



TopKAT™ PLUS

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# Installation Manual

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## Approvals

Gasboy, Greensboro, is an ISO 9001:2000 registered facility.

### Underwriters Laboratories (UL):

UL File#	Products listed with UL
MH4314	All dispensers and self-contained pumping units
MH10581	Key control unit, Model GKE-B Series Card reader terminals, Models 1000, 1000P Site Controller, Model 2000S CFN Series Data entry terminals, Model TPK-900 Series Fuel Point Reader System

### California Air Resources Board (CARB):

Executive Order #	Product
G-70-52-AM	Balance Vapor Recovery
G-70-150-AE	VaporVac

## National Conference of Weights and Measures (NCWM) - Certificate of Compliance (CoC):

Gasboy pumps and dispensers are evaluated by NCWM under the National Type Evaluation Program (NTEP). NCWM has issued the following CoC:

CoC#	Product	Model #	CoC#	Product	Model #	CoC#	Product	Model #
95-179	Dispenser	9100 Retail Series, 8700 Series, 9700 Series	91-019	Dispenser	9100 Commercial Series	05-002	Atlas	8700K, 8800K, 9100K, 9200K, 9800K
95-136	Dispenser	9800 Series	91-057	Controller	1000 Series FMS, 2000S-CFN Series			

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# 1 – Introduction

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## Purpose

This manual provides installation instructions for TopKAT™ PLUS, the complete station automation solution in a dispenser-mounted compact box. The system must be installed in the factory as described in this manual to ensure its reliability and proper operation.

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

## Intended Users

This manual is intended for Authorized Service Contractors (ASCs) of TopKAT PLUS and its components. It is also intended for the factory and island electricians.

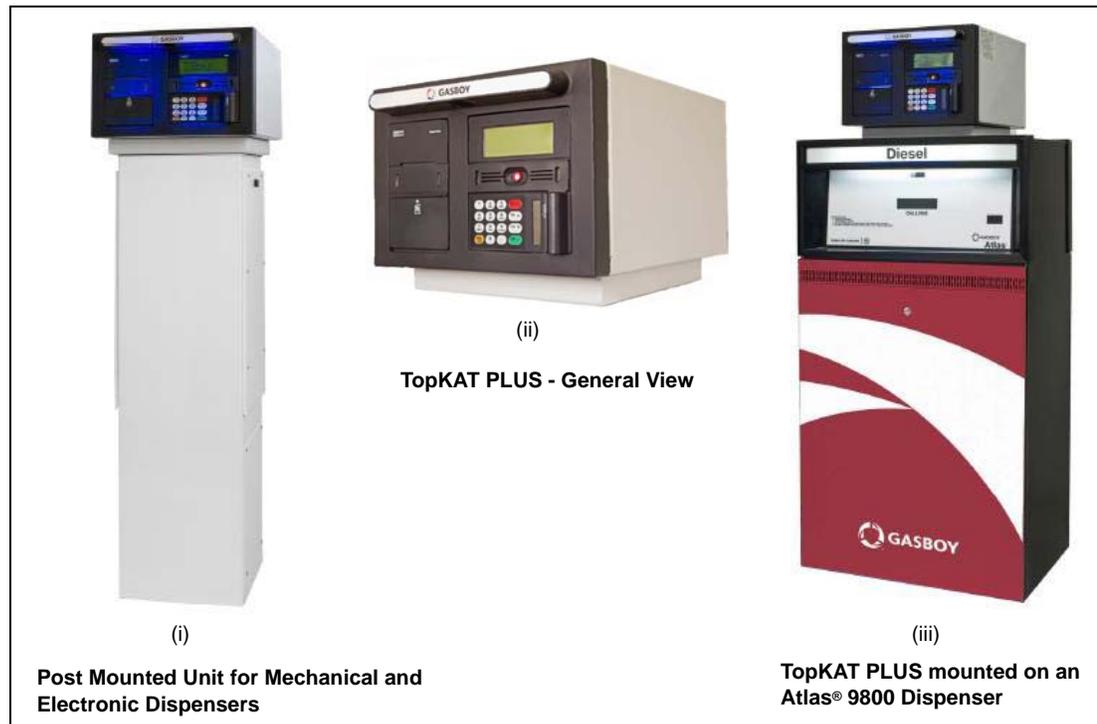
## Description

TopKAT PLUS is a fuel control and data acquisition system. The system is self-contained in a forecourt compatible and weather-resistant cabinet installed on top of Gasboy® dispensers or mounted on a post.

