*Fore***Fuel**

Vehicle Units Manual

ORPAK

FUELING YOUR BUSINESS FOR SUCCESS

SAFETY CONSIDERATIONS

Carefully read all warnings and instructions, provided to help you install and maintain the equipment safely in the highly flammable environment of a gas station.

Disregarding these warnings and instructions could result in serious injury and property loss or damage.

It is your responsibility to install, operate and maintain the equipment according to the instructions 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.

Ensure that the installation is performed by experienced personnel, licensed to perform work in gas stations and in flammable environments, according to the local regulations and all relevant standards.

WARNING - EXPLOSION HAZARD

Use a separate conduit for intrinsically safe wiring. Do not run any other wires or cables through this conduit, since it may lead to 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.

Installation and service must 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 equipment. Always disconnect power before working on the equipment. The equipment may have more than one power supply connection point. Disconnect all power before servicing.

WARNING – PASSING VEHICLES

When working in an open area, block off the work area to protect yourself and other persons. Use safety cones or other signaling devices.

WARNING

Substitutions of components could impair intrinsic safety. Use of unauthorized components or equipment will void all warranties associated with this equipment.

CAUTION

Do not attempt to make any repair on the printed circuit boards that reside in the equipment, as this will void all warranties associated with this equipment.

FCC COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B & C 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:

» Reorient or relocate the receiving antenna

» Increase the separation between the equipment and receiver

» Connect the equipment to an outlet on a circuit different from that to which the receive is connected

» Consult an authorized dealer or service representative for help

FCC WARNING

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

FCC Radio Frequency Exposure Statement

The device has been evaluated to meet general RF exposure requirements. The device can be used in fixed/mobile exposure conditions.
The min separation distance is 20cm.

IC RF Statement

When using the product, maintain 20cm from the body to ensure compliance with RF exposure requirements.

Lors de l'utilisation du produit, maintenez une distance de 20 cm du corps afin de vous conformer aux exigences en matière d'exposition RF.

CE RF exposure information

The Maximum Permissible Exposure (MPE) level has been calculated based on a distance of d=20 cm between the device and the human body. To maintain compliance with RF exposure requirement, use product that maintain a 20cm distance between the device and human body.

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Section 1 Introduction

1.1. General

This manual is intended to assist the user in installing and programming ForeFuel's Automatic Vehicle Identification (AVI). This manual includes a general and functional description of the vehicle units, their main components, and installation requirements. The installation guidelines in this manual are for qualified and authorized installers and / or technicians of all ForeFuel vehicle units and components. All types of vehicle ID and data units must be installed as described in this manual to ensure optimal system reliability and proper operation.

1.2. Solution Description

ForeFuel is an Automatic Vehicle Identification (AVI) RFID fueling solution enabling fast refueling with no need for cash, card, or coupon payment – enhancing loyalty and allowing self-service refueling. ForeFuel ensures that fuel is being dispensed solely to the authorized vehicle whose account should be charged. Removing the nozzle and trying to fuel another vehicle immediately suspends RFID fueling activity.

The following describes the ForeFuel fueling process:

» Once a vehicle arrives at the station, the Vehicle Data Unit transmits the vehicle's data to the Wireless Network Gateway (WGT), including:

   » Odometer / mileage

   » Engine hours

» When a fueling nozzle is inserted into the authorized vehicle's fuel inlet, the nano Nozzle Reader unit reads encrypted data from the Vehicle Identification Unit's and sends it to the WGT

» The WGT then combines both Vehicle ID and Data and sends it to the Station Controller. ForeFuel is designed for full integration with Orpak's Controller as well as with other leading forecourt automation providers' POS / SC

» The Station Controller sends a request to the Authorization Server, which returns approval, balance, and restrictions (if any)

» Once approved, the pump is opened. All of this happens within seconds and with no human intervention

» The system monitors the entire fueling session, and if the nozzle is removed the pump is automatically stopped so that refueling continues only when the nozzle is put back into the same car

1.3. System Architecture

Figure 1-1 displays a diagram of Orpak's ForeFuel system architecture:
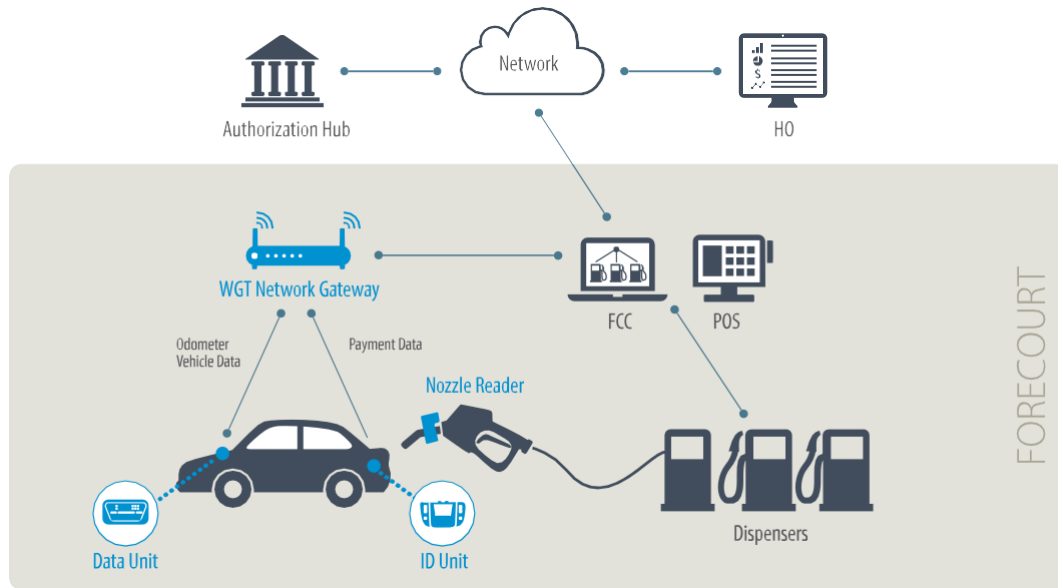
Figure 1-1 - System Architecture

1.4. Solution Components

» **Vehicle Identification Units**: consist of a secure chip which includes encrypted identification and payment information, as well as a tamper-resistant mechanism. The following types of vehicle identification units are available:

  » **NanOpass**: contains an RFID chip and antenna in one compact unit

  » **FuelOpass**: a vehicle ID device mostly installed in heavy vehicles with a variety of ring types to suit any vehicle

» **Vehicle Data Units**: compact units that connect to the vehicle's on-board computer and transmit encrypted data. The following types of data units are available:

  » **µDataPass**: connects to the vehicle's on-board diagnostics OBD-II, and is designed for both light and commercial vehicles

  » **µDataPass Sense**: contactless connection to the vehicle's on-board diagnostic OBD-II, which passively reads information from the vehicle's CAN bus without any physical electrical connections

  » **DataPass**: connects to the vehicle bus and is designed for heavy vehicles including trucks

  » **DataPass Sense Probe**: an add-on to the DataPass unit which passively reads information from the vehicle's CAN bus without any physical electrical connections

  » **DataPass Sense**: an integrated all-in-one contactless unit (DataPass and DataPass Sense Probe) for light and commercial vehicles

» **WGT**: The Wireless Network Gateway covers the forecourt, securely forwarding data to the Station Controller, with its mesh topology, robust, and reliable network ensuring highest availability and strong resistance to interferences

» **nano Nozzle Reader**: reads ForeFuel's ID units using contactless technology and uploads the encrypted data over the wireless mesh network to the station's automation systems for refueling authorization.

1.5. Manual Structure

Section 1: Introduction

This section provides a general description of the system.

Section 2: Vehicle Identification Units

This section provides a description of the vehicle identification units as well as installation guidelines.

Section 3: Vehicle Data Units

This section provides a description of the vehicle data units as well as installation guidelines.

Section 4: Programming Vehicle Units

This section provides a description of the Wireless Programmer Units as well as installation guidelines.

Section 5: Troubleshooting

This section provides a description of possible issues related to the vehicle units, or to their communication with the ForeFuel system, as well as corrective actions.

1.6. References

For installation and setup of station-side equipment, please refer to ForeFuel Station Equipment Manual, P/N 817439320.

1.7. Documentation Conventions

This manual uses the following conventions:

Warning notes contain information that, unless strictly observed, could result in injury or loss of life.

Caution notes contain information that, unless strictly observed, could result in damage or destruction of the equipment or long-term health hazards to personnel.

Notes contain helpful comments or references to material not covered in the manual.

Best practice notes contain helpful suggestions.

Example notes contain additional information to illustrate a concept / procedure.

Section 2 Vehicle Identification Units

2.1. General

This section provides a description of the vehicle identification units as well as installation guidelines.

ForeFuel's Vehicle ID units consist of a secure chip, which includes high-level encrypted identification and payment information.

There are two kinds of vehicle ID units available:

» NanOpass: is a passive vehicle identification tag featuring a Radio Frequency Identification (RFID) chip and an antenna in one compact unit

» FuelOpass: is a passive vehicle identification tag which consists of a circular antenna and an ID chip

The following tables detail installation kits for NanOpass and FuelOpass:

Table 2-1 - NanOpass and FuelOpass Kit Descriptions

Kit P/N	P/N	Description	QT.
818905539	**100 x NanOpass Glue Set for Light & Heavy Installation**		
	818005500	Acceler. Aerosol, Hyloglue 50ml	1
	818005300	Glue, Sicoment 77 20g	1
	818005400	Glue, Acrylic, Dual-Components	5
	818005910	Short Mixer for DP - 805, 10 PC	2
	815000300	3 mm metal drill	1
818905501	**Glue Set for Light Vehicles**		
	818002700	Acceler. Aerosol, Hyloglue 15ml	3
	818005300	Glue, Sicoment 77 20g	3
	818005400	Glue, Acrylic, Dual-Components	4
	818005910	Short Mixer for DP - 805, 10 PC	2
819005400	**100 FuelOpass & NanOpass Kit for Secure Installation in Heavy Vehicles, without glue**		
	814905500	Security Cover	100
	815202401	Screw, Self Drill 6 x 1" FLAT, 100 pcs.	2
	815207300	Screw, Security bolt M8 x 20 SST	100
	815305500	Washer, flat	100
	815805802	Nirosta wire, 25 pcs.	2
	815806001	Clamp coil holder, 100 pcs.	3
	815806400	Band lock tie, 7.9 x 482 mm	50
	815700701	Crimping Sleeves, 100 pcs.	2
	815801101	("5/16) Cable Clamp, Black, 100 pcs.	2
819005402	**100 FuelOpass Coil Clamp Set for Heavy Vehicles**		
	815805802	Nirosta wire, 25 pcs.	2
	815806000	Clamp coil holder, 100 pcs.	300
	815806400	Band lock tie, 7.9 x 482 mm	50
819005404	**1 FuelOpass Installation Kit for Heavy Vehicles, without glue**		
	813350000	Close End Wire Conn. CE-2	2

Kit P/N	P/N	Description	QT.
	814905500	FuelOpass Security Cover	1
	815202400	Screw, 6 x 1" Self Drill Flat HD	2
	815206900	Screw, Security Bolt, M8 x 20	1
	815305500	Washer, Flat, M8 / EXT = 20 mm / 1.2 mm	1
	815801000	Cable Clam, Black, 22CC37D0250	2
	815805801	1 x Loop, Nirosta Wire	1
	815806000	Clamp-Coil Holder (MOLDED)	3
	815806400	Band-Lok Tie BL213 (7.9 x 482 mm)	1
819005410	**1 FuelOpass Installation Kit for Heavy Vehicles, Nirosta**		
	814905550	Security Cover - FuelOpass, SST	1
	815207300	Screw, Security Bolt, M8 x 20 SST	1
	815305500	Washer, Flat, M8 / EXT = 20 mm / 1.2 mm	1
	815202400	Screw, 6 x 1" Self Drill Flat HD	2
	813350000	Close End Wire Conn. CE-2	2
	815801000	Cable Clam, Black, 22CC37D0250	2
	815805801	1 x Loop, Nirosta Wire	1
	815806000	Clamp-Coil Holder (MOLDED)	3
	815806400	Band-Lok Tie BL213 (7.9 x 482 mm)	1

> **Note**: To extend the shelf life for glues and accelerator, it is recommended to store the products at a temperature of 20° C or less. High temperature or direct sunlight dramatically reduces shelf life. For more details refer to manufacturer's instructions.

2.2. NanOpass

With its minute size and extreme ease of installation, the NanOpass has been designed for mass deployment as part of the ForeFuel vehicle identification and automatic refueling process solution. The tag is highly secure including a tamper-resistant feature which prevents unauthorized removal and disables the unit upon any attempt to remove it from the vehicle. NanOpass is compatible with all ForeFuel's nano Nozzle Reader units.

» The RFID tag data read by the nano Nozzle Reader is used for vehicle identification in the automatic refueling process

» NanOpass is typically installed next to the fuel inlet

Figure 2-1 - NanOpass Unit

2.2.1. Technical Specifications

The following table details the technical specifications for the NanOpass (see <u>Table 2-2</u>):

Table 2-2 - NanOpass - Technical Specifications

Parameter	Value
PHYSICAL	
Dimensions (H x W x D)	42 x 23 x 7.8 mm
Weight	8.1 grams
Ingress Protection	IP 67
ENVIRONMENTAL	
Operating temperature	-40°C to +80°C
Storage temperature	-40°C to +85°C
Humidity	95% (non - condensation)

2.2.2. NanOpass Installation Kit

The following table details the installation kit for 100 NanOpass units (see <u>Table 2-3</u>):

Table 2-3 - NanOpass Installation Kit (x100) - P/N 818905501

Description	QT.	P/N
Acceler. Aerosol, Hyloglue 50ml	1	818005500
Glue, Sicoment 77 20g	1	818005300
Glue, Acrylic, Dual-Components	5	818005400
Short Mixer for DP - 805, 10 PC	2	818005910
Gun, Glue, EPX 37/50, 3M	1	818005800
3 mm metal drill bit	1	815000300

2.2.3. Installing NanOpass in Light Vehicles

The following provides instructions for installing NanOpass in light vehicles.

2.2.3.1. Required Tools

To install NanOpass, you will need the following tools:

» A damp cloth
» 70% alcohol
» Installation kit
» Safety pin - comes with the NanOpass unit (optional)
» Drill (optional)

2.2.3.2. Installation Locations

Before installing the NanOpass, an optimal location should be chosen based on the shape of the vehicle's fuel compartment, according to the following guidelines.

Install the unit:

» on a flat surface next to the fuel inlet. A minimum surrounding area of 25 mm is required for installation
» perpendicular / orthogonal to the fuel inlet
» ensuring that the arrow points outwards of the vehicle
» at a location where it will not interfere with inserting the nozzle and the Nozzle Reader unit
» at a location where it will not interfere with closing the fuel compartment lid / inlet cap

> **Note**: If there isn't a suitable flat surface available for installation, you will have to install the unit vertically (see Figure 2-6).

The following provides the recommended locations for installing the NanOpass (see Figure 2-2):
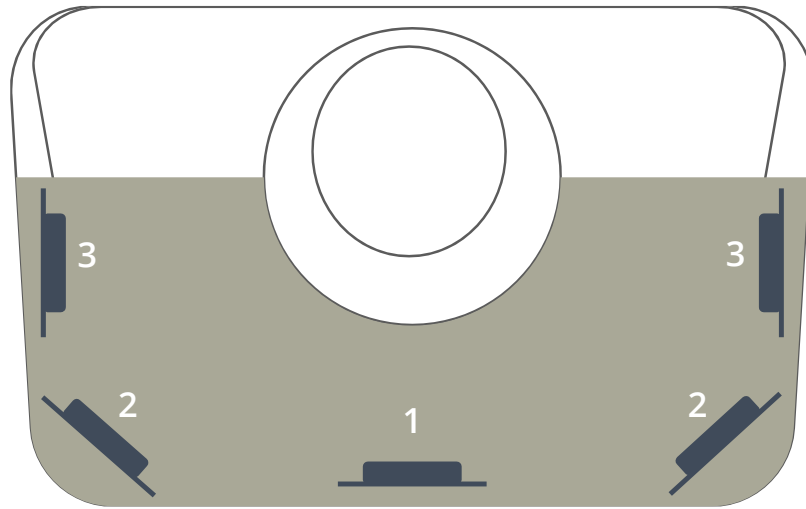
Figure 2-2 - Recommended Locations for Installing NanOpass

Try positioning the unit in the order above. Following are examples of these locations:

» At the bottom of the fuel compartment (see Figure 2-3)

Figure 2-3 - Position 1: NanOpass Installed on the Bottom of the Fuel Compartment

» At the side of the fuel compartment, in a corner (see Figure 2-4)

Figure 2-4 - Position 2: NanOpass Installed in a Corner at the Side of the Fuel Compartment

» At the side of the fuel compartment (see Figure 2-5)

Figure 2-5 - Position 3: NanOpass Installed at the Side of the Fuel Compartment

» If none of the above are possible, or the compartment is covered in rubber, install the unit behind the rubber gasket, perpendicular to the fuel filler hose (see Figure 2-6)

Figure 2-6 - Position 4: NanOpass Installed Behind the Rubber Gasket

> 👉 **Note**: When installed perpendicular to the fuel filler hose, the arrow should face inwards.

2.2.3.3. Verifying Location Using the RFID Tester

In order to confirm that the location of the NanOpass is optimal before fixing the unit, place the unit in the selected location and perform the following test with the RFID Tester, P/N 800960190.

1. Insert the RFID Tester nozzle into the fuel tank (see Figure 2-7)

Figure 2-7 - Inserting the FP Tester

2. Press the button on top of the unit (see <u>Figure 2-8</u>)

Figure 2-8 - Turning the FP Tester ON

3. The tester's LED light will turn on briefly to indicate the beginning of the test (see <u>Figure 2-9</u>)

Figure 2-9 - FP Tester LED Indication

The test results will be indicated in a couple of seconds. If the RFID Tester successfully read the NanOpass unit, the LED light will blink quickly for two seconds. In this case, you may proceed to the following section.

If the RFID Tester was unable to read the NanOpass unit, the LED light will turn on for a second. In this case, try placing the NanOpass unit in a better location based on the above guidelines and perform the test again.

2.2.3.4. Positioning DO's and DON'Ts

DO:

» Read entire manual before installing

DON'T:

» Install the unit on rubber

» Install the unit on the fuel compartment lid, or any location where the lid or fuel nozzle could interfere with the NanOpass unit

» Install the unit at a location where the fuel inlet is too curved. It may cause the NanOpass to bend

2.2.3.5. Installation Procedure

☞ **Note**: The installation must be carried out by a qualified and trained personnel.

Proceed as follows:

1. Clean the fuel compartment with 70% alcohol (see Figure 2-10)

Figure 2-10 - Cleaning the Fuel Compartment

2. (Optional) Clean with sand paper

☞ **Note**: In places with extremely low temperature, it is recommended to use the Accelerator Aerosol Hyloglue 50ml for the desired location of attaching the chip.

3. (Optional) For maximum protection, you may drill a 0.118" (3 mm) hole to insert the safety pin in (see Figure 2-11). If you choose not to drill a hole, proceed to step 5

Figure 2-11 - Drilling a Hole for Safety Pin

4. Peel off the adhesive tape cover from the ID chip (see Figure 2-12)

Figure 2-12 - Peeling off the adhesive tape cover

5. Attach the chip to the compartment. Press and apply pressure for a few seconds to ensure that the sticker is attached well (see Figure 2-13)

> **Notes**:
>
> » Please make sure not to touch the adhesive surface, and that the NanOpass isn't bent
>
> » If using the Safety Pin, align the hole in the sticker with the drilled hole

Figure 2-13 - Attaching the Chip

6.   (Optional, only if Step 3 was performed) Insert the safety pin in the drilled hole (see <u>Figure 2-14</u>)

Figure 2-14 - Inserting the Safety Pin

7.   Apply Holdtite ST3294 glue. Make sure that the glue covers the border and the area surrounding it, at least 2 mm around its outer surface (see <u>Figure 2-15</u>)

Figure 2-15 - Applying Glue

8. Set the unit down on the glue. Hold and apply pressure for a minute. The glue takes an hour to set, and up to 24 hours to completely dry (see Figure 2-16)

Figure 2-16 - Completing the Installation

9. To verify the success of the installation, you may repeat the test with the RFID Tester (see Verifying Location Using the RFID Tester)

2.2.3.6. Installation DO's and DON'Ts

DO:

» Read entire manual before installing

» Prepare all of the cars for installation before the glue is ready (since mixer dries after 30 seconds)

» Make sure that the glue mixer is open and mixed together

DON'T:

>> Break off the unit's wings

2.2.4. Installing NanOpass in Heavy Vehicles

In heavy vehicles, the NanOpass along with a coil can be installed in place of an identification chip.

In these cases, the NanOpass serves solely as an identification chip.

For installation guidelines, see NanOpass Chip Installation.

2.3. FuelOpass

The FuelOpass is read by ForeFuel's nano Nozzle Reader using RFID contactless technology, and provides high-level data encryption. There is a variety of FuelOpass rings to suit any fuel inlet size - from light to heavy vehicles. Similar to the NanOpass, the FuelOpass has a patented tamper resistant mechanism to eliminate risk of theft. FuelOpass is compatible with all Orpak's nozzle readers.

>> FuelOpass includes a coil and an identification chip connected through a cable, so that the ID chip can be installed either in a concealed place inside a truck, or next to the fuel tank inlet in light vehicles

>> In order to achieve enhanced protection, it is recommended to install both the DataPass and the FuelOpass together in the same vehicle

Figure 2-17 - FuelOpass Unit

👉 **Note**: The distance between the coil and the ID chip must not exceed 39.37" - 1 M.

