GILBARCO VEEDER-ROOT

Frontier

Owner's Manual

MDE-5342H

Computer Programs and Documentation

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Federal Communications Commission (FCC) Warning

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Follow the Regulations

Relevant national regulations related to installation, inspection, maintenance, and service must be observed. Where a regulation may conflict with information in this manual, the regulation must be followed.

MID

The Frontier dispenser conforms to Measuring Instruments Directive (MID) 2004/22/EC.
The approval number is UK/0126/0170.

ATEX

The Frontier dispenser is ATEX certified. The approval number is ITS05ATEX53877.

Special Conditions for Safe Use:
If petrol dispensing pumps are supplied without hose, nozzle, breakaway coupling, sight glass, swivel or shear valve, in that case pumps will be suffixed with "X" in the certificate. Correct installation needs to be ensured. The petrol dispensing pumps are installed with certified components only as per European Directives.

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1 – Introduction

Purpose

This manual provides instructions for safely operating and maintaining Frontier pumps/dispensers (hereafter referred to as units, unless otherwise specifically stated).

IMPORTANT INFORMATION
This is the original manual and contains instructions in English. Manuals that are in languages other than English are a translation of the original manual. Modifications to this equipment or connection of unauthorized equipment to its electrical circuits is likely to invalidate any safety or metrological certification and is likely to invalidate conformity with the Environment Management Console (EMC) directive.

Intended Users

This manual is intended for the owners and operators of Frontier units.

Scope

This manual provides the following information on using Frontier units:

- Operating the units
- Preliminary steps for servicing the units
- Maintaining the units

Related Documents

Document Number	Title	GOLD℠ Library
MDE-5078	Frontier Technical Manual	Frontier
MDE-5150	Frontier Installation Manual	Frontier
MDE-5341	Frontier Single and Dual Installation Manual	Frontier
MDE-5343	Frontier Single and Dual Technical Manual	Frontier
MDE-5622	GVR INDIA Export Warranty Parts Replacement Form	Frontier

Abbreviations and Acronyms

Term	Description
ASC	Authorized Service Contractor
ATEX	Atmosphere Explosibles
CSC	Customer Specified Contractor
DIP	Dual In-line Package
E-Cal	Electronic Calibration
EC	Error Code
EMC	Environment Management Console
EMT	Electro-mechanical Totalizer
ERA	Electronics Register Assembly
EU	European Union
FAME	Fatty Acid Methyl Ester
GOLD	Gilbarco® Online Documentation
GPU	Global Pumping Unit
GSM	Gilbarco Security Module
IFSF	International Forecourt Standards Forum
J-box	Junction Box
LCD	Liquid Crystal Display
POS	Point of Sale
PPU	Price per Unit
SOP	Standard Operating Procedure
STP	Submersible Turbine Pump
VDC	Voltage Direct Current

2 – Important Safety Information

Notes: 1) Save this Important Safety Information section in a readily accessible location.

2) Although DEF is non-flammable, diesel is flammable. Therefore, for DEF cabinets that are attached to diesel dispensers, follow all the notes in this section that pertain to flammable fuels.

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury, if these safe service procedures are not followed.

Preliminary Precautions
You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.

Emergency Total Electrical Shut-Off
The first and most important information you must know is how to stop all fuel flow to the pump/dispenser and island. Locate the switch or circuit breakers that shut off all power to all fueling equipment, dispensing devices, and Submerged Turbine Pumps (STPs).

⚠ WARNING

The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser. This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not the console's ALL STOP and PUMP STOP or similar keys.

Total Electrical Shut-Off Before Access
Any procedure that requires access to electrical components or the electronics of the dispenser requires total electrical shut off of that unit. Understand the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gasboy equipment.

Evacuating, Barricading and Shutting Off
Any procedure that requires access to the pump/dispenser or STPs requires the following actions:

- An evacuation of all unauthorized persons and vehicles from the work area.
- Use of safety tape, cones or barricades at the affected unit(s).
- A total electrical shut-off of the affected unit(s).

Read the Manual
Read, understand and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call a the Gilbarco Technical Assistance Center (TAC) at 1-800-743-7501. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

Follow the Regulations
Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Fuel Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code (NEC)*, Occupational Safety and Health Administration (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

Replacement Parts
Use only genuine Gasboy replacement parts and retrofit kits on your pump/dispenser. Using parts other than genuine Gasboy replacement parts could create a safety hazard and violate local regulations.

Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

Alert Symbol

This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

Signal Words
These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions below must be followed to prevent death, injury or damage to the equipment:

DANGER: Alerts you to a hazard or unsafe practice which will result in death or serious injury.

WARNING: Alerts you to a hazard or unsafe practice that could result in death or serious injury.

CAUTION with Alert symbol: Designates a hazard or unsafe practice which may result in minor injury.

CAUTION without Alert symbol: Designates a hazard or unsafe practice which may result in property or equipment damage.

Working With Fuels and Electrical Energy

Prevent Explosions and Fires
Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

DEF is non-flammable. Therefore, explosion and fire safety warnings do not apply to DEF fluid lines.

No Open Fire

Open flames from matches, lighters, welding torches or other sources can ignite fuels and their vapors.

No Sparks - No Smoking

Sparks from starting vehicles, starting or using power tools, burning cigarettes, cigars or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuel vapors. Every time you get out of a vehicle, touch the metal of your vehicle, to discharge any electrostatic charge before you approach the dispenser island.

Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/Tagout procedures. If you are not familiar with this requirement, refer to this information in the service manual and OSHA documentation.

Working With Electricity Safely

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Ensure that grounding connections are properly made. Take care that sealing devices and compounds are in place. Ensure that you do not pinch wires when replacing covers. Follow OSHA Lockout/Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth

⚠ WARNING

In the event of inclement weather, including snow, ice, or flooding that makes driving conditions dangerous, please avoid servicing units. Always use available door stops to secure upper doors against unwanted/unexpected movement, especially during high winds. If necessary, reschedule service to avoid damage to the equipment. Weather may change unexpectedly; be aware of local weather conditions. During service, if conditions develop making service unsafe, close the unit(s) and proceed to a safe location.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause cancer.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Gilbarco Veeder-Root encourages the recycling of our products. Some products contain electronics, batteries, or other materials that may require special management practices depending on your location. Please refer to your local, state, or country regulations for these requirements.

In an Emergency

Inform Emergency Personnel

Compile the following information and inform emergency personnel:

- Location of accident (for example, address, front/back of building, and so on)
- Nature of accident (for example, possible heart attack, run over by car, burns, and so on)
- Age of victim (for example, baby, teenager, middle-age, elderly)
- Whether or not victim has received first aid (for example, stopped bleeding by pressure, and so on)
- Whether or not a victim has vomited (for example, if swallowed or inhaled something, and so on)

⚠ WARNING

Gasoline/DEF ingested may cause unconsciousness and burns to internal organs. Do not induce vomiting. Keep airway open.
Oxygen may be needed at scene. Seek medical advice immediately.

⚠ WARNING

DEF generates ammonia gas at higher temperatures. When opening enclosed panels, allow the unit to air out to avoid breathing vapors. If respiratory difficulties develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

⚠ WARNING

Gasoline inhaled may cause unconsciousness and burns to lips, mouth and lungs.
Keep airway open.
Seek medical advice immediately.

⚠ WARNING

Gasoline/DEF spilled in eyes may cause burns to eye tissue.
Irrigate eyes with water for approximately 15 minutes.Seek medical advice immediately.

⚠ WARNING

Gasoline/DEF spilled on skin may cause burns.
Wash area thoroughly with clear water.
Seek medical advice immediately.

⚠ WARNING

DEF is mildly corrosive. Avoid contact with eyes, skin, and clothing. Ensure that eyewash stations and safety showers are close to the work location. Seek medical advice/recommended treatment if DEF spills into eyes.

IMPORTANT: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

Lockout/Tagout

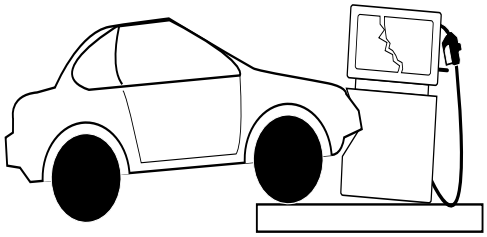
Lockout/Tagout covers servicing and maintenance of machines and equipment in which the unexpected energization or start-up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Lockout/Tagout applies to all mechanical, hydraulic, chemical, or other energy, but does not cover electrical hazards. Subpart S of 29 CFR Part 1910 - Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/Tagout provision for electrical hazards.

Hazards and Actions

WARNING

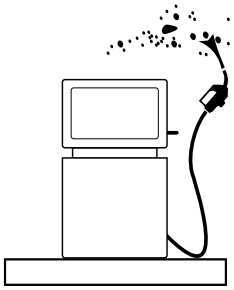
Spilled fuels, accidents involving pumps/dispensers, or uncontrolled fuel flow create a serious hazard.
Fire or explosion may result, causing serious injury or death.
Follow established emergency procedures.
DEF is non-flammable. However, it can create a slip hazard. Clean up spills promptly.

The following actions are recommended regarding these hazards:



Collision of a Vehicle with Unit

Fire at Island



Fuel Spill

- Do not go near a fuel spill or allow anyone else in the area.
- Use station EMERGENCY CUTOFF immediately. Turn off all system circuit breakers to the island(s).
- Do not use console E-STOP, ALL STOP, and PUMP STOP to shut off power. These keys do not remove AC power and do not always stop product flow.
- Take precautions to avoid igniting fuel. Do not allow starting of vehicles in the area. Do not allow open flames, smoking or power tools in the area.
- Do not expose yourself to hazardous conditions such as fire, spilled fuel or exposed wiring.
- Call emergency numbers.

General Exclusions

Problems caused by faulty installation are not covered by this warranty. This warranty applies only if equipment has been installed, used, and maintained in-accordance with Gilbarco installation, operating, and service instruction.

Use of service personnel other than qualified Gilbarco ASCs without prior approval of Gilbarco product support department will void payment of the warranty claim in question.

Damage suffered by Gilbarco equipment resulting from shipping, accident, power surges, neglect, misuse, act of God, or abuse is not covered by this warranty.

Use of non-Gilbarco replacement parts, defect caused by the unauthorized addition of non-Gilbarco equipment or unauthorized alteration of Gilbarco equipment voids this warranty. For more information on warranty, refer to *MDE-5622 GVR INDIA Export Warranty Parts Replacement Form*.

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3 – Supplementary Instructions for European Union (EU) Countries

Dispensing areas of the forecourt must be adequately lit for safety purposes at all times of use. The luminance at ground level and the read-out level of displays must not be less than 100 lux.

Sample Declaration of Conformity for EU Only

DECLARATION OF CONFORMITY FOR MACHINERY
FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES

Serial Number

Date of Manufacture :

Gilbarco Veeder-Root India Private Limited, Coimbatore Industrial Estate, Coimbatore 641021, TamilNadu, India declares that models of **Fuel Dispenser** made available to the European Union conform with the provisions of:

The Machinery Directive (Directive 2006/42/EC),
and ATEX Directive (Directive 94/9/EC) Group II Category II.