TopKAT PLUS (see [Figure 1-1](#) on [page 1-2](#)) is a core component in Gasboy's solution for small home base gas stations. TopKAT PLUS provides the central function of site controller adequate for a maximum of two nozzles in a single dispenser. It also fulfills other essential services on the island such as driver identification system, transaction data storage, and so on. Its ergonomic design, as well as its user-friendly operating program, enables fast and accurate service for the driver in the refueling site.

TopKAT PLUS is equipped with the Outdoor Payment Terminal (OrPT), a payment terminal and communication receptacle. The payment terminal is equipped with an alphanumeric Liquid Crystal Display (LCD) and a keyboard to interface with the client. This enables TopKAT PLUS to support all common refueling identification devices such as magnetic cards, contactless Radio Frequency Identification (RFID) tags (also known as MIFARE® tags), and keypad entry.

Figure 1-1: TopKAT PLUS - General View



## System Overview

### TopKAT PLUS System

TopKAT PLUS is an innovative product that enables refueling in home base gas stations for fleet authorized vehicles or drivers. TopKAT PLUS electronically locks the dispenser nozzles, thereby ensuring that only appropriately authorized vehicles and plants receive the required fuel. The system also ensures accurate recording of each transaction (see [Figure 1-2](#) on [page 1-3](#)).

The heart of the home base station solution is the SiteOmat automation software. SiteOmat runs on an embedded operating system on the Orpak™ Controller Unit (OrCU). OrCU is an embedded hardware platform designed to survive the harsh gas station environment. It uses a solid state flash disk and Real Time Clock (RTC) with backup along with surge suppressors for transient and noise immunity. The system also includes power failure recovery mechanisms.

### Remote Web Access

Remote web-based capabilities for monitoring, management, and maintenance are available. A standard PC with Microsoft® Internet Explorer® is used for management of the site either locally or remotely (secured). A special management software is not required, thanks to the built-in web server technology integrated into the station controller and the large variety of communication links supported.