There are two types of installations for FuelOpass:

>> Installing FuelOpass in Light Vehicles
>> Installing FuelOpass in Heavy Vehicles

2.3.1. FuelOpass Components

The FuelOpass is comprised of two major parts (see Figure 2-18):

» **ID Chip**: a one-time programmed identification chip housed in a casting package to protect the unit from mechanical damages

» **Coil**: a uniquely designed coil made for ForeFuel vehicle installations
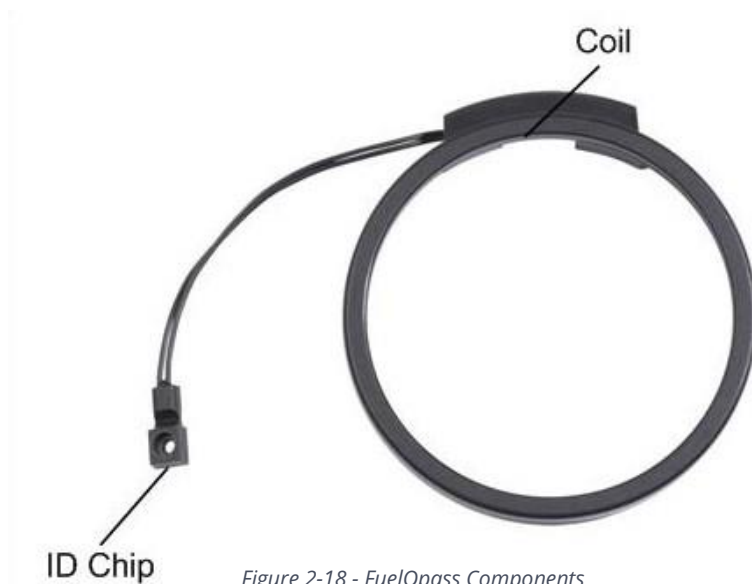
Figure 2-18 - FuelOpass Components

There are three types of FuelOpass ID Chips available (see Figure 2-19):

» Flexible Identification Chip

» Plastic Identification Chip (designed for heavy vehicles)

» NanOpass Identification Chip (designed for heavy vehicles)
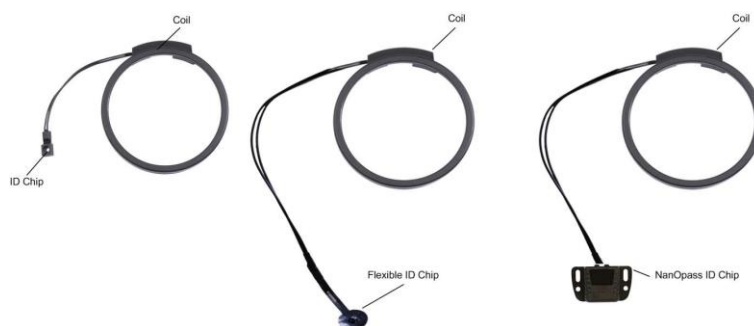
Figure 2-19 - Types of FuelOpass ID Chips

Table 2-4 - Types of FuelOpass ID Chips

Type	Part Number
Flexible case - FuelOpass	819205547
NanOpass - connects to the exterior ring (for heavy vehicles)	819205552
ID Chip - FuelOpass (for heavy vehicles)	819205553

2.3.1.1. FuelOpass Coils

In order to fit a wide range of fuel inlets for diverse vehicles, the following FuelOpass coils are available:

» Shaped Coil
» Self-Installed Coil
» Molded Coil
» Thin Molded "U" Coil
» Robust Coil
» Thin Coil
» "U" Coil

2.3.1.1.1. Shaped Coil

Designed to maintain a distance from metal surfaces, the Shaped coil includes an ID Chip Connector and three support legs which can be easily glued (see Figure 2-20, Table 2-5). The Shaped Coil is intended for use in cases where an easy connection to the FuelOpass ID Chip is required, mainly when the chip is close to the Nozzle Reader, e.g. private vehicles.

The Shaped Coil is connected to the ID Chip by plugging the chip's connector to the coil's connector.

Figure 2-20 - FuelOpass Shaped Coil

Table 2-5 - FuelOpass Shaped Coils

Description	Part Number
Shaped Molded Coil; 75 mm	816000001
Shaped Molded Coil; 85 mm	816000002
Shaped Molded Coil; 95 mm	816000003
ID chip	819205503

2.3.1.1.2. Self-Installed Coil

The Self-Installed coil is rubber coated and includes an internal rubber ring designed for installation in heavy or light vehicles that have short fuel inlet necks (see Figure 2-20, Table 2-6). The Self-Installed coil is well suited for heavy vehicles with short fuel inlet necks, or for vehicles where there is no way to fix the coil around the fuel neck. Additionally, it is intended to withstand harsh environments, such as: water, oil, dust, etc.

The FuelOpass ID chip connector should be cut in order to be connected to the coil's wires.

Figure 2-21 - FuelOpass Self-Installed Coil

Table 2-6 - FuelOpass Self- Installed Coils

Description	Part Number
Self-Installed Coil; 70 mm	816000030
Self-Installed Coil; 105 mm	816000032
Self-Installed Coil; 120 mm	816000033
Self-Installed Coil; 130 mm	816000034
ID Chip	819205503

2.3.1.1.3. Molded Coil

The Molded coil is widely installed in vehicles, and is approximately 7 mm thick (see Figure 2-22, Table 2-7).

Additionally, the Molded coil can slightly change its shape and is durable in water, oil, etc.

Figure 2-22 - FuelOpass Molded Coil

Table 2-7 - FuelOpass Molded Coils

Description	Part Number	Notes
Molded Coil; 55 mm	816000040	Cable length: 100 cm
Molded Coil; 80 mm	816000041	
Molded Coil; 90 mm	816000042	
Molded Coil; 95 mm	816000043	
Molded Coil; 110 mm	816000044	
Molded Coil; 120 mm	816000045	For heavy vehicles
Molded Coil; 130 mm	816000046	For heavy vehicles
Molded Coil; 145 mm	816000047	For heavy vehicles

2.3.1.1.4. Thin Molded "U" Coil

The Thin Molded "U" coil is identical to the Molded coil in its shape and flexibility, but its thickness is approximately 5 mm.

The Thin Molded "U" coil is intended for installations in vehicles that have a non-metallic surface, and a short fuel inlet to prevent the coil from interfering with closing the fuel compartment lid / inlet cap (see Figure 2-23, Table 2-8).

Figure 2-23 - FuelOpass Thin Molded "U" Coil

Table 2-8 - FuelOpass Thin Molded "U" Coils

Description	Part Number
Thin Molded "U" Coil; 60 mm	816106015
Thin Molded "U" Coil; 70 mm	816107015
Thin Molded "U" Coil; 80 mm	816108015
Thin Molded "U" Coil; 90 mm	816109015
Thin Molded "U" Coil; 100 mm	816110015
Thin Molded "U" Coil; 105 mm	816110515
Thin Molded "U" Coil; 110 mm	816111015
Thin Molded "U" Coil; 120 mm	816112015
Thin Molded "U" Coil; 130 mm	816113015

2.3.1.1.5. Robust Coil

The Robust coil is coated in hard plastic and includes metal support legs designed for welding the tag to metal surfaces. The Robust coil is designed to withstand harsh environments, and intended for use mainly with older models of Wiggins nozzles or in heavy moving devices (see Figure 2-24, Table 2-9).

Robust coil should be installed only when distance from the nano Nozzle Reader antenna is up to 4 cm.

Figure 2-24 - FuelOpass Robust Coil

Table 2-9 - FuelOpass Robust Coils

Description	Part Number	Notes
FuelOpass, Wiggins Loco, 125 x 183	819312660	
FuelOpass, Wiggins, 96 x 154	819312661	
FuelOpass, Wiggins Loco, 125 x 183	819312640	Includes ID Chip
FuelOpass, Wiggins, 96 x 154	819312641	Includes ID Chip
FuelOpass assembly, Locomotive 96 x 154 x 23	819312840	Includes the FuelOpass Chip and antenna inside. The coil is glued without screws and metal.

The ID Chips used with the Robust coil are detailed in the following table (see Table 2-10):

Table 2-10 - FuelOpass Robust Coil's ID Chips

Description	Part Number
FuelOpass, Wiggins Hex Bobbin	819322100
FuelOpass, Wiggins Round Bobbin	819322200
FuelOpass, Wiggins Hex Bobbin	819322160
FuelOpass, Wiggins Round Bobbin	819322260

2.3.1.1.6. Thin Coil

The Thin coil is a strip-coated coil, approximately 3 mm thick, and is not flexible (see Figure 2-25, Table 2-11). It is intended to provide a solution when no other coils could be installed, and in vehicles that have a non-metallic surface as well as a short fuel inlet to prevent the coil from interfering with closing the fuel compartment lid / inlet cap.

> 👉 **Note**: The Thin coil should never be installed on metal surfaces, bent, or stretched.

Figure 2-25 - FuelOpass Thin Coil

Table 2-11 - FuelOpass Thin Coils

Description	Part Number
Thin Coil; 58 mm	816000026
Thin Coil; 75 mm, Special	816000024
Thin Coil; 80 mm (145T), Special	816000022
Thin Coil; 105 mm	816000027
Thin Coil; 140 mm	816000028

2.3.1.1.7. "U" Coil

The "U" coil has the same shape as the Thin coil, and is approximately 5 mm thick (see Figure 2-26, Table 2-12).

It should be used in special cases where flexibility is needed, in vehicles that have a non-metallic surface and a short fuel inlet to prevent the coil from interfering with closing the fuel compartment lid / inlet cap.

Figure 2-26 - FuelOpass "U" Coil

Table 2-12 - FuelOpass"U" Coil

Description	Part Number	Notes
"U" Coil; 80 mm	816000020	Special for motorcycle

2.3.2. Technical Specifications

The following table details the technical specifications for FuelOpass (see Table 2-13):

Table 2-13 - FuelOpass - Technical Specifications

Parameter	Value
ENVIRONMENTAL	
Operating temperature	-40°C to +80°C
Storage temperature	-40°C to +85°C
Humidity	95% (non-condensation)
TECHNOLOGY	
Low Frequency (125KHz) RFID chip ISO 18000-2:2004	

2.3.3. Available Configurations

The following table details the available configurations for FuelOpass ID units (see Table 2-14):

Table 2-14 - Available Configurations for FuelOpass

Description	Part Number
FuelOpass - Homebase	819205591
FuelOpass - Retail	819205592

2.3.4. Installing FuelOpass in Light Vehicles

The installation procedure for FuelOpass in light vehicles includes installing the appropriate coil as well as the identification chip.

The following provides instructions for installing FuelOpass in light vehicles.

Two techniques are available for installing the FuelOpass coil unit:

» [Clamping the coil to the vehicle](#)
» [Gluing the bottom of the coil to the vehicle](#)

2.3.4.1. Preliminary Guidelines

Note: Warranty does not cover defects or damage caused by improper installation.

In order to prevent any possible hardships or issues during installation, please verify that:

1. The coil in use is larger than the fuel tank inlet to optimize coil assembly
2. The coil is kept away from any metal surfaces, maintaining an air gap of at least 5 mm
3. The coil and ID chip have a distance of up to 150 cm between them
4. The bottom legs of the plastic molded coil faces the surface of the vehicle
5. The installed coil will be placed as close as possible to the nano Nozzle Reader when the fueling nozzle is inserted into the inlet
6. The unit is handled carefully without applying mechanical or physical pressure on the identification chip. Improper handling of the unit could damage the unit and cause malfunction
7. The installation area complies according to an approved location
8. The coil is installed so that it does not interfere with closing the fuel compartment lid / inlet cap. In order to verify this, close the lid completely before performing the installation / gluing
9. **FuelOpass should be installed when the fuel tank lid is closed.**

2.3.4.2. Required Tools

To install FuelOpass, you will need the following tools:

» A damp cloth
» 70% alcohol
» Cutter
» Crimping tool
» Pair of pliers
» A drilling machine approved for hazardous environments

2.3.4.3. Installation Procedure

WARNING: Before installing or handling equipment, carefully read all of the warnings and precautions provided at the beginning of this manual.

Proceed as follows:

1. Ensure that the fuel tank inlet cap is closed
2. Use an optimal sized FuelOpass which can easily be placed around the fuel compartment inlet, and allows opening and closing the fuel compartment lid and inlet cap
3. Choose an optimal and secure position for the ID chip. In cases where the installation is performed near the fuel tank inlet, it is preferable to choose either the upper part of the compartment or at the sides, but not at the bottom, as the fuel nozzle may damage the ID chip when refueling. The surface must be flat for better gluing, and to ensure that the unit is not damaged by pressure applied during installation
4. Slightly sand the area where the ID chip is to be glued, using a soft sandpaper (e.g. #300). Pay attention not to damage the vehicle's paint
5. Thoroughly clean the surface where the coil and ID chip will be placed, using a clean cloth and 70% alcohol

2.3.4.3.1. Installing the Plastic ID Chip

The ID chip is installed with glue, and with the option of using a special screw which is also included in the kit.

Proceed as follows:

a. In the designated area, drill a 0.094" (2.4 mm) diameter hole. Be careful not to drill through the fuel tank. Upon drilling completion, make sure to clean the area before applying the glue (see Figure 2-27)

Figure 2-27 - Preferred Position for the ID Chip

b. Insert the one-way special screw into the ID chip (see Figure 2-28)

Figure 2-28 - Inserting the One-Way Screw

c. Apply instant glue to the back part of the ID chip (see Figure 2-29)

Figure 2-29 - Applying Glue to the ID Chip

d. Secure the screw to the position in the space prepared without applying too much pressure on the screw. Make sure to go through all the instructions in order to prevent malfunction

e. Spray instant glue accelerator - Activator, pronto, 60 ml (3M) around the glued area

> 👉 **Note**: When installing the Shaped coil, first connect the ID chip to the coil.

In order to prevent corrosion caused by humidity and accumulation of fluid in the installation area (shaped coil only), after connecting the coil to the ID chip, it is recommended to: seal the area of connection by applying dual component glue DP-805NS (3M), or neutral silicon on top of the connectors, such as P/N 818005000 – Terostat939, or Holdtite HNCS.

2.3.4.3.2. Installing the Flexible Identification Chip

Proceed as follows:

a. Clean the surface with a cloth dipped in 70% alcohol

b. Remove the adhesive label from the flexible ID chip while avoiding contact with the exposed surface

c. Attach the ID chip in a flat and clean surface in the compartment

d. Remove the protective adhesive label and attach the protective label on the flexible chip (see Figure 2-30)
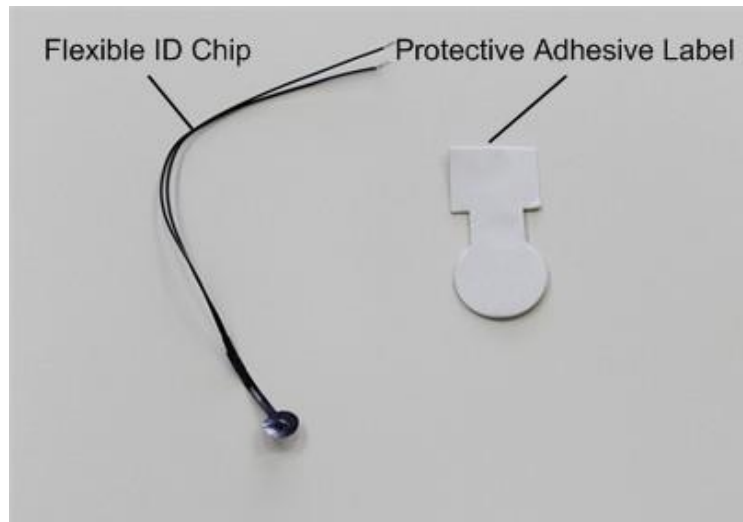
Figure 2-30 - Flexible ID Chip - Installation Kit Components

2.3.4.3.3. Installing the ID Chip inside the Trunk

To ensure maximum protection against theft and tampering, it is recommended to install the ID chip in a concealed place such as in the trunk. This procedure is also suggested for vehicles that plastic fuel compartment inlets.

Proceed as follows:

1. Drill a 0.094" (2.5 mm) hole inside the trunk near the fuel inlet, using a drilling machine approved for hazardous environments (see Figure 2-31)

Figure 2-31 - Drilling Inside the Trunk

2. Thoroughly clean the surface where the ID chip will be placed, using a clean cloth and 70% alcohol

3. Apply instant glue to the back part of the ID chip

4. Secure the screw to the position in the space prepared without applying too much pressure on the screw (see Figure 2-32)

Figure 2-32 - Securing the ID Chip

5. Spray instant glue accelerator - Activator, pronto, 60 ml (3M) around the glued area

6. Drill a 0.236" (6 mm) hole inside the trunk near the fuel inlet and thread the ID chip wires through the hole

7. Connect the ID chip to the coil's connector and seal the connector's area as described above

2.3.4.3.4. Securing the coil using clamps

Proceed as follows:

a. Place two clamps on the coil

b. Place the coil so that the coil's support legs are facing the metal surface and the cable extending from the coil faces the ID chip

c. Using two self-drilled screws, secure the clamps. Be very careful not to drill the fuel tank itself (see Figure 2-33)

Figure 2-33 - Securing the Clamps

2.3.4.3.5. Securing the Coil Using Glue

Proceed as follows:

a. Clean the surface to be glued

b. Apply a few drops of Cyanoacrylate adhesive (Super Glue) to the bottom of the coil's support legs

c. Place the coil so that the coil's support legs face the metal surface and the cable extending from the coil faces the ID chip

d. Hold for several seconds

e. While securing the coil, spray instant glue accelerator around the area.

f. To secure the unit against theft, apply Acrylic dual-components (epoxy glue) to the upper and lower part of the chip only (see Figure 2-34)
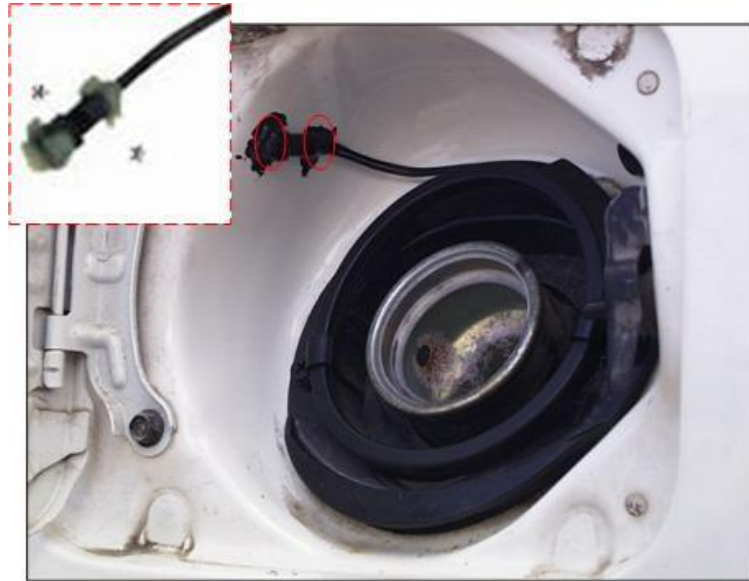
Figure 2-34 - Gluing the ID Chip

> 👉 **Note**: The installation guidelines detailed in this manual are general. In cases where there are specific guidelines for certain vehicle models, instructions should be fulfilled in addition to, or instead of, the detailed guidelines in the relevant sections of this manual.

2.3.5. Installing FuelOpass in Heavy Vehicles

In order to provide a solution for various fuel tank inlets in different truck models, the following options are available for installing the FuelOpass coils:

» [Long Fuel Inlet Installation](#)

» [Short Fuel Inlet Installation](#)

» ["Self-Installed" Coil Installation](#)

The following options are available for installing the FuelOpass ID chips:

» [Installing NanOpass](#)

» [Installing the chip with a security cover](#)

» [Installing the chip without a security cover](#)

The coil unit is placed around the fuel inlet. The coil should be installed using Orpak's molded FuelOpass clamps. These clamps are used in order to achieve the required distance from the fuel tank inlet and from the surface of the fuel tank for maximum performance.

2.3.5.1. Preliminary Guidelines

> ⚡ **WARNING**: Before installing or handling equipment, carefully read all of the warnings and precautions provided at the beginning of this manual.

> 👉 **Note**: Warranty does not cover defects or damage caused by improper installation.

In order to prevent any possible hardships or problems during installation, please verify that:

1. The coil used is larger than the fuel tank inlet's diameter by approximately 0.984" (25 mm)

2. The coil is assembled as close as possible to the fuel tank inlet's cap without interfering with opening and closing the fuel tank inlet cover

3. In cases where the security cover is used, the identification chip should be positioned as close as possible to the fuel inlet as well as a side wall in order to prevent any movement that could damage the ID chip or wiring

4. In order to prevent theft or tampering, the ID chip should be placed in a less accessible location

5. The ID chip is not secured to the fuel tank. The FuelOpass cable is long enough to allow the ID chip to be placed in a safe and hidden place inside the truck (distance of up to 100 cm between the coil and the ID chip is permitted)

6. The unit is handled and carefully while avoiding any physical or mechanical pressure on the chip. Improper handling could damage the unit and cause malfunction

7. In long neck installations, an additional metal band is tied under the installed coil to prevent the coil from sliding down as well as to guarantee additional safety.

2.3.5.2. Required Tools

To install FuelOpass, you will need the following tools:

» Cutter
» Crimping tool
» Pair of pliers
» Isolation tape
» 0.5" (13 mm) wrench key
» Soldering iron
» Soldering tin
» Pistol Grip Twister - 2002T3, P/N 815806200 (see Figure 2-35)
» CV Joint Banding tool and cutter, P/N 815806510 (see Figure 2-36)

Figure 2-35 - Pistol Grip Twister

Figure 2-36 - CV Joint Banding Tool and Cutter

2.3.5.3. Coil Installation

The three installation methods available for FuelOpass's coil installation are detailed below.

2.3.5.3.1. Long Fuel Inlet Installation Procedure

This installation method is implemented in fuel tanks where the fuel tank inlet protrudes sufficiently from the fuel tank surface. It makes use of vertical positioning of the molded coil clamps.

Proceed as follows:

1. Place an adequate number of clamps evenly around the coil (use three to five clamps per coil size). Make sure that the clamps are positioned vertically (see Figure 2-37)

Figure 2-37 - Positioning the Clamps

2. Remove the fuel inlet cover

3. Tighten the clamps to the fuel tank inlet using the stainless steel clamp band: insert the clamp band into the designated slots of the clamps. Fasten the metal band firmly to avoid future sliding of the FuelOpass using the joint banding tool and cutter (see Figure 2-38)

> **Note**: Before tightening the metal band, raise the coil as much as possible to bring it close to the fuel inlet (less than 3 cm) and verify that the coil does not interfere with the opening and closing of the fuel tank inlet cover.
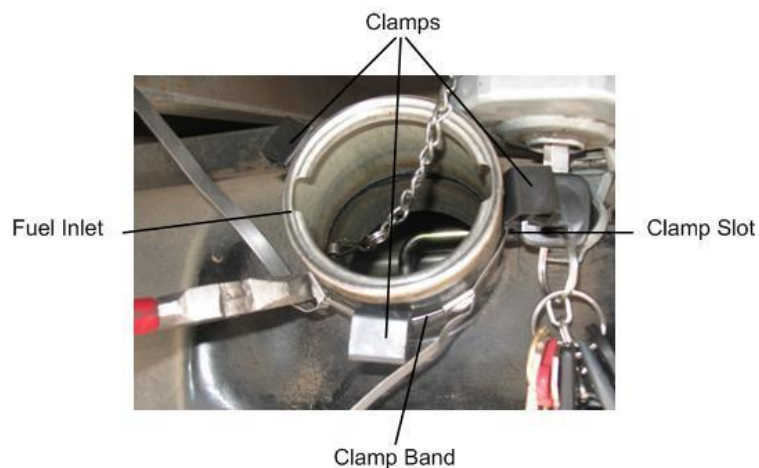
Figure 2-38 - Tightening the Clamps

4. Lock and tighten it, and then cut the edges using the CV Joint Banding Tool and cutter

5. Using a drilling machine or a pair of pliers, insert the provided conduit termination nipples at each side of the flexible conduit

6. Thread the coil wire through the flexible conduit

7. Verify that the cover can be properly closed upon completion of the installation. Then close the fuel inlet cover (see Figure 2-39)

Figure 2-39 - Complete Coil Installation in Long Neck Fuel Inlet

2.3.5.3.2. Short Fuel Inlet Installation

This installation is implemented in fuel tanks where the fuel tank inlet does not significantly protrude from the fuel tank surface. Thus, this installation is performed by positioning the molded coil clamps horizontally.