The manufacturer's compliance with Annexes IV and VII of the ATEX Directive is assured by Notified Body No 0359, Intertek Testing and Certification Ltd, Leatherhead, Surrey UK
Quality Assurance Notification ITS12ATEXQ7563

Gilbarco Veeder-Root India Private Limited also declare that this fuel dispenser conforms with the harmonized product standard EN 13617-1, giving presumption of conformity with the ATEX Directive, and is in conformance with Type Examination Certificate ITS05ATEX53877

The following standards, and others, have also been applied :

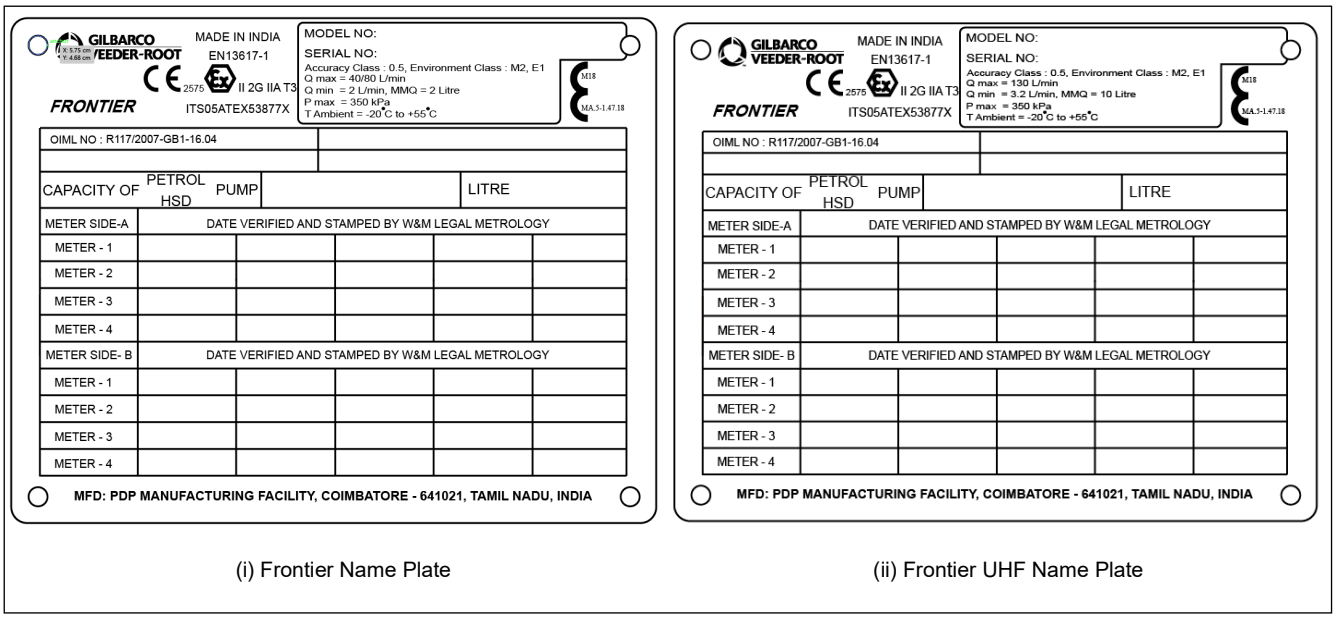
Machinery Directive:
EN 13617-1, ISO 12100-1, ISO 12100-2, EN 60204-1, EN1050
ATEX Directive:
EN 13463-1 (partially)

This Declaration has been signed, as empowered by the manufacturer, by

Name:

Position: QUALITY HEAD Place: Coimbatore, India

Markings Related to Atmosphere Explosibles (ATEX) Directive



(i) Frontier Name Plate

(ii) Frontier UHF Name Plate

Specifications

Parameter	Value
Operating Condition	T3
Maximum Surface Temperature	200 °C (392 °F)
Three-phase Power Supply	400 VAC ±10 - 20%
Single-phase Power Supply	230 VAC ±10 - 20%
Maximum Pressure	3.5 bar
Airborne Noise Emissions	< 72 DB

IMPORTANT INFORMATION

The Frontier fuel dispenser is intended for use in an open location. The dispenser's electronics are suitable for use in condensing humidity. Ensure that you follow the operating conditions and classes stated on the nameplate of the equipment.

Zoning Diagram

Frontier pumps and dispensers are ATEX approved. The zoning diagrams shown in Figure 3-1 and Figure 3-2 on page 3-4 are as per ATEX.

Figure 3-1: Zoning Diagram with Grill

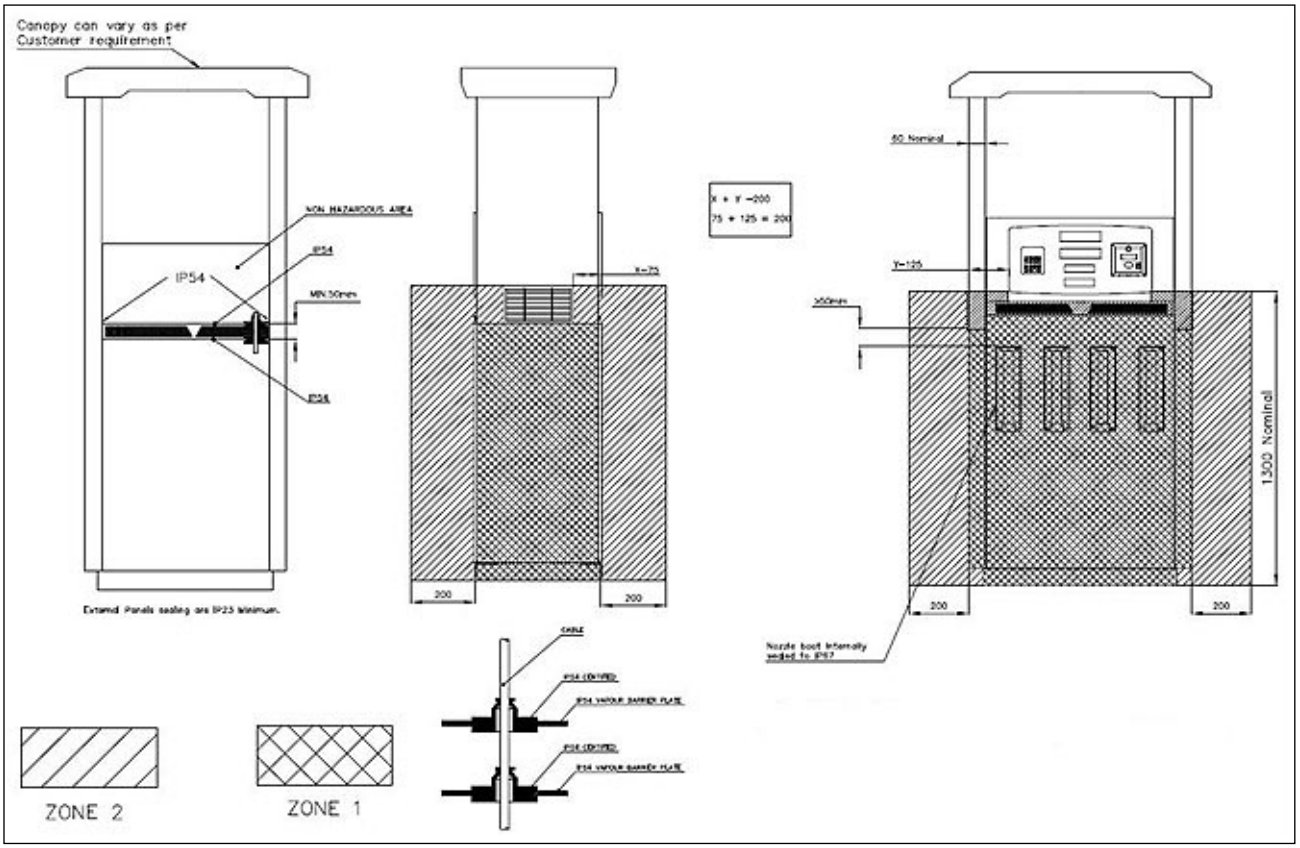
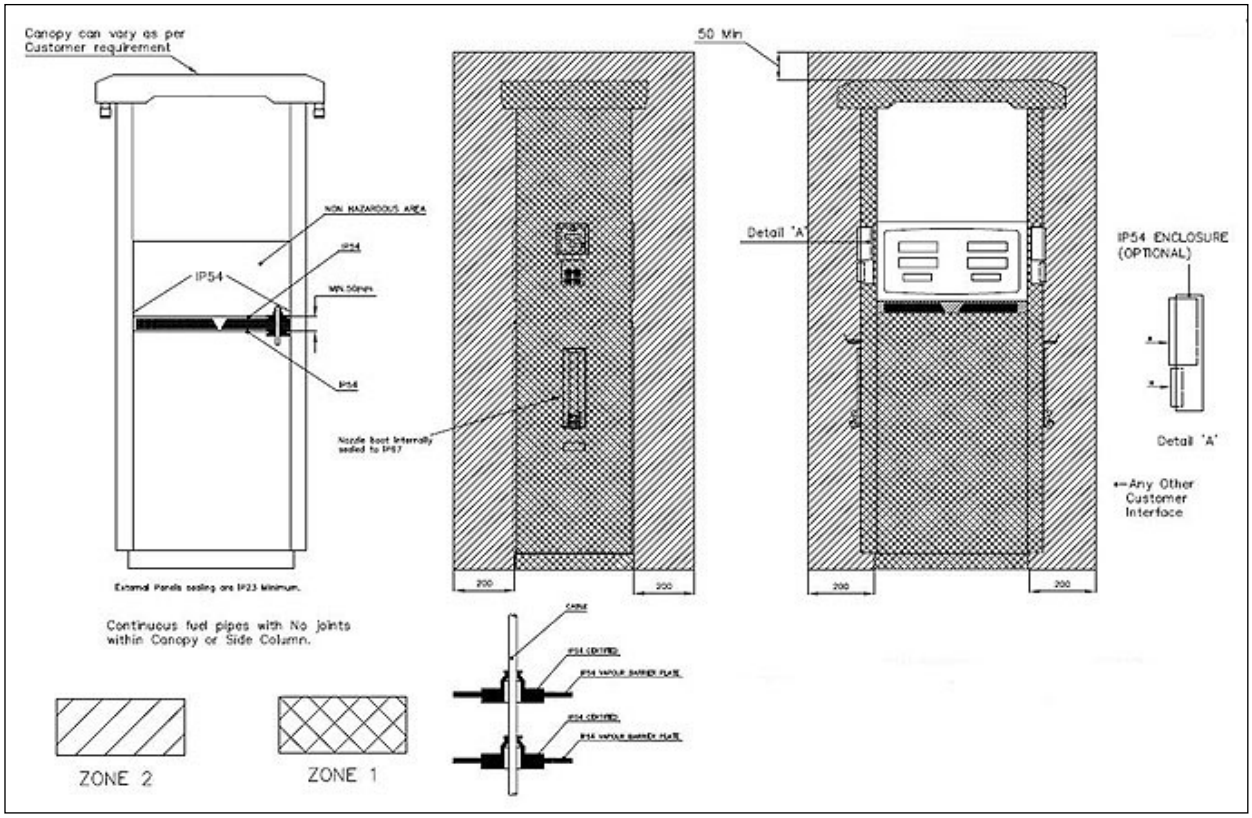


Figure 3-2: Zoning Diagram Without Grill



4 – Frontier Components

This chapter provides a description of the Frontier unit and its components.