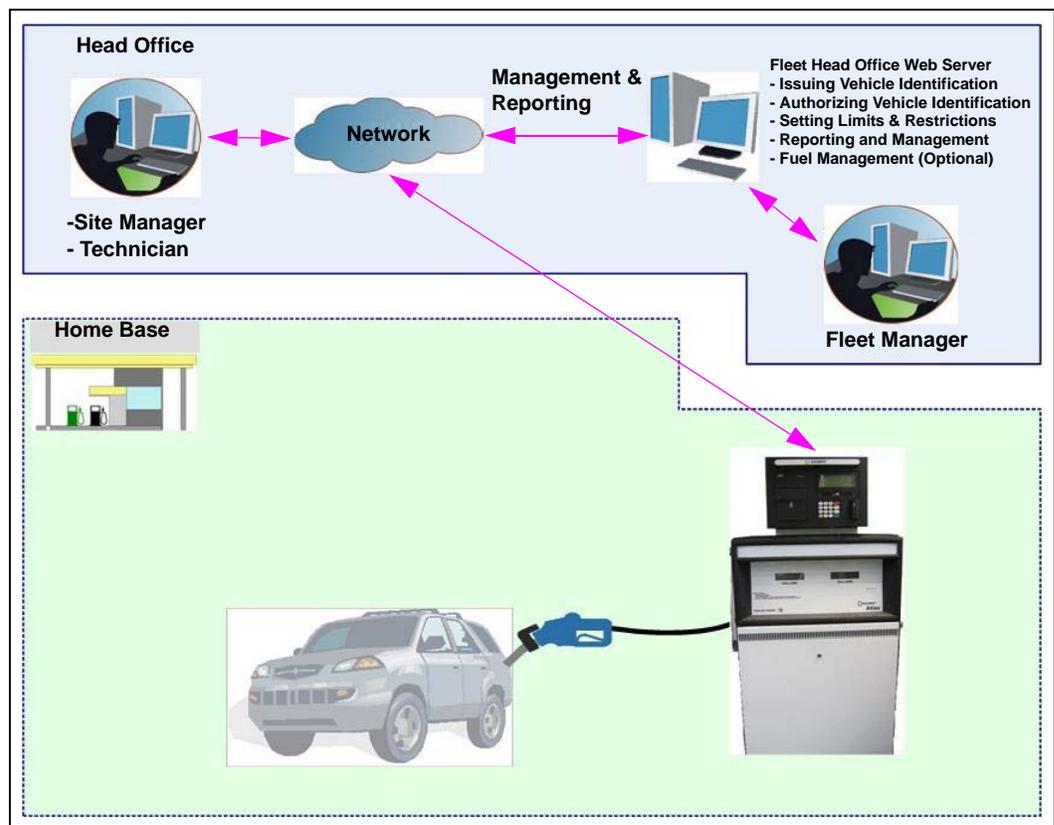
## Head Office

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

## Restrictions and Limits

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

**Figure 1-2: TopKAT PLUS in Home Base Station - General Configuration Diagram**



## System Workflow Example

Following example depicts the operational workflow for self-service at the home base station:

### Refueling Scenario with Magnetic Cards

A motorist stops for fuel at the station. His authorization device for the fueling transaction is a magnetic card. The client swipes the card through the magnetic card reader on the payment panel.

The magnetic card information is read and sent to the site controller (OrCU) for authentication and approval. The client lifts the nozzle and inserts it in the car inlet. On approval, the fueling transaction starts, at the end of which the transaction data is kept internally. The data is transferred to the fuel head office for future billing.

The client may add more data to the transaction, by manually entering the information using the payment panel keyboard. After the refueling is completed, the motorist replaces the nozzle to pump.

The motorist may print a transaction ticket from the TopKAT PLUS printer (optional).

## TopKAT PLUS Structure

### Main Components

Following is a short description of the TopKAT PLUS main sub-assemblies:

#### OrCU

OrCU is a complete forecourt controller with its own embedded operating system. The unit consists of an embedded hardware platform with a solid state flash hard disk, RTC with backup, along with surge suppressors for transient and noise immunity.

OrCU features two separate and isolated networks (TCP/IP over Ethernet®). One network links the TopKAT PLUS system components. The second network is intended for external remote communication (head office and third-party systems). This network is protected by Secured Socket Layer (SSL) security.

OrCU includes a built-in server for web access through an Internet browser (Internet Explorer).

**Figure 1-3: OrCU**



### OrPT Panel

The OrPT consists of a payment panel and communication equipment. The panel is equipped with an alphanumeric LCD (graphic LCD, optional) and a keyboard to interface with the client. The payment panel is equipped with several authorization options such as magnetic card reader and RFID tag reader. These authorization tools enable TopKAT PLUS to accept all common authorization methods such as credit cards, magnetic cards, and contactless tags.

OrPT supports keyboard entry for authorization, and other parameters' input from the user such as odometer, engine hours, vehicle plate number, and PIN code.

The OrPT panel is connected to the site controller (OrCU) through a Local Area Network [LAN (Ethernet)] link.

**Figure 1-4: OrPT Panel**



### Outdoor Printer (Optional)

TopKAT PLUS includes an optional printer for receipts printout, as well as data output. The printer is linked to the central payment terminal that sends to it the transaction data for printout.

Printer module G2 is a compact, ruggedized thermal printer suitable for the harsh environment of the gas station. It includes two sensors for paper usage alerts:

- Low paper sensor - activated when there is approximately 25% of the paper roll left
- End paper sensor - activated when printer paper runs out completely

The paper usage and receipt indications include a buzzer sound, Light Emitting Diode (LED) indicators or the combination of both, dependent on its configuration.