Proceed as follows:

1. Use an optimal sized FuelOpass that can easily be placed around the fuel tank inlet and allows opening and closing the fuel tank inlet cover (use a coil larger than the fuel tank inlet diameter by approximately 35 mm)

2. Insert a metal wire into the designated slots in the molded clamps. Use an adequate number of clamps in order to firmly position the coil around the fuel tank inlet (use three to five clamps according to the size of the coil). Make sure to position the clamps horizontally (see Figure 2-40)
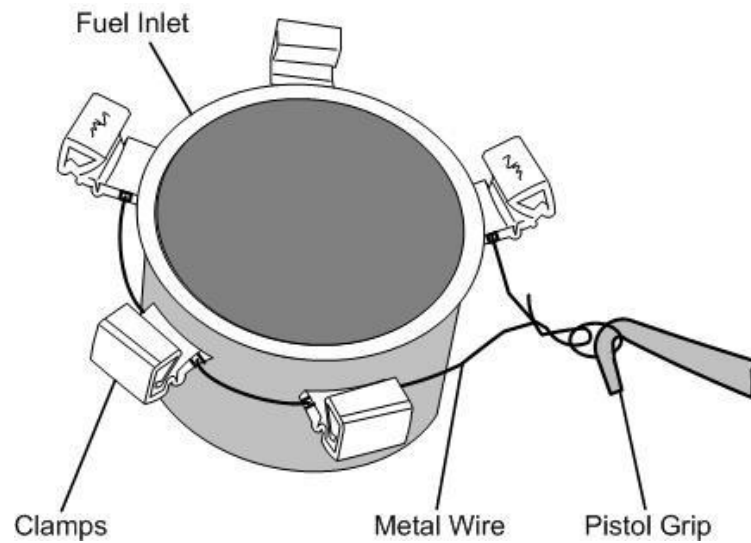
Figure 2-40 - Securing Clamps on the Short Neck Inlet

3. Using the pistol grip (or a pair of pliers), pull the metal wire and twist it until the molded coil clamps are firmly fastened to the truck's fuel tank inlet. Please note that tightening the metal wire too strongly may tear the molded coil clamps or wire, while fastening it too weakly may cause the coil to slide

> **Note**: Before tightening the metal band, raise the coil as much as possible to bring it close to the fuel inlet (less than 30 mm), and verify that the coil does not interfere with opening and closing the fuel tank inlet cover.

4. After tightening the metal wire, cut the excess wire using a cutter
5. Insert the coil into the molded clamps (see Figure 2-41)

Figure 2-41 - Complete Coil Installation in Short Neck Fuel Inlet

2.3.5.3.3. "Self-Installed" Coil Installation

This installation method is implemented in fuel tanks where the fuel tank inlet is very short or has no neck at all. The coil is equipped with a rubber membrane, which attaches the coil firmly to the fuel tank inlet using pressure.

Proceed as follows:

1. Use FuelOpass of an optimal size which can be easily placed around the fuel tank inlet and allows the opening and closing of the fuel tank inlet cover (use a coil larger than the fuel tank inlet diameter by approximately 25 mm)

> **Note**: Raise the coil as much as possible to bring it close to the fuel inlet (less than 30 mm), and verify that the coil does not interfere with opening and closing of the fuel tank inlet cover.

2. Install a metal band around the fuel tank inlet and underneath the coil to prevent the coil from sliding down
3. Install the coil on the fuel tank inlet applying pressure (see Figure 2-42)

Figure 2-42 - Complete Coil Installation in Self-Installation

2.3.5.4. ID Chip Installation

The three installation methods available for the FuelOpass ID chip are detailed below.

2.3.5.4.1. NanOpass Chip Installation

In order to install the NanOpass identification chip, proceed as follows:

1. Choose a flat and convenient surface for installation close to the fuel tank inlet where the NanOpass won't be vulnerable to damage
2. Position the drilling template on a surface

3. Mark three holes and drill three holes 3 mm in diameter (see Figure 2-43)
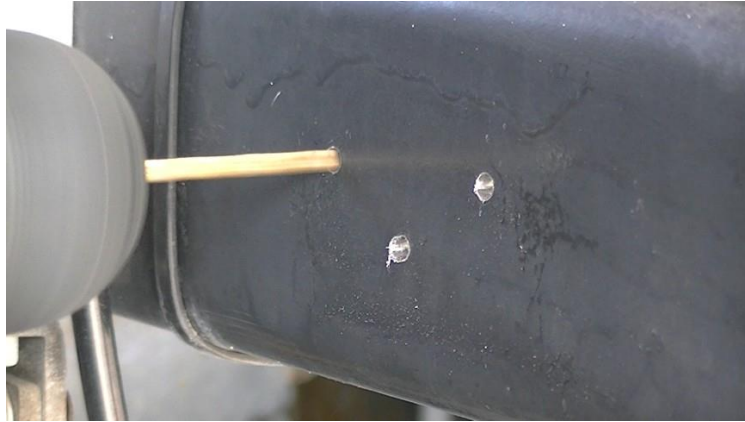
Figure 2-43 - Drilling Holes to Secure the Unit

4. Sand and clean the surface with a damp cloth dipped in 70% alcohol (see Figure 2-44)

Figure 2-44 - Sanding the Installation Surface

5. Remove the adhesive label from the identification chip (see Figure 2-45)

Figure 2-45 - Removing the Adhesive Label

6. Attach the identification chip while straightening its hole with the bottom hole previously drilled (see Figure 2-46)

Figure 2-46 - Attaching the Identification Chip

7. Press and hold for a few seconds

8. Thread the splitting pin through the label's hole (see Figure 2-47)
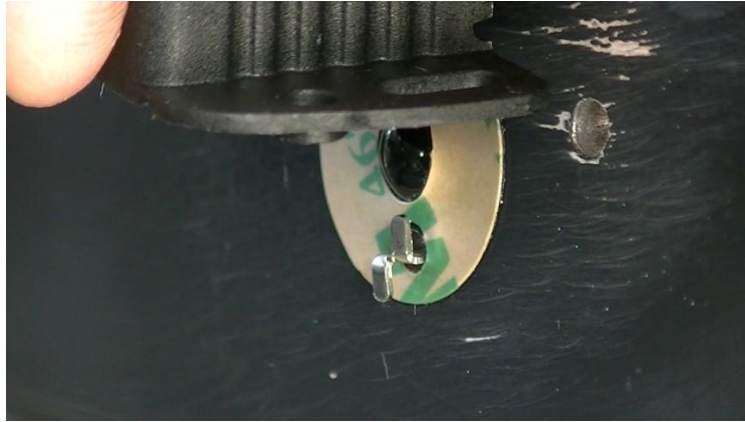
Figure 2-47 - Threading the Splitting Pin

9. Apply Epoxy glue on the chip and the pin (see Figure 2-48)

Figure 2-48 - Applying Glue on the Chip and Pin

10. Secure the unit using two drilling screws (see Figure 2-49)

Figure 2-49 - Securing the Unit

11. Apply Epoxy glue to the perimeter of the unit (see Figure 2-50)
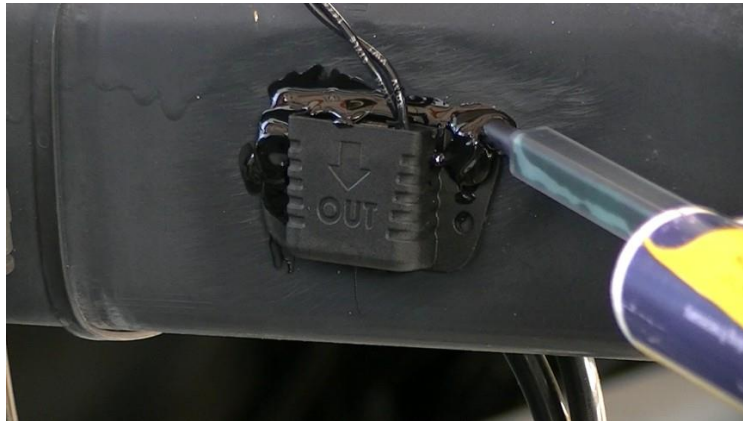
Figure 2-50 - Applying Glue to the Unit's Perimeter

12. Connect the chip's wire to the coil's wires by welding them together, or by any other appropriate means

2.3.5.4.2. Installing the Identification Chip with a Security Cover

To install the identification chip with a security cover, proceed as follows:

1. Close the fuel inlet cover

2. Choose an optimal and secure position for the Security cover (such as in a corner so that the unit will not rotate)

3. Connect the ID chip wires to the coil wires after cutting the chip's connector by soldering them or using connection terminals (Conn end. Wire ETC EC-2), or any other suitable connection

4. Verify that the ID chip is programmed with correct data, using the Wireless Programmer

5. Use the acrylic glue to glue the ID chip inside the Security cover (see Figure 2-51)
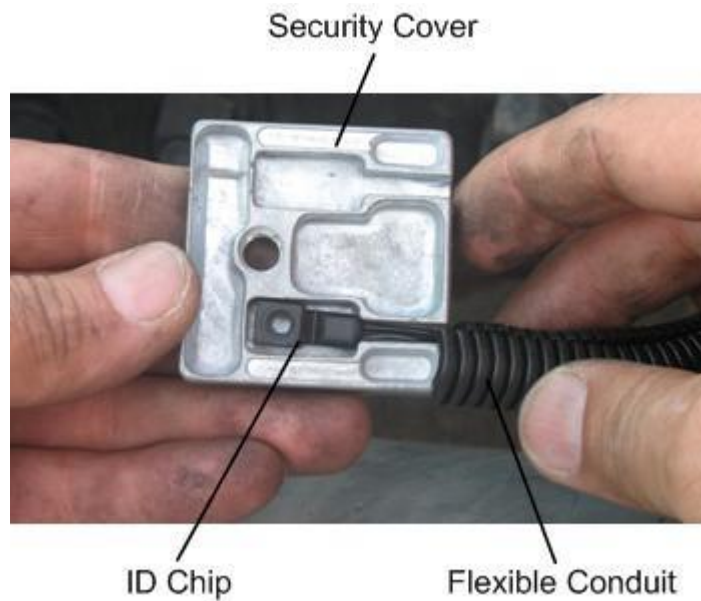
Figure 2-51 - ID Chip Installed in a Security Cover

6. Attach the security cover to a free hole in the vehicle chassis using the ~0.33" (8 mm) dedicated screw

7. If there aren't any unoccupied holes, create a ~0.33" (8 mm) thread hole using a tap in any available bar and attach the security cover (see Figure 2-52)

Figure 2-52 - Attaching the Security Cover to a Bar

8. Tighten the screw until its head is broken; the Security cover and the ID chip are now fully secured and cannot be removed from the vehicle (see Figure 2-53)
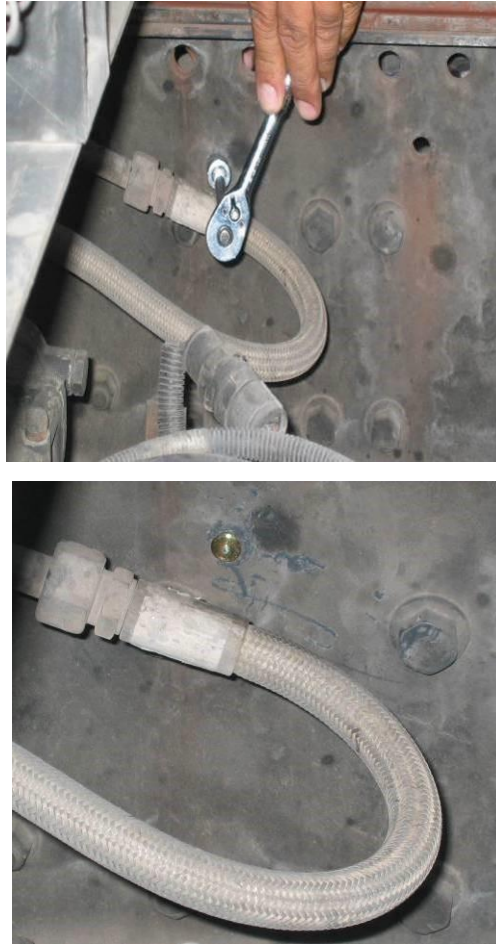
Figure 2-53 - Tightening the Security Cover

2.3.5.4.3. Installing the Identification Chip without a Security Cover

To install the identification chip without a security cover, proceed as follows:

1. Close the fuel inlet cap

2. Choose an optimal, secure, and flat position for installing the ID chip

3. In the designated area, drill a 0.94" (2.4 mm) diameter hole. **DO NOT** drill through the fuel tank! When drilling is completed, clean the area before applying glue onto the surface

4. When installing any coil other than the **Shaped coil**, connect the ID chip's wires to the coil wires after cutting the chip's connector by soldering them or using connection terminals (Conn end. Wire ETC EC-2), or through any other suitable connection

5. Verify that the ID chip is programmed with correct data using the Wireless Programmer Screw, the unidirectional screw through the ID chip in the space prepared. Carefully push the ID chip towards the vehicle's surface. Don't tighten the screw firmly; verify that the chip has a certain amount of freedom and can slightly rotate

6. Tighten the coil-ID chip wires to a fixed object, so as not to interfere with the refueling process.

Note: It is recommended to install according to the security cover installation described above to ensure the best removal protection of the ID-Chip.

Section 3 Vehicle Data Units

3.1. General

This section provides a description of the vehicle data units as well as installation guidelines.

ForeFuel's vehicle data units are compact transmitters which connect to the vehicle's on-board computer, receive data from the vehicle's CPU / Bus, and then accurately transmit the vehicle's information to the station's WGT.

The following provides a description of the different types of vehicle data units available:

» **µDataPass** / **µDataPass Plus**: a plug & play unit for light and commercial vehicles which connects directly to the OBD-II connector

» **µDataPass Sense**: a compact & contactless unit intended for light vehicles which receives information from the vehicle's OBD-II without physical electrical contact

» **DataPass** / **DataPass Plus**: a unit designed for heavy vehicles which connects directly to the vehicle's Bus or to a J1939/J1708 Deutsch 9-pin connector using a specially designed harness

» **DataPass Sense Probe** (**DP-Sense**): an add-on to the DataPass unit, which reads the data from the vehicle's CAN bus without physical electrical contact

» **DataPass Sense**: an integrated all-in-one contactless unit (DataPass and DataPass Sense Probe) for light and commercial vehicles

The following table specifies the vehicle data supported by the vehicle data units (see Table 3-1):

Table 3-1 - Supported Vehicle Data

Vehicle Data	DataPass / µDataPass	DataPass Plus / µDataPass Plus
Odometer	✓	✓
Main Engine Hour	✓	✓
Error Codes		✓
Fuel Level		✓
Fuel Consumed		✓
Idle Time		✓
Over Speeding		✓
Over RPM		✓
Aux #1 E.H.		✓
Aux #2 E.H.		✓
PTO		✓

The following table provides part numbers for the vehicle data units available (see Table 3-2):

Table 3-2 - Types of Vehicle Data Units

Data Units	Part Number
µDataPass	800907450
µDataPass Plus	800907430
µDataPass Sense	800907475
DataPass	800907340
DataPass Plus	800907310
DataPass Sense Probe	819207370
DataPass Sense	800907390

Note: Available data may vary between various vehicle brands / models.

3.2. μDataPass

ForeFuel's μDataPass unit collects vehicle data, and wirelessly transmits it to Orpak's WGT while refueling, or when the vehicle passes by a WGT installed at fleet facilities.

Figure 3-1 - μDataPass Unit

3.2.1. Technical Specifications

The following table details the technical specifications for the μDataPass unit (see Table 3-3):

Table 3-3 - µDataPass - Technical Specifications

	Parameter	Value
PHYSICAL	**Height**	22.1 mm
	Width	41.3 mm
	Depth	16.8 mm
	Weight	8 grams
	Connectors	OBD-II Compatible (male)
ELECTRICITY	**Voltage Input**	**Normal Operation**: 12 VDC (Nominal) **Minimum**: 9 VDC **Maximum**: 16 VDC
	Current Consumption (typical)	**Standby Mode**: up to 4mA **Active Mode**: up to 55mA
ENVIRONMENTAL CONDITIONS	**Range of Temperature**	**Operating**: -40 to +70°C **Storage**: -40 to +85°C
COMMUNICATION	**Wireless Interfaces**	Single IEEE802.15.4 wireless channel **Operating Frequency**: ISM 2.405 to 2.480 GHz (free global license frequency) **Advanced Encryption Standard**: AES128
	IEEE802.15.4 Modem	DSSS / FA - Direct Sequence Spread Spectrum with Frequency Agility **Channel Capacity**: 16 frequency channels / 5MHz channel spacing **Transmitter Power Output**: 2mW (3dbm) **Reception Sensitivity**: -101dbm
	Wireless Antenna	Built-in PCB Antenna
	Wired Interfaces	OBD-II – J2284 / ISO15765 (CAN bus) **Data Rate**: 250Kbps / 500Kbps OBD-II – ISO14230 / ISO9141 (KLINE) **Data Rate**: 10400bps

The following table details the µDataPass connector pinout (see Table 3-4):

Table 3-4 - µDataPass Pinout

Pin Number	Pin Name	Description
4	GND	Ground connection
6	CAN H	CAN High
14	CAN L	CAN Low
16	VCC	Vehicle's power

3.2.2. Installing µDataPass

The installation procedure for the µDataPass is very simple. However, since the µDataPass unit is a miniature device, it is recommended to fasten the unit to the vehicle using nylon thread or a similar fastener in order to prevent loss if removed from the OBD-II connector during vehicle servicing.

To install the µDataPass unit, proceed as follows:

1. Locate the standard On Board Diagnostics OBD-II connector

    Note: This is usually hidden behind one of the panels below the steering wheel or near the pedals.

2. Remove the panel covering the diagnostics connector (see Figure 3-2)

Figure 3-2 - Diagnostics Connector

3. Plug the µDataPass unit gently into the diagnostics connector while being careful not to bend the µDataPass's pins (see Figure 3-3)

Figure 3-3 - Inserting the µDataPass

4. By pressing your finger, tighten the μDataPass into place (see <u>Figure 3-4</u>)

Figure 3-4 - Tightening the μDataPass

5. Re-assemble the board which covers the diagnostic connector.

3.3. Micro DataPass Sense

ForeFuel's micro DataPass-Sense is a unique contactless vehicle interface unit, which reads and wirelessly transmits vehicle data to the fuel station automation and management system. Although physically inserted into the vehicle's diagnostic connector - OBD-II, the unit's circuits are totally passive and isolated from the CAN bus by utilizing a capacitive technology to "induce" the vehicle's data within its circuits.
Thus, it does not affect the data transmitted on the bus in any form (see <u>Figure 3-5</u>).

Figure 3-5 - μDataPass Sense Unit

3.3.1. Technical Specifications

The following table details the technical specifications for the μDataPass Sense unit (see <u>Table 3-5</u>):

Table 3-5 - µDataPass Sense - Technical Specifications

	Parameter	Value
PHYSICAL	**Height**	22.1 mm
	Width	41.3 mm
	Depth	16.8 mm
	Weight	8 grams
	Connectors	OBD-II Connector (male)
ELECTRICITY	**Voltage Input**	**Normal Operation**: 12 VDC **Minimum**: 9 VDC **Maximum**: 16 VDC
	Current Consumption (typical)	**Standby Mode**: up to 4mA **Active Mode**: up to 55mA
ENVIRONMENTAL CONDITIONS	**Range of Temperature**	**Operating**: -40 to +70°C **Storage**: -40 to +85°C
COMMUNICATION	**Wireless Interfaces**	Single IEEE802.15.4 wireless channel **Operating Frequency**: ISM 2.405 to 2.480 GHz (free global license frequency) **Advanced Encryption Standard**: AES128
	IEEE802.15.4 Modem	DSSS / FA - Direct Sequence Spread Spectrum with Frequency Agility **Channel Capacity**: 16 frequency channels / 5MHz channel spacing **Transmitter Power Output**: 2mW (+4dbm) **Reception Sensitivity**: -101dbm
	Wireless Antenna	Built-in PCB Antenna
CERTIFICATIONS		CE (Safety, Radio, EMC) Israeli Standard 6200 - Universal Fueling Device
	Contactless Vehicle Interfaces	OBD-II – J2284 / ISO15765 (CAN bus) **Data Rate**: 250 / 500Kbps ITL labs – CAN bus isolation test for IEC/EN/UL 60950-1 compliance

The following table details the µDataPass Sense connector pinout (see Table 3-6):

Table 3-6 - μDataPass Sense Pinout

Pin Number	Pin Name	Description
5	GND	Ground connection
6	CAN H	CAN High (contactless capacitive connection)
14	CAN L	CAN Low (contactless capacitive connection)
16	VCC	Vehicle's power

3.3.2. Installing Micro DataPass Sense

Similar to the μDataPass, the μDataPass Sense installation procedure is very simple. However, since the μDataPass Sense unit is a miniature device, it is recommended to fasten the unit to the vehicle using nylon thread or a similar fastener in order to prevent loss if removed from the OBD-II connector during vehicle servicing.

To install the μDataPass Sense unit, proceed as follows:

1. Locate the standard On Board Diagnostics - OBD-II connector

> 👉 **Note**: This is usually hidden behind one of the panels below the steering wheel or near the pedals.

2. Remove the panel covering the diagnostics connector (see Figure 3-6)

Figure 3-6 - Diagnostics Connector

3. Plug the μDataPass Sense unit gently into the diagnostics connector while being careful not to bend the μDataPass Sense's pins (see Figure 3-7)

Figure 3-7 - Inserting the μDataPass Sense

4. By pressing your finger, tighten the μDataPass Sense into place (see Figure 3-8)

Figure 3-8 - Tightening the μDataPass Sense

5. Re-assemble the board which covers the diagnostic connector.

3.4. DataPass

The DataPass is installed in heavy vehicles using the provided DataPass harness. The harness is installed inside the driver cabin behind the dashboard, and connects to the vehicle's diagnostics plug rear wiring (see Figure 3-9).
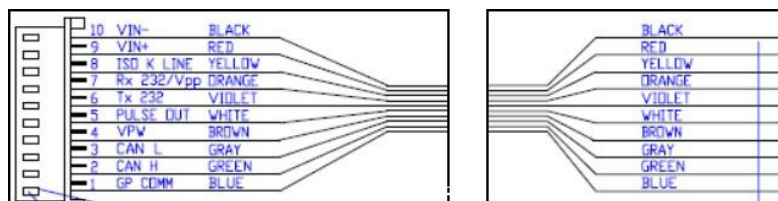
Figure 3-9 - DataPass Harness

There are three types of installation for the DataPass unit:

» Connecting the DataPass to the vehicle's bus which allows retrieving additional information from the vehicle computer

» Connecting the DataPass in a contactless connection using the DataPass Sense Probe

» Connecting the DataPass to the odometer pulses output either directly or via tachograph's pulses output

> ☞ **Note**: DataPass DC IN (red wire) should be connected to vehicle's switch / battery only.

> ☞ **Note**: Use protection harness P/N 819107345 to prevent overloading the power line and meet the requirements of the applicable safety standards.

> ☞ **Note**: In cases where red and blue wires are shortened (engine hour output is not used) add the protection harness between this connection and the DataPass unit.