Figure 4-1: Frontier Pump

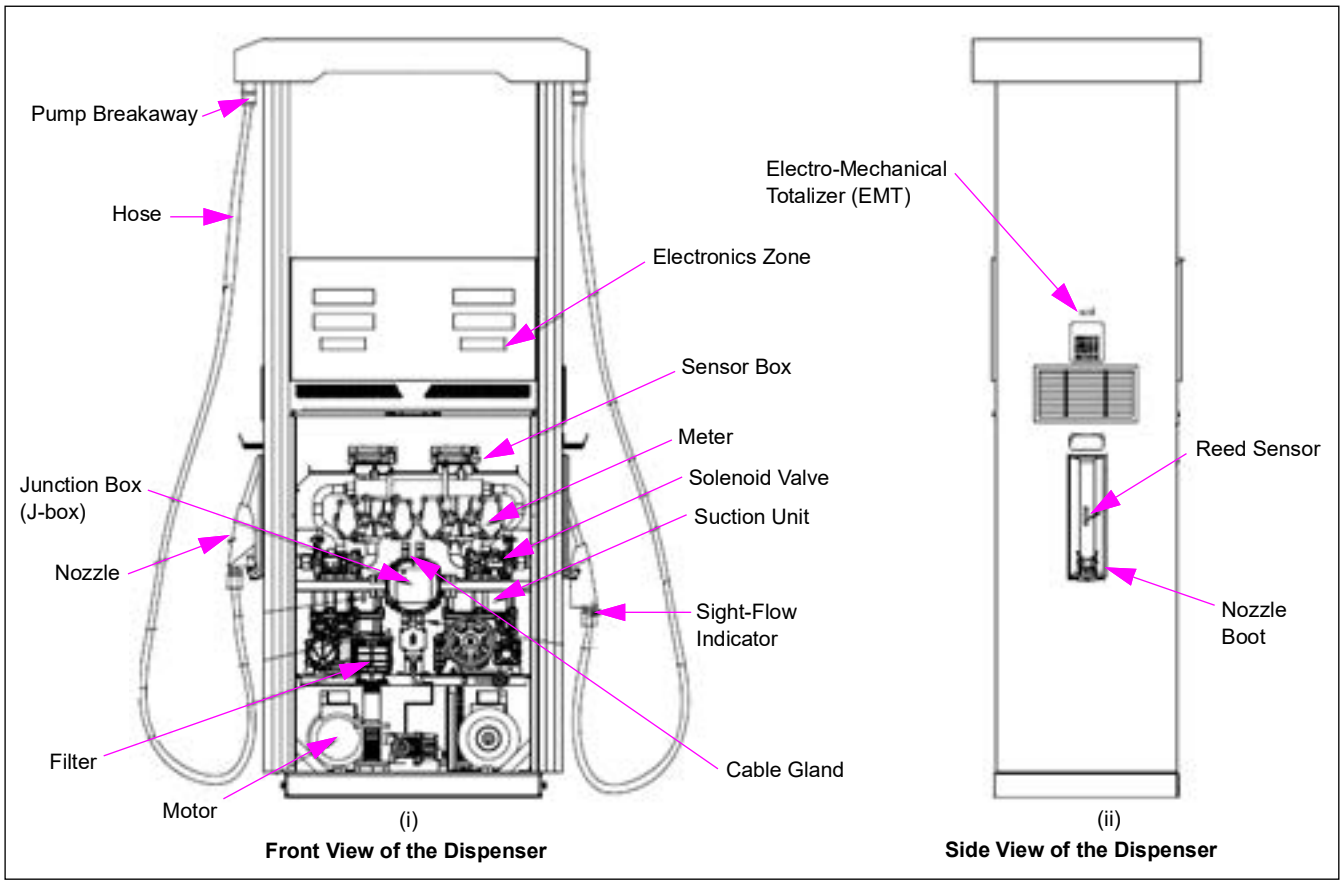
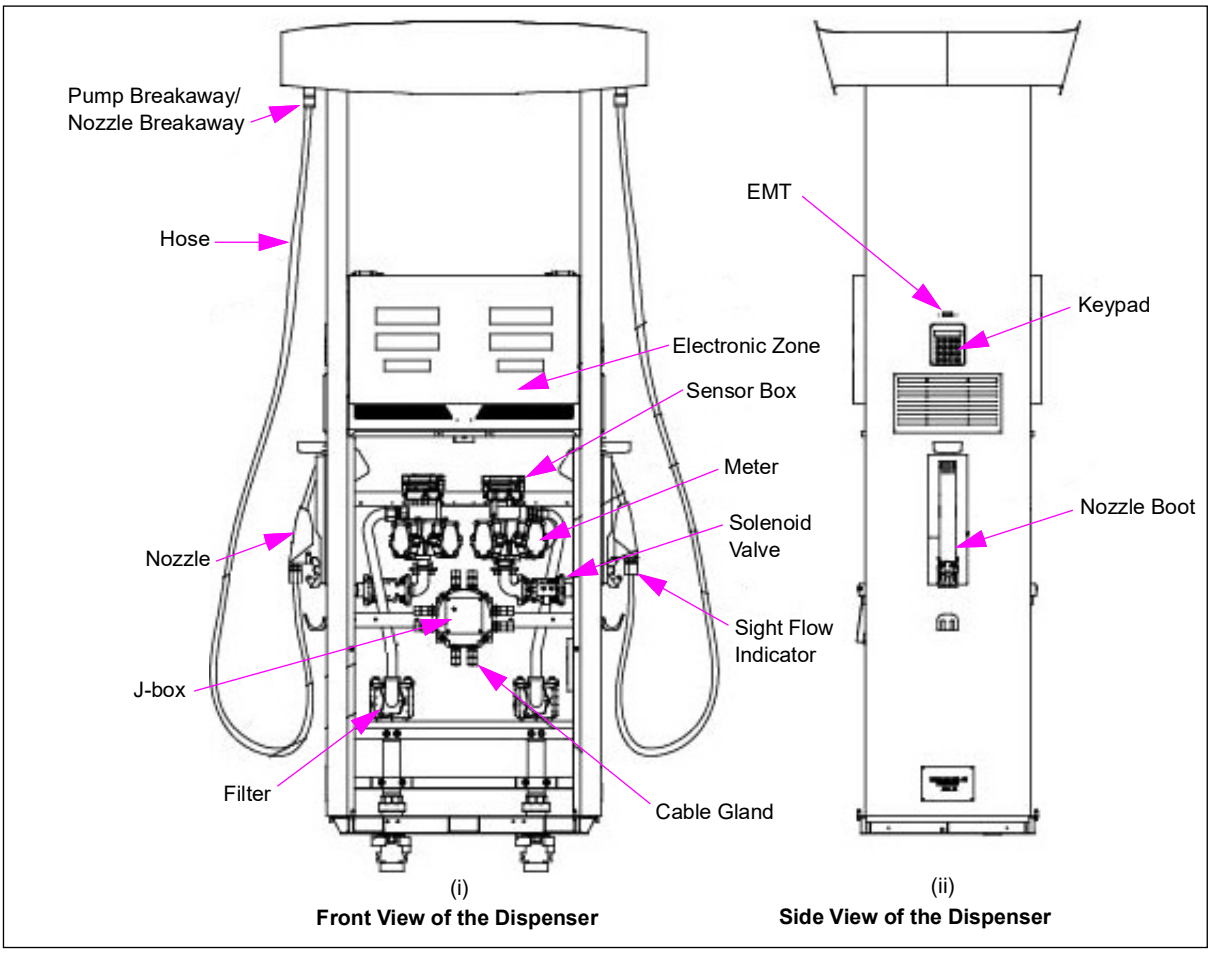


Figure 4-2: Frontier Dispenser



Understanding Model Codes

Numbering System for Pumps and Dispensers Series

Figure 4-3 on page 4-3 shows the model codes for Frontier pumps and dispensers.

Figure 4-3: Frontier FG Pump CAT Number Nomenclature

1= Product Line	2=Model	3= version	4= VARIANT CONFIGURATIO N	5= E-stop, V+ meter, C+ Meter, 776 displag.	6=Fabrication options	7=Hydraulic Stack	8=MOTOR Rating
F - Frontier	1 =160/170	6=160	M= Mono	3-F210/F160, V+, 666	S - Standard Panel	S - Suction, VP	X - No Motor
	2= 210/230)	7=170	D=Duo	E-F210/160, V+, 666, Estop	C - Custom Colour Panel	G - Suction, GP	1 - 1PH, 50 Hz, 1 HP
		1=210	I= 1 P MPD Island	J-F210/160, V+, 776	A - Standard Panel, 210/230 White Add on canopy	A - Suction, UHF 115	A - 1PH, 60 Hz, 1 HP
		3=230	L = 1 P MPD Lane	F-F210/160, V+, 776, Estop	B - Standard Panel, 210/230 Black Add on Canopy	B - Suction, VP , VR	3 - 3PH, 50 Hz, 1 HP
			Q= Quad	C-F210/160, C+, 666	D - Standard Panel, 210/230 Custom Colour add on Canopy	C - Suction, GP, VR	B - 3PH, 60 Hz, 1 HP
				D-F210/160, C+, 666, Estop	E - Standard Panel, 210 Branding Canopy -	P - Pressure	C - 3PH, 50 Hz, 1.5 HP
				K-F210/F160, C+, 776	F - Custom Colour Panel, 210/230 White Add on Canopy	D - Pressure + UHF	D - 3PH, 60 Hz, 1.5 HP
				8-F210/F160, C+, 776, Estop	G - Custom Colour Panel, 210/230 Black Add on Canopy	E - Pressure + VR	E- Rael 3PH, 50Hz, 1 HP
				X-F230, V+, 776, Estop	H - Custom Colour Panel, 210/230 Custom Colour add on Canopy	F - Suction UHF 130	F- Rael 3PH, 50Hz, 2 HP
				L-F230, V+, 776	I - Custom Colour Panel, 210 Branding Canopy	H - Swapstack suction,GP	
				Y-F230, C+, without E-stop	J - Standard Panel with SS Fasteners + HM for F160 + RCV	J - Swapstack suction ,VP	
				M-F230, C+, with E-stop	K - Standard Panel with SS Fasteners	K - Pressure (For new PG structure)	
					L - Custom colour with SS Fastners	L - Jaisong Pumping unit	
					M - SS panel, F210/F160		

Colored hose pipe
Display with 7 / 7 / 6 digits
Sight glass mounted between hose and nozzle (per hose)
Receipt/ticket printer

Orange 1"
Black 3/4" Std
Yellow 1" UHF
Blue 3/4" Std
Yellow 1" High
Green 3/4"
Yellow 3/4"

9=FLOW RATE	10=HANGING HARDWARE	11=Breakaway, Spin Off filter, VDI	12= Customizations	13= PACKING
S -SF, NVR, 4H3/4", N3/4"	X - No hanging hardware	X - Not required	X - Not required	S=STANDARD PACKING (EDGE BOARD)
A -SF, NVR, 6H3/4", N3/4"	1 - H&S	A - EB	A - FCH	C=REUSABLE PACKING - Sea Shipment
B -SF, VR, 4VRH3/4",VRN	2- H&S + ONS	B - EB + VDI	B - Printer	A=REUSABLE PACKING - Air Shipment
C -SF, VR, 6VRH3/4",VRN	3 - H&S + ONB	C - VDI	C-JAISONG + Unicorn software ABB detact function enable	X = NO PACKING
D -HF, NVR, 4H1", N3/4"	4 - H&S + ONR	D - EB + VDI + SOF	D - Timer	
H -HF, NVR, 4H1", N1"	5 - H&S + ONY	E - EB + VDI + SOFWS	E - PPU lock	
E -HF, NVR, 6H1", N3/4"	6 - H&S + ONG	F - EB + VDI + MSOF	F - Gallon	
F -HF, NVR, 6H1", N1"	7 - H&S + ONC	G - EB + SOF	G - FCH + Printer	
M -MF, NVR, 4H3/4", 4H1",N3/4",N1"	8 - H&S + CNS	H - EB + SOFWS	H - FCH + Printer + Timer	
G -MF, NVR, 6H3/4", 6H1",N3/4",N1"	9 - H&S + CNB	I - EB + MSOF	I - FCH + Printer + Timer + PPU Lock	
I -MF, VR, 4VRH3/4", NVR, 4H1",VRN,N1"	10 - H&S + CNR	J - SOF	J - FCH + Printer + Timer + PPU Lock + Gallon	
J -MF, VR, 6VRH3/4", NVR, 6H1",VRN,N1"	11 - H&S + CNY	K - SOFWS	K- Coop tender - rael motor for swapstack - Don't use, refer column H	
K -UHF 115, NVR, 4H1",UHFN - Elaflex Nozzle	A - H&S + CNG	L - MSOF	L - SS Panel - Don't use, refer column F	
L -UHF 130, NVR, 4H1",UHFN - Elaflex Nozzle	B - H&S + CNM	M - CB	M - MISR Pseudo Customer Code - Only for COOP order	
	C - H&S + ONR,ONG	N - CB + VDI	N - NILE Pseudo Customer Code - Only for COOP order	
	D - H&S + ONR,ONY	O - CB + VDI + SOF	O - Printer + Timer	
	E - H&S + ONB,ONY	P - CB + VDI + SOFWS	P - Printer + Timer + PPU Lock	
	F - H&S + ONS,ONR	Q - CB + VDI + MSOF		
	G - H&S + ONG,ONY	S - CB + SOF		
	H - H&s + CNY	T - CB + SOFWS	S - Mono island one sided closed	
	J - H&s + CNR	U - CB + MSOF	T - Duo island one sided closed	
	N - only nozzle	V - VDI + SOF	U - Mono lane one side closed	
	M - H&S+ Catlow nozzle with Customs scuff colour		V - Duo lane one side closed	
	O - EH + ENC	Y - VDI + MSOF	W - Duo 4 - keypad	
	P - EH + ENB		Y - Removable Check Valve	
	Q - EH + ENY		Z - Custom sticker	
	R - EH + ENS		1 - Front facing Jun.box	
	S - EH + ENG		2 - CPU Software for Nigeria	
	T - EH + ENY + ENG		3 - Shear Valve	
	U - EH+ENB + ENY		4- 3 meter polyhose	
	V - EH + ENS + ENY		5 - Unicorn software ABB detact function enable	
	W-H&S + CNG,CNY		6 - FGDI product sticker comination 1	
	Y - H&S + CNR,CNS		7 - FGDI product sticker comination 2	
	Z - EH&S + CNS		8 - PERTA SHOP WITH PRINTER	
	K - H&S + CNB,CNY		9-Removable Check Valve + Custom sticker	
	L- ONLY HOSE			

Common Functions

This section provides information on the common functions of the Frontier unit.