**Figure 1-5: Outdoor Printer (Optional)**



### 8-port CommVerter

The 8-port CommVerter consists of a communication board for all TopKAT PLUS electronic units and for the peripheral equipment interface.

The CommVerter includes an Ethernet switch, RS-485 port for electronic pumps or an Mechanical Pump Interface Card (MPI-C) for interface to a mechanical pump. For more information, refer to “Printer” on [page 4-1](#). The CommVerter communicates with the site controller (OrCU) through a LAN (Ethernet) link.

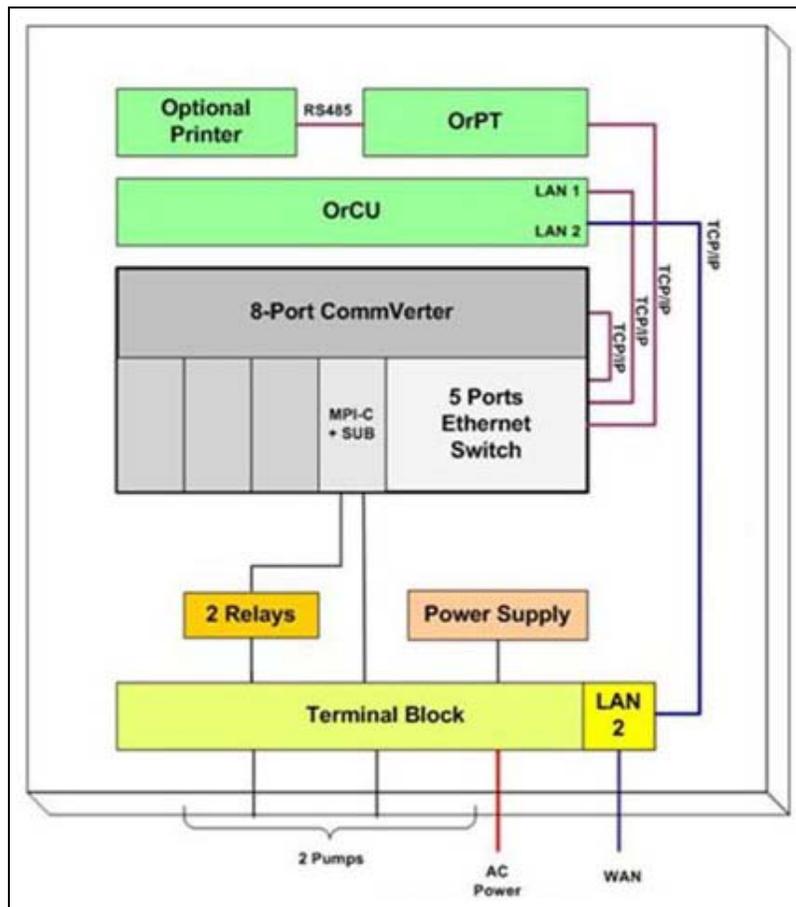
Figure 1-6: 8-port CommVerter



**TopKAT PLUS Internal Configuration - Mechanical Pump**

Figure 1-7 shows a general configuration diagram of the TopKAT PLUS up to two mechanical pumps.