Figure 3-10 - DataPass Unit

3.4.1. Technical Specifications

The following table details the technical specifications for the DataPass unit (see Table 3-7):

Table 3-7 - DataPass - Technical Specifications

	Parameter	Value
PHYSICAL	**Height**	50 mm
	Width	70 mm
	Depth	21 mm
	Weight	45 grams
	Connectors	562810 Molex
ELECTRICITY	**Voltage Input**	**Normal Operation**: 12 VDC (Nominal) **Minimum**: 9 VDC **Maximum**: 32 VDC
	Current Consumption (typical)	**K-LINE Mode** Sleep Mode: 5mA Active Mode: 35mA
		CAN Mode Sleep Mode: 5mA Active Mode: 25mA
		J1708 Mode Sleep Mode: 5mA Active Mode: 25mA
ENVIRONMENTAL CONDITIONS	**Range of Temperature**	**Operating**: -40 to +70°C **Storage**: -40 to +85°C
	Humidity	95% non-condensing
COMMUNICATION	**Wireless Interfaces**	Single IEEE802.15.4 wireless channel **Operating Frequency**: ISM 2.405 to 2.480 GHz (free global license frequency) **Advanced Encryption Standard**: AES128
	IEEE802.15.4 Modem	DSSS / FA - Direct Sequence Spread Spectrum with Frequency Agility **Channel Capacity**: 16 frequency channels / 5MHz channel spacing **Transmitter Power Output**: 2mW (3dbm) **Reception Sensitivity**: -101dbm
	Wireless Antenna	Built-in PCB Antenna

	Parameter	Value
	Wireless Interfaces	**CAN Bus** OBD-II – J2284 / ISO15765 **Data rate**: 250Kbps / 500Kbps
		KLINE OBD-II – ISO14230 / ISO9141 **Data Rate**: 10400bps
		J1708 / J1587 **Data Rate**: 9600bps

The following table details the DataPass connector pinout (see Table 3-8):

Table 3-8 - DataPass Pinout

Pin Number	Pin Name	Description
10	GND	Ground connection
9	VCC	Vehicle's power
8	K LINE	Utilized for K- line protocol
7	Rx	Used for diagnostics
6	Tx	Used for diagnostics
5	ODO PULSES	Pulses representing vehicle's mileage; used when PLS interface is selected (through WP)
4	VPW	For future use
3	BUS L	For CAN bus protocol, connects to DataPass Sense Probe in order to receive vehicle's data in a contactless manner
2	BUS H	For CAN bus protocol, connects to DataPass Sense Probe in order to receive vehicle's data in a contactless manner
1	ENG HOUR*	Signal representing vehicle's engine hours; used when PLS interface is selected (via the WP)

3.4.2. DataPass Sense Probe

Orpak's DataPass Sense Probe is a unit which reads the information transmitted on the vehicle's CAN bus without any physical electrical contact. The unit is installed externally on the wires of the CAN bus by placing the wires on the unit's pin without any physical or electrical connection.

The DataPass Sense Probe unit passively reads the vehicle's data by "listening" to the data transmitted. The DataPass Sense Probe then transmits the gathered data to the vehicle data unit which analyzes and provides the vehicle data such as mileage traveled and engine hours. The vehicle data unit then

wirelessly transmits the information to the station's network based on Orpak's Wireless Gateway Terminal (WGT).

Figure 3-11 - DataPass Sense Probe Unit

3.4.2.1. Technical Specifications

The following table details the technical specifications for the DataPass Sense Probe unit (see Table 3-9):

Table 3-9 - DataPass Sense Probe - Technical Specifications

	Parameter	Value
PHYSICAL	Height	18 mm
	Width	40 mm
	Depth	16 mm
	Weight	5 grams
	Connectors	MOLEX Micro-Fit 4-pin Connector (female)
ELECTRICITY	Voltage Input	**Minimum**: 9 VDC **Maximum**: 32 VDC
	Current Consumption (typical)	**Standby Mode**: up to 2mA **Active Mode**: up to 15mA
ENVIRONMENTAL CONDITIONS	Range of Temperature	**Operating**: -40 to +80°C **Storage**: -40 to +85°C
COMMUNICATION	Wired Interfaces	ISO11898-1 (CAN) **Data Rate**: 500Kbps

The following table details the DataPass Sense Probe connector pinout (see Table 3-10):

Table 3-10 - DataPass Sense Probe Pinout

Pin Number	Pin Name	Description
3	GND	Ground connection
2	CAN H	CAN High
1	CAN L	CAN Low
4	VCC	Vehicle's power

3.4.3. Installing DataPass

3.4.3.1. Required Tools

To install DataPass unit, you will need the following tools:

» Star head Screwdriver (TORX)
» Flat head Screwdriver
» Philips head screwdriver
» Cutter
» Isolating tape
» Soldering iron
» Soldering tin

3.4.3.2. Connecting the DataPass to the Vehicle Bus

Connections to vehicle's bus is implemented via the BUS connector, which is usually hidden behind one of the dashboard panels.

Unlike light vehicles that have a standard OBD-II connector, heavy vehicles have different types of connectors and the DataPass is connected to the connector wires / harness from the interior part of the panel.

» The following illustration details the pinout for common protocols in heavy vehicles representing the required DataPass wiring:
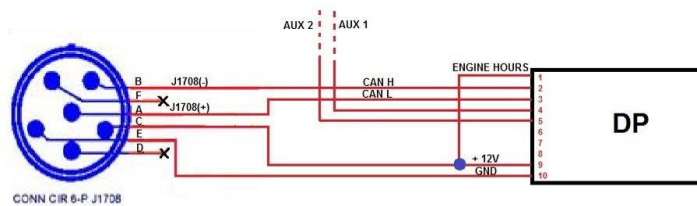
Figure 3-12 - J1708 (J1587) 6 Pin Harness - DataPass Connection

» The following, and the illustration above, illustrate the typical J1587 protocol with 6 and 9 pin harnesses:
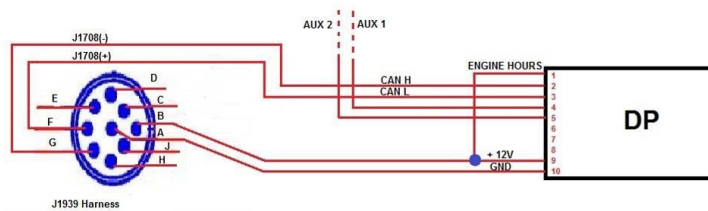
Figure 3-13 - J1708 (J1587) 9 Pin Harness - DataPass Connection

» The following illustrates the J1939 protocol harness, including description for the respective pins:
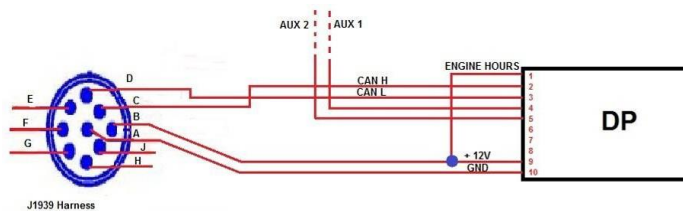
Figure 3-14 - J1939 Harness - DataPass Connection

Table 3-11 - Typical Bus Connector Pinout

Pin Number	Protocol: FMS / J1939 / CAN	Protocol: J1708 / J1587
1	+V (vehicle switch)	+V (vehicle switch)
2	CAN H	J1708 (-B)
3	CAN L	J1708 (-A)
9	+V (vehicle battery)	+V (vehicle battery)
10	-V (vehicle battery)	-V (vehicle battery)

3.4.3.3. Installing DataPass with DataPass Sense Probe

> **Note**: Use protection harness P/N 819107345 to prevent overloading the power line and meet the requirements of the applicable safety standards.

Proceed as follows:

1. Locate the vehicle's CAN-High and CAN-Low wires
2. Locate the vehicle's fuse box or power source
3. Peel off the adhesive tape from the DataPass Sense Probe's lid
4. Attach the vehicle's CAN-High and CAN-Low wires to the adhesive tape so that they will be placed respectively against the CAN-H and CAN-L marked pads on the DataPass Sense Probe circuit board (see Figure 3-15)
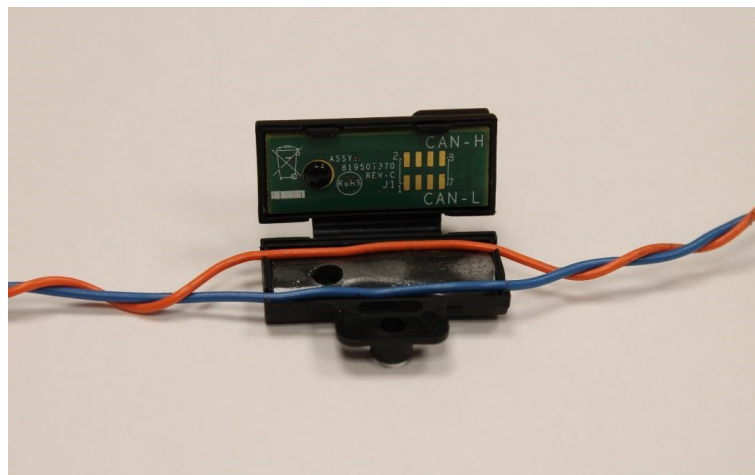
Figure 3-15 - Pinning Vehicle's Wires on DataPass Sense Probe

5. Close the unit firmly until hearing the clips locking
6. (Optional) You may tighten the unit with a zip tie through the dedicated opening
7. Connect the Sense Probe's harness to the probe
8. Connect the Sense Probe's harness white (CAN-H) and green (CAN-L) wires to the DataPass's gray and green wires respectively (see Figure 3-16)
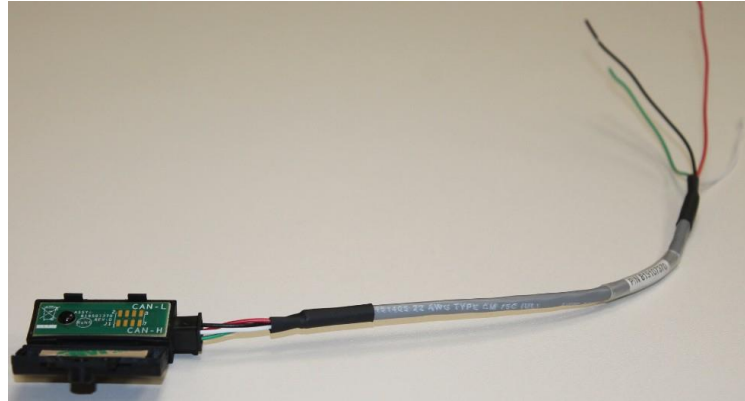
Figure 3-16 - DataPass Sense Probe and Harness Connection

9. Connect the Sense Probe harness's red and black voltage wires to the DataPass harness's red and black voltage wires respectively (see Figure 3-17)
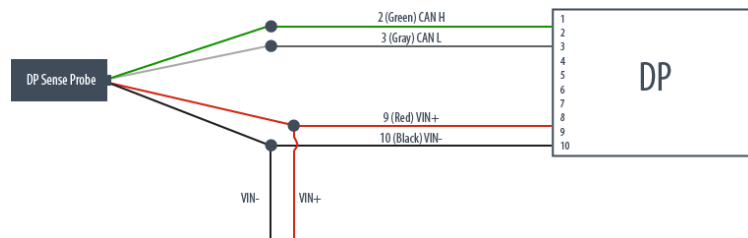
Figure 3-17 - DataPass Sense Probe and DataPass Connection - Illustration

10. Connect the red voltage wires to the fuse's harness

11. Locate a 12 or 24 Volt power source in the vehicle fuse box; connect the black wires to the GND, and the fuse harness to VCC

12. Connect the DataPass to the harness (see Figure 3-18)

Figure 3-18 - Connecting the DataPass to Harness

13. Tighten the unit, the Sense Probe, and the harnesses to one of the vehicle's rods / boards using a plastic zip-tie; verify that they are well secured and cannot move (see Figure 3-19)

Figure 3-19 - Fastening the DataPass and Harness to Vehicle

3.4.3.4. Connecting the DataPass to the Odometer Pulses Source

A simple way to retrieve odometer pulses is from the truck's tachograph output.

The installation of the DataPass requires disassembling the vehicle's tachograph and accessing its rear side wiring in order to connect the DataPass harness to the tachograph's wiring.

The following table details the connections between the tachograph and the DataPass (see Table 3-12).

Table 3-12 - Tachograph – DataPass Harness Connections

DataPass Harness Wire	Tachograph
White	Pulse output
Red	Connect to vehicle's switch / battery
Black	GND
Blue	Vehicle switch

Proceed as follows:

1. Locate the tachograph in the vehicle. Two extraction slots are placed on both sides (see Figure 3-20)

Figure 3-20 - Tachograph Extraction Slots

2. Use the dedicated extraction tool to disassemble the tachograph (see Figure 3-21)

Figure 3-21 - Removing the Tachograph

> 👉 **Note**: Handle each wire individually until it is fully connected and isolated in order to avoid shorts.

3. Access the wiring in the back of the tachograph and expose the desired wires (see Figure 3-22)

Figure 3-22 - Tachograph Wiring

4. Connect and solder each wire to its corresponding wire in the DataPass harness (see Table 3-12, Figure 3-23)

Figure 3-23 - Connecting DataPass Harness to Tachograph Wiring

5. Wrap each soldered wire in insulating tape (see Figure 3-24)
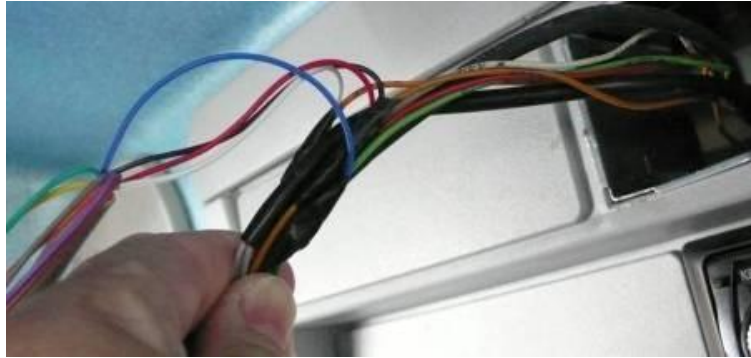
Figure 3-24 - Wrapping Connections in Insulating Tape

6. Wrap the newly created harness in insulating tape (see Figure 3-25)

Figure 3-25 - Wrapping the Harness with Insulating Tape

7. Connect the DataPass to the harness (see Figure 3-26)

Figure 3-26 - Connecting the DataPass to the Harness

8. Fasten the DataPass to any of the vehicle panels / rods using a tie wrap; verify that the unit does not move

9. Fasten the newly created harness to one of the vehicle's rods / boards; verify that the harness is well secured (see Figure 3-27)

Figure 3-27 - Fastening the DataPass and Harness

10. Gently push the tachograph with its harness into place until it is locked (a clicking sound is heard).

3.5. DataPass Sense

Orpak's DataPass Sense is an integrated unit that utilizes contactless reading technology to passively obtain vehicle data transmitted on the vehicle's CAN bus without any physical electrical contact, analyzes it and wirelessly transmits it to Orpak's Wireless Gateway Terminal (WGT). The unit is installed by attaching it to the vehicle's CAN bus wires without any electrical connection to the bus.

Figure 3-28 - DataPass Sense Unit

3.5.1. Technical Specifications

The following table details the technical specifications for the DataPass Sense unit (see Table 3-13):

Table 3-13 - DataPass Sense - Technical Specifications

	Parameter	Value
PHYSICAL	**Height**	24 mm
	Width	48 mm
	Depth	11 mm
	Weight	8 grams
ELECTRICITY	**Voltage Input**	**Minimum**: 9 VDC **Maximum**: 32 VDC
	Current Consumption (typical)	**Standby Mode**: up to 4mA **Active Mode**: up to 55mA
ENVIRONMENTAL CONDITIONS	**Range of Temperature**	**Operating**: -40 to +85°C **Storage**: -40 to +85°C
COMMUNICATION	**Wireless Interfaces**	Single IEEE802.15.4 wireless channel **Operating Frequency**: 2.4 GHz (free global license frequency)
	IEEE802.15.4 Modem	DSSS / FA - Direct Sequence Spread Spectrum with Frequency Agility

The following table details the DataPass Sense wiring (see Table 3-14):

Table 3-14 - DataPass Sense Wiring

Wire Color	Wire Name	Description
Black	GND	Ground connection
Red	VCC	Vehicle's power

3.5.2. Installing DataPass Sense

ForeFuel's DataPass Sense is installed by applying the unit onto the vehicle's CAN bus wires.

> **Note**: Use protection harness P/N 819107345 to prevent overloading the power line and meet the requirements of the applicable safety standards.

To install the DataPass Sense, proceed as follows:

1. Locate the vehicle's CAN-High and CAN-Low wires
2. Locate the vehicle's fuse box or power source
3. Peel off the adhesive tape from the DataPass Sense's lid
4. Attach the vehicle's CAN-High and CAN-Low wires to the adhesive tape so that they will be placed respectively against the CAN-H and CAN-L marked pads on the DataPass Sense circuit board (see Figure 3-29)

Figure 3-29 - Attaching Vehicle's Wires onto DataPass Sense

5. Close the unit firmly until hearing the clips locking

6. (Optional) You may tighten the unit with a zip tie through the dedicated opening

7. Connect the red voltage wires to the fuse's harness

8. Locate a 12 or 24 Volt power source in the vehicle fuse box; connect the black wires to the GND, and the fuse harness to VCC.

Section 4 Programming Vehicle Units

4.1. General

This section provides a description of the Wireless Programmer Units as well as installation guidelines.

Orpak's Wireless Programmer is a field programming device used to set-up all ForeFuel's Vehicle Identification and Data units as well as the nano Nozzle Reader device.

The Wireless Programmer is a portable unit which reduces installation and activation time without compromising security as only authorized technicians can install and program units on-premises (see Figure 4-1).

Figure 4-1 - Wireless Programmer Unit

There are two types of Wireless Programmers:

» Homebase Solution
» Retail Solution

The following table details the Wireless Programmer units (see Table 4-1):

Table 4-1 - Wireless Programmer Units

Description	Part Number
Wireless Programmer Unit - Homebase Solution	800920910
Wireless Programmer Unit - Retail Solution	800920930

4.2. Homebase Solution

This section provides instructions on the programming sequence of the vehicle units installed in private and heavy duty vehicles using the Wireless Programmer device as follows:

» FP and µDP / µDP+ / µDP-Sense

» FP and DP / DP+ for heavy vehicles

» FP and DP for light vehicles

In addition, this section describes the Wireless Programmer device and includes instructions for setting up the WP as well as registering the device in the FHO server.

Note: If an error message is received when programming FP +DP units, replace the FP unit, and use the Replace FP option detailed below.

4.2.1. Wireless Programmer

Warning: Programming using the Wireless Programmer should be done in safe area (Non-Hazardous location). Therefore, it should be done prior to FuelOpass installation.

In the Homebase solution, the vehicle units are programmed on-the-spot with the Wireless Programmer (WP) - version 2.07.45, P/N 800920910 (see Figure 4-2).

Figure 4-2 - Homebase Solution Wireless Programmer

4.2.1.1. Technical Specifications

The following table details the technical specifications for the Homebase Solution Wireless Programmer unit (see Table 4-2):

Table 4-2 - Homebase Solution Wireless Programmer - Technical Specifications

	Parameter	Value
PHYSICAL	**Height**	29 mm
	Width	192 mm
	Depth	99 mm
	Weight	380 grams
	Connectors	Terminal Port: DB-9 (Female) Power Port: DC Jack
USER INTERFACE	**Keyboard**	48 Keys
	Display	2 x 16 Characters LCD
ELECTRICAL	**Supply voltage**	7.2V, 2000mAh Lithium-ion internal battery
	Charge Voltage	12V to 28V DC input
	Protection	Supply voltage reverse polarity protected Short circuit protected over charge and full discharge protected
ENVIRONMENTAL CONDITIONS	**Temperature**	Operating: -20 to +70 °C
		Storage: -40 to +85 °C
	Humidity	In accordance with IEC 68-2-30
COMMUNICATION	**Wired Interfaces**	External - RS232 Communication Link
	Wireless Interfaces	Single IEEE802.15.4 wireless channel Receive sensitivity: -101dbm : 50 meter at open space
	Wireless Antenna	Built in PCB Antenna for Nozzle Reader units programming
	RFID / VIU	Designed for Low Frequency (125 KHz) chip reading Reading distance: Up to 8 cm, influenced by Tag geometry

4.2.1.2. Battery Saving and Chargers

The WP includes a battery saving timeout function which alerts the user emitting three consecutive beeps in cases where the unit has been idle for more than five minutes. The unit stays on by pressing any key.

When turned off, the user is logged out, and the device can be turned on again by using the ON / OFF button.

The WP is supplied with two types of battery chargers (see Figure 4-3, Figure 4-4):

>> AC Adapter – connected to main power supply

Figure 4-3 - WP AC Adapter

>> DC Adapter - connected to vehicle's cigarette lighter socket
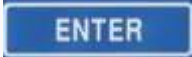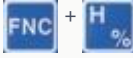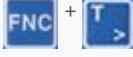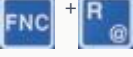
Figure 4-4 - WP DC Adapter

4.2.1.3. Wireless Programmer Keyboard

The following table provides a description for the keys on the Wireless Programmer keyboard (see Table 4-3):

Table 4-3 - Homebase Wireless Programmer - Keyboard

Key	Parameter
ON/OFF	Turns the device ON / OFF
SEND	Sends data to the Head Office / Vehicle ID Unit / Vehicle Data Unit
ENTER	Stores data entered
DEL	Deletes current selection
BCK	Returns to the previous screen
2 ↑	Scrolls up
8 ↓	Scrolls down
6 →	Scrolls right
4 ←	Scrolls left
SFT + O	Inserts a space
SFT + K -	Inserts an hyphen
INS	Inserts a blank character in editing screens
SFT + C .	Inserts a point
FNC + H %	Redirects to the Main Menu (Home)
FNC + T >	Redirects to Tech Functions Menu
FNC + R @	Redirects to Read VIU Screen (for maintenance purposes such as modifying parameters)
FNC + P /	Redirects to Program VIU first screen

4.2.1.4. Wireless Programmer Common Actions

The following table details common actions for the Wireless Programmer (see Table 4-4):

Table 4-4 - Wireless Programmer - Common Actions

Action	Description
Editing parameters	In order to change a default, or edit already entered values, use the key and then enter the new value using the keypad
Saving parameters/ Navigating screens	In order to save definitions and advance to the next screen, use the ENTER key. In cases where both display lines contain parameters, use the ENTER key to approve the first parameter and point to the second parameter
Selecting parameters	In cases where several parameters are displayed, use the UP / DOWN / LEFT / RIGHT arrow keys to move the pointer (>) to the required parameter. Various parameters (i.e. Vehicle Manufacturer, Model, Year) support insertion of the parameter's first character to quicken the process

4.2.1.5. Wireless Programmer Parameters

The following table details common parameters for the Wireless Programmer (see Table 4-5):

Table 4-5 - Wireless Programmer - Common Parameters

Parameter	Description
Organization ID	Company Name assigned in the HO
Vehicle ID	The license plate number, or unique number of the vehicle, to which the device is assigned, as defined in HO
Fleet Code	The code of the fleet to which the device is associated with, as defined in HO
Fuel Type	The fuel type allowed for the vehicle, as defined in HO
Additional Info	Special structure which may be included in the vehicle in addition to vehicle model, year, and manufacturer, and that may affect the odometer factor
Odometer Address	Source address for odometer reading in the vehicle communication protocol. Default is 255 and should only be changed in cases where odometer was not successfully read or another value was provided by the client
DP Odometer Address	Address assigned in the vehicle communication protocol to the DP for obtaining odometer reading. Default is 141 and should only be changed in cases where odometer was not read or another value was provided by the client
Distance Unit	Distance measurement units' definition for calculations and reports
E.H. Source	Physical source of E.H. reading: Vehicle switch or bus
E.H. Address	Source address for E.H. reading in the vehicle communication protocol. Default is 255 and should only be changed in cases where E.H. was not successfully read or another value was provided by the client
DP E.H. Address	Address assigned in the vehicle communication protocol to the DP for obtaining E.H. reading. Default is 141 and should only be changed in cases where E.H. was not read or another value was provided by the client
E.H. PID	E.H. Parameter ID. The code used to request E.H. data from the vehicle. Default is 247 and should only be changed in cases where E.H. was not read or another value was provided by the client
Engine On Report	Reports on Main Engine operation status (ON / OFF), as may be required to comply with local regulations forbidding refueling while vehicle's engine is ON
MAC Address	Unique identifier assigned to the DP / μDP unit. The MAC appears on the unit's back label.
Main Engine	The source engine for Idle Time, Over Speeding, Over RPM, and Fuel Level data collection
Switch Time Out	Period of time in which the DataPass remains active after the vehicle is switched off. Default is 10 minutes

Parameter	Description
Odometer Factor	Number of pulses indicating a distance unit (mile or Km), as provided by the vehicle manufacturer
Odometer Threshold	Oscillation amplitude to be identified as a pulse (1), as provided by the vehicle manufacturer (in cases where the value is unknown, set a threshold of 2000 mV)
Odometer Hysteresis	Amplitude threshold to be identified as no pulse (0) for noise elimination (in cases where the value is unknown, set the hysteresis to 200 mV)
DP Factor	Odometer reading calibration factor for different OBD-II interface vehicle models
DP Offset	Offset value for calibration of Odometer readings in different OBD-II interface vehicle models
Aux EH Polarity	Auxiliary Engine Hour counter setup, according to the available physical connection, as follows: Select **Plus** if Aux Engine starts to operate when the line go from zero to 12V (from 0 to 1 state) Select **Minus** to start counting in power drop, from 12V to zero (from 1 to 0 state) In cases where the vehicle chassis is the positive output line, please call Professional Services for support.

