notes and instructions carefully. They are included to help you 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 "Automotive and Marine Service Station Code", 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 points. Disconnect all power before servicing.

WARNING – PASSING VEHICLES

When working in any open area of fuel 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.

WARNING

Components substitutions could impair intrinsic safety.
Attaching unauthorized components or equipment will void your warranties.

CAUTION

PROPRIETY NOTICE

DISCLAIMER

FCC Compliance Statement

FCC Warning

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TABLE OF CONTENTS

Paragraph   **Page**

SECTION 1   GENERAL DESCRIPTION

SECTION 2   INSTALLATION

TABLE OF CONTENTS

SECTION 3   USING TAG READER

SECTION 4   MAINTENANCE

LIST OF ILLUSTRATIONS

Figure   **Page**

LIST OF TABLES

Table   **Page**

SECTION 1
GENERAL DESCRIPTION

1-1. *SCOPE*

This manual is provided to assist you in installing the Gilbarco TR- Tag Reader . The Tag Reader must be installed as described in this manual to ensure unit reliability and normal operation.

This manual includes a general and functional description of the Tag Reader. It provides the installation requirements and procedures for the Tag Reader.

This manual is intended for qualified authorized installers of the Tag Reader. It is also intended for the Island electrician.

1-2. *DESCRIPTION*

1-2.1. *General*

The Gilbarco Tag Reader (P/Ns: Tag Reader - PA04020000, Tag and Magnetic Card Reader - PA04020001) is a standalone reader unit for contactless cards and tags intended for vehicle or driver tag identification in gas stations and other applications. In addition, it can also be equipped with an optional magnetic card reader, at the right-hand side of the unit. The TR includes a Security Application Module (SAM) used to handle encrypted contactless cards and tags. The TRis within easy reach of the customer wishing to refuel, and transmits the information to the station automation system (CFN PLUS) over an RS-485 shielded cable.

The TR is designed to be installed in a non hazardous location in the station.

1-2.2. *Description*

The Tag Reader has a modern, stylish-look, with a clean panel, which includes two indicators (green and red) and a large LCD. Its operation is very simple: to start a fuel purchase, the customer waves the tag or card in front of the unit. After the tag is recognized and validated, clear messages shown on the display guide the customer and help him to complete the transaction. In addition to the LCD, an internal buzzer beeps to provide audio feedback and the status of the current operation is indicated by the green and red indicators.

One or several TRs can be installed in a single station for improved service. In this case, all TRs in the station should be connected to the same single CFN PLUS (e.g. Fuel Truck Controller or others) via RS-485.connection.

Two LEDs on the Tag Reader front panel indicate the transaction status:

Green – ✓ - Positive recognition, transaction was authorized

Red – ✗ - Negative recognition, transaction is not authorized.

The indicators are automatically activated by the station Controller when the customer places the tag or card near the tag reader, close to the sensing component located at the bottom of the front panel (see Figure 1-1).
A welcome message is displayed on the TR display, and is replaced by messages which indicate the progress of the transaction. The display is backlit for improved readability under poor lighting conditions. An internal speaker provides audio feedback.

Figure 1-1. Tag Reader, General view

1-3.   *FUNCTIONAL DESCRIPTION*

1-3.1. *Main Features*

The TR is based on advanced technology, implemented by two microcomputer subsystems: one for handling the secure communication protocol with the tag/card, and the other for communication with the station Controller and for controlling the operation of TR.
The Tag Reader includes a single cable carrying power and RS485 communication.

The Tag Reader user interface (UI) can easily be adapted to the customer requirements. For flexibility, the Tag Reader uses a standard communication protocol, and the displayed messages are controlled by the station Controller.
The message contents and language can be selected by the system operator, and the microcomputer application software can be updated in the field.

1-3.2. *Supported Cards/Tags Options*

Tag Reader has several configurations and can support various cards and tags, including: MiFare, magnetic fuel and fleet cards and optional payment contact less cards.

1-3.2.1.   MiFare Tag/Card

This is a contact less card that can be used as a fueling card by the driver at the gas station. When the card is presented next to the TR, it reads the card / tag data and transmits it to the station controller in the gas station. Upon verification and approval, the station Controller activates and releases the pump valve, so fuel can be dispense to the vehicle.
Four types of tags are recognized:
* Driver's tag: this tag is used to identify a specific driver. Therefore, fuel dispensing is allowed only after the vehicle has been identified by means of its Vehicle Identification Unit (VIU).
* Vehicle's tag: this tag is used to authorize fuel dispensing and charging.
* Attendant's tag: permits operation of any fuel nozzle from the TR, by a station attendant.
* Technician tag: this tag is used to setup TR RS-485 address, as explained in para. 1-3.4.