Keypad

The Frontier dispenser keypad has a total of 16 keys that include alphanumeric, numeric, and functional keys.

Figure 4-4: Liquid Crystal Display (LCD) Keypad

Using Keypad

The following functions can be performed using the keypad:

- Customer Preset
- Pump Parameter Programming
- View Sale and Volume Totals
- Electronic Calibration (E-Cal)

Keypad LCD

The Frontier dispenser uses a 16 X 2 LCD that displays all pump parameters and fault information.

PIN of Each Level Command

Enter a four-digit PIN code to use all programming functions and levels. The PIN can be changed from the respective menu or from menus with higher rights.

The users must make their own rule on how to manage different levels of PIN.

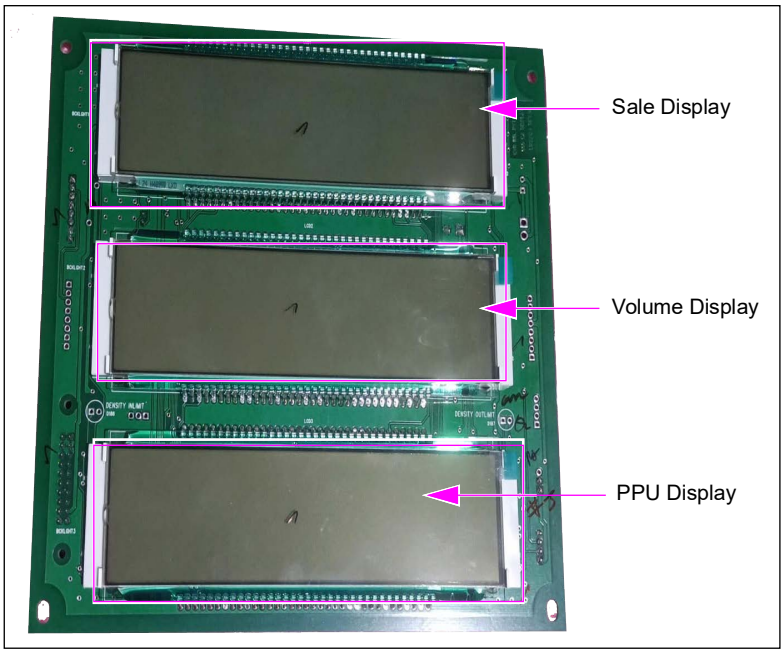
The following table lists the different command levels and their respective PIN:

Level Command	PIN
Level 1 Command PIN	0000
Level 2 Command PIN	1369
Level 3 Command PIN	Only for Professionals
Level 5 Calibration	Only for Professionals

Display Board

Figure 4-5 shows a display board which displays the sale, volume, and Price per Unit (PPU) information.

Figure 4-5: Display Board



The following table lists the display board details:

Display	Digits	Height	Decimal Setting
Sale Amount Display	6 digits or more	1” or more	0/1/2/3
Volume Display	6 digits or more	1” or more	2/3
PPU Display	6 digits	1”	0/1/2/3

Note: Display board performs a backup for 15 minutes after the main power failure.

Electronic Controller Boards (CPU)

Note: Switches SW2, SW3, and SW4 are removed from electronic controller board units after April 2018.

Figure 4-6: Switches on the Electronic Controller Board (CPU) (Before April 2018)

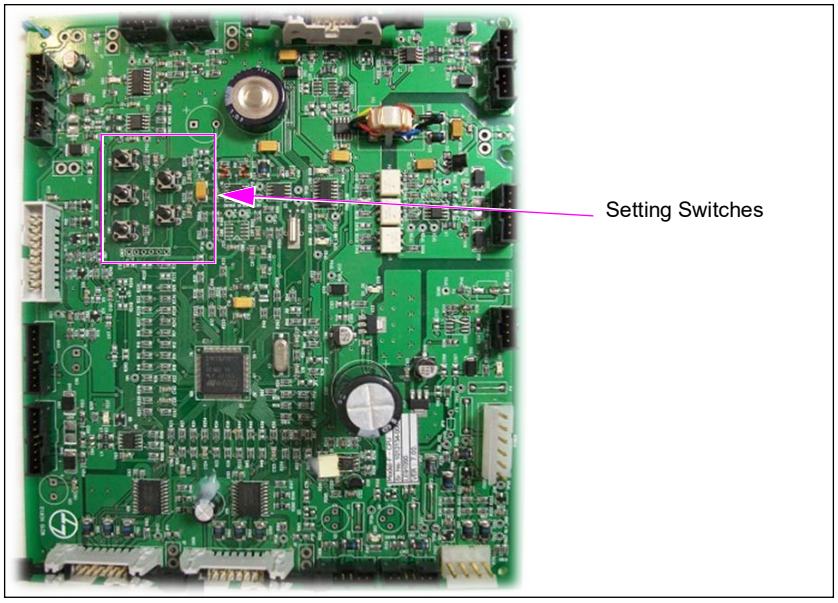
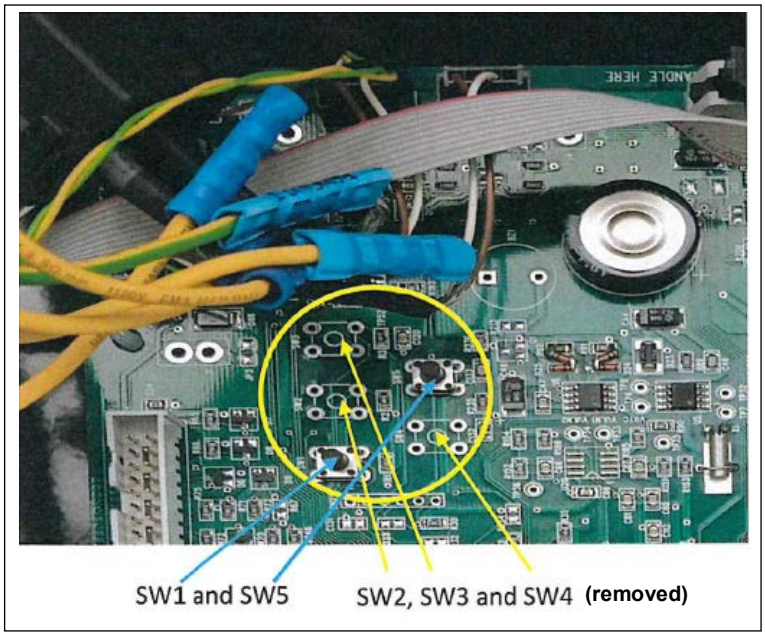


Figure 4-7: Switches on the Electronic Controller Board (CPU) (April 2018 Onwards)

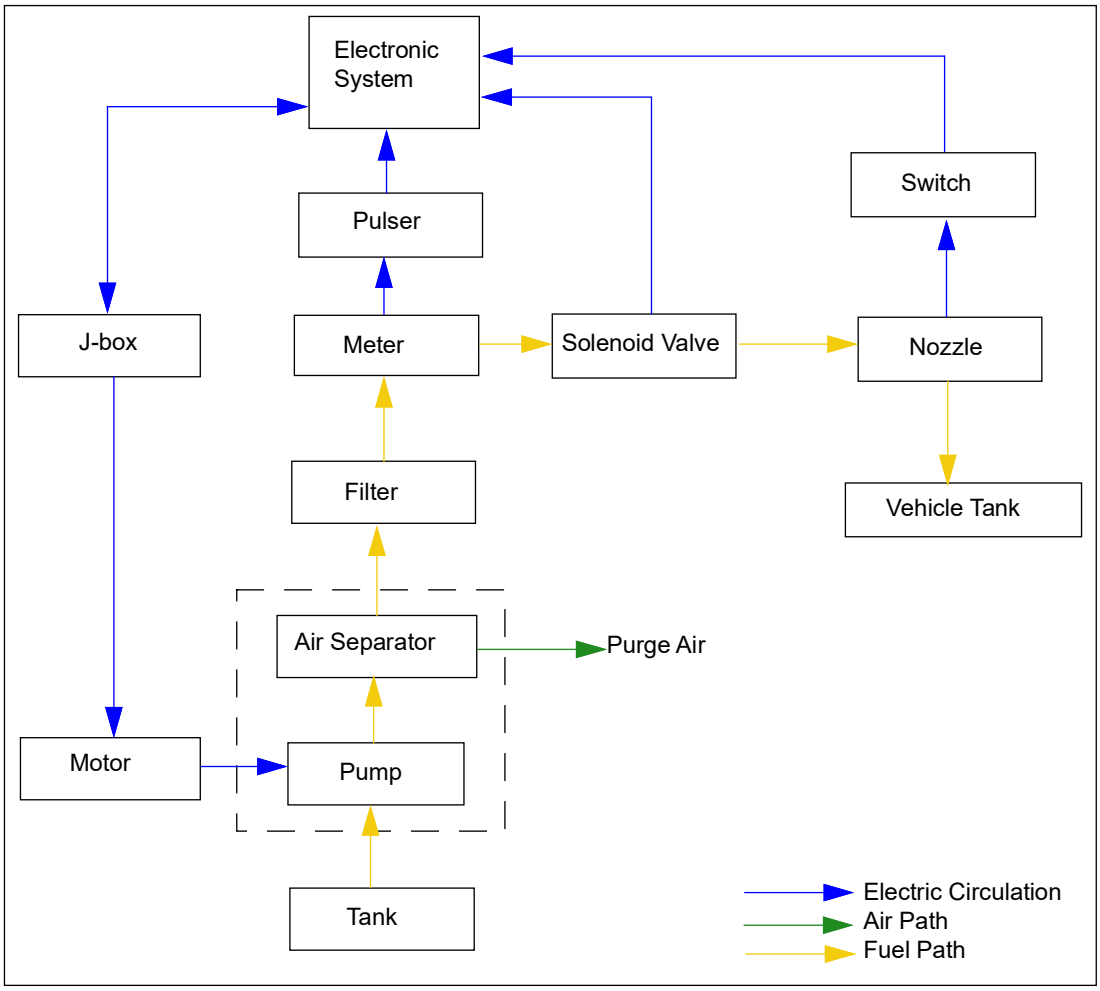


5 – Frontier Operation

Working Principle

Figure 5-1 illustrates the working principle of the Frontier pump. Pump operates on standalone or console-controlled mode.

Figure 5-1: Work Flow Diagram of Frontier Pump



Self-contained Pump

The following steps describe the functioning of a self-contained pump:

1. Fuel enters through the pump inlet pipe passing through a strainer.
2. If the pressure is too high, the fuel flows through a bypass valve and recirculates.
3. The pump has an air separation system. Air-separated fuel flows back to the pump.
4. Air-free fuel flows out of the pump discharge line and through a filter.
5. On single and dual two-product units, fuel flows through a solenoid valve.
   Note: Dual one-product units use two solenoid valves in parallel.
6. The meter measures fuel flow.
7. Fuel discharges through the nozzle.

Start-up

The following section describes the procedure to start a dispenser:

Initializing Dispenser

To initialize the dispenser, proceed as follows:

1. Power on the dispenser, to enter the initialization state. 8.8.8.8.8.8.8 is displayed on Total Sale, Volume, and PPU displays. The text on the LCD indicates the version of the system software.
   Note: It takes about 15 seconds for the text to appear on the screen.

   After initialization, the system enters the IDLE state. The main display shows the last transaction log, including Total Sale, Volume, and PPU. “GVR-FRONTIER” appears on the keypad display.

Fueling

To start fueling, proceed as follows:

Sale Preset

Dispenser is in the IDLE state.

1. Press **Sale** and then press the number key to set the amount. You can also use a fixed preset key (sale - F1 sale - F2). This value can be changed from the level 1 setup. The value will add to the number that you have previously entered.
2. Remove and activate the nozzle, and start dispensing.

View Totalizer

Ensure that the nozzle is in the boot. Each nozzle will have individual totalizers as listed below. All electronic totalizers are 16 digits including decimals. EMT is seven digits irreversible and non-resettable totalizer (9999999).

1 Press **F1** + **Nozzle number** to see the cumulative volume totalizer. This is an irreversible and non-resettable totalizer (9999999999999.999).