4.2.1.6. Wireless Programmer Setup in FHO

Prior to programming the vehicle units, the Wireless Programmer device should be registered in the Fleet Head Office to which the vehicles to be programmed are attributed.

After the Fleet Head Office has been completely installed and set up, verify that the **Company name** field is filled (see Figure 4-5).

For further details on the Fleet Head Office installation, please refer to FHO Installation and User Manual, P/N 817423708.
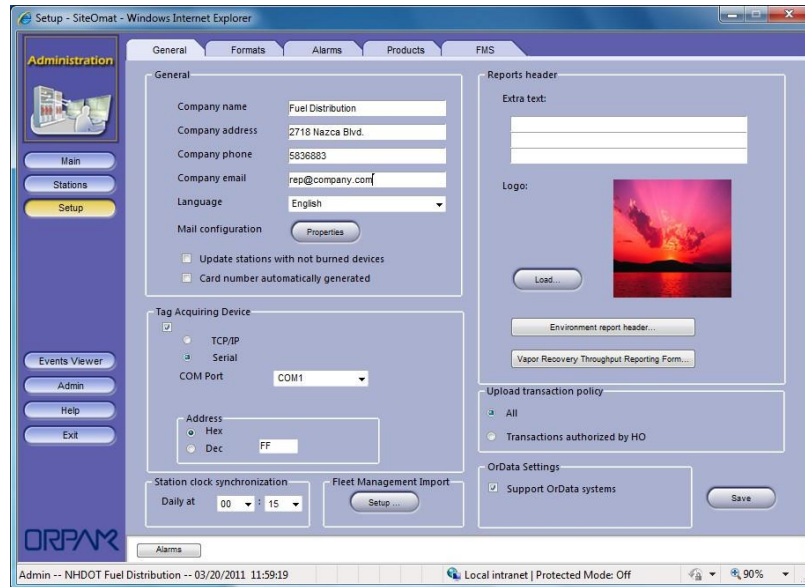
Figure 4-5 - Administration Setup Screen - General Tab

4.2.1.7. WP Tunnel Installation

The WP Tunnel application is required for registering the Wireless Programmer.

> **Note**: In order to properly register the Wireless Programmer, you must install all certifications prior to the WP Tunnel Installation.

Proceed as follows:

1. Double click on the WP Tunnel.exe file. The following welcome screen appears (see Figure 4-6)
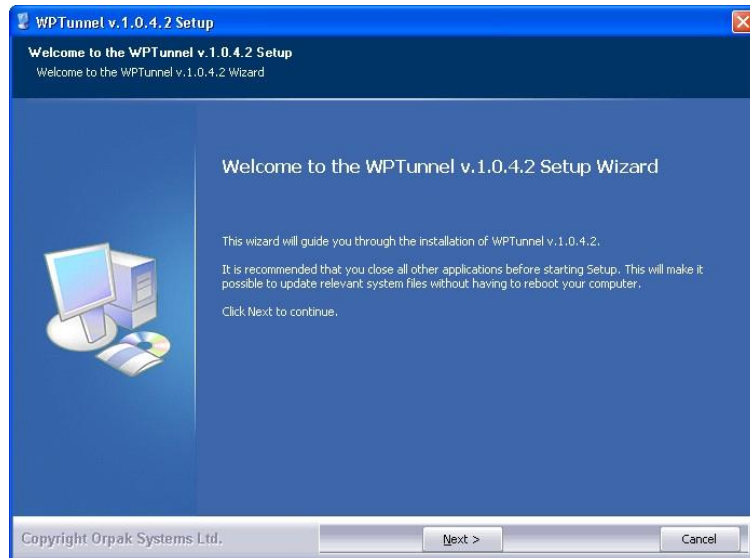
Figure 4-6 - WP Tunnel Setup Wizard -Welcome Screen

2. Click on **Next**. The License Agreement screen appears (see Figure 4-7)
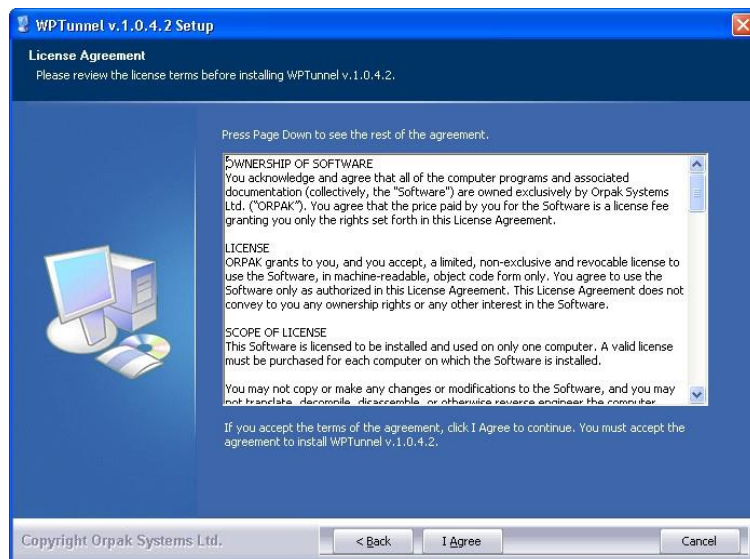
Figure 4-7 - WP Tunnel Setup Wizard - License Agreement Screen

3. Click on **I Agree** and the following screen appears (see Figure 4-8)
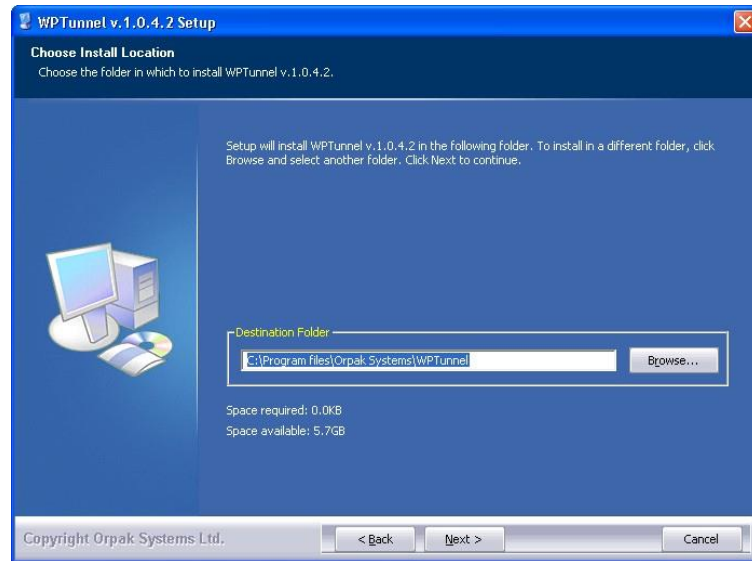
Figure 4-8 - WP Tunnel Setup Wizard - Choose Install Location Screen

4. Click **Next** to install the files in the default folder, or click **Browse** to choose another destination folder and then **click** Next. The Connection settings screen appears (see Figure 4-9)
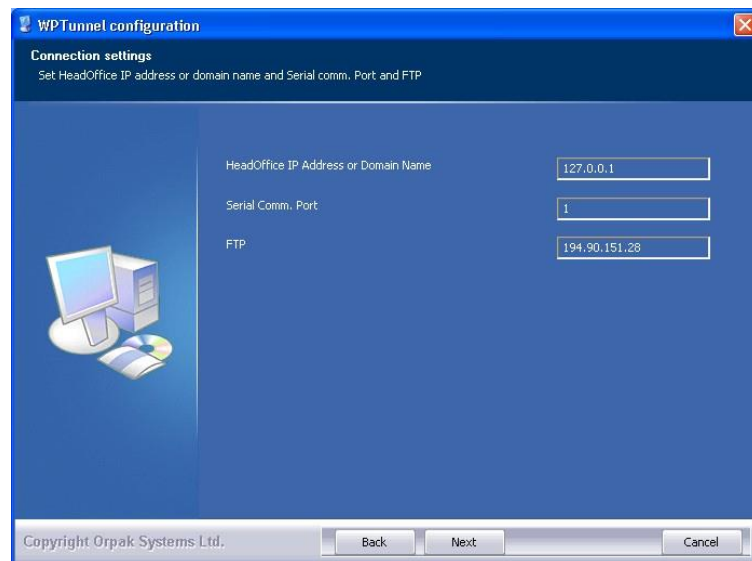
Figure 4-9 - WP Tunnel Setup Wizard - Connection Settings Screen

5. Enter the **Head Office IP Address**. In the example above, WP Tunnel is installed in FHO PC, so the local Host IP address (127.0.0.1) is entered
6. Enter the **Serial Com port** to which the WP device is to be connected. Click **Next**

> **Note**: The FTP stores updated vehicle lists required for WP proper functioning. Default FTP address: 194.90.151.28 should not be changed.

7. The installation process is fully automated. The Installing screen displays process messages as well as possible error messages. At the end of the process, click **Close** to exit the Wizard (see Figure 4-10)
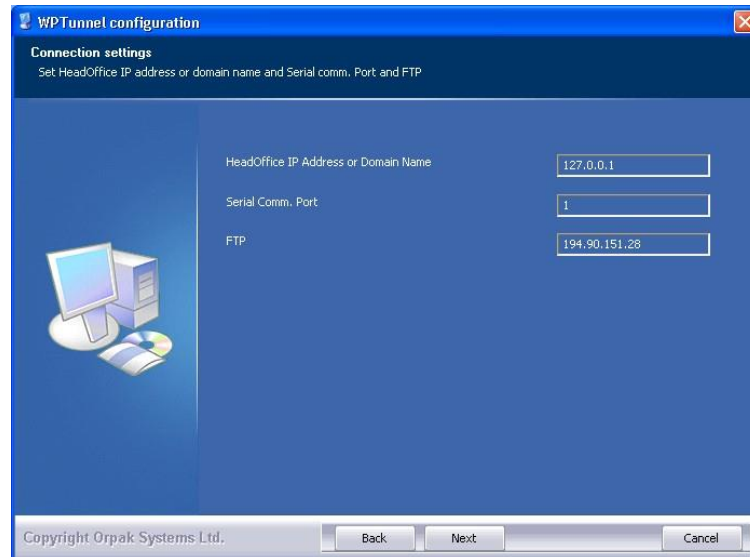
Figure 4-10 - WP Tunnel Setup Wizard - Installation Complete Screen

8. A WP Tunnel icon is created on the PC's desktop (see Figure 4-11)

Figure 4-11 - WP Tunnel Desktop Icon

4.2.1.8. Establishing Communication Between WP and HO

In order to establish communication between the WP and the Head Office, proceed as follows:

1. Open the Fleet Head Office application
2. Click on the **Admin** button on the left hand side navigation bar

3. Select the Registration tab (see Figure 4-12)
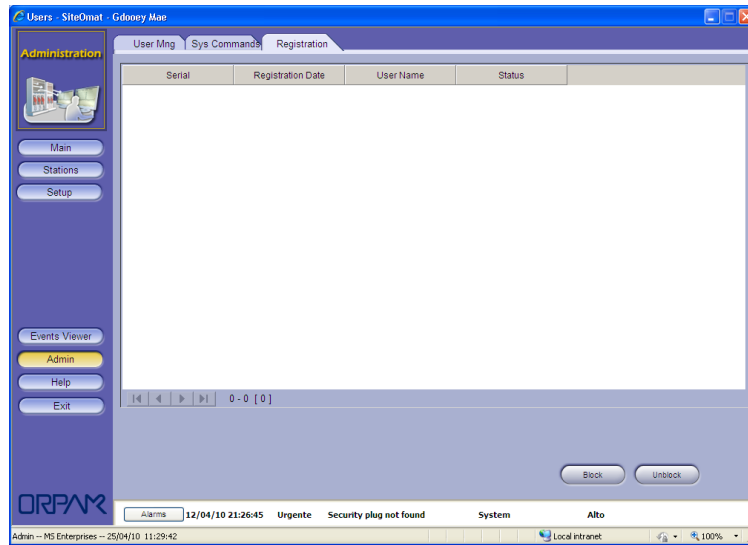
Figure 4-12 - Admin Screen - Registration Tab

4. Launch the WP Tunnel application by clicking on the desktop icon (see Figure 4-13)
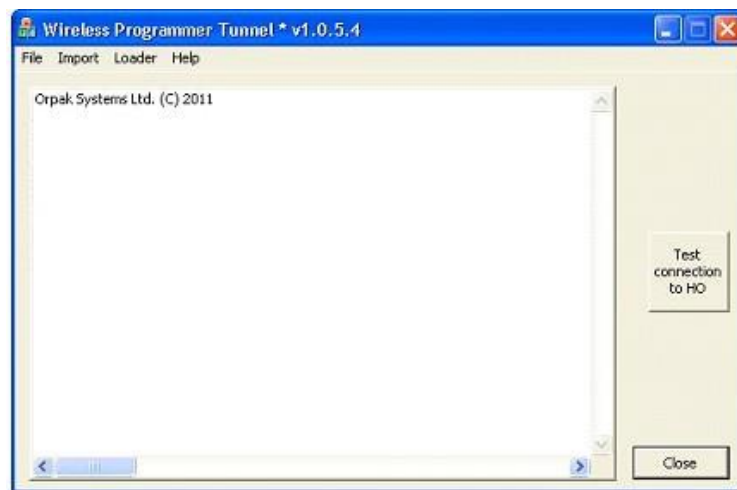
Figure 4-13 - WP Tunnel - Main Screen

5. Connect the WP to the PC using a RS232 serial cable

6. Turn the Wireless Programmer on, and follow the instructions that appear on its display (see Table 4-6)

> **Note**: When operating the Wireless Programmer for the first time, enter the factory default user name and password: "admin". The device will prompt the user for a new username and password.

Table 4-6 - WP Registration Sequence

Step	Display	Description
1	Enter User ID	Enter User ID and press **ENTER**
	Enter Password	Enter password and press **ENTER**. Press the **BCK** key
2	>WP Functions Sys Functions	The System menu is displayed
3	>Sys Functions Services	Use the DOWN arrow key to move the pointer (>) to the Sys Functions option and press **ENTER**
4	>WP Registration Remove Registr.	Press **ENTER**
5	Connect to PC and press SEND	Press **SEND**
6	Connect to PC Wait...	Wait while the PC connects to the FHO

7. The WP Tunnel displays the session details. After the WP is successfully recognized by the FHO, the application registers the device's serial number as well as the currently logged user name and sends the organization's name (company name) to the WP. A confirmation message is displayed (see Figure 4-14)
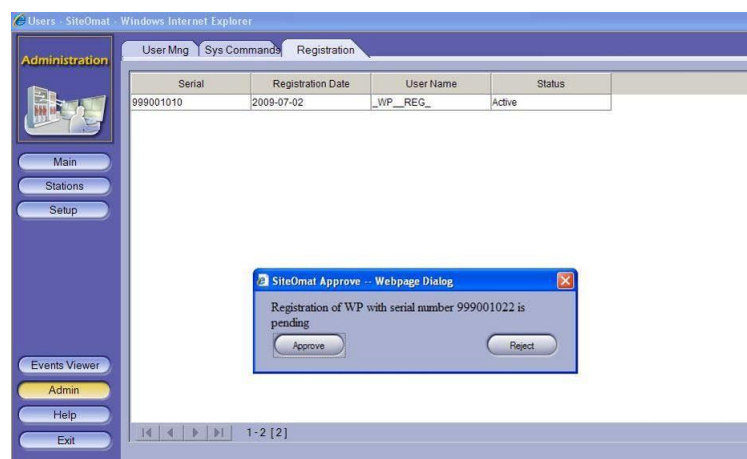
Figure 4-14 - Approving Wireless Programmer Registration

8. Close the WP Tunnel.

The organization name is recorded in the Wireless Programmer's memory, and the device is now ready for programming the vehicle units.

The **Block** button blocks the WP device (selected from the grid) for future use, while the **Unblock** button activates previously blocked WP units.

4.2.1.9. Updating Vehicle List

The Vehicle List contains updated specific calibration data per vehicle model, required for programming the vehicle data units.

To download the latest vehicle table from Orpak's FTP server into the Wireless Programmer, proceed as follows:

1. Connect the WP to the PC using a RS232 serial cable
2. Launch the WP Tunnel application by clicking on the WPTunnel icon
3. Click **Import** on the menu bar and then select Vehicle List. The application downloads the updated vehicle table from the FTP server and displays the session details. This process takes approximately 2 minutes to complete (see Figure 4-15).
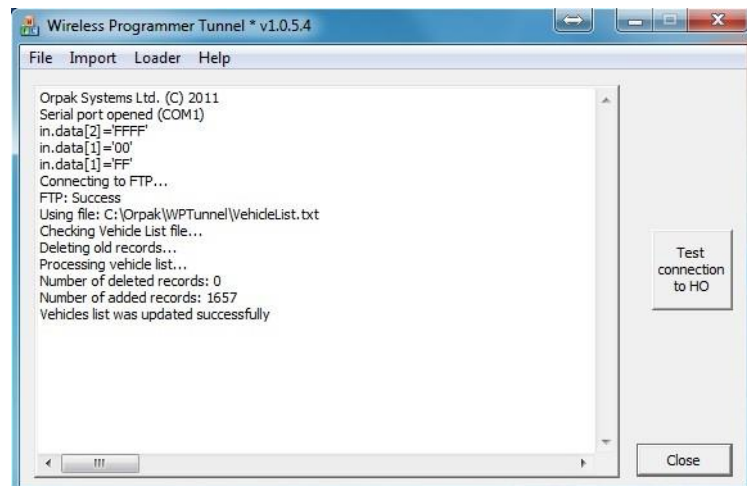
Figure 4-15 - WP Tunnel - Vehicle List Update

4. Do not close the WPTunnel application. Turn the WP on and follow the instructions appearing on the display (see Table 4-7)

Table 4-7 - Vehicle List Update Sequence

Step	Display	Description
1	Enter User ID	Enter User ID and press **ENTER**
	Enter Password	Enter password and press **ENTER**. Press the **BCK** key
2	>Services Tech Functions	The System menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Services option and press **ENTER**
3	>Replace Veh TBL Local Download	Use the DOWN arrow key to move the pointer (>) to the Replace Vehicle Table option and press **ENTER**. ☞ **Note**: After loading the WP with the Vehicle List for the first time, you may check for updates and download these updates only by selecting the **Check for Updates** option. If a new list is available "**Update Vehicle Parameters**" message is displayed. Otherwise, the WP displays: "**No need for update**"

Step	Display	Description
4	>Connect to PC and press SEND	Press **SEND**
5	Updating vehicle params, wait...	Wait while the WP receives the data
6	Update Done	At the end of the process, the following success message is displayed. Restart the WP

4.2.1.10. Updating WP Software

4.2.1.10.1. Local Download

Local Download option allows downloading the latest version of the following components from Orpak's FTP into your WP device:

» WP AVR (antenna component)

» WP ARN (WP application)

» DP and µDP firmware

Proceed as follows:

1. Connect the WP to the PC using a RS232 serial cable

2. Launch the WP Tunnel application by clicking on the icon

3. Click **Loader** on the menu bar and then select **Start**. The Loader dialog box appears (see Figure 4-16)
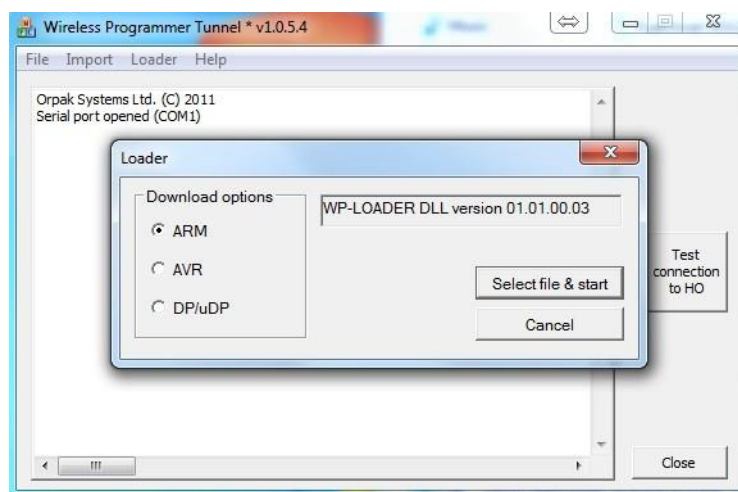
Figure 4-16 - WP Tunnel - Vehicle List Update

4. Select the component radio button in the Download options section and then click **Select File and Start**

5. A file selection dialog box appears. Browse for the file and click OK

6. Click Select File and Start

7. Do not close the WPTunnel application. Turn the WP on and follow the instructions on the WP display (see Table 4-8)

Table 4-8 - Local Download Sequence

Step	Display	Description
1	Enter User ID	Enter User ID and press **ENTER**
	Enter Password	Enter password and press **ENTER**. Press the **BCK** key
2	>Services Tech Functions	The System menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Services option and press **ENTER**
3	>Local Download Update DP SW	Use the DOWN arrow key to move the pointer (>) to the Local Download option and press **ENTER**
4	Downloading WP success, wait...	The following success message is displayed. At the end of the process, the WP restarts automatically

4.2.1.10.2. Show Files

The Show Files option enables the technician to verify that the latest versions are stored in WP's internal memory: WP's ARM (WP firmware) and AVR (WP antenna firmware), Vehicle Parameters table, DP and µDP firmware (for view only).

In cases where a file is missing: **File not found** is displayed under the file type.

The table below describes the Show Files sequence steps (see Table 4-9).

Turn the WP on and follow the instructions that appear on the display as described below.