Figure 1-2. MiFare Tag, General view

1-3.2.2. Magnetic Stripe Fuel Cards

If the TR is equipped with an optional magnetic card reader, at the right-hand side of the unit, the driver can use a magnetic stripe card.

A magnetic stripe card is a type of card capable of storing data. The magnetic stripe is read by physical contact and swiping past a reading head.

The driver may have a vehicle fuel card or personal driver card.

1-3.2.3. Payment Contact Less Cards (optional)

Payment contactless cards such as the PayPass® cards enable the driver to pay using a standard credit or debit card which has contact less capabilities.

This allows the home-base station to be semi-public and accept payment from occasional customers and process the transaction through the bank or local processing network.

TR has an optional PayPass reader to support these types of cards

1-3.3. *Serial Communication Interface*

The TR has a balanced bidirectional RS-485 communication interface, which connects to the CFN PLUS of the gas station or tanker truck.
This interface is used to communicate with the station controller.

The power and communication cable has five wires: two power supply wires, two wires for the communication interface and one Ground Wire (see
Figure 1-3).

Wire Color	Functional Description
Green	Power (+)
White	Power (-)
Red	RS-485 (+)
Black	RS-485 (-)
Shield	Shield
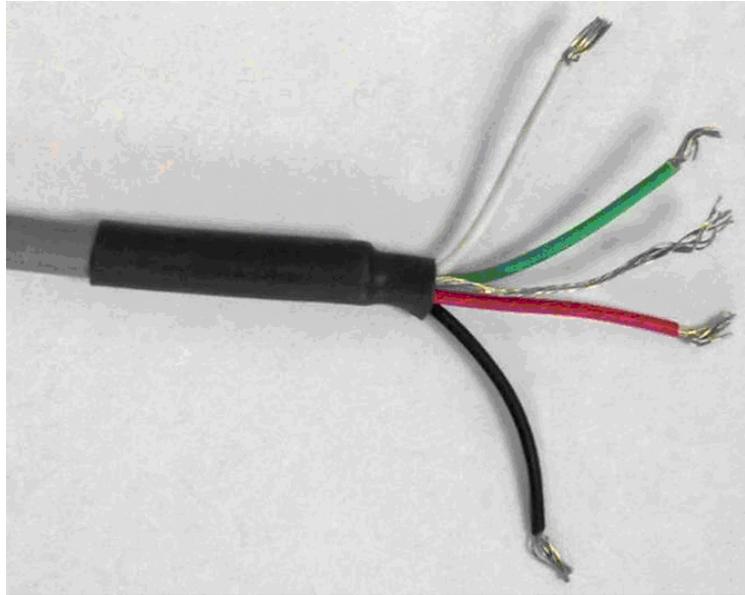
Figure 1-3 Tag Reader. Power and Communication Cable

The same interface can be used for maintenance purposes, e.g., to download software updates, configure various parameters, select the RS-485 communication address, etc. For such purposes,

1-3.4. *Assigning Tag Reader RS-485 Address*

1-3.5. *Assigning TR RS-485 Address*

To enable communication with the station controller, the TR must be assigned a unique RS-485 address. This address must be selected by the system operator, during the planning stages of the system installation or upgrading.
The RS-485 address of the TR can be programmed in two ways:

- Contact less mode: the address is selected using the Technician tag. The selection is performed using a simple interactive process: The Technician tag is brought close to be read by the TR, which then starts sequentially displaying the addresses in the allowed range. When the prescribed address is displayed, the Technician tag is removed.
- By a PC directly connected to TR RS-485 interface.

1-4. *POWER SUPLY*

The TR requires 12 to 24 VDC power input. Power can be provided by the CFN PLUS or an external power supply. If an external power supply is used, it should be approved in accordance with local regulations.

In North America, use a NEC Class 2 power supply, low voltage and low current [maximum 100 VA even under fault conditions]. The adaptor can be installed in the office, in the installation pole or pedestal, or in a separate box.

The TR is provided with DC connection cables protruding from the rear panel for easy connection.

> **NOTE**
>
> If the power supply is installed far from the TR box, make sure the TR receives a correct voltage! There may be a power failure on the lines!