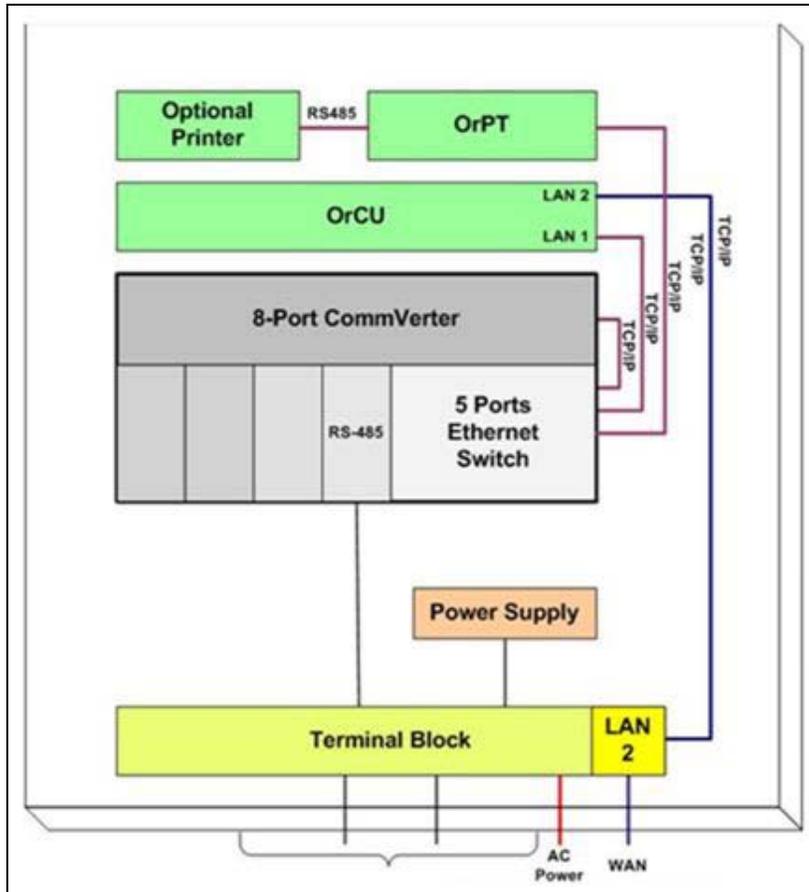
Figure 1-7: Internal Configuration Diagram - Two Mechanical Pumps



### TopKAT PLUS Internal Configuration - Electronic Pump

Figure 1-8 shows a general configuration diagram of the TopKAT PLUS up to two electronic pumps.

Figure 1-8: Internal Configuration Diagram - Two Electronic Pumps



### TopKAT PLUS Main Components Location

Figure 1-9 shows the location of the main components of the TopKAT PLUS.