2 Press "**DOT**" + **Nozzle number** to see the cumulative sale totalizer. This is an irreversible and non-resettable totalizer.

3 Press **C** + **Nozzle number** to see the shift-wise volume totalizer.

4 Press **F2** + **Nozzle number** to see the shift-wise sale totalizer.

Starting up the dispenser is now complete.

Setting Parameters

Note: Ensure that the Dispenser is in the IDLE state and the nozzles are in the boot. The measurement system must be metric. To set the parameters, proceed as follows:

1 Press **F1** and **F2**.

2 Select the operation level you want to enter.

3 Enter the level 1 and level 2 PIN.

4 If the PIN is correct, then enter level 1 or 2 in Parameter Settings > Commands. Commands menu is not accessible from other side.

Parameter Settings Menu

The following table provides information on various operation levels:

Operation Level	Description
Level 1	Indicates the basic operational level which typically covers all features that are required to be handled during day-to-day usage of the pump/dispenser.
Level 2	Incorporates the entire menu that is available in Level 1 and offers some additional menus to handle the operation of the pump, which is normally controlled by the management team of the oil company or the service management team authorized to maintain the pump/dispenser.
Level 3	It is the highest level under which all parameters to be set at the factory level are clustered together. This level is normally not required for operating or maintaining the pump/dispenser in the field.

Note: Level 4 - Pump lease feature applicable for Bangladesh region only.
Level 5 - Calibration level. Meter calibration is done in this level.
Level 6 - Factory configuration level

Existing menu structure for Frontier (Software Version 7.05.06 and above)

Press **F1** and **F2** on keypad to display the select level option.

1. Level 1 - Press **1** from keypad and press **Select**, and then enter password XXXX.
2. Level 2 - Press **2** from keypad and press **Select**, and then enter password XXXX.
3. Level 3 - Press **3** from keypad and press **Select**, and then enter password XXXX.
4. Calibration - Press **5** from keypad and press **Select**, and then enter password XXXX.

The following table provides information on various parameters that can be set under three different levels of operations:

Sl. No.	Menu	Submenu	Level 1 (Site)	Level 2 (Service)	Level 3 (Engineer)
0	REAL TIME CLOCK		Y	Y	Y
0.a		SEC	Y	Y	Y
0.b		MIN	Y	Y	Y
0.c		HR	Y	Y	Y
0.d		DAY	Y	Y	Y
0.e		MONTH	Y	Y	Y
0.f		YEAR	Y	Y	Y
1	UNIT PARAMS		Y	Y	Y
1.a		PASSWORD L3	N	N	Y
1.b		GSM/PRINTER	N	Y	Y
1.c		DOMS	N	Y	Y
1.d		SINGLE/DUAL	N	N	Y
1.e		VL RND OFF	N	Y	Y
1.f		SL RND OFF	N	Y	Y
1.g		KUWAIT RND OFF	N	N	Y
1.h		STP PRESTART	N	N	Y
1.i		TW TIMEOUT	N	N	Y
1.j		LCD SEG DELAY	N	Y	Y
1.k		NO PULSE Tout	N	Y	Y
1.l		PASSWORD L1	Y	Y	Y
1.m		PASSWORD L2	N	Y	Y
2	RECEIPT PARA (PRINTER ENABLE)		N	Y	Y
2.a		HL1	N	Y	Y
2.b		HL2	N	Y	Y
2.c		HL3	N	Y	Y
2.d		HL4	N	Y	Y
2.e		HL5	N	Y	Y
2.f		FL1	N	Y	Y
2.g		FL2	N	Y	Y
2.h		FL3	N	Y	Y
2.i		FL4	N	Y	Y
2.j		FUEL A	N	Y	Y
2.k		FUEL B	N	Y	Y

Sl. No	Menu	Submenu	Level 1 (Site)	Level 2 (Service)	Level 3 (Engineer)
2	RECEIPT PARA (GSM ENABLE)		N	Y	Y
2.a		HL1	N	Y	Y
2.b		HL2	N	Y	Y
2.c		FUEL A	N	Y	Y
2.d		FUEL B	N	Y	Y
2.e		MAX VOL (L)	N	Y	Y
2.f		MIN VOL (mL)	N	Y	Y
2.g		IDLE TIME (hrs)	N	Y	Y
2.h		MANAGER MOBILE	N	Y	Y
2.i		ENGINEER MOBILE	N	Y	Y
2	NOZZLE PARAMS				
2.a		Hi-FLOW CUTOFF	N	Y	Y
2.b		PSET SALE TERMINATION	N	N	Y
2.c		HOSE SWELL	N	Y	Y
2.d		ABB DETECT	N	Y	Y
2.e		NZ LCK/UNLCK	N	Y	Y
3	PRODUCT PARAMS		Y	Y	Y
3.a		PPU	Y	Y	Y
3.b		VOLUME DEC SET	N	Y	Y
3.c		SALE DEC SET	N	Y	Y
4	PRESET		Y	Y	Y
4.a		1A	Y	Y	Y
4.b		1L	Y	Y	Y
4.c		2A	Y	Y	Y
4.d		2L	Y	Y	Y
5	AUTOPARA CONFIG		N	Y	Y
5.a		PROTOCOL MODE	N	Y	Y
5.b		FP 1 ID	N	Y	Y
5.c		FP 2 ID	N	Y	Y
5.d		ENBL 6-DIG VOL	N	Y	Y
5.e		AUTO VOL DP	N	Y	Y
5.f		EXT TOT PER FP	N	Y	Y
6	MOTOR ERROR		N	Y	Y
6.a		MOTOR ER. Y	N	Y	Y
6.b		MOTOR ER. N	N	Y	Y
7	MAX SALE		N	Y	Y
7.a		Side A	N	Y	Y
7.b		Side B	N	Y	Y
8	MAX VOLUME		N	Y	Y
8.a		Side A	N	Y	Y
8.b		Side B	N	Y	Y

Sl. No	Menu	Submenu	Level 1 (Site)	Level 2 (Service)	Level 3 (Engineer)
9	PPU HISTORY		Y	Y	Y
9.a		NOZZLE A	Y	Y	Y
9.b		NOZZLE B	Y	Y	Y
10	CALIB HISTORY		Y	Y	Y
10.a		NOZZLE A	Y	Y	Y
10.b		NOZZLE B	Y	Y	Y
11	CALIB COUNT		Y	Y	Y
11.a		NOZZLE A	Y	Y	Y
11.b		NOZZLE B	Y	Y	Y
12	SALE TRANSACTION				
12.a		NOZZLE A	Y	Y	Y
12.b		NOZZLE B	Y	Y	Y
13	ERROR HISTORY		Y	Y	Y
14	PUMP MODE		N	N	Y
14.a		STDLONE	NA	NA	Y
14.b		POS	N	N	Y
15.	SHIFT	SHIFT	Y	Y	Y

Level 1, 2, and 3 Commands

There are 15 commands. Each screen displays one option.

- Press **Up** or **Down** to move to the next screen.
- Press **Select** to edit a particular parameter.
- Press **Enter** to save the edited value.
- Press **F1** to return from main menu to IDLE status.

"0" - REAL TIME CLOCK

To set the REAL TIME CLOCK, proceed as follows:

1 In Level 1 Commands menu, scroll to REAL TIME CLOCK.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No.	Option	Definition
1	SEC	Set seconds between 0-59
2	MIN	Set minutes between 0-59
3	HR	Set hour between 1-23
4	DAY	Set day between 1-31
5	MONTH	Set month between 1-12
6	YEAR	Set year between 0-99

Note: Press F1 from the submenu to go to the main menu.

"1" - UNIT PARAMS

To set the UNIT PARAMS, proceed as follows:

1 In Level 3 Commands menu, scroll to UNIT PARAMS.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No.	Option	Definition
1	LCD SEG DEL	Set segment check time between 0-9 seconds
2	NO PULSE TIMEOUT	Set no dispense timeout to 30/60 seconds
3	PASS L1/L2/L3	Set password between 0-9999
4	SINGLE/DUAL	To set pump configuration Default 0 - Duo Pump Set 1 - Mono Pump
5	STP PRESTART	To set Submersible Turbine Pump (STP) configuration Default 0 - STP will start after display segment check Set 1 - STP will start before display segment check
6	SL RND OFF	To round off the sale to the nearest whole digit Default 0 - Sale roundoff is not enabled Set 1 - Round off the decimal points (xxxx.00) Set 10 - Round off the 1st digit (xxx0.00) Set 100 - Round off the 1st and 2nd digit (xx00.00) Set 1000 - Round off the 1st, 2nd and 3rd digit (x000.00)
7	DOMS	To set automation requirements when DOMS is used Set 1 - Multiply the value of volume by 10 and send to DOMS To suit automation requirements when DOMS is used Default 0 - Disable Set 1 - Multiply the value of volume by 10 and send to DOMS
8	TW TIMEOUT	To set two-wire communication timeout Default - 15 secs *Note: After timeout, Keypad display will show "E25 Comm error".*
9	GSM/PRINTER	To set receipt type Default 0 - Receipt disable Set 1 - GSM receipt selected Set 2 - Printer receipt selected
10	VL RND OFF	To round off the volume to the nearest whole digit Default 0 - Volume Round-off Disable Set 1 - Volume Round-off to 100 ml (xxxx.x0) Set 5 - Volume Round-off to 500 ml (xxxx.x0) Set 10 - Volume Round-off to 1 litre (xxxx.00)
11	KUWAIT RND OFF	To round off the Sale as per Kuwait requirements. Applicable only for 3 DP sale position. Sale value will round of to x.xx5 or x.x10 Default 0 - Kuwait Round-off Disable Set 1 - Kuwait Round-off enable

"2" - RECEIPT PARAM

To set the RECEIPT PARAMS, proceed as follows:

Note: 1) Receipt param will be displayed only if you enable printer or GSM in Unit Parameters.

2) Depending on the selection as Printer or GSM, the sub parameter list varies.

1 In level 2-3 Commands menu, scroll to NOZZLE PARAMS.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
Receipt Parameter for Printer:		
1	HL 1	To set header line 1 (24 - Characters) Default – "XYZ-OIL"
2	HL 2	To set Header line 2 (24 - Characters) Default – Blank
3	HL 3	To set Header line 3 (24 - Characters) Default – Blank
4	HL 4	To set Header line 4 (24 - Characters) Default – Blank
5	HL 5	To set Header line 5 (24 - Characters) Default – Blank
6	FL 1	To set Footer line 1 (24 - Characters)
7	FL 2	To set Footer line 2 (24 - Characters) Default – Blank
8	FL 3	To set Footer line 3 (24 - Characters) Default – Blank
9	FL 4	To set Footer line 4 (24 - Characters) Default – Blank
10	FUEL A	To set fuel type of Nozzle A Default – "PETROL"
11	FUEL B	To set Fuel type of Nozzle B Default – "PETROL"

Receipt Parameter for GSM (for software version 7.05.26 and below):		
1	HL 1	To set Header line 1 (24 - Characters) Default – "XYZ-OIL"
2	FL 1	To set footer line 1 (24 - Characters)
3	FUEL A	To set fuel type of Nozzle A Default – "PETROL"
4	FUEL B	To set fuel type of Nozzle B Default – "PETROL"
5	MAX VOL (L)	To set maximum volume alert limit in litres Default – 300 litres
6	MIN VOL (mL)	To set minimum volume alert limit in milliliters (ml) Default – 100 ml
7	IDLE TIME (hrs)	To set Idle time alert of the pump Default – 3 hours
8	MANAGER MOBILE	To set manager mobile number which receives the alert messages. Compulsory enter country code.
9	ENGINEER MOBILE	To set engineer mobile number which receives the error messages. Compulsory enter country code.