1-5. *HOUSING*

The Tag Reader system enclosure is made of rugged plastic, in the form of a small box. The enclosure is weather-proof in order to sustain the harsh environment of a Home Base Station. The devices in its front panel are sealed to prevent humidity and dust penetration.

1-6. *SPECIFICATIONS*

1-6.1. *Operational*

- User Interface –   Alphanumeric LCD
                              Dual-LED green and red indicators
                              Piezoelectric speaker
  Readers -   Contactless MiFare reader
  Magnetic card reader (optional)
  Payment contactless cards reader (optional)
- Display Type –   Backlit alphanumeric LCD with 5×7 dot matrix display units
- Display Size –   2 rows of 16 characters each

1-6.2. *Communication Interface*

- RS- 485

1-6.3. *Physical*

- Height –   140 mm (5.1 in.)
- Width –   210 mm (8.3 in.)
- Depth –   38 mm (1.5 in.)
- Weight –   480 gram (1.1 lb.)

 (see Figure 1-4).

1-6.4. *Power*

- Operating voltage -   12 - 24 V DC.

- Operating current -　　　0.5 A
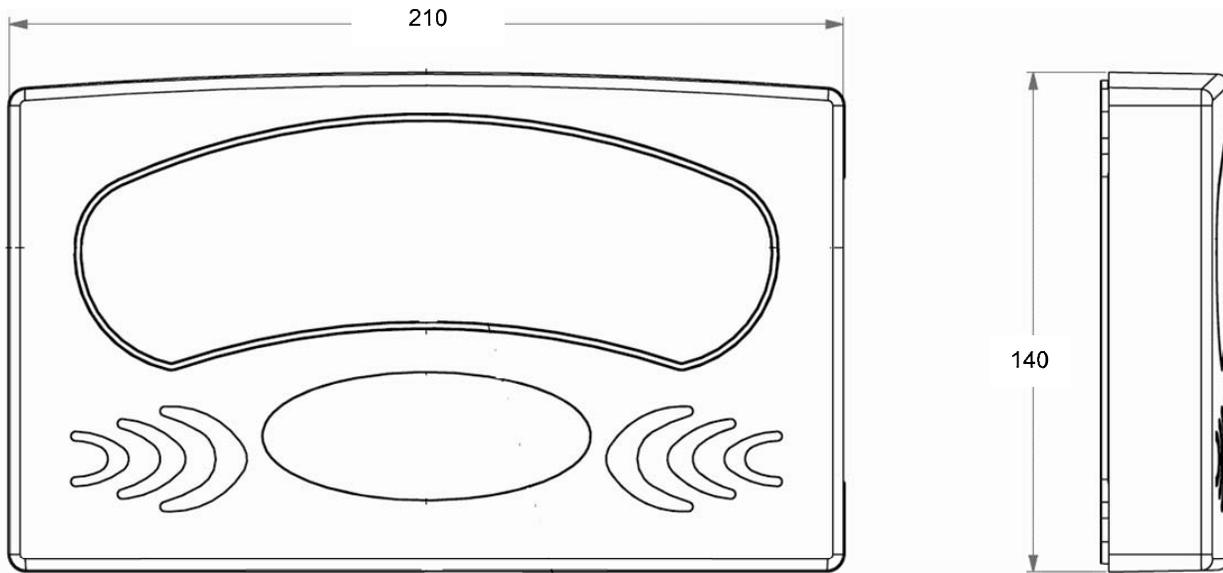
Figure 1-4. Tag Reader – Dimensions

1-6.5. *Environmental*

- Operating temperature :　　-40 - +70 °C (-40 – 158 °F)
- Storage temperature :　　-40 - +70 °C (-40 – 158 °F)
- Humidity –　　　　　　95% RH
- Degrees of Protection -　　IP66

1-7.　TYPES

The TR can be obtained in several contact less models, in accordance with the functional options:

- Contactless readers: MiFare, or PayPass

- Connectivity: RS485

- With or without magnetic card reader

1-8. *STANDARDS*

1-8.1. *Communication Standard*

The Tag Reader communicates, in its different models, over the following standard:

- RS-485 link

1-8.2. *Security Standards*

Tag Reader has a Security Authentication Module (SAM) used to decrypt the card/tag data.

1-9. *MANUAL STRUCTURE*

This manual comprises of the following sections:

Section 1: General Description

This section provides a general description of the Tag Reader system.

Section 2: Installation Procedures

This section provides the preliminary installation requirements and procedures to be performed before installing Tag Reader.