**Figure 1-9: Internal Components Location**

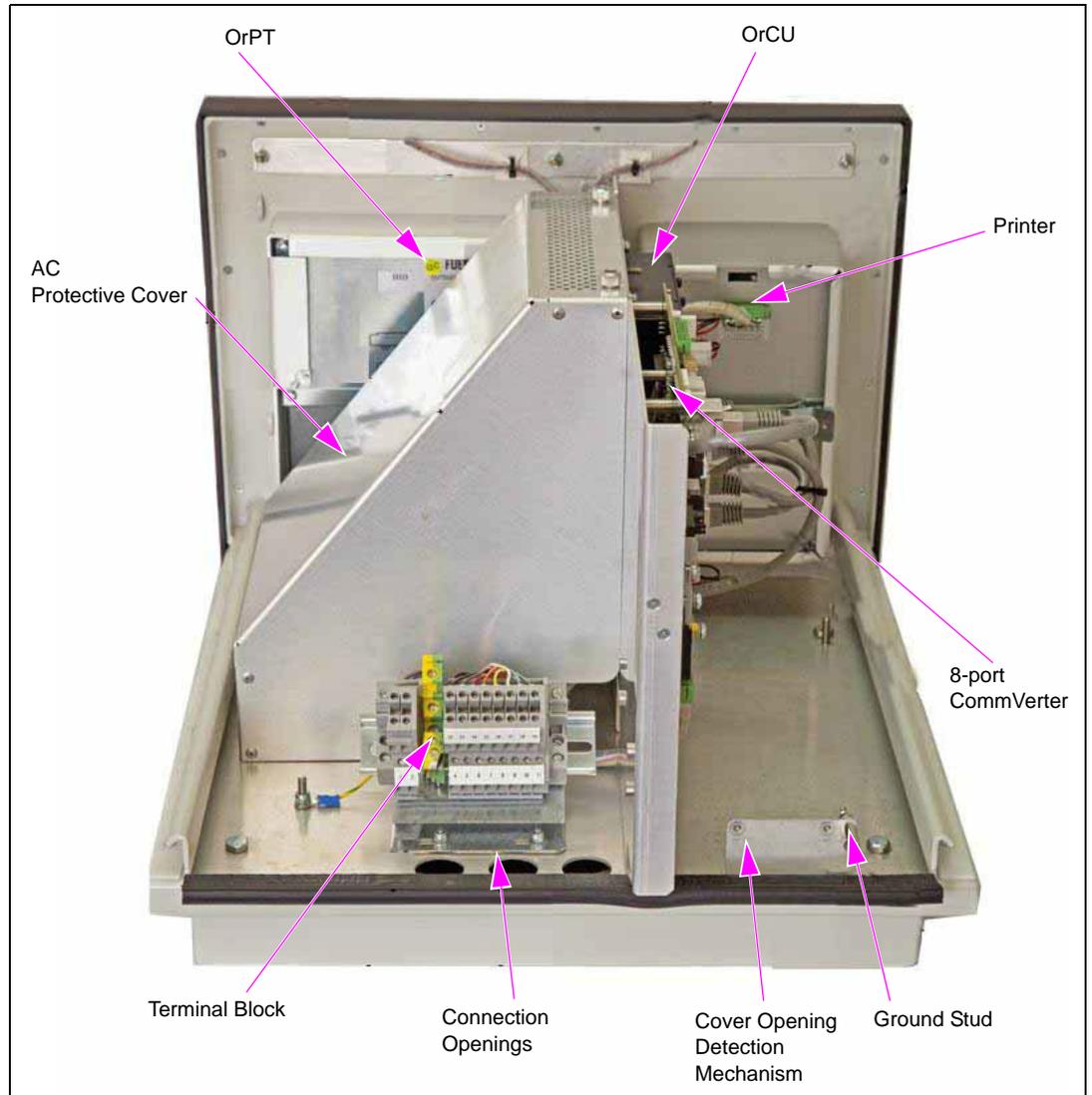
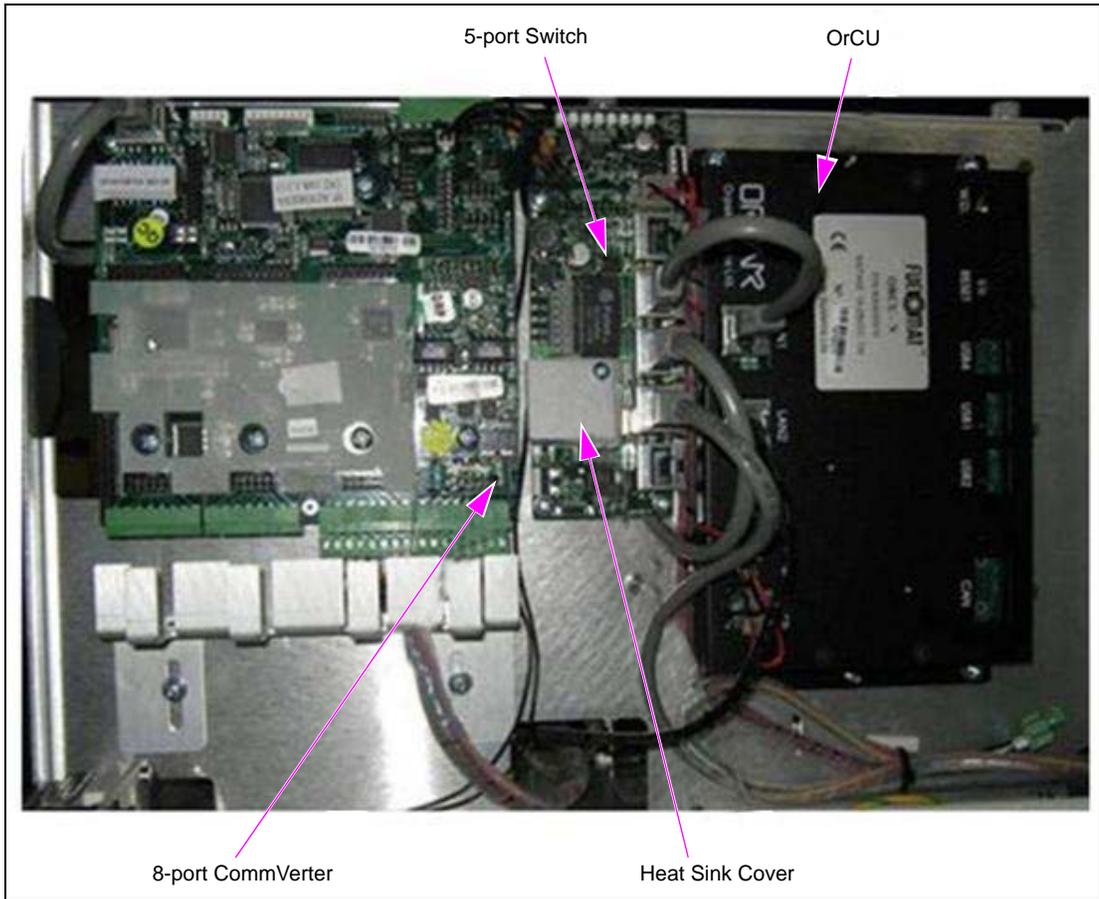