Table 4-9 - Show Files Address Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >WP Functions Sys Functions	The WP Functions menu is displayed. Press the **BCK** key to access the main menu
3	>Services Tech Functions	Use the DOWN arrow key to move the pointer (>) to the Services menu
4	>Show Files Test	Use the UP arrow key to move the pointer (>) to the Show Files option

Step	Display	Description
5	>Vehicle Params: dd-mm-yy hh:mm	The Vehicle Parameters update date and time is displayed (for view only). Use the DOWN arrow key to view the next file
	>WP ARM: Ver: X.XX.XXX	The currently installed WP ARM is displayed (for view only). Use the DOWN arrow key to view the next file
	>WP AVR: Ver: XX.XX	The currently installed WP AVR is displayed (for view only). Use the DOWN arrow key to view the next file
	>DP Heavy: Ver: XX.XX.XX	The currently installed DP and µDP firmware versions are displayed (for view only) for each unit type. Use the DOWN arrow key to view next firmware files, these will include: » DP Light » DP AVL Light » DP Heavy » DP AVL Heavy » µDP CAN » µDP Kline **Note**: Firmware versions are compatible for both DP / µDP and DP Plus / µDP Plus units

4.2.1.10.3. Updating DP Software

This option enables the technician to upgrade a DP / µDP unit with the firmware version stored in WP's internal memory.

Turn the WP on and follow the instructions appearing on the display (see)

Table 4-10 - Update DP Software Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >WP Functions Sys Functions	The WP Functions menu is displayed. Press the **BCK** key to access the main menu
3	>Services Tech Functions	Use the DOWN arrow key to move the pointer (>) to the Services menu
4	>Update DP SW WP MAC Address	Select the Update DP SW option
5	>Read DP by Tag Read DP by Add	DP identification method: » **Tag**: WP recognizes the DP by means of the FP correlated with the unit. If this option was selected, **proceed to step** 8 » **Address**: WP recognizes the DP by means of the unit MAC address. If this option was selected, **proceed to step** 6

Step	Display	Description
6	>DP Address: 1. Auto 2. Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5 m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for results » Enter 2 for manual insertion of the MAC address
7	>DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save. **Proceed to step** 9
8	Reading FP + DP Wait...	Wait a few seconds until the WP recognizes the FP & DP
9	DP Ver X.XX.XX Do: WP Ver X.XX.XX Y/N	The first row displayed the current unit firmware version, while the second row shows the version stored in WP's memory. Press **Y** to update
10	DP Updating Wait...	Wait a few seconds while the unit is being updated
11	DP Updating Succeeded!	A success message is displayed

4.2.2. Programming Light Vehicles

The following describes the programming processes for light vehicles.

4.2.2.1. FP and µDP Programming Sequence

The table below describes the programming sequence for light vehicles equipped with FuelOpass only, and FuelOpass as well as µDataPass / µDataPass Plus / µDataPass Sense devices (see Table 4-11).

Before proceeding, verify that µDP is already installed and is powered (turn ignition switch ON).

Turn the WP on and follow the instructions appearing on the display as described below.

Table 4-11 - FP and µDP Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Org: [Organization Name]	The Organization Name is displayed. If the WP is associated with several HO, select the required organization
5	Vehicle ID:	1. Enter Vehicle ID (8 characters) 2. Reenter Vehicle ID for confirmation
6	Fleet Code:	Enter fleet code (4 characters)
7	Fuel Type:	Enter the allowed fuel type code
8	FP Type: 1: FP 2: FP+DP	FP type options are displayed: » Enter 1 to program a FuelOpass device only. **In this case proceed to step 42** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
9	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5 m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
10	Reading DP Wait...	Wait a few seconds until the WP recognizes the DP. **Proceed to step 13, except for the following:**
11	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process
12	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
13	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
14	Vehicle Model: >XXXXX	Select the vehicle model
15	Vehicle Year: >XXXX	Select the vehicle year

Step	Display	Description
16	Additional Info: >	Select additional vehicle data, if any
17	DP Type: μDP DP Type: μDP+	The detected DP type is displayed: » μDP » μDP+
18	Odometer X Method	The WP displays the odometer method: » Direct » OBD » VAG
19	Interface: >Kline Interface: >CAN	The communication protocol is displayed depending on the μDP type
20	Enbl OBD if Auto Dtct Fail? Y/N	**This screen appears for CAN OBD with μDP only.** » Press **Y** to enable reading odometer if the OBD doesn't provide it **Caution**: If you press N, and the vehicle doesn't provide the odometer reading, then the unit won't be able to read the odometer.

Step	Display	Description
21	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option **In OBD and VAG, proceed to step 22** **In Direct, proceed to step 25**
22	Distance Unit: 1: Km 2: Miles	**This screen appears in OBD and VAG only.** Distance measurement units' definition: » Enter 1 for Km » Enter 2 for Miles **In OBD, proceed to step 23** **In VAG, proceed to step 25** **If Odometer reading was disabled, proceed to step 39**
23	DP Factor: 7200	DP Factor is displayed. Edit the parameter, entering a known factor, if needed
24	DP Offset: 0	DP Offset is displayed. Edit the parameter, entering a known offset, if needed
25	Read Engine Hour: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve engine hour reading » Change default to N to disable the option **Note**: In Direct, and if selected N in step 21, proceed to **step 39**.

Step	Display	Description
26	Odometer: 0.0	**This screen appears for OBD and VAG only, and is displayed in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard. **Note**: In Direct and VAG, if the odometer entered does not match what the WP read, then you'll receive an error message asking to try again: Press **Y** to display the WP odometer reading If pressed N, the WP returns to **step** 23
27	Switch on Engine Press SEND	**This screen appears in Direct and VAG only.** Switch on the engine, wait 20 seconds, and then press **SEND**. DP attempts to read the odometer / engine hours. If reading attempt failed, a failure message will appear and will ask if you to repeat the odometer reading. Press **Y** to repeat reading attempt

Step	Display	Description
28	Odometer XXXXXXX Correct? Y/N	Odometer reading is displayed. » Press **Y** to confirm the odometer reading displayed and proceed to next step » Press **N** if the reading displayed is incorrect **Note**: If the odometer does not match the WP's reading, a message appears asking to enter dashboard odometer. The WP then converts the entered reading from miles to kilometers, or vice versa, to confirm the difference between both readings. If you've entered something out of the mile / kilometer conversion range, a failure message appears asking if to repeat the odometer reading. In this case: Press **Y** to repeat WP odometer reading attempt If pressed N, the WP returns to **step** 19 and proceeds through the CAN interface process
29	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available) **If programming μDP (not μDP+), proceed to step** 39

Step	Display	Description
30	Progress <_____>	**This screen appears when programming μDataPass Sense only.**
31	Error Codes Exist: Y/N	Error codes collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
32	Idle Time: Exist: Y/N	Idle Time collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 34 » Change default to Y to enable the option
33	Idle Time (Min) Threshold: 5	Idle Time Threshold. Default: Five minutes. Save or edit the parameter and save
34	Over Speed Exist: Y/N	Over Speed collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 36 **for μDP+ CAN, or to step** 38 **for μDP+ K-Line** » Change default to Y to enable the option
35	Over Speed Threshold: 70	Over Speed Threshold. Default: 70 miles / 113 Km. Save or edit the parameter and save
36	Over RPM Exist: Y/N	**This parameter is available for μDP+ CAN.** Over RPM collection option. Default: N » Press **ENTER** to leave the option disabled **In this case, proceed to step** 38 » Change default to Y to enable the option

Step	Display	Description
37	Over RPM Threshold: 4500	Over RPM Threshold. Default: 4500 RPM. Save or edit the parameter and save
38	Fuel Level Exist: Y/N	Fuel level collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
39	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and save
40	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and save
41	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
42	SEND to FP/DP	Press **SEND**
43	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
44	Programming Done!	An operation successful screen is displayed.

4.2.2.2. FP and DP Light Programming Sequence

The table below describes the programming sequence for light vehicles equipped with FuelOpass only and FuelOpass and DataPass Light devices (see Table 4-12).

Before proceeding, verify that the DataPass is already installed and is powered (turn ignition switch ON).

Turn the Wireless Programmer on and follow the instructions appearing on the display as described below.

Table 4-12 - FP and DP Light Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Org: [Organization Name]	The Organization Name is displayed. If the WP is associated with several HO, select the required organization
5	Vehicle ID:	1. Enter Vehicle ID (8 characters) 2. Reenter Vehicle ID for confirmation
6	Fleet Code:	Enter fleet code (4 characters)
7	Fuel Type:	Enter the allowed fuel type code
8	FP Type: 1: FP 2: FP+DP	FP type options are displayed: » Enter 1 to program a FuelOpass device only. **In this case proceed to step 27** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
9	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
10	Reading DP Wait...	Wait a few seconds until the WP recognizes the DP. **Proceed to step 13, except for the following:**
11	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process
12	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
13	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
14	Vehicle Model: >XXXXX	Select the vehicle model
15	Vehicle Year: >XXXX	Select the vehicle year
16	Additional Info: >	Select additional vehicle data, if any

Step	Display	Description
17	DP Type: DP Light	The detected DP type is displayed
18	Interface: >CAN Kline PLS	Select the communication protocol
19	Is DP Connected to Switch? Y/N	Select the DP connection type (whether DP is connected to ignition switch or not) to set the unit sleep mode. **If working with Odometer pulses, proceed to step** 20 **in** Table 4-13
20	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
21	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km. » Enter 2 for Miles **If Odometer reading was disabled, proceed to step** 24
22	DP Factor: 7200	DP Factor is displayed. Edit the parameter, entering a known factor, if needed
23	DP Offset: 0	DP Offset is displayed. Edit the parameter, entering a known offset, if needed
24	Read Engine Hour: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve engine hour reading » Change default to N to disable the option
25	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard

Step	Display	Description
26	E.H.: 0.0	**This screen is displayed only in cases where E.H. reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
27	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and save
28	SEND to FP/DP	Press **SEND**
29	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
30	Programming Done!	An operation successful screen is displayed.

4.2.2.3. DP Light Programming Sequence - Pulses Interface

The following table describes the sequence for units connected directly to odometer pulses output (see <u>Table 4-13</u>):

Table 4-13 - DP Light Programming Sequence - Pulses Interface

Step	Display	Description
20	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
21	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km. » Enter 2 for Miles Save or edit the parameter and save. **In cases where the Odometer reading option was disabled, proceed to step** <u>25</u>
22	Odometer Factor: 0	Set the Odometer factor
23	Odometer Threshold: mV 0	Set the Odometer threshold
24	Odometer Hysteresis: mV 0	Set the Odometer hysteresis
25	Read Engine Hour: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve engine hour reading » Change default to N to disable the option.
26	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard
27	E.H.: 0.0	**This screen is displayed only in cases where E.H. reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
28	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and save

Step	Display	Description
29	SEND to FP/DP	Press **SEND**
30	Programming DP Wait…	Wait a few seconds until the DP and VIU programming process finishes.
31	Programming Done!	An operation successful screen is displayed.

4.2.2.4. DP Programming Only

The Program DP only option enables the technician to program a DP unit which is not correlated with an FP unit.

The table below describes the Program DP only sequence steps which are common for all DP types (see Table 4-14).

Before proceeding, verify that the DP is powered (turn ignition switch ON).

Turn the WP on and follow the instructions on the WP display as described below.

Table 4-14 - DP Programming Only

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >Prog DP Only Read DP Only	The WP Functions menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Prog DP Only option
3	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
4	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save. **In cases where automatic recognition was selected and more than one DP is detected, the WP shows the MAC addresses of all DP units found:**
5	Select DP Address: >XXXXXXXX	Use the DOWN arrow key to move the pointer (>) to the required DP address
6	Wait...	Wait a few seconds until the WP recognizes the DP. **Proceed to step 9, except for the following:**

Step	Display	Description
7	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process
8	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
9	Org: [Organization Name]	The Organization Name is displayed. If the WP is associated to several HO, select the required organization
10	Vehicle ID:	1. Enter Vehicle ID (8 characters) 2. Reenter Vehicle ID for confirmation
11	Fleet Code:	Enter fleet code (4 characters). Program the unit, as follows: » Proceed to step 13 in Table 4-11 for µDP » Proceed to step 13 in Table 4-18 for DP Heavy » Proceed to step 13 in Table 4-12 for DP Light
After setting DP parameters, the following screen is displayed:		
	SEND to DP	Press **SEND** to set DP parameters
	Programming Done!	An operation successful screen is displayed.

4.2.2.5. Adding FP to DP Only

Add FP to DP option enables the technician to add an FP unit to a vehicle equipped with DP only.

The table below describes the Add FP to DP sequence steps which are common for all DP types (see Table 4-15).

Before proceeding, verify that the DP is powered (turn ignition switch ON).

Turn the WP on and follow the instructions on the WP display as described below.

Table 4-15 - Adding FP to DP Only

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >Add FP to DP Initialize NR	The WP Functions menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Add FP to DP option
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
5	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save. **In cases where automatic recognition was selected and more than one DP is detected, the WP shows the MAC addresses of all DP units found:**
6	Select DP Address: >XXXXXXXX	Use the DOWN arrow key to move the pointer (>) to the required DP address
7	Wait...	Wait a few seconds until the WP recognizes the DP.

Step	Display	Description
8	Vehicle ID: XXXX	Vehicle ID is displayed. Reenter Vehicle ID for confirmation
9	Fleet Code: XX	Fleet Code is displayed. Save or edit the parameter and save
10	Fuel Type:	Enter the allowed fuel type code
11	Vehicle Code: XXXX	Vehicle code is displayed. Save or edit the parameter and save. » Proceed to step 13 in Table 4-11 for µDP » Proceed to step 13 in Table 4-18 for DP Heavy » Proceed to step 13 in Table 4-12 for DP Light
	After setting DP parameters, the following screen is displayed:	
	SEND to DP+FP	Press **SEND** to set DP parameters
	Programming Done!	An operation successful screen is displayed.

4.2.2.6. Replacing DP

Replace DP option enables the technician to check a DP unit correlated with FP and to replace the DP if necessary.

During this process, the WP attempts to read the DP. In cases where the DP is found to be working, a proper message is displayed.

If the unit is defective, the technician should connect a new DP and use this option to program the new DP correlating it with the existing FP.

The table below describes the Replace DP sequence steps which are common for all DP types (see Table 4-16).

Before proceeding, verify that the DP is powered (turn ignition switch ON).

Turn the WP on and follow the instructions on the WP display as described below.

Table 4-16 - Replace DP Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >Replace DP Add DP to FP	The WP Functions menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Replace DP option
3	Attach Coil to FP. Press SEND	Place the WP coil near the vehicle's fuel inlet and then press **SEND**
4	Reading FP + DP Wait...	Wait a few seconds while the WP attempts to read FP and DP units. **In cases where the DP is found to be working, the following message is displayed (see step 5), otherwise proceed to step 6**
5	DP OK! No need to replace it!	No further action is required.
6	Replace DP and Press SEND	Replace defective DP with a working unit and then press **SEND**
7	DP Address: 1: Auto 2: Manual	Program the newly installed unit, as follows: » Proceed to step 9 in Table 4-11 for µDP » Proceed to step 9 in Table 4-18 for DP Heavy » Proceed to step 9 in Table 4-12 for DP Light
After setting DP parameters, the following screen is displayed:		
	SEND to DP	Press **SEND** to set DP parameters
	DP Parameters Done	An operation successful screen is displayed.

4.2.2.7. Add DP to FP

The Add DP to FP option enables the technician to program a DP unit and to correlate it with an already programmed FP.

> 👉 **Note**: FP units may not be reprogrammed after being associated to a DP.

The table below describes the Add DP to FP sequence steps which are common for all DP types (see Table 4-17).

Before proceeding, verify that the DP is powered (turn ignition switch ON).

Turn the WP on and follow the instructions on the WP display as described below.

Table 4-17 - Add DP to FP Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP >Add DP to FP Prog DP Only	The WP Functions menu is displayed. Use the DOWN arrow key to move the pointer (>) to the Add DP to FP option
3	Attach Coil to FP. Press SEND	Place the WP coil near the vehicle's fuel inlet and then press SEND
4	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
5	DP Address: 1: Auto 2: Manual	Program the newly added unit, as follows: » Proceed to step 9 in Table 4-11 for μDP » Proceed to step 9 in Table 4-18 for DP Heavy » Proceed to step 9 in Table 4-12 for DP Light
After setting DP parameters, the following screen is displayed:		
	SEND to FP & DP	Press SEND to program the DP unit
	DP Parameters Done	An operation successful screen is displayed.

4.2.3. Programming Heavy Vehicles

The following describes the programming process for heavy vehicles

4.2.3.1. FP and DP Heavy Programming Sequence

The table below describes the programming sequence for heavy and multi-tank vehicles equipped with FuelOpass only and FuelOpass and DataPass / DataPass Plus heavy devices (see Table 4-18).

Before proceeding, verify that the DP is already installed and is powered (turn ignition switch ON).

Turn the WP on and follow the instructions appearing on WP display described in the tables below.

Table 4-18 - FP and DP Heavy Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID
	Enter Password	Enter password
2	>Prog FP/FP+DP Read FP/FP+DP	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Org: [Organization Name]	The Organization Name is displayed. If the WP is associated with several HO, select the required organization
5	Vehicle ID:	1. Enter Vehicle ID (8 characters) 2. Reenter Vehicle ID for confirmation
6	Fleet Code:	Enter fleet code (4 characters)
7	Fuel Type:	Enter the allowed fuel type code
8	FP Type: 1: FP 2: FP+DP	FP type options are displayed: » Enter 1 to program a FuelOpass device only. **In this case proceed to step 56** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
9	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
10	Reading DP Wait...	Wait a few seconds until the WP recognizes the DP. **If this is not the first FP of a multi-tank vehicle, proceed to step** <u>56</u> **Proceed to step13, except for the following:**
11	Old Generation! Update DP? Y/N	In cases where the current DP is an older version, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process

Step	Display	Description
12	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
	DP Not Empty! >Add FP **i** DP Not Empty! >Replace FP **h**	The following options are available when using WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up: » Select **Add FP** to correlate an additional FP to the DP (for multi-tank vehicle) and proceed to **step** <u>56</u> » Select **Overwrite** to re-program the DP and proceed to **step** <u>13</u> » Select to replace a defective FP in cases where more than one FP unit is correlated to the DP (multi-tank trucks) and proceed to **step** <u>60</u>
13	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
14	Vehicle Model: >XXXXX	Select the vehicle model
15	Vehicle Year: >XXXX	Select the vehicle year
16	Additional Info: >	Select additional vehicle data, if any
17	DP Type: DP+ Heavy DP Type: DP Heavy	The detected DP type is displayed
18	Interface: FMS >PLS J1939 J1587	Select the communication protocol

Step	Display	Description
19	Is DP Connected to Switch? Y/N	Select the DP connection type (whether DP is connected to ignition switch or not) to set the unit sleep mode. **If working with Odometer pulses, proceed to step** 20 **in** Table 4-19
20	CAN Data Rate: 1: 250K 2: 500K	**This option exists for J1939 and FMS only.** CAN Data Rate: » Enter 1 for 250K » Enter 2 for 500K Then press **Enter**
21	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option. **In this case, proceed to step** 23
22	Odometer Adr: 255 DP Odo. Adr: 141	**This option exists for J19 and J15 only.** Odometer Address (Default: 255) and DP Odometer Address (Default: 141). Save or edit the parameters and then save
23	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km » Enter 2 for Miles Save or edit the parameter and then save
24	Read Engine Hour: Y/N	Engine hour reading option. Default: Y » Press **ENTER** to retrieve engine hour reading » Change default to N to disable the option. **In this case, proceed to step** 28

Step	Display	Description
25	E.H. SRC 1: Switch 2: Bus	**This option exists for J19 and J15 only.** Select the input source for Engine Hour reading: 1 for Switch or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select Bus » Change default to 1 to select Switch. **In this case, proceed to step** <u>28</u>
26	E.H. Adr: 255 DP E.H. Adr: 141	**This option exists for J19 and J15 only.** E.H. Address (Default: 255) and DP E.H. Address (Default: 141). Save or edit the parameters and then save
27	E.H. PID: 247	**This option exists for J19 and J15 only.** The E.H. PID (Parameter ID) is displayed. Default: 247. Save or edit the parameter (changing the value to 246) and then save
28	Switch on Engine Press SEND	**This option exists for J19 and J15 only.** Switch on the engine, wait 20 seconds and then press **SEND**. DP attempts to read the odometer / engine hours. If reading attempt fails, the WP will go back to step <u>21</u>.
29	Odometer: XXXXXXX	**This option exists for J19 and J15 only.** Odometer reading is displayed. Edit the parameter, entering the value displayed on the dashboard
30	Engine Hour: XXXXXXX	Engine Hour reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available)

Step	Display	Description
31	Main Engine: 255 DP SRC Adr: 141	**This option exists for J19 and J15 only.** This screen is displayed in cases where Engine Hour reading was disabled (step 24) or the E.H. source selected was Switch (step 25). Main Engine Address (Default: 255) and DP Source Address (Default: 141). Save or edit the parameters and then save **If programming DP (not DP+), proceed to step** 53
32	Error Codes Exist: Y/N	Error codes collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
33	Aux1 E.H. Exist: Y/N	Aux. Engine #1 E.H. reading option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 38 » Change default to Y to enable the option
34	Aux1 E.H. SCR: 1: Line 2: Bus	Select the input source for Aux. #1 Engine Hour reading: 1 for Line or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select BUS. **In this case, proceed to step** 36 » Change default to 1 to select Line. **In this case, proceed to step** 35
35	Aux1 Polarity: 1: Minus 2: Plus	Select the line polarity: 1 for Minus, 2 for Plus. Default: Plus » Press **ENTER** to select Plus » Change default to 1 to select Minus **Proceed to step** 37

Step	Display	Description
36	Aux1 E.H. Adr: 175	Aux. Engine #1 E.H. Address (Default: 175). Save or edit the parameter and then save
37	Aux1 E.H.:	Aux. Engine #1 E.H. reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available)
38	Aux2 E.H. Exist: Y/N	Aux. Engine #2 E.H. reading option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 43 » Change default to Y to enable the option
39	Aux2 E.H. SCR: 1: Line 2: Bus	Select the input source for Aux. #2 Engine Hour reading: 1 for Line or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select BUS. **In this case, proceed to step** 41 » Change default to 1 to select Line. **In this case, proceed to step** 40
40	Aux2 Polarity: 1: Minus 2: Plus	Select the line polarity: 1 for Minus, 2 for Plus. Default: Plus » Press **ENTER** to select Plus » Change default to 1 to select Minus **Proceed to step** 42
41	Aux2 E.H. Adr: 183	Aux. Engine #2 E.H. Address (Default: 183). Save or edit the parameter and then save
42	Aux2 E.H.	Aux. Engine #2 E.H. reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available)

Step	Display	Description
43	PTO Exist: Y/N	Power take-off operating hour's collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
44	Idle Time Exist: Y/N	Idle Time collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 47 » Change default to Y to enable the option
45	Idle Time (Min) Threshold: 5	Idle Time Threshold. Default: Five minutes. Save or edit the parameter and then save
46	Over Speed Exist: Y/N	Over Speed collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 48 » Change default to Y to enable the option
47	Over Speed Threshold: 65	Over Speed Threshold. Default: 65 miles / 105 Km. Save or edit the parameter and then save
48	Over RPM Exist: Y/N	Over RPM collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 50 » Change default to Y to enable the option
49	Over RPM Threshold: 3500	Over RPM Threshold. Default: 3500 RPM. Save or edit the parameter and then save
50	Fuel Level: Exist: Y/N	Fuel level collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option

Step	Display	Description
51	Fuel Consumed Exist: Y/N	Fuel consumption collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
52	Tacho Driver ID Exist? Y/N	**This option exists for J1939 and FMS only**. Tachograph reading of Driver ID from driver's card. » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
53	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and then save
54	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
55	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
56	SEND to FP/DP	Press **SEND**
57	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes. **Proceed to step 64, except for the following:**

Step	Display	Description
58	Done! (X FP) Add FP? Y/N	**The following options are available when using WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up**: The number of FP units correlated to the DP is displayed. » To add another FP (for an additional tank) press **Y**. **Proceed to step** 59 » Press **N** to finish the process and return to the WP Functions main menu (**step 2**)
59	Attach Coil to FP. Press SEND	Place the WP coil near the FP coil and press SEND. **Note**: The system supports up to five different FP devices per vehicle. After 5 FP units were successfully programmed the option to add FP becomes unavailable and a success message is displayed
59	Fuel Type:	Enter the allowed fuel type code. **Proceed to step** 56
60	X FPs Left: >Read another FP i	**The following screens appear if the Replace FP option was selected**: The number of remaining functional FP devices is displayed. Select the Read another FP option

Step	Display	Description
61	Bring Ring to FP and Press SEND	Place the WP coil near the FP coil and press **SEND**. The WP reads the functional FP data. » If there are more FPs installed, the WP automatically returns to **step** 60 to read the rest of the units » Otherwise, proceed to **step** 62
62	Bring Ring to new FP and Press SEND	Place the WP coil near the newly replaced FP coil and press **SEND**
63	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes.
64	Programming Done!	An operation successful screen is displayed.