Section 3: Maintenance and Troubleshooting

This section provides basic troubleshooting procedures for the Tag Reader.

1-10. *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.

SECTION 2
INSTALLATION

2-1. *GENERAL*

This section provides installation and configuration instructions for the Tag Reader, and instructions for solving problems that may occur during installation and operation

The Tag Reader is designed to be installed in a non hazardous location in the station or tanker truck in both indoors and outdoors installation. The Tag Reader is intended for installation outside the associated fuel pump, on the side accessible to the customer (at an area defined as safe area).

The Tag Reader is designed to be installed in a non hazardous location in the station.

Three installation alternatives are available:

1. Installation on a wall or pole

2. Together with the CFN PLUS station controller. See Figure 2-3 for instructions.

3. In fueling trucks, as part of the TC solution

Figure 2-1 – Tag Reader beneath CFN PLUS

2-2. TOOLS AND ACCESSORIES

Tag Reader can be provided with an installation kit for the Tag Reader, which includes a rubber seal, P/N 8149-27400, and four M4 × 20 screws, P/N 8152-03120, with spring washers.

No special tools are required for installing the Tag Reader. Make sure you have 4 mm, 4.4 mm and 5mm drill bits.

2-3. LOCATIONS

The Tag Reader can be installed in several Unclassified/Non-Hazardous Locations:

- Attached to a station controller box (CFN PLUS) and Over Class 1 Division 2 Group D
- Attached to a Tanker Truck controller box and Over Class 1 Division 2 Group D
- On a pole or wall mounted close to the station dispensers.
- Connected to the station controller box (CFN PLUS) in the station office or in any other non-explosive environment.
- If no suitable walls or poles are available, the Tag Reader can be installed on a dedicated pole. In that case, setting the pole in the island must comply with the UL/EU or any local regulations requirements such as cementing the pole to the island floor, laying cables and keeping the Tag Reader Box outside Class I zone, as described in paragraph 2-4.

- Inside the driver compartment of a tanker truck

☞
| **NOTE** |
| Maximum distance of the RS-485 communication line between Tag Reader and Controller box is 330 feet (100m). |

More than one Tag Reader can be mounted in one station for improved service. In this case all Tag Readers shall be connected to the same, single CFN PLUS via RS-485.

The preferred installation method depends on the layout and configuration of the gas station. Any of the above selected methods must comply with UL and EU requirements.

☞
| **CAUTION** |
| The Tag Reader must NOT be installed on the dispenser or in any other hazardous environment. |

2-4. SAFETY LIMITATIONS

Due to safety requirements, the Tag Reader box can be installed *only* in non-hazardous areas/ non-classified area. Hazardous areas are shown in grey in the control drawing (see Figure 2-2). Therefore, the Tag Reader must be installed within the following boundaries:

1. Above 18" (0.5 meter) from the island floor
2. At least 18" (0.5 meter) away from the dispenser

Figure 2-2 shows various possible installation locations for the Tag Reader Box.
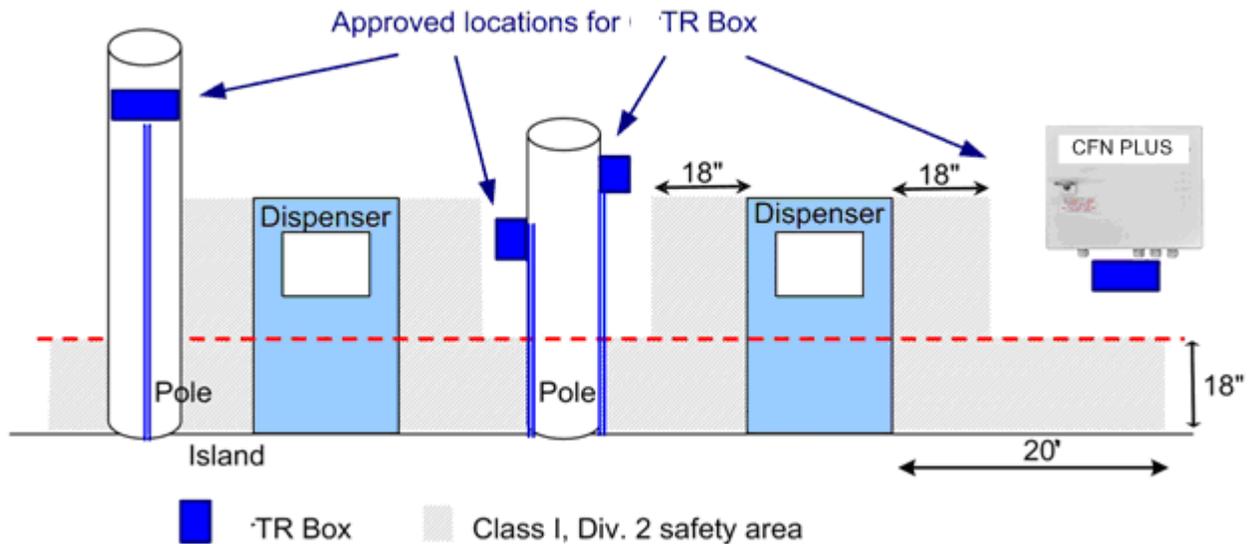
Figure 2-2. Tag Reader, Outdoor Installation Control Drawing