"2" - NOZZLE PARAMS

To set the NOZZLE PARAMS, proceed as follows:

1 In level 2-3 Commands menu, scroll to NOZZLE PARAMS.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
1	HI-FLOW CUT OFF	Set value X 100 ml High flow to cutoff
2	PSET SALE TERMINATION	Refer technical manual for setting this parameter
3	HOSE SWELL	Set value x 10 ml to blank for hose swell allowance
4	ABB DETECT	To enable abnormal pulse detection error (consecutive > 100ml) Default 0 - Disable Set 1 - Enable
5	NZ LCK/UNLCK	To set nozzle lock/unlock mode. Default 0 - Disable Set 1 - Enable

"3" - PRODUCT PARAMS

To set the PRODUCT PARAMS, proceed as follows:

1 In level 3 Commands menu, scroll to PRODUCT PARAMS.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
1	PPU	Set PPU with maximum 3 decimals
2	VOLUME DEC SET	Set decimal setting 2-3
3	SALE DEC SET	Set decimal setting 0-3

"4" - PRESET

To set the PRESET, proceed as follows:

1 In level 1 Commands menu, scroll to PRESET.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
1	1A	Set short key for frequent preset dispensing in amount for key F1
2	1L	Set short key for frequent preset dispensing in volume for key F1
3	2A	Set short key for frequent preset dispensing in amount for key F2
4	2L	Set short key for frequent preset dispensing in volume for key F2

"5" - AUTOPARA CONFIG

To set the AUTOPARA CONFIG, proceed as follows:

1 In level 1 Commands menu, scroll to AUTOPARA CONFIG.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menu.

4 Press **Enter** to save this setting.

Sl. No	Option	Definition
1	PROTOCOLMODE	Set 5 for 5 digit mode Set 6 for 6 digit mode Set 7 for 7 digit mode Default - 6 digit Protocol mode
2	FP 1 ID	Set first fueling point ID
3	FP 2 ID	Set second fueling point ID
4	ENBL 6-DIGIT VOL	To set volume dispense more than 999 liters in 6 digit protocol mode. Default 0 - Disable Set 1 - Enable (Dispense more than 999 liters)
5	AUTO VOL DP	To set transaction volume data decimal position. Default 0 -Transaction volume data decimal position as per two-wire protocol (XXX.xxx) Set 1 - Set Transaction volume decimal position as per display setting (XXXX.xx)
6	EXT TOT PER FP	To set number of grades totalizer request response. Default 1 – 1-Grade tot request Set 2 – 2-Grade tot request Set 3 – 3-Grade tot request Set 4 – 4-Grade tot request Set 5 – 5-Grade tot request Set 6 – 6-Grade tot request

"6" - MOTOR ERROR

To set the MOTOR ERROR, proceed as follows:

1 In level 1 Commands menu, scroll to MOTOR ERROR.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menu.

Sl. No	Option	Definition
1	MOTOR ERR Y	Enable motor error
2	MOTOR ERR N	Disable motor error

"7" - MAX SALE

To set the MAX SALE, proceed as follows:

1 In level 2 Commands menu, scroll to MAX SALE.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
1	Side A	Set maximum allowable volume per delivery
2	Side B	Set maximum allowable volume per delivery

"8" - MAX VOLUME

To set the MAX VOLUME, proceed as follows:

1 In level 2 Commands menu, scroll to MAX VOLUME.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menus.

Sl. No	Option	Definition
1	Side A	Set maximum allowable volume per delivery
2	Side B	Set maximum allowable volume per delivery

"9" - PPU HISTORY

To set the PPU HISTORY, proceed as follows:

1 In level 1 Commands menu, scroll to PPU HISTORY.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the PPU log.

Sl. No	Option	Definition
1	NOZZLE A	To view PPU log history of nozzle A, proceed as follows: 1 Press **F2** Key to enter into the logs. An RTC with log number will be displayed. 2 Press the **Up** key. Change PPU with log number will be displayed. 3 Press the **Up** key again. The volume totalizer at which PPU got changed will be displayed.
2	NOZZLE B	To view PPU log history of nozzle B, proceed as follows: 1 Press **F2** Key to enter into the logs. An RTC with log number will be displayed. 2 Press the **Up** key. Change PPU with log number will be displayed. 3 Press the **Up** key again. The volume totalizer at which PPU got changed will be displayed.

"10" - CALIB HISTORY

To set the CALIB HISTORY, proceed as follows:

1 In level 1 Commands menu, scroll to CALIB HISTORY.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the calibration log.

4 The log has the following details:

Sl. No	Option	Definition
1	NOZZLE A	To view PPU log history of nozzle A, proceed as follows: 1 Press **F2** Key to enter into the logs. An RTC with log number will be displayed. 2 Press the **Up** key. Changed PPU with log number will be displayed. 3 Press the **Up** key again. The volume totalizer at which PPU got changed will be displayed.
2	NOZZLE B	To view PPU log history of nozzle B, proceed as follows: 1 Press **F2** Key to enter into the logs. An RTC with log number will be displayed. 2 Press the **Up** key. Changed PPU with log number will be displayed. 3 Press the **Up** key again. The volume totalizer at which PPU got changed will be displayed.

"11" - CALIB COUNT

To set the CALIB COUNT, proceed as follows:

1 In level 1 Commands menu, scroll to CALIB COUNT.

2 Press **Select**.

This will provide information of how many times the pump got calibrated.

"12" - PUMP MODE

To set the PUMP MODE, proceed as follows:

1 In level 1 Commands menu, scroll to PUMP MODE.

2 Press **Select**.

3 Press **Up** or **Down** to scroll through the menu.

4 Press **Enter** to save this setting.

Sl. No	Option	Definition
1	STDLONE	To set the dispenser in standalone mode, press "C+Enter" key from keypad. The keypad display will show STDALONE SELECTED.
2	POS	To set the dispenser in standalone mode, press "C+Enter" key from keypad. The keypad display will show POS SELECTED.

Error Codes (ECs) and Notes

The following table lists the diagnostic ECs that are displayed on the LCD screen of the keypad (preset PIN pad). At times, the preset keypad may not be required for daily usage in the forecourt. In such cases (and wherever it was specified while placing the order), the preset keypad shall be mounted inside the Electronics Register Assembly (ERA) box, along with other electronic cards.

Error on Display	Description	Resolution
E01 PULSER ERR	Pulser Board Connectivity Error. The electronics Pulser/Encoder is not detected by the system.	1. Power off the dispenser. 2. Check if the cable connections to the pulser boards are proper. 3. Check the Dip switch setting of each pulser board. - Nozzle A - Dip Switch 1 and 2 OFF - Nozzle B - Dip Switch 1 ON and 2 OFF 4. Power up the pump and verify.
E02 NO PULSES	No Pulse Time Out. This is a power saver mode which will shutdown motor. No Fueling is done for a long (predefined) time at the start or during Fueling.	Keep back the nozzle on boot switch properly to clear this error.
E06 LOW BATTERY	Battery voltage is low.	If not connected, connect the battery. If connected, check the connections.
E07 TOTALZR ERR	Totalizer error. Electronics Totalizer has reached to the end of it's life.	1. Reprogram the CPU board and verify, or 2. Replace the CPU board.
E08 1 SENSOR ERR	OPTO sensor on pulser board not responding.	1. Power off the dispenser. 2. Clean the OPTO sensor on pulser board and verify, or 3. Replace the sensor assembly.
E09 LOW VOLTAGE	Low voltage or power failure.	Check power to the pump.
E11 LCDCON	Display board connectivity error. Display board not connected properly.	1. Power off the dispenser. 2. Check cable connections between controller to keypad. 3. Check cable connections between keypad to master display. 4. Check cable connections between master display to parallel display. 5. Check the Dip switch setting of each master display board. - Nozzle A - Dip switch 1 & 2 OFF - Nozzle B - Dip switch 1 ON & 2 OFF
E21 PARAM CORRUP	Parameter corruption. Parameters/Data saved in CPU and/or Ecal board gets corrupted.	1. Make sure software version of CPU and Keypad are compatible. 2. Do the master reset and verify, or 3. Reprogram the CPU board and verify, or 4. Change CPU board and verify, or 5. Do the calibration reset and verify, or 6. Replace the calibration card.
E22 NO RLY CARD	Relay board Connectivity Error. Relay board not detected by System	1. Power off the dispenser. 2. Check if the cable connections to the relay boards are proper. 3. Power up the pump and verify.
E25 COMM ERR	Communication timeout. Communication link broken between dispenser and FCC.	1. Check that automation system is operative. 2. Check the communication cable for breakage or disconnection. 3. Check whether the TX and RX connections are interchanged.
E28 E-CARD ERR	E-Cal Board connectivity Error.	1. Power off the dispenser. 2. Check the cable connections between controller card and E-cal Card. 3. Check DIP switch settings on E-Cal card - Switch 1 and 2 - OFF position - Switch 2 and 4 - ON position

Error on Display	Description	Resolution
E35 TAMPER ERR	pulser board Tampered. Misalignement of pulser disk on the pulser board.	1. Power off the dispenser. 2. Verify for tampering in the pulser assembly, or 3. Verify for misalignemnt of the disk on the pulser board, or 4. Replace pulser board with new.
E40 NO EMT	EMT Not detected by the system.	1. Power off the dispenser 2. Check if the cable connections from the EMT is properly connected to the CPU.
E115 MOTOR ERR	Motor Power supply Error. This is to protect motor from running.	1. Check power supply of the dispenser, 2. Motor power supply must be >160V and <250V for normal working.
E105 2 SENSOR ERR	Both OPTO sensor on pulser board not responding.	1. Power off the dispenser. 2. Clean the OPTO sensor on pulser board and verify, or 3. Replace the sensor assembly.
E110 NOZZLE LOCK	If abnormal pulse is enable and detected. Abnormal pulses (consecutive > 100 ml).	1. Check for the leakages of the fuel. 2. Go to Nozzle parameter setting and unlock the nozzle.
Display Blank	If display is completely blank but only backlight is ON.	1. Verify if the keypad to display cable is connected at CN6 main display, or 2. Re-program the display board.

Operating Pump/Dispenser

The modes of operation for a pump/dispenser are as follows:

- 'POS/2W': The pump is authorized for use through the console or automat.
- 'Standalone'

To operate the pump/dispenser, proceed as follows:

1 Lift the nozzle for the required fuel.

a All other fueling points on this side of the pump are now disabled.

b The pump performs a display check and then the amount, volume, and unit price displays are zeroed.

c The unit price for the fuel selected is now fixed.

d The pump motor will start (with about 3-6 seconds delay after the nozzle is lifted).

On two-speed pumps, the higher flow rate may be selected by pushing the button.

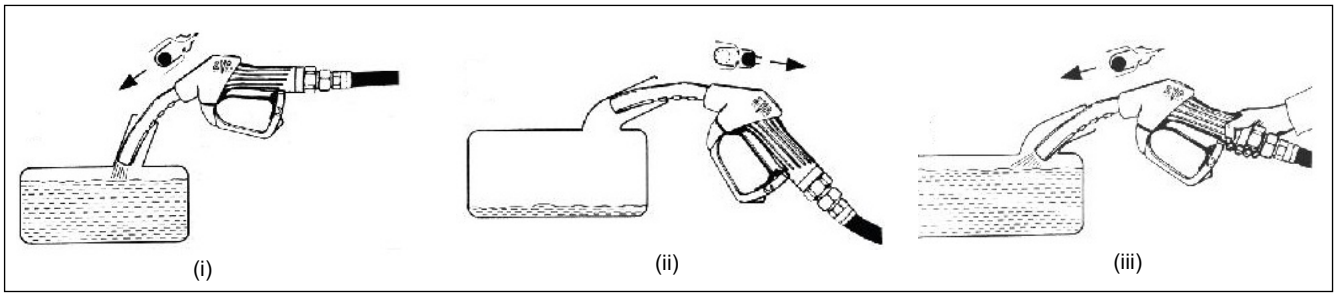
2 Fill the tank.

a Insert the nozzle pipe deep into the car filler and position the nozzle so that it does not slip out [see Figure 5-2 (i)].

b Squeeze the trigger of the nozzle. DO NOT remove the nozzle spout from the filler. If the nozzle is positioned horizontally, the safety mechanism may prevent the nozzle from opening [see Figure 5-2 (ii)]. In this case the nozzle must be tilted up a little [see Figure 5-2 (iii)].

Note: Tanks with incorrectly positioned filler or poor ventilation can cause the nozzle to shut off prematurely, or may cause fuel to be spilled. In these cases, the filling speed must be reduced by not fully squeezing the nozzle trigger in case of attended service operation. The nozzle may include a hold open latch. This must be removed at self service sites.

Figure 5-2: Filling Tank



c Terminate filling by releasing the nozzle trigger.

Note: Automatic nozzles close as soon as the maximum fuel level of the tank is reached.

3 Draw the nozzle out of the car filler neck. Ensure not to touch the trigger and return it to the support on the petrol pump.

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6 – Preliminary Steps for Service

This section provides instructions for collecting information on any unit-related problems that a Gilbarco-trained Authorized Service Contractor (ASC) or Customer Specified Contractor (CSC) will require for servicing. Providing complete information can shorten the time that the ASCs/CSCs spend in troubleshooting and enable them to have the correct parts required for service.