4.2.3.2. DP Heavy Programming Sequence - Pulses Interface

The following table describes the sequence for units connected directly to odometer pulses output (see Table 4-19):

Table 4-19 - DP Heavy Programming Sequence - Pulses Interface

Step	Display	Description
20	CAN Data Rate: 1: 250K 2: 500K	**This step is intended for J1939 only.** CAN Data Rate: » Enter 1 for 250K » Enter 2 for 500K Then press **Enter**
21	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option.
22	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km » Enter 2 for Miles Save or edit the parameter and then save. **In cases where the Odometer reading option was disabled, proceed to step** 26
23	Odometer Factor: 0	Set the Odometer factor
24	Odometer Threshold: mV 0	Set the Odometer threshold
25	Odometer Hysteresis: mV 0	Set the Odometer hysteresis
26	Read Engine Hour: Y/N	Engine hour reading option. Default: Y » Press **ENTER** to retrieve Engine Hour reading » Change default to N to disable the option
27	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard

Step	Display	Description
28	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
29	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and then save
30	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
31	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
32	Pulse Factor: Y/N	**This option exists for Pulse interface only.** » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
33	SEND To FP/DP	Press **SEND**
34	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes. **Proceed to step 42, except for the following:**

Step	Display	Description
35	Done! (X FP) Add FP? Y/N	The number of FP units correlated to the DP is displayed. » To add another FP (for an additional tank press **Y**. **Proceed to step** 36 » Press **N** to finish the process and return to the WP Functions main menu (**step** 2 **in** Table 4-18**)**
36	Attach Coil to FP. Press SEND	Place the WP coil near the FP coil and press **SEND** **Note**: The system supports up to five different FP devices per vehicle. After 5 FP units were successfully programmed the option to add FP becomes unavailable and a success message is displayed
37	Fuel Type:	Enter the allowed fuel type code. **Proceed to step** 33
38	X FPs Left, >Read another FP i	**The following screens appear if the Replace FP option was selected:** The number of remaining functional FP devices is displayed. Select the **Read another FP** option
39	Bring Ring to FP and Press SEND	Place the WP coil near the FP coil and press **SEND**. The WP reads the functional FP data. » If there are more FPs installed, the WP automatically returns to **step** 38 to read the rest of the units **Otherwise, proceed to step** 40
40	Bring Ring to new FP and SEND	Place the WP coil near the newly replaced FP coil and press **SEND**

Step	Display	Description
41	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
42	Programming Done!	An operation successful screen is displayed.

4.2.3.3. DP Heavy Vehicle Interface - Communication Parameters

The following table details the default and the alternative values for DP-vehicle interface communication parameters described above (see Table 4-20):

Table 4-20 - DP-Heavy Vehicle Interface Communication Parameters Values

Parameter	J1587		J1939	
	Default	Alternative	Default	Alternative
Odometer Adr	255	128	255	0
DP Odo Adr	141	171, 179, 180	24	-
E.H Adr	255	128	255	0
DP E.H Adr	141	171, 179, 180	24	-
E.H PID	247	246	229	-

In cases where Odometer and Engine Hour readings are not obtained using default values, proceed as follows:

Odometer reading:

» If Odometer reading is 0 / fails: Change **DP Odo Adr** to one of the alternative values shown above

Engine Hour Reading:

» If Engine Hour reading fails: Change **DP E.H Adr** to one of the alternative values shown above
» If Engine Hour reading still fails – change **E.H PID** to 246

4.3. Retail Solution

This section provides a description for the Retail Solution Wireless Programmer, and installation as well as activation guidelines as follows:

» FP and µDP / µDP
» FP and DP / DP+ for heavy vehicles
» FP and DP for light vehicles

ForeFuel includes a secure issuing system enabling oil companies to generate and install vehicle identification encrypted devices over a GPRS installation system. Devices programming and installation can be executed either in an Installation Center or on customer premises. The Issuing System for retail

solutions accelerates deployment by enabling installation of any vehicle at and programming units on the spot, providing high security and tight control of the process.
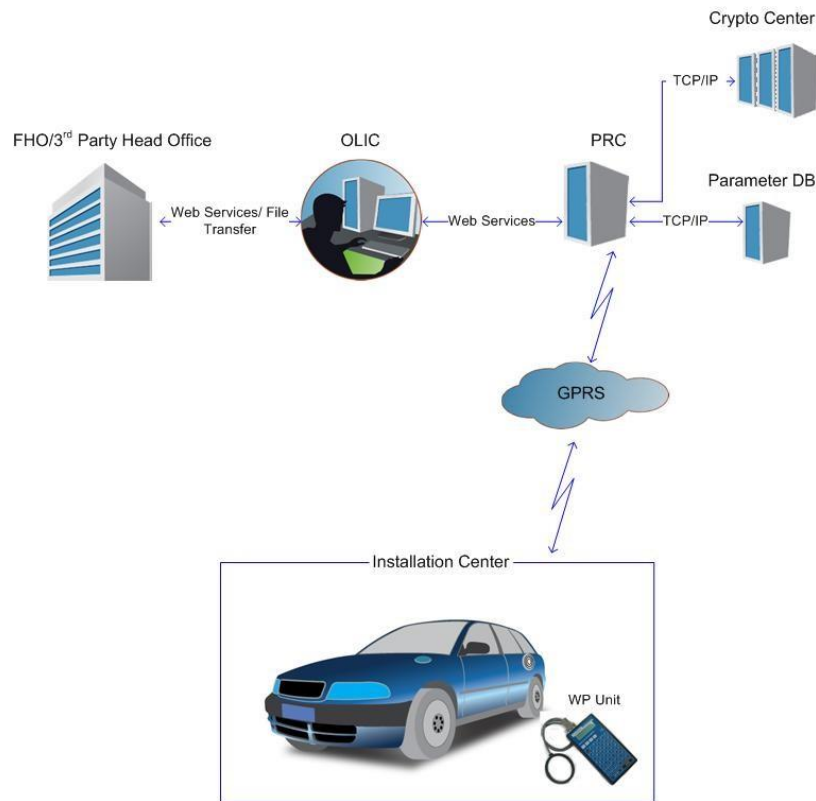
Figure 4-17 - ForeFuel Issuing System Architecture for Retail Solutions

4.3.1. Main Components

The main system components are detailed below:

» **OLIC** (P/N 800923890): Orpak's Online Issuing Center application interfaces with Orpak's FHO, or 3rd party's CRM solutions, and allows customers to centralize the vehicle devices issuing process, tracking orders and devices throughout each stage. The application guides the user through the issuing process, enabling operators to control orders, send them to the Programming Center, as well as print or save the Order Form required for customer's personnel / drivers. OLIC also manages Wireless Programmer (WP) units as well as receives all orders for new vehicle identification units.

» **PRC** (P/N 819820991): Orpak's Programming Center server centralizes order requests received from OLIC as well as programming requests from the WP. PRC and OLIC communicate via Web Services, while WP units are connected to PRC via GPRS link. Orders are sent for programming by the OLIC operator to the PRC and are kept in its database. Subsequent to receiving a programming request, PRC validates the various parameters' integrity in accord with order details, sends programming data to the Crypto Center, and retrieves the encrypted data back to the WP.

> **Note**: For further information on PRC server and OLIC application, please refer to OLIC Installation and User's Manual, P/N 817423890.

» **Wireless Programmer Units**: Orpak's WP Units burn the vehicle identification units. WP units communicate with PRC via GPRS link in order to request for approval and retrieve results at end of the process. WP Units must be defined in OLIC, operated by a Certified Technician and associated to a predefined Installation Center, to strengthen the security of the issuing process.

» **FHO**: Orpak's Fleet Head Office, or 3rd party's HO / CRM, application is intended for creation and maintenance of customers, fleets and vehicles, acting as the CRM (Customer Relations Management) application in Orpak's issuing process. FHO or any other CRM program communicates with OLIC via Web Services or file transfer. All new devices' parameters created in FHO are sent automatically to OLIC which generates a unique order number.

» **Crypto Center**: Orpak's Crypto Center is a sophisticated secure encryption server which receives validated programming data from PRCs, and retrieves encrypted strings coded with the customer's unique encryption key.

» **Parameter Database**: Orpak's Parameter Database contains vehicles parameters which enable an accurate calibration of Vehicle Identification Units according to the vehicle type and model. The database communicates with the PRC, and sends the relevant parameters upon request from the WP.

4.3.2. Wireless Programmer

> **Warning**: Programming using the WP should be done in safe area (Non-Hazardous location). Therefore, it should be done prior to Fuel ring installation.

In the Retail solution, the vehicle units are programmed on-the-spot with the Wireless Programmer (WP) - version 2.07.27, P/N 800920930 (see Figure 4-18).

> **Note**: If an error message is received when programming FP +DP units, replace the FP unit, and use the **Replace FP** option detailed below.

Figure 4-18 - Retail Solution Wireless Programmer

4.3.2.1. Technical Specifications

The table below details the technical specifications for the Retail Solution Wireless Programmer (see Table 4-21):

Table 4-21 - Retail Solution Wireless Programmer - Technical Specifications

	Parameter	Value
PHYSICAL	Height	29 mm
	Width	192 mm
	Depth	99 mm
	Weight	380 grams
	Connectors	Terminal Port: DB-9 (Female) Power Port: DC Jack
USER INTERFACE	Keyboard	48 Keys
	Display	2 x 16 Characters LCD
ELECTRICAL	Supply Voltage	7.2V, 2000mAh Lithium-ion internal battery
	Charge Voltage	12V to 28V DC input
	Protection	Supply voltage reverse polarity protected Short circuit protected over charge and full discharge protected
ENVIRONMENTAL CONDITIONS	Temperature	Operating: -20 to +70 °C
		Storage: -40 to +85 °C
	Humidity	In accordance with IEC 68-2-30
COMMUNICATION	Wired Interfaces	External - RS232 Communication Link
	Wireless Interfaces	Single IEEE802.15.4 wireless channel Receive sensitivity: -101dbm : 50 meter at open space
	RFID / VIU	Designed for Low Frequency (125 KHz) chip reading Reading distance: Up to 8 cm, influenced by Tag geometry
	Modem	GPRS Modem

4.3.2.2. Battery Saving and Chargers

See Battery Saving and Chargers.

4.3.2.3. Wireless Programmer Setup

Prior to programming the vehicle units, the following setup procedures should be performed:

» Setting up WP and users in OLIC

» Establishing WP- PRC connection

4.3.2.3.1. Defining WP Units and Technicians in OLIC

For details on WP setup, please refer to OLIC Installation and User's Manual, P/N 817423890.

The following sections describe the steps required for defining WP and WP users in the system:

1. Creation of an Installation Center (Section 10)
2. Registration of WP Technicians (Section 11)
3. Association of WP Units to the Installation Center (Section 12)

4.3.2.3.2. Configuring WP Cellular Network

In order to establish the WP connection to the PRC via GPRS link, perform the following preliminary steps:

1. Obtain a Data SIM card (GPRS) compatible with the local cellular network. Verify that the SIM card supports 2.5 generation modems
2. Obtain an APN (Access Point Name) from an ISP (Internet Service Provider). The APN must be provided without a username or password
3. Define, together with the ISP, which frequency band is to be used
4. Obtain a cellular internet package for the SIM card. It is highly recommended to use at least 50 MB
5. Before placing the SIM card in the WP, test it in a cellular phone to make sure an internet connection can be established

4.3.2.3.3. Placing the SIM Card

To place the SIM card in the WP, proceed as follows:

1. Release the four screws from the WP's rear cover and remove the cover (see Figure 4-19)

Figure 4-19 - Removing the WP Rear Cover

2. The SIMRpel card is located on the rear side of the PCB. Turn the PCB over

3. Pull out the SIM card tray and place the SIM card in the tray (see Figure 4-20)
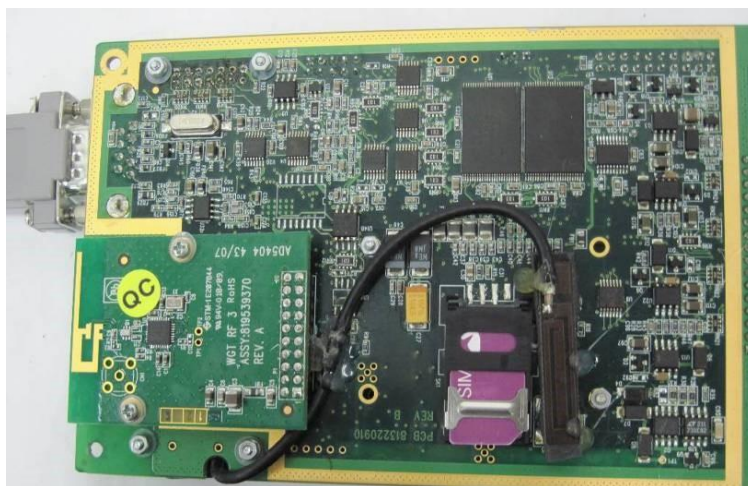
Figure 4-20 - Placing the SIM in the WP

4. Replace and secure the rear cover

4.3.2.3.4. Setting the GPRS Link

To configure the WP's GPRS modem, turn the WP on and follow the instructions appearing on the display as described below (see Table 4-22).

Note: When setting the WP modem, enter the factory default username: "1234", and password: "5678". These credentials allow primary setup but do not provide access to programming features.

Table 4-22 - WP Modem Configuration Sequence

Step	Display	Description
1	Enter User ID	Enter 1234 and press **ENTER**
	Enter Password	Enter 5678 and press **ENTER**
2	>Test Terminal SN	The System menu is displayed
3	>Server Address Check for Update	Use the DOWN arrow key to move the pointer (>) to the Server Address menu and press **ENTER**
4	Band (1-4): 1	Select the appropriate GPRS frequency band depending on the geographical location of the ISP operator interface terminal. The following bands are available (Default: 1): » 1: - 900MHz + 1800MHz » 2: - 900MHz + 1900MHz » 3: - 850MHz + 1800MHz » 4: - 850MHz + 1900MHz Press **ENTER** to select 1 or use the **DEL** key and then enter the required bend number using the keypad and then press **ENTER**
5	Server IP Add1: 0.0.0.0	Enter PRC primary IP address and press **ENTER**
6	APN:	Enter the Access Point Name as received from the ISP and press **ENTER**
7	Server Port1:	Enter PRC primary IP port and press **ENTER**
8	Server IP Add2: 0.0.0.0	Enter PRC secondary IP, if any. Press **ENTER**

Step	Display	Description
9	APN:	Enter the Access Point Name as received from the ISP and press **ENTER**
10	Server Port2:	Enter PRC secondary IP port and press **ENTER**
11	Turn OFF and ON to accept change	Restart the device, pressing the ON/OFF key to save the changes

4.3.2.3.5. Testing WP - PRC Communication

To perform a WP – PRC communication test, turn the WP on and follow the instructions appearing on the display as described below (see Table 4-23).

Table 4-23 - GPRS Communication Test Sequence

Step	Display	Description
1	Enter User ID	Enter User ID as defined in OLIC and press **ENTER**
	Enter Password	Enter password as defined in OLIC and press **ENTER**. Press the **BCK** key
2	>WP Functions Sys Functions	The System menu is displayed
3	>Services Tech Functions	Use the DOWN arrow key to move the pointer (>) to the Services option and press **ENTER**
4	>Test Terminal SN	Press **ENTER**
5	>Test LCD Test KBD	The Test menu is displayed
6	>Test GPRS Comm Test LCD	Use the UP arrow key to move the pointer (>) to the Test GPRS Comm option and press **ENTER**
7	>Comm Status Test PRC Comm	The GPRS Test submenu appears
8	>Test PRC Comm Test Net	Use the DOWN arrow key to move the pointer (>) to the Test GPRS Comm option and press **ENTER**
9	To test PRC COMM Press SEND	Press **SEND**
10	Test PRC Comm...	Wait a few seconds until the test finishes
11	Test PRC Comm: Passed!	An operation successful screen is displayed.

4.3.2.4. Wireless Programmer Keyboard

See Wireless Programmer Keyboard.

4.3.3. Programming Light Vehicles

The following tables describe the programming processes for light vehicles.

4.3.3.1. FP and µDP Programming Sequence

The table below describes the programming sequence for light vehicles equipped with FuelOpass only, and FuelOpass as well as µDataPass / µDataPass Plus / µDataPass Sense / DataPass Sense devices (see Table 4-24).

Before proceeding, verify that µDP is already installed and is powered (turn ignition switch ON).

Turn the WP on and follow the instructions appearing on the display as described below.

Table 4-24 - FP and μDP (DP Sense for Direct) Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID as defined in OLIC
	Enter Password	Enter password as defined in OLIC
2	>Prog String Read String	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Vehicle ID:	Enter Vehicle ID as it appears on the Order Form
5	Prog Code:	Enter the Programming Code (unique identification code generated by the OLIC, identical to the Order Number)
6	FP Type: 1: FP 2: FP+DP	FP type options are displayed, define the devices to be programmed according to order details » Enter 1 to program a FuelOpass device only. **In this case proceed to step 12** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
7	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
8	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
9	Reading DP Wait…	Wait a few seconds until the WP recognizes the DP. **Proceed to step 12, except for the following:**
10	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process

Step	Display	Description
11	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y** **Note**: If the vehicle's Bus wasn't detected, a message appears asking to try again. If pressed N, a follow-up message appears asking if you'd like to install another DP. In this case: if pressed Y, return to step <u>8</u>. If pressed N, the WP restarts this step and proceeds without odometer, where the interface process will state an "unknown bus".
12	SEND to PRC	Press **SEND** to send the order parameters to PRC for validation
13	Waiting for PRC Reply	Wait a few seconds until the WP receives approval from PRC
14	Chassis	Enter the vehicle's chassis number. **If programming FP only, proceed to step** <u>50</u>
15	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
16	Vehicle Model >XXXXX	Select the vehicle model
17	Vehicle Year >XXXX	Select the vehicle year
18	Additional Info: >	Select additional vehicle data, if any

Step	Display	Description
19	DP Type: µDP DP Type: µDP+	The detected DP type is displayed: » µDP » µDP+
20	Odometer X Method	The WP displays the odometer method: » Direct » OBD (only for µDP) » VAG
21	Interface: >Kline Interface: >CAN	The communication protocol is displayed depending on the µDP type **In Direct or VAG, proceed to step 30** **If the setup is for DP Sense, proceed to step 22**
22	Read Odometer: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading. **In this case, proceed to step 24** » Change default to N to disable the option
23	Read Engine Hour: Y/N	Engine hour reading option. Default: Y » Press **ENTER** to retrieve engine hour reading. **In this case, proceed to step 37** » Change default to N to disable the option
24	Switch on Engine Press SEND	**This screen appears in Direct and VAG only.** Switch on the engine, wait 20 seconds and then press **SEND**. DP attempts to read the odometer / engine hours
25	Progress <_____>	**This screen appears when programming µDataPass Sense only.**

Step	Display	Description
26	Odometer: XXXXXXX Correct? Y/N	Odometer reading is displayed. Edit the parameter, entering the value displayed on the dashboard. » Press **Y** if the odometer reading is the same as displayed on the dashboard. **In this case, go to step** 23 » Press **N** if the he odometer reading is not the same as displayed on the dashboard
27	Enter Dashboard Odometer	Enter the odometer value displayed on the dashboard and press **ENTER**
28	Direct Odo failed Repeat? Y/N	If the manual odometer read fails: » Press **Y** to repeat. **In this case, go to step** 27 » Press **N** to proceed to engine hour reading. **In this case, go to step** 23
29	Are you sure? Y/N	**This screen appears for CAN OBD only.** » Press **Y** to continue » Press **N** to back to the previous screen
30	Odometer Exist: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
31	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km » Enter 2 for Miles **In Direct or VAG, or if Odometer reading was disabled, proceed to step** 34

Step	Display	Description
32	DP Factor: 7200	This screen appears for OBD and VAG only. DP Factor is displayed. Edit the parameter, entering a known factor, if needed
33	DP Offset: 0	**This screen appears for OBD and VAG only.** DP Offset is displayed. Edit the parameter, entering a known offset, if needed
34	E.H. Exist: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve Engine Hour reading » Change default to N to disable the option
35	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard.
36	Switch on Engine Press SEND	**This screen appears in Direct and VAG only.** Switch on the engine, wait 20 seconds and then press **SEND**. DP attempts to read the odometer / engine hours **Note**: In Direct and VAG, if the odometer entered does not match what the WP read, then you'll receive an error message asking to try again: Press **Y** to display the WP odometer reading If pressed N, the WP returns to **step** 21

Step	Display	Description
37	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available) **If programming µDP (not µDP+), proceed to step 47**
38	Progress <_____>	**This screen appears when programming µDataPass Sense only.**
39	Error Codes Exist: Y/N	Error codes collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
40	Idle Time: Exist: Y/N	Idle Time collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step 42** » Change default to Y to enable the option
41	Idle Time (Min) Threshold: 5	Idle Time Threshold. Default: Five minutes. Save or edit the parameter and then save
42	Over Speed Exist: Y/N	Over Speed collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step 44 for µDP+ CAN or to step 46 for µDP+ K-Line** » Change default to Y to enable the option
43	Over Speed Threshold: 70	Over Speed Threshold. Default: 70 miles / 113 Km. Save or edit the parameter and then save

Step	Display	Description
44	Over RPM Exist: Y/N	**This parameter is available for µDP+ CAN.** Over RPM collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 46 » Change default to Y to enable the option
45	Over RPM Threshold: 4500	Over RPM Threshold. Default: 4500 RPM. Save or edit the parameter and then save
46	Fuel Level Exist: Y/N	Fuel level collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
47	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and then save
48	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
49	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
50	SEND to VIU/DP	Press **SEND**
51	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
52	Programming Done!	An operation successful screen is displayed.

4.3.3.2. FP and DP Light Programming Sequence

The table below describes the programming sequence for light vehicles equipped with FuelOpass only, as well as FuelOpass and DataPass Light devices (see Table 4-25).

Before proceeding, verify that the DP is already installed and is powered (turn ignition switch ON).

Turn the WP on and follow the instructions appearing on the display as described below.