2-5.   INSTALLATION INSTRUCTIONS

2-5.1. *Preparation*

The Tag Reader is fastened by means of four M4 × 16 screws to the mounting surface or flange. The fastening screws pass through holes in the bottom plate of the Tag Reader. In addition, a 0.474" hole is required to pass the connection cable. The Tag Reader support flange is provided with holes suitable for attaching the Tag Reader to it. Figure 2-3 shows the drilling marking template for the Tag Reader.
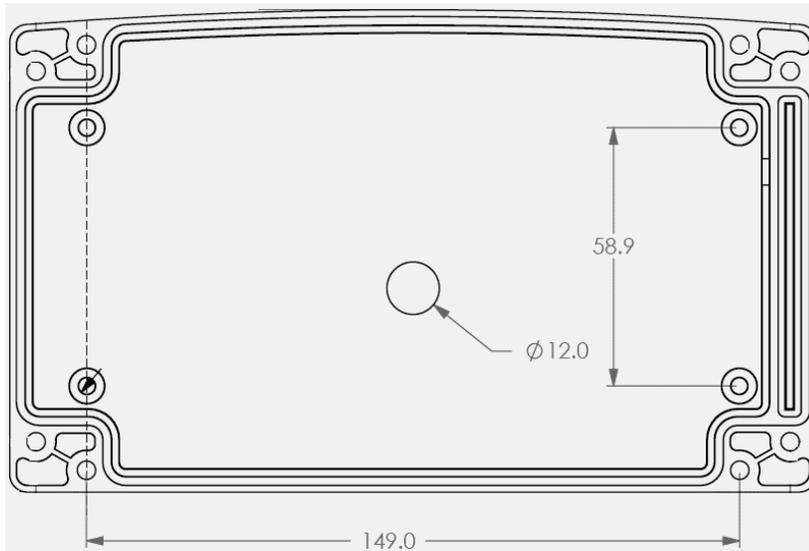
Figure 2-3. Tag Reader Installation Holes, Internal View

2-5.2. *General Instructions*

The following paragraph provides step by step instructions for installation of the Tag Reader box.

1. Install the Tag Reader in a non-hazardous area in accordance with Figure 2-2.

2. Install the Tag Reader at a height suitable for LCD screen reading by an average driver.

3. Link the Tag Reader to the Controller (CFN PLUS, Islander Plus, Fuel Truck Controller or other) with the RS-485 wires.

4. Connect Tag Reader to power supply

5. The installation procedures must meet all safety regulations in accordance with local state regulations.

2-5.3. *Mechanical Installation*

In this configuration, the Tag Reader is installed on a pole or a wall. Proceed as follows:

1. Verify that the Tag Reader support flange is provided with holes suitable for attaching the Tag Reader to it (see Figure 2-3)

2. Remove the four M4 x16 screws at the rear panel attaching the rear panel (see Figure 2-4)

3. Remove the Grommet cap at the center of rear panel and pull out cable from the Tag Reader

4. Insert the free end of the Tag Reader cable through the 12 mm hole, and then place the Tag Reader rear (with the rubber seal) in the prescribed position on the support flange

5. Attach the unit using four M4 x16 screws from the rear side

6. Install the Tag Reader with support flange to the installation site: Smooth flat surface/Pole/ Dedicated Pole/CFN PLUS (with special flange)

7. Secure the Tag Reader support flange at installation location using the appropriate screws, spring washers and flat washers. Make sure the rubber seal remains properly seated under the Tag Reader base.