⚠ WARNING

Do not attempt to service a Frontier pump/dispenser on your own, without special, qualified training. Servicing a Frontier pump/dispenser incorrectly could result in severe injury or death. Only Gilbarco-trained ASCs/CSCs must service a Frontier pump/dispenser.

⚠ WARNING

Do not make unapproved modifications to Gilbarco equipment. Doing so could result in improper equipment operation and violation of state and local codes and could also create a safety hazard. Consult your ASC/CSC, distributor, or Gilbarco for approved modifications and kits.

Important Considerations when Changing Fuel Types

⚠ WARNING

Certain special alternative fuels and additives can degrade pump/dispenser performance or integrity if the dispensers are not designed for use with such fuels. Additionally, converting to certain standard fuels (gasoline, diesel, kerosene, and so on) from alternative fuels such as those with ethanol, methanol, or biodiesel or from alternative fuels to standard fuels can degrade dispenser performance or integrity. Similar effects can also occur when converting units to different standard fuel types.

Leaks and potential environmental hazards can result or components may fail prematurely. To avoid these issues, follow the guidelines as described in this section.

Before changing the fuel types, consider the following:

- Check with your Gilbarco ASC or distributor to verify that the fuel you use is compatible with the pumps/dispensers that dispense the fuel.

CAUTION

For flexible fuel dispensers, do not use standard hydraulic parts used in other Gilbarco pumps/dispensers in these units. Standard dispenser parts may not be compatible with the fluids.

CAUTION

Biodiesel fuels must comply with American Society for Testing and Materials (ASTM) standards for biodiesel fuels, or equivalent. In Europe, biodiesel blends must be a blend of biocontent [Fatty Acid Methyl Ester (FAME)] to EN14214, and diesel to EN590. Mixes of diesel with cooking oils, other plant or animal derived oils, and so on are not considered biodiesel fuel. Use of such mixes may void the warranty on the hydraulic components of the unit.

- Review the latest copy of the unit's warranty statement regarding use of the fuel.
- Certain fuels (especially fuels enhanced with alcohol) when used in tanks that previously contained a different fuel may clean out the tanks and force a large amount of contaminant into the dispenser. Apart from abnormally clogging filters, this large quantity of contaminant may damage certain dispenser components. Do not run units without filters at such times. Normally tanks and lines are cleaned of all water, sediments, and contaminants before such conversions, to minimize potential unit downtime or damage. Damage to hydraulic components from contamination when not using filters is not covered by warranty. Consult your ASC or Gilbarco distributor for recommendations.
- Although conversions from one fuel to an equivalent fuel (for example, from another supplier) generally do not create issues, it is recommended that after making any fuel type conversions (including those to alternative fuels or back), all units be visually inspected for leaks in two days, one week, and one month after fuel conversion. The ASC repairs any possible leaks. This must be done also for standard fuels when significant new additives are incorporated.
- It is recommended that whenever making non-equivalent fuel conversions, all units are checked for calibration within one month after the fuel conversion.
- Some non-equivalent fuel conversions will necessitate the requirement to change the pump/dispenser filter type previously used. Consult your ASC or Gilbarco distributor for any required changes before making any fuel conversions.

Preparing for Service

Appoint an ASC/CSC to efficiently service and maintain your Frontier unit. Gilbarco trains and certifies ASCs/CSCs to service and maintain the Frontier unit in a safe manner. Warranty service must be performed by an ASC/CSC only.

Before Making Service Call

Perform the following tasks, before you make a service call:

- Obtain complete information from station personnel about the problem. Provide any history that may help (whether the unit has a recurring problem, or the problem has been observed for the first time, and so on).
- Mention the associated hose number(s) along with the problem.
- Confirm if the tank contains fuel.
- Confirm if the power, pump lights, and circuit breakers are on.
- For electronic units, write down and report any ECs displayed.

Describing Problem

Provide the ASC/CSC with a complete and accurate description of the problem, including all symptoms and ECs. Ensure that you give the service personnel complete and accurate information. It will ensure faster and potentially inexpensive repairs and keep downtime costs to a minimum.

Replacing Parts

Use only genuine Gilbarco replacement parts and retrofit kits on your unit.

⚠ WARNING

Use only Gilbarco replacement parts and retrofit kits. Non-Gilbarco replacement parts may create safety hazards and violate local regulations.

Gilbarco replacement parts are required to maintain warranty.

Specialized Training

For safety reasons, do not attempt to service a Frontier unit on your own, unless you have been trained and certified to do so.

⚠ WARNING

Do not attempt to service a Frontier pump/dispenser yourself. Only a Gilbarco-trained ASC/CSC must service a Frontier pump/dispenser. Servicing a Frontier pump/dispenser incorrectly could result in severe injury or death.

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7 – Frontier Pump/Dispenser Maintenance

This chapter provides information on the following aspects of pump/dispenser maintenance:

- "Inspecting Pump/Dispenser Periodically"
- "Periodic Maintenance Requirements" on page 7-10
- "Special Maintenance Instructions" on page 7-10

CAUTION

Do not open the electronics cabinet to change paper, to remove cash acceptor cassettes, or to perform any other tasks when it is raining. The moisture from the rain can damage the pump/dispenser.

General Safety Considerations

Safe operation of the equipment is very important. The following recommendations are in addition to those found in the sections that follow and in "Important Safety Information" on page 2-1.

- Do not allow the customer to use damaged units or broken components with sharp edges.
- Do not allow the customer to use units with missing doors or panels or with doors open.
- Ensure that adequate and readable instructions are clearly given on the units or nearby areas for potential safety hazards such as static electricity fueling hazards, use of unapproved containers, and so on. Place signs where fueling customers will notice and can read them.
- Do not use long hoses beyond recommendations that may present a trip hazard. Use hose retrievers in good operating condition, when long hoses are used.
- Do not allow the customer to use units that do not have breakaway installed on them.
- Do not allow the customer to use units with hoses and/or nozzles removed from either side.
- Do not allow the customer to use units that are leaking fuel.

Inspecting Pump/Dispenser Periodically

Performing General and Component Maintenance Inspections

This section provides instructions for scheduling two types of maintenance inspections:

- "General Inspections" on page 7-2
- "Component Inspections" on page 7-2

Note: This section does not include special inspections such as those required when changing fuel types. For those requirements, refer to "Important Safety Information" on page 2-1.

Safety Warnings

You are performing inspections and maintenance in a potentially dangerous environment of flammable fuels/vapors and high voltage. Follow all safety precautions in "Important Safety Information" on page 2-1 to prevent injury when inspecting a unit at the islands.

⚠ WARNING

You are performing inspections and maintenance in a potentially dangerous environment of flammable fuels/vapors and high voltage. Failure to adhere to the safety precautions in this manual may cause fire or explosion, resulting in severe injury or death. Read and adhere to all safety precautions before performing any maintenance activity.

General Inspections

Perform a general inspection of each unit as follows:

- Every week, to ensure that all units are operating properly
- Whenever you receive a complaint about potential unit problems
- External damage
- Leaks
- Exposed sharp or similar edges that may cause cuts
- Missing parts, doors, and so on
- Safety hazards when fueling, such as slippery surfaces, trip hazards, missing warning signs, and so on

⚠ WARNING

If you find any leaks or damage, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion, or electrical shock could result, if you continue to use leaking or damaged pumps/dispensers.

⚠ WARNING

To prevent injury to customers or yourself, block customer access to the pump/dispenser with cones or similar equipment, when inspecting.

Component Inspections

Refer to the following table to schedule component inspections. Generally, the station owner must only inspect for damage or problems with the units. For safety reasons, several tasks in the following table, including all repairs, must be performed only by an ASC/CSC. Refer to the column titled "Who Performs the Inspection/Repair" on page 7-3 in the following table to determine if an ASC/CSC must perform a task.

⚠ WARNING

Do not attempt to perform any task that is noted "ASC/CSC only" in the "Who Performs the Inspection/Repair" column on page 7-3. Performing those tasks incorrectly could result in severe injury or death.

⚠ WARNING

If you find a leak during an inspection, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion, or electrical shock could result, if you continue to use a leaking or damaged pump/dispenser.

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Once a week	Displays	1 Inspect displays for proper reading of all digits. 2 Verify if the displays are properly backlit.	• Owner-inspect • ASC/CSC only-repair and test
At least once a week or if a customer complaint arises	Hoses	1 Inspect each hose for leaks and damage. **⚠ WARNING** If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion or electrical shock could result, if you continue to use a damaged pump/dispenser. 2 Inspect each hose for the following wear or damage: • Bulges • Cracks • Cuts • Flattened spots • Reinforcement showing • Soft spots • Splits • Weaknesses • Tears 3 Consult the hose manufacturer for any additional inspections required. *Note: If repair is required, call an ASC/CSC to make the repairs.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	
Once a week or if a customer complaint arises	Hose retrievers	1 Inspect hose retrievers for frayed or broken cables. 2 Inspect hose retrievers for cables wrapped around hoses. *Notes: 1) If repair is required, call an ASC/CSC to make the repairs.* *2) When hose retrievers are used, the breakaway whip hose must be attached to the nozzle, and the breakaway coupling attached to the whip hose, with the retriever clamp positioned between the breakaway coupling and the dispenser outlet casting. When retrievers are not used, the breakaway whip hose is attached to the dispenser outlet casting and the breakaway coupling is attached to the other end of the breakaway whip hose.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Once a week or as notified about a potential problem	Nozzles and boot area	1 Inspect nozzles for the following: • Damage • Leaks • Loose nozzle spouts • Missing parts, such as retainer springs and splash guards **⚠ WARNING** If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion, or electrical shock could result, if you continue to use a damaged pump/dispenser. 2 Inspect vapor recovery boots (bellows) for proper seal and signs of damage. 3 Consult the nozzle manufacturer for any additional required inspections. *Note: If repair is required, call an ASC/CSC to make the repairs.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test
Once a week, or as notified about a potential leak	Leaks outside the unit	1 Inspect the following for leaks or signs of leakage: • Breakaway • Couplings • Hose outlet castings • Hoses • Nozzles • Swivels 2 Look for any signs of fuel or fuel staining around the base of the dispenser, especially at the side columns and at the upper housing. 3 Review all documentation provided by each component's manufacturer for additional inspection information. 4 If a leak is found, stop using the unit, and make arrangements to repair the leak. **⚠ WARNING** If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion or electrical shock could result, if you continue to use a damaged pump/dispenser. **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Once a week or after drive-offs	Breakaway	1 Inspect the breakaway for secure connection to hose and for any leaks. **⚠ WARNING** If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion or electrical shock could result, if you continue to use a damaged pump/dispenser. 2 Consult the breakaway manufacturer for any additional required inspections. *Notes: 1) If repair is required, call an ASC/CSC to make the repairs.* *2) Some breakaway are not repairable. Check with the ASC/CSC whether the breakaway is repairable before the ASC/CSC attempts to reassemble the breakaway.* *3) A leak inspection within the hydraulics cabinet is also required. See the relevant section, later in this chapter.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test
Once a week or as required	Wash Unit	Clean with Simple Green® all purpose cleaner (or equivalent). **CAUTION** Do not wash with a high pressure hose. Refer to “Performing General and Component Maintenance Inspections” on page 7-1.	Owner

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Once a month, after drive-offs, or as notified about a potential leak	Leaks, within the lower hydraulics cabinet	1 Whenever possible, Gilbarco recommends removing power to the unit before performing these inspections. 2 Block the unit area to prevent customers from operating the unit during inspection. 3 Remove the lower panels slowly and carefully to avoid any fuel being sprayed in the cabinet (especially if a drive-off has occurred). Wear eye protection. 4 Inspect all hydraulic connections and seals, including the following: • Meters • Valves 5 If wetness or dripping fuel is found, stop using the unit, and make arrangements to repair the leak. *Note: Some staining of parts around seals is normal and does not indicate a problem. Look for dripping or wet surfaces.* 6 Monitor repaired places closely.	• Owner-inspect • ASC/CSC only-repair and test

⚠ WARNING

To prevent injury when inspecting self-contained units (equipped with pumps and electric motors), do not place your hands near the belts, pulleys, or motors. Do not allow anyone to use either side of the pump when inspecting. Block the pump/dispenser off or lock the nozzle to the nozzle hook.