Table 4-25 - FP and DP Light Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID as defined in OLIC
	Enter Password	Enter password as defined in OLIC
2	>Prog String Read String	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Vehicle ID:	Enter Vehicle ID as it appears on the Order Form
5	Prog Code:	Enter the Programming Code (unique identification code generated by the OLIC, identical to the Order Number)
6	FP Type: 1: FP 2: FP+DP	FP type options are displayed, define the devices to be programmed according to order details » Enter 1 to program a FuelOpass device only. **In this case proceed to step 12** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
7	DP Type: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
8	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
9	Reading DP Wait…	Wait a few seconds until the WP recognizes the DP. **Proceed to step** 12**, except for the following:**
10	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process
11	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
12	SEND to PRC	Press **SEND** to send the order parameters to PRC for validation
13	Waiting for PRC Reply	Wait a few seconds until the WP receives approval from PRC
14	Chassis	Enter the vehicle's chassis number. If programming FP only, **proceed to step** 31

Step	Display	Description
15	Manual Params Setting? Y/N	» Press **Y** to manually edit DP Factor and DP Offset values » Press **N** to use the predetermined values
16	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
17	Vehicle Model: >XXXXX	Select the vehicle model
18	Vehicle Year: >XXXX	Select the vehicle year
19	Additional Info: >	Select additional vehicle data, if any
20	DP Type: DP Light	The detected DP type is displayed
21	Interface: >CAN Kline PLS	Select the communication protocol
22	Is DP Connected to Switch? Y/N	Select the DP connection type (whether DP is connected to ignition switch or not) to set the unit sleep mode. **If working with Odometer pulses, proceed to step** 23 **in** Table 4-26
23	Odometer Exist: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
24	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km. » Enter 2 for Miles **If Odometer reading was disabled, proceed to step** 27

Step	Display	Description
25	DP Factor: 7200	**This screen is displayed only in cases where the Manual Parameters Setting option was selected (step 15).** DP Factor is displayed. Edit the parameter, entering a known factor, if needed
26	DP Offset: 0	**This screen is displayed only in cases where the Manual Parameters Setting option was selected (step 15).** DP Offset is displayed. Edit the parameter, entering a known offset, if needed
27	E.H. Exist: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve Engine Hour reading » Change default to N to disable the option
28	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard
29	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
30	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
31	SEND to VIU/DP	Press **SEND**
32	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
33	Programming Done!	An operation successful screen is displayed.

4.3.3.3. DP Light Programming Sequence - Pulses Interface

The table below describes the sequence for units connected directly to odometer pulses output (see Table 4-26):

Table 4-26 - DP Light Programming Sequence - Pulses Interface

Step	Display	Description
23	Odometer Exist: Y/N	Odometer reading option. Default: Y 》 Press **ENTER** to retrieve odometer reading 》 Change default to N to disable the option.
24	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: 》 Enter 1 for Km. 》 Enter 2 for Miles Save or edit the parameter and then save. **In cases where the Odometer reading option was disabled, proceed to step** 28
25	Odometer Factor: 0	Set the Odometer factor
26	Odometer Threshold: mV 0	Set the Odometer threshold
27	Odometer Hysteresis: mV 0	Set the Odometer hysteresis
28	E.H. Exist: Y/N	Engine Hour reading option. Default: Y 》 Press **ENTER** to retrieve Engine Hour reading 》 Change default to N to disable the option
29	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard
30	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
31	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save

Step	Display	Description
32	SEND to VIU/DP	Press **SEND**
33	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes.
34	Programming Done!	An operation successful screen is displayed.

4.3.4. Programming Heavy Vehicles

The following describes the programming processes for heavy vehicles.

4.3.4.1. FP and DP Heavy Programming Sequence

The table below describes the programming sequence for heavy vehicles equipped with FuelOpass only, as well as FuelOpass and DataPass / DataPass Plus heavy devices (see Table 4-27).

Before proceeding, verify that the DP is already installed and is powered (turn ignition switch ON).

Turn the WP on and follow the instructions appearing on WP display described below.

Table 4-27 - FP and DP Heavy Programming Sequence

Step	Display	Description
1	Enter User ID	Enter User ID as defined in OLIC
	Enter Password	Enter password as defined in OLIC
2	>Prog String Read String	Place the WP coil near the vehicle's fuel inlet
3	Reading VIU Wait...	Wait a few seconds until the WP recognizes the FuelOpass
4	Vehicle ID:	Enter Vehicle ID as it appears on the Order Form
5	Prog Code:	Enter the Programming Code (unique identification code generated by the OLIC, identical to the Order Number)
6	FP Type: 1: FP 2: FP+DP	FP type options are displayed, define the devices to be programmed according to order details » Enter 1 to program a FuelOpass device only. **In this case proceed to step 12** » Enter 2 to program both FuelOpass and DataPass devices

Step	Display	Description
7	DP Address: 1: Auto 2: Manual	DP MAC address (unique unit ID) insertion: » Enter 1 to automatically recognize DP MAC address. Stay inside the vehicle close to DP, or at a maximum range of ~0.5m to maintain proper receiving signal and avoid the possibility of finding by mistake another DP. Wait up to seven seconds for result » Enter 2 for manual insertion of the MAC address
8	DP Address: XXXXXXXX	Verify the automatically entered MAC / Type the eight characters as shown on DP rear label and save
9	Reading DP Wait…	Wait a few seconds until the WP recognizes the DP. **Proceed to step** 12**, except for the following**:
10	Old Generation! Update DP? Y/N	In cases where the current DP version is old, users may update DP firmware (i.e. update DP to DP+): » Press **Y** to update » Press **N** to continue the current process

Step	Display	Description
11	DP Not Empty! Overwrite? Y/N	In cases where the DP has been previously programmed, approve re-programming: press **Y**
	DP Not Empty! >Add FP **i** Overwrite >Replace FP **h**	**The following options are available when using WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up:** » Select **Add FP** to correlate an additional FP to the DP (for multi-tank trucks) and proceed to **step** 12 » Select **Overwrite** to re-program the DP and proceed to **step** 12 Select to replace a defective FP in cases where more than one FP unit is correlated to the DP (multi-tank trucks) and proceed to **step** 12
12	SEND to PRC	Press **SEND** to send the order parameters to PRC for validation
13	Waiting for PRC Reply	Wait a few seconds until the WP receives approval from PRC
14	Chassis	Enter the vehicle's chassis number. » If programming FP only / Adding a FP, **proceed to step** 56 » If replacing FP, **proceed to step** 65
15	Vehicle Manufact: >XXXXX	Select the vehicle manufacturer
16	Vehicle Model: >XXXXX	Select the vehicle model
17	Vehicle Year: >XXXX	Select the vehicle year
18	Additional Info: >	Select additional vehicle data, if any

Step	Display	Description
19	DP Type: DP+ Heavy DP Type: DP Heavy	The detected DP type is displayed
20	Interface: FMS >PLS J1939 J1587	Select the communication protocol
21	Is DP connected to Switch? Y/N	Select the DP connection type (whether DP is connected to ignition switch or not) to set the unit's sleep mode. **If working with Odometer pulses, proceed to step** 22 **in** Table 4-28
22	Odometer Exist: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
23	Odometer Adr: 255 DP Odo. Adr: 141	Odometer Address (Default: 255) and DP Odometer Address (Default: 141). Save or edit the parameters and then save
24	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km. » Enter 2 for Miles Save or edit the parameter and then save
25	E.H. Exist: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option. **In this case, proceed to step** 29

Step	Display	Description
26	E.H. SRC 1: Switch 2: Bus	Select the input source for Engine Hour reading: 1 for Switch or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select Bus » Change default to 1 to select Switch. **In this case, proceed to step** 29
27	E.H. Adr: 255 DP E.H. Adr: 141	E.H. Address (Default: 255) and DP E.H. Address (Default: 141). Save or edit the parameters and then save
28	E.H. PID: 247	The E.H. PID (Parameter ID) is displayed. Default: 247. Save or edit the parameter (changing the value to 246) and then save
29	Switch on Engine Press SEND	Switch on the engine, wait 20 seconds and then press **SEND**. DP attempts to read the odometer / engine hours
30	Odometer: XXXXXXX	Odometer reading is displayed. Edit the parameter, entering the value displayed on the dashboard
31	Engine Hour: XXXXXXX	Engine Hour reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available) **If programming DP (not DP+), proceed to step** 53
32	Main Engine: 255 DP SRC Adr: 141	This screen is displayed in cases where Engine Hour reading was disabled (**step** 25) or the E.H. source selected was Switch (**step** 26). Main Engine Address (Default: 255) and DP Source Address (Default: 141) Save or edit the parameters and then save

Step	Display	Description
33	Error Codes Exist: Y/N	Error codes collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
34	Aux1 E.H. Exist: Y/N	Aux. Engine #1 Engine Hour reading option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 39 » Change default to Y to enable the option
35	Aux1 E.H. SCR: 1: Line 2: Bus	Select the input source for Aux. #1 Engine Hour reading: 1 for Line or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select BUS. **In this case, proceed to step** 37 » Change default to 1 to select Line. **In this case, proceed to step** 36
36	Aux1 Polarity: 1: Minus 2: Plus	Select the line polarity: 1 for Minus, 2 for Plus. Default: Plus » Press **ENTER** to select Plus » Change default to 1 to select Minus **Proceed to step** 38
37	Aux1 E.H. Adr: 175	Aux. Engine #1 E.H. Address (Default: 175). Save or edit the parameter and then save
38	Aux1 E.H.:	Aux. Engine #1 E.H. reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available)

Step	Display	Description
39	Aux2 E.H. Exist: Y/N	Aux. Engine #2 Engine Hour reading option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 44 » Change default to Y to enable the option
40	Aux2 E.H. SCR: 1: Line 2: Bus	Select the input source for Aux. #2 Engine Hour reading: 1 for Line or 2 for Vehicle Bus. Default: Bus » Press **ENTER** to select BUS. **In this case, proceed to step** 42 » Change default to 1 to select Line. **In this case, proceed to step** 41
41	Aux2 Polarity: 1: Minus 2: Plus	Select the line polarity: 1 for Minus, 2 for Plus. Default: Plus » Press **ENTER** to select Plus » Change default to 1 to select Minus **Proceed to step** 43
42	Aux2 E.H. Adr: 183	Aux. Engine #2 E.H. Address (Default: 183). Save or edit the parameter and then save
43	Aux2 E.H.	Aux. Engine #2 E.H. reading is displayed, in cases where the E.H. source is the Bus. Otherwise, a zero is displayed. Edit the parameter, entering the value displayed on the dashboard (if available)
44	PTO Exist: Y/N	Power take-off operating hour's collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option

Step	Display	Description
45	Idle Time Exist: Y/N	Idle Time collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 47 » Change default to Y to enable the option
46	Idle Time (Min) Threshold: 5	Idle Time Threshold. Default: Five minutes. Save or edit the parameter and then save
47	Over Speed Exist: Y/N	Over Speed collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 49 » Change default to Y to enable the option
48	Over Speed Threshold: 65	Over Speed Threshold. Default: 65 miles / 105 Km. Save or edit the parameter and then save
49	Over RPM Exist: Y/N	Over RPM collection option. Default: N » Press **ENTER** to leave the option disabled. **In this case, proceed to step** 51 » Change default to Y to enable the option
50	Over RPM Threshold: 3500	Over RPM Threshold. Default: 3500 RPM. Save or edit the parameter and then save
51	Fuel Level: Exist: Y/N	Fuel level collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
52	Fuel Consumed Exist: Y/N	Fuel consumption collection option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option

Step	Display	Description
53	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and then save
54	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
55	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
56	SEND to VIU/DP	Press **SEND**
57	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes. **Proceed to step** 69**, except for the following:**
58	Done! (X FP) Add FP? Y/N	**The following options are available when using WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up**: The number of FP units correlated to the DP is displayed. » To add another FP (for an additional tank) press **Y**. **Proceed to step** 59 » Press **N** to finish the process and return to the WP Functions main menu (**step** 2)

Step	Display	Description
59	Attach Coil to FP. Press SEND	Place the WP coil near the FP coil and press **SEND** **Note**: The system supports up to five different FP devices per vehicle. After 5 FP units were successfully programmed the option to add FP becomes unavailable and a success message is displayed
60	Vehicle ID:	Enter Vehicle ID as it appears on the Order Form.
61	Prog Code:	Enter the Programming Code (unique identification code generated by the OLIC, identical to the Order Number)
62	SEND to PRC	Press **SEND** to send the order parameters to PRC for validation
63	Waiting for PRC Reply	Wait a few seconds until the WP receives approval from PRC
64	Chassis	Enter the vehicle's chassis number. **Proceed to step 56**
65	X FPs Left, >Read another FP i	**The following screens appear if the Replace FP option was selected (Step 12, WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up):** The number of remaining functional FP devices is displayed. Select the **Read another FP** option

Step	Display	Description
66	Bring Ring to FP and Press SEND	Place the WP coil near the FP coil and press **SEND**. The WP reads the functional FP data. » If there are more FPs installed, the WP automatically returns to **step** 65 to read the rest of the units » Otherwise, **proceed to step 67**
67	Bring Ring to new FP and Press SEND	Place the WP coil near the newly replaced FP coil and press **SEND**
68	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes.
69	Programming Done!	An operation successful screen is displayed.

4.3.4.2. DP Heavy Programming Sequence - Pulses Interface

The table below describes the sequence for units connected directly to odometer pulses output (see Table 4-28):

Table 4-28 - DP Heavy Programming Sequence - Pulses Interface

Step	Display	Description
22	CAN Data Rate: 1: 250K 2: 500K	**This step is intended for J1939 only.** CAN Data Rate: » Enter 1 for 250K » Enter 2 for 500K Then press **Enter**
23	Odometer Exist: Y/N	Odometer reading option. Default: Y » Press **ENTER** to retrieve odometer reading » Change default to N to disable the option
24	Distance Unit: 1: Km 2: Miles	Distance measurement units' definition: » Enter 1 for Km » Enter 2 for Miles Save or edit the parameter and then save. **In cases where the Odometer reading option was disabled, proceed to step** 28
25	Odometer Factor: 0	Set the Odometer factor
26	Odometer Threshold: mV 0	Set the Odometer threshold
27	Odometer Hysteresis: mV 0	Set the Odometer hysteresis
28	E.H. Exist: Y/N	Engine Hour reading option. Default: Y » Press **ENTER** to retrieve Engine Hour reading » Change default to N to disable the option
29	Odometer: 0.0	**This screen is displayed only in cases where Odometer reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard

Step	Display	Description
30	E.H.: 0.0	**This screen is displayed only in cases where Engine Hour reading was not disabled.** Edit the parameter, entering the value displayed on the dashboard (if available)
31	Switch T.O. Units 1: M 2: H 3: D	Switch Timeout units: » 1 for Minutes » 2 for Hours » 3 for Days Default: Minutes. Save or edit the parameter and then save
32	Switch Time Out: 10 Minutes	Switch Timeout. Default: 10 Minutes. Save or edit the parameter and then save
33	Engine On Report Exist: Y/N	Engine On Report option. Default: N » Press **ENTER** to leave the option disabled » Change default to Y to enable the option
34	SEND To VIU/DP	Press **SEND**
35	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes. **Proceed to step <u>47</u>, except for the following:**

Step	Display	Description
36	Done! (X FP) Add FP? Y/N	The following options are available when using WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up: The number of FP units correlated to the DP is displayed. » To add another FP (for an additional tank), place the WP coil near the FP coil and press **Y**. **Proceed to step** 37 » Press **N** to finish the process and return to the WP Functions main menu (**step** 2 **in** Table 4-27)
37	Attach Coil to FP. Press SEND	Place the WP coil near the FP coil and press send. **Note**: The system supports up to five different FP devices per vehicle. After 5 FP units were successfully programmed the option to add FP becomes unavailable and a success message is displayed
38	Vehicle ID:	Enter Vehicle ID as it appears on the Order Form
39	Prog Code:	Enter the Programming Code (unique identification code generated by the OLIC, identical to the Order Number)
40	SEND to PRC	Press **SEND** to send the order parameters to PRC for validation
41	Waiting for PRC Reply	Wait a few seconds until the WP receives approval from PRC
42	Chassis	Enter the vehicle's chassis number. **Proceed to step** 34

Step	Display	Description
43	X FPs Left, >Read another FP i	**The following screens appear if the Replace FP option was selected (step** 12 **in** Table 4-27**, WP ARM ver. 2.1.16, AVR ver. 4.3.6 and up, DP ver. 4.2 and up):** The number of remaining functional FP devices is displayed. Select the **Read another FP** option
44	Bring Ring to FP and Press SEND	Place the WP coil near the FP coil and press **SEND**. The WP reads the functional FP data. » If there are more FPs installed, the WP automatically returns to **step** 43 to read the rest of the units » Otherwise, **proceed to step** 45
45	Bring Ring to new FP and SEND	Place the WP coil near the newly replaced FP coil and press **SEND**
46	Programming DP Wait...	Wait a few seconds until the DP and VIU programming process finishes
47	Programming Done!	An operation successful screen is displayed.

Section 5 Troubleshooting

5.1. General

This section provides a description of possible issues related to the vehicle units, or to their communication with the ForeFuel system, as well as corrective actions.

5.1.1. Programming Troubleshooting

The following details possible programming issues and their corrective actions (see Table 5-1):

Table 5-1 - Programming Troubleshooting

Symptom	Probable Cause	Checks	Corrective Action
When turning the WP unit on, the display is blank	The battery is empty		Charge the unit and check again
	The unit is faulty		Replace the WP: insert SAM card into the unit, enter its Serial Number into OLIC, and check again
WP works but can't program FP	Faulty SAM	Perform the internal tests	Replace the SAM card
	No connection to the PRC (Retail only)	Perform the internal WP PRC test	Improve your location and try again
	Faulty WP antenna		Replace the antenna
	Incorrect FP type (Homebase / Retail)	Prompt WP for incorrect ID chip	Replace FP (Homebase / Retail)
	Incorrect parameters	Check communication parameters	Update parameters according to the local ISP
	FP is not defined in the HO	Check the presence of the device under **Devices**	Enter device into HO
	Faulty WP		Replace the WP: insert SAM card into the unit, enter its Serial Number into OLIC, and check again
WP doesn't work with FP or DP	Faulty antenna		Replace the antenna
WGT LEDs are off	Unit's power	Check that the power supply is connected to the main one	Connect to power
		Check the power's wiring from the power supply to the WGT	Fix the wiring and check again
	Faulty WGT		Replace WGT, set it up, and check again

Symptom	Probable Cause	Checks	Corrective Action
WGT's LAN's LEDs are off	Faulty unit		Replace WGT
	Faulty LAN cable		Replace the LAN cable
	Faulty FCC LAN		Replace FCC
	Incorrect setup	1. Check the FCC setup for correct IP+Port+4852 2. Check MWGT for correct IP+Port+48	Edit parameters

5.1.2. Refueling Troubleshooting

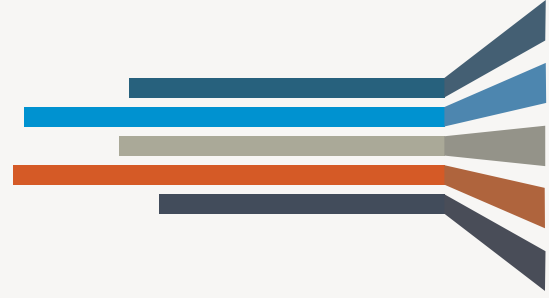The following details possible refueling issues and their corrective actions (see <u>Table 5-2</u>):

Table 5-2 - Refueling Troubleshooting

Symptom	Probable Cause	Checks	Corrective Action
Specific vehicle cannot refuel at any station	Defective FP Coil / Chip	Read FP with WP	If issue persists, replace antenna or chip, and program using the WP
	Connection between antenna and chip	Check the connection	Improve connection, and if needed - open and reassemble (solder)
	FP antenna is far from nozzle's antenna		FuelOpass: use the coil clamp to raise the antenna to the top so it will be closer to the nozzle antenna when refueling NanOpass: it is strongly recommended to test the location before installing the unit (see Verifying Location Using the RFID Tester)
	DP is missing	Search for DP availability	Restart the DP (power off / on) Reprogram it
	DP is not working	Check with WP that DP is working	Check parameters Check DP connection to power Check sleep timeout Check that Engine Hour wire is connected properly Replace DP
	DP does not match FP	Check with WP	Reprogram the vehicle (FP+DP)
	Programming did not complete correctly	With WP, check that parameters are valid	Correct or reprogram the parameters
Specific vehicle can't refuel with specific nozzle (fuel type)	Incorrect device parameters	Check device parameters in Head Office	Update parameters in HO then try to refuel

Symptom	Probable Cause	Checks	Corrective Action
Vehicle can not refuel at a specific station	SAM in MWGT or WGT	Check that SAM card is defined in WGT	Add / replace defective SAM
	No communication between FCC and HO	Check communication's path	Update communication between FCC and HO
	No communication to the MWGT		See WGT communication above
Nozzle Reader LED blinks twice but fueling does not start	FCC or HO wrong setup	Check the specific device parameters (fuel type, rules, etc)	Update parameters, wait for HO to sync with SO, and then try to refuel
	NR is not set up properly to work with WGT	Use WP to check NR parameters	Update NR parameters according to its linked WGT parameters

	No communication between the MWGT and FCC	Ping MWGT from FCC	If ping is available:
			
			    Check setup of FCC & MWGT
			
			    Replace MWGT
			 If ping is unavailable:
			
			    Check MWGT's IP+Port+485
			
			    Repair / replace LAN cable
			
			    Replace MWGT
			
			    Replace / check FCC LAN port

	DP is not detected by MWGT	Check that **DP available** is enabled in MWGT setup	Enable MWGT to read FP even if DP is not available
The FP is read, but the DP is not detected	Faulty DP	Read DP with WP	Check wires and firm connections If the DP is not responding, replace and reprogram
	DP is missing	Check the DP's availability	Add DP and reprogram it

Symptom	Probable Cause	Checks	Corrective Action
Can't read vehicles and / or no authorization at the pumps	No communication between NR and MWGT	Check WGT's physical connection to the local network	If no activity on LAN port, check the cable and / or change the port on switch
			Check MWGT LEDs status
			Check WGT settings, browse and setup the MWGT according to your station layout
			If WGT is not responding to ping: connect to MWGT through the 9-pin serial port and open Hyperterminal (115200, 8, None, 1, None), reset the power to the MWGT, and follow the startup messages to locate the IP address
			Check the FCC settings, and set the FCC, MWGT, and Nozzle channel, according to your station layout
		Check if NR LED blinks 3 times	Unblock the NR using WP or MWGT
	Incorrect Nozzle Readers setup	Check the WGT's network settings	Reprogram the MWGT to include the correct NR mapping in **Group**
		Check the nano Nozzle Reader programming	Reprogram the NR
Incorrect Odometer reading	Calibration procedure for this vehicle was not performed	Check vehicle model in calibration parameter	Perform calibration procedure (Factor, Offset, and Bus)
	Incorrect DP type for this vehicle	Check the bus type using VCM	Replace DP to fit the specific vehicle Bus reprogram and setup

Symptom	Probable Cause	Checks	Corrective Action
Odometer is zero	Faulty DP	Read DP with WP	If DP is not responding: replace and reprogram
	Incorrect wiring	Check wires according to the vehicle's electric schema	Fix the wiring and check again
Incorrect Engine Hour reading	Weak signal	Use an oscilloscope to check the signal	Improve wire connection Locate a stronger signal Add a Protection Box
	Incorrect initial value	Using the WP, compare DP reading to the vehicle's engine hour meter	Set the DP to have the same value as the vehicle's engine hour meter