8. In case of installation to the CFN PLUS, attach a special flange to CFN PLUS lower plate with two appropriate screws

9. Proceed with the wiring connections (paragraph 2-5.4).
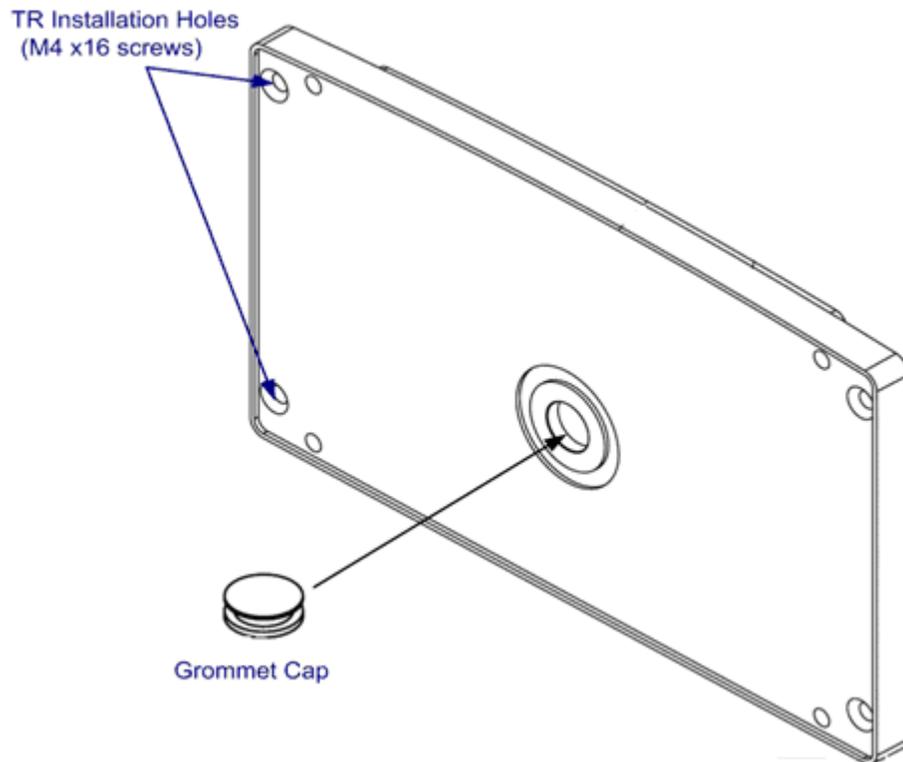
Figure 2-4. Tag Reader Installation Holes and Grommet Cap, Rear View

2-5.4. *Wiring*

The Tag Reader is equipped with a single cable carrying the Power and Serial Communication cable. The Tag Reader requires power input and data input/output connections. The RS-485 wires should be connected to the appropriate CFN PLUS serial communication ports. The cables must be inserted through dedicated conduits that comply with UL/EU regulations and any other local regulations. The cables enter the CFN PLUS from the sealing glands that ensure the box sealing.

Proceed as follows:

1. Remove appropriate length of cable coating for connection to power supply and RS-485 ports

2. Connect the Tag Reader power wires to a 12-24 VDC (stabilized), 500 mA (minimum) power supply or to CFN PLUS DC connection ports