⚠ WARNING

If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion or electrical shock could result, if you continue to use a damaged pump/dispenser.

⚠ WARNING

If you find a leak, stop using the pump/dispenser, and contact your local ASC/CSC. Fire, explosion or electrical shock could result, if you continue to use a damaged pump/dispenser.

CAUTION

To prevent potential injury, wear eye protection when performing these inspections.

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
New installations - After 200,000 liters (50,000 gallons), or after one month	Filter change and strainer cleaning	Replace filters and clean strainers regularly. *Note: Water alert filters may fail prematurely if water passes through them.*	Only an ASC/CSC must perform these tasks.
After first filter change - Every 1.1 million liters (300,000 gallons), every six months, or when fuel delivery rate significantly slows.		**⚠ WARNING** Do not attempt to perform any of these tasks yourself. Performing these tasks incorrectly could result in severe injury or death. *Note: Most complaints regarding continual slow flow rate from the dispenser are caused by clogged filters.*	
Every six months	Inspect and lubricate shear valves	To check valve operation, proceed as follows: 1 Trip the valve. 2 Authorize the hose at the console, if required. 3 Lift the operating handle. 4 Place the discharge nozzle in an approved container. 5 Squeeze the nozzle operating lever. If flow continues after several seconds, the valve is defective and must be serviced or replaced. 6 Place a few drops of SAE10 oil on shear valve body shaft. 7 Open and close valve with a wrench several times. 8 Place valve back in service. *Note: If repair is required, call an ASC/CSC to make the repairs.* **CAUTION** If you are not sure which device is the shear valve or have not been trained regarding its use or service, have the ASC/CSC inspect and lubricate this device for you. **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Every six months	Pump pulleys, belts, and belt tension	1 Remove power to the unit. **⚠ WARNING** To prevent an injury, remove power to the pump/dispenser before you start the maintenance activity. **CAUTION** To avoid injury, avoid getting your fingers in a pinch point between the pulley and belt during an inspection. 2 Inspect belts for fraying/cracks. 3 Inspect pulleys for excessive wear in grooves and excessive bearing play. 4 Ensure, by pressing the belt midway between the two pulleys, that there is no more than one inch of play on either side of the belt. *Note: If repair is required, call an ASC/CSC to make the repairs.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test
Every six months	Nozzle hooks and shafts	1 Lubricate with silicone grease, if required. 2 Check for damage. 3 Ensure that the locking tab locator is not broken. The locking tab locator helps hold the nozzle in the nozzle boot and enables the station owner to lock the nozzle boot with a clasp padlock. *Note: If repair is required, call an ASC/CSC to make the repairs.* **⚠ WARNING** Do not attempt to make these repairs yourself. Doing so could result in severe injury or death.	• Owner-inspect • ASC/CSC only-repair and test

Recommended Frequency	Components	Recommended Maintenance	Who Performs the Inspection/Repair
Every six months	Door locks	Lubricate with a graphite lubricant or lock oil. Follow manufacturer's instructions. Do not over-lubricate.	Owner
Every 12 months or as required in harsh climate	Polish unit	Polish metal parts with high quality car polish. Do not use automobile wax. Refer to "Performing General and Component Maintenance Inspections" on page 7-1.	Owner
Every six months or if fuel inventory discrepancies exist.	Meter calibration	Have the unit meters checked for proper calibration and corrected as required. High volume stations may require more frequent calibration checks when compared to the low volume stations.	• Owner - arranges for service • ASC/CSC - tests and recalibrates, if required.
For Units with Ecometer™			
Yearly	Ecometer calibration	Have the unit meters checked for proper calibration and corrected as required. Ecometers with proper air purging during installation will not generally vary from initial calibration settings.	• Owner - arranges for service. • ASC/CSC - tests and recalibrates, if required.

Periodic Maintenance Requirements

Cleaning Filter

Cleaning the filter regularly will prevent it from clogging and improves flow rate. For more information, refer to "Special Maintenance Instructions".

Special Maintenance Instructions

Cleaning and Detailing Unit

To clean and detail the unit, use the following items:

- Safety glasses
- Flexible rubber gloves
- Concentrated Simple Green all purpose cleaner
- Soft bristle nylon brush
- Spray bottle filled with water
- Empty spray bottle (to use with prepared cleaning mixture)
- White cotton cloths
- High quality car polish
- Safety cones or barricades

IMPORTANT INFORMATION
• Do not use waxes, harsh abrasives, or ammonia-containing cleaners on the textured door surfaces. • Always use a soft bristle nylon brush and rinse after cleaning. • Simple Green cleaner is recommended for all surfaces. • Do not spray the cleaner or rinse water onto or into the card reader, receipt printer, cash acceptor, or electronic display areas of the unit. • High quality car polish is recommended. Do not use wax-based polishes. • Do not apply the high quality car polish to electronic displays or nozzle boots. • Do not use pressure washers or high pressure hoses. Rinse water must be applied as a gentle spray. • Do not use high pressure hoses.

Routine Cleaning

To clean the unit, proceed as follows:

Note: Perform routine cleaning weekly or as required.

1 Place safety cones or other devices to barricade the units being cleaned.

2 Wear safety glasses and flexible rubber gloves.

3 In the empty spray bottle, prepare a mixture of one part concentrated Simple Green cleaner to 10 parts water.

CAUTION

Do not spray the cleaning mixture and water in or onto the card reader, receipt printer, cash acceptor, or electronic display area, as it may damage the equipment and will not be covered by warranty.

4 Spray the prepared cleaning mixture on the unit from bottom to the top. Streaking may occur if sprayed from the top down.

5 Scrub the unit with a soft bristle nylon brush in a circular motion from bottom to top. Scrub long enough to cause the cleaning solution to foam. For best results, two scrubbing cycles are recommended.

6 Rinse the unit thoroughly from the top to the bottom. Ensure that the cleaner is removed. For best results, brush the unit when rinsing. Cleaner that dries on the unit will attract dirt.

7 Dry the unit with a clean white cloth.

8 Remove barricade(s) and cleaning supplies from the unit area.

Deep Cleaning and Detailing

To deep clean and detail the unit, proceed as follows:

Note: Deep clean and detail as required or at least once a year. This helps to restore the original color to the painted surfaces.

1 Prepare a mixture of one part concentrated Simple Green cleaner to one part water.

2 Use a new clean white cloth, apply the high-quality car polish to the cloth, and then apply the polish to the painted or metal surfaces of the unit.

Note: For ground-in dirt, apply high quality car polish to the soft bristle nylon brush and rub the surface.

3 Wipe the surface of the unit with a clean white cloth.

4 Remove barricade(s) and cleaning supplies from the unit area.

Deep cleaning and detailing the dispenser is now complete.

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8 – Hand Cranking Overview

Frontier F160 frame has an option of dispensing fuel manually by hand cranking if the main power is not available.

Note: This information is in addition to Standard Operating Procedure (SOP) for Frontier pumps. All conditions in this owner's manual for the standard pumps apply to hand cranking pump.

This chapter provides information on the following aspects of pump/dispenser operation and hand cranking:

- "Precautions While Hand Cranking"
- "Service and Maintenance of Hand Cranking Mechanism"
- "Using Hand Crank Pump" on page 8-2

CAUTION

Do not open the electronics cabinet to change paper, to remove cash acceptor cassettes, or to perform any other tasks when it is raining. The moisture from the rain can damage the pump/dispenser.

Precautions While Hand Cranking

Safe operation of the equipment involves the following precautionary measures:

- Alignment of sprocket assembly fly wheel with Global Pumping Unit (GPU) wheel is extremely important. Both the wheels should be in same plane. Confirm the chain is not loose by rotating it for 2-3 revolutions. It must remain engaged to sprocket assembly.
- Display will show dispensed volume on battery supply when main power fails. Battery must be replaced when it gets weak (charge retention is reduced) by 12 VDC 7 AH (ampere hour).
- Display will start blinking when battery is about to discharge completely. Deliveries made after display starts blinking are not assured to get recorded. Do not make any delivery after display starts blinking.
- Battery will get charged on mains power when available.
- Additional mechanical totalizer is provided to indicate any dispensing is carried out after mains and battery power is not available. Based on E-Cal, it will record the reading within three percent of dispensed volume. Take the reading at total power shutoff and read it before condensing the first delivery after power resumes. Both readings should be the same if pump is not dispensed during that period.

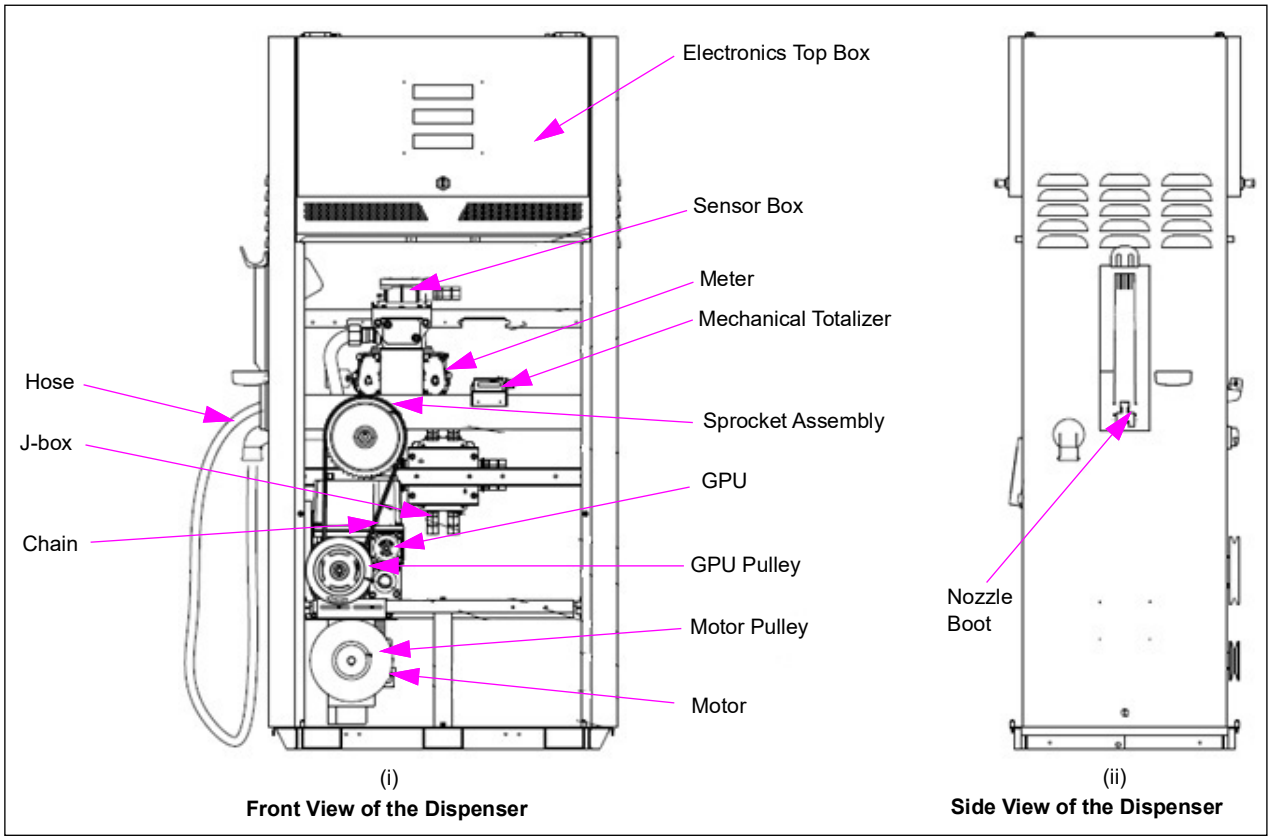
Service and Maintenance of Hand Cranking Mechanism

In addition to the information in "Frontier Pump/Dispenser Maintenance" on page 7-1, grease the chain during preventive maintenance and check for smooth functioning of hand cranking mechanism.

Components - Frontier Hand Crank Pump

Figure 8-1 shows the components of Frontier pump with hand cranking option.

Figure 8-1: Frontier Hand Cranking Pump Components



Using Hand Crank Pump

To dispense the using a hand crank pump, proceed as follows:

Note: Working principle with electrical power is explained in "Frontier Operation" on page 5-1.

1 When electrical power is not available, connect handle to sprocket assembly and rotate clockwise.

2 Open the nozzle and fuel will get dispensed.

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