3. Connect Tag Reader serial communication wires to the CFN PLUS RS-485 ports

4. Connect coax (shield) wire of RS-485 cable to Ground inside CFN PLUS

5. When installing cables into CFN PLUS Controller, do not damage unit sealing (IP66 protection)

6. Verify that Tag Reader is powered on.
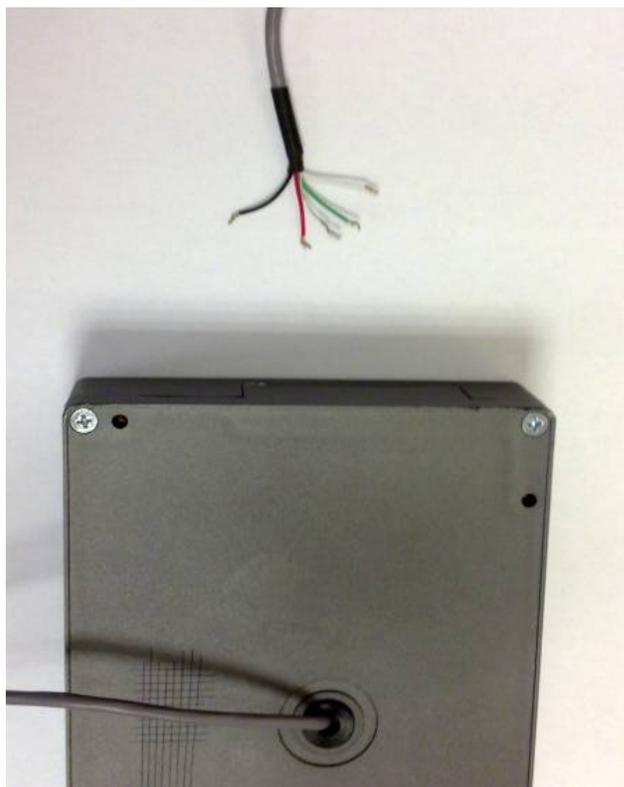
Figure 2-5. Tag Reader with Cables

2-5.5. *Post-Installation Checks and Programming of Tag Reader Address*

Proceed as follows:

1. Restart the CFN PLUS

2. Monitor the power-up indications provided by the Tag Reader:

   - Check that the green ✓ and red ✖ indicators turn on for a few seconds and then turn off.

   - Check that a single beep is heard.

   - Check that the LCD displays Tag Reader software version, followed by the welcome message.

   ```
   WELCOME! PLEASE
   PRESENT TAG
   ```

3. Observe the default OrTR address as displayed on the screen as the device is powered-up, and then set the new OrTR address using the Host ORPT application, as follows:

   a. Connect a PC on which the Host OrPT application was previously installed to OrTR RS-485 connector via 8-Port Commverter or any other RS-485/RS-232 convertor

   b. Run the Host OrPT application. The following screen is displayed (see Figure 2-6):
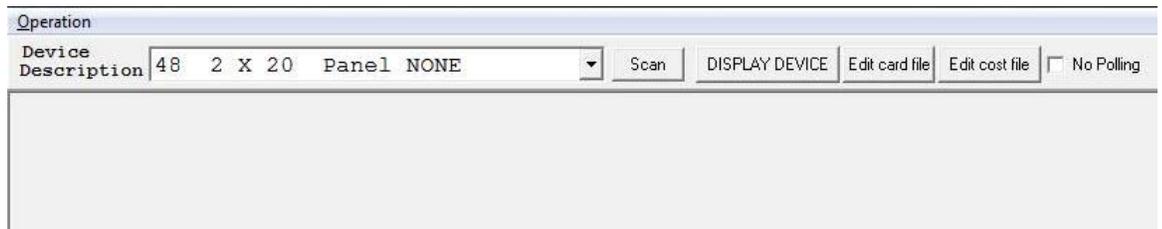
Figure 2-6. Host OrPT Main Screen

   c. Click on the **Scan** button. The Scan/Set New Address dialog box appears (see Figure 2-7)
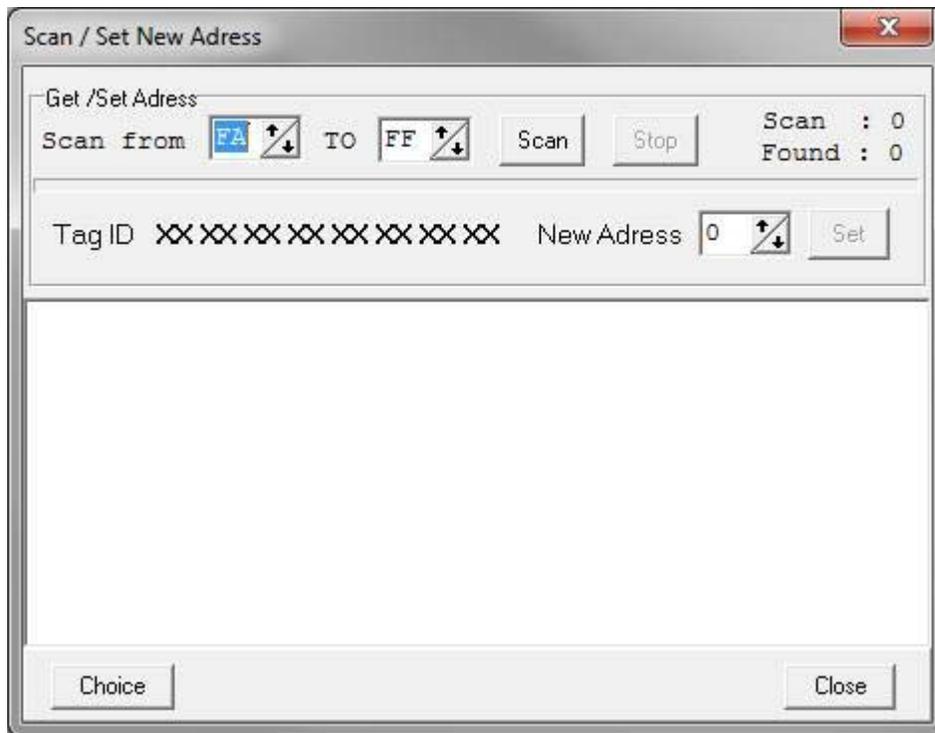
Figure 2-7. Scan/Set New Address Dialog Box

d. Enter the address range to be scanned using the **Scan From** and **To** spin boxes and then click on the **Scan** button

e. The application displays all the allowed addresses in ascending order on the bottom of the screen

f. Click on the required address and then click **Choice**

g. The selected address in displayed on the **New Address** spin box. Click **Set** to assign the new address to the device

h. Click **Close** to exit the dialog box

i. Click **Exit** on the OrPT Host Main Screen to close the application

The OrTR is now ready for use.

SECTION 3
USING TAG READER

3-1. *GENERAL*

This section provides a description of the customer's interaction with the Tag Reader.

👉
NOTES
The following messages are usually displayed. However, they may be changed at the setup of the Station Controller

For a regular Fuel Dispensing procedure, proceed as follows:

1. When ready for service, the Tag Reader displays a welcome message, and its two indicators, green ✓ and red ✗, are both off.

```
WELCOME! PLEASE
PRESENT TAG
```

2. A customer wishing to start fuel dispensing needs to bring his tag/card near the "tap" icon on the Tag Reader, as shown in Figure 3-1.

Figure 3-1. Starting Fuel Dispensing

3. The two Tag Reader indicators, green ✓ and red ✖, flash for a few seconds to indicate that it reads the tag/card, a beep is heard, and the customer sees a notification message:

```
READING TAG
PLEASE WAIT
```

4. After the tag/card is successfully read, only the green ✓ indicator continues to flash. The Tag Reader waits for a confirmation or rejection message from the station controller, and notifies the customer to wait:

```
TAG OK
PLEASE WAIT
```

5. After tag/card OK is displayed, the customer can remove the tag/card.

6. If everything is OK, the station controller confirms the transaction within 10 seconds. The green ✓ indicator turns on (or flashes) and the customer is notified to start refueling:

```
PLEASE
REFUEL
```

7. After refueling is ended by returning the refueling nozzle to its cradle, the customer see the following message:

```
THANK YOU
AND COME AGAIN
```

3-2. *ERROR CONDITIONS*

In case an error occurs after the customer starts a refueling in accordance with para. 3-1, the red ✖ indicator turns on (or starts flashing) and a beep is heard. The cause of the error is displayed on the LCD.

- Error during the reading of information from the tag or card. In this case, after step 3 the following message is displayed: In this case, the customer should wait until the welcome message appears, and bring again the tag/card close to Tag Reader.
In case the problem occurs again, the customer should contact one of the station attendants.

```
READING TAG
ERROR
```

- The tag/card is rejected by the station controller. In this case, after step 5 the following message is displayed: In this case, the customer should contact one of the station attendants.

```
SORRY YOUR TAG
WAS NOT ACCEPTED
```

SECTION 4
MAINTENANCE

4-1. *GENERAL*

This section provides general maintenance and troubleshooting instructions for the Tag Reader.

4-2. *CLEANING*

4-2.1. *General*

The Tag Reader 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.

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

4-2.2. *Cleaning Instructions*

The Tag Reader should be cleaned periodically, preferably once every two (2) weeks, in order to ensure proper operation. The cleaning purpose is to remove any dust or foreign body that may harm the reader and consequently prevent the completion of a sale.

Proceed as follows:

- Clean the Tag Reader with a damp cloth only.

4-3. TROUBLESHOOTING

Table 4-1 lists the recommended procedures for troubleshooting the Tag Reader.

Table 4-1. Tag Reader, Troubleshooting Procedures			
No.	*Symptom*	*Troubleshooting Procedure*	*Recommended Action*
1	Display is off	Check DC Voltage power supply output	Replace DC Voltage power supply
		Check the proper connection between the Power Supply and Tag Reader	Wire the unit anew.
2	No communication between Tag Reader and the controller	Check RS-485 and CAT-5E cables connection between Tag Reader and controller	Replace Tag Reader
3	LEDs are not operating	Check DC Voltage power supply output	Replace DC Voltage power supply