Figure 1-10: Internal Components Location - Right Side

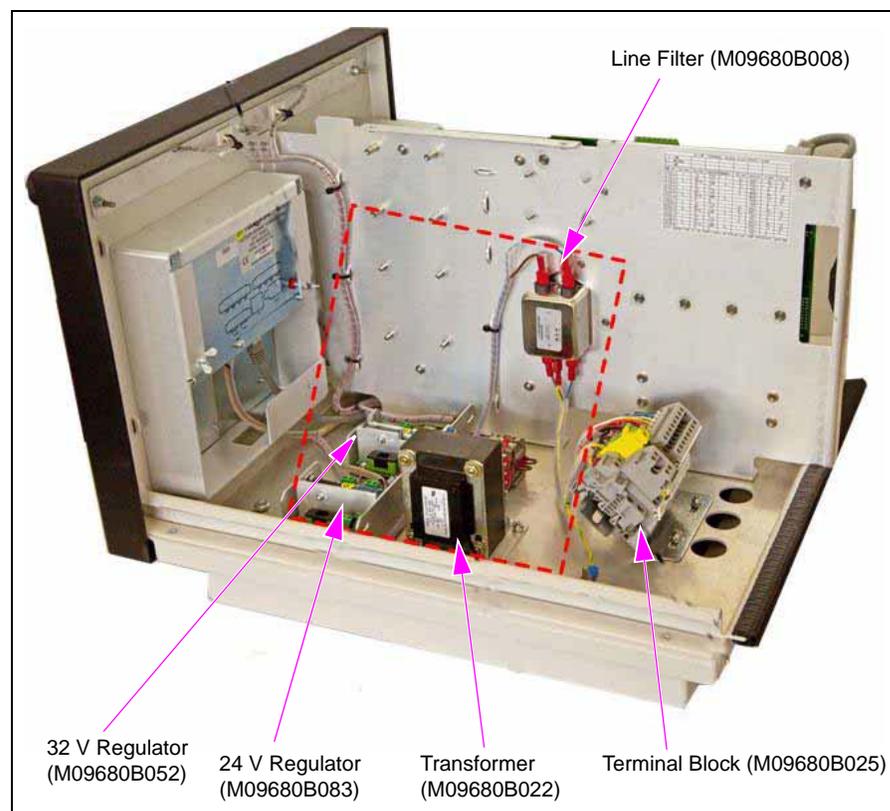


# Electrical Setup

TopKAT PLUS electrical components are protected by a dedicated cover to ensure physical separation between high voltage and low voltage in the box. The mains cable is first connected to the terminal block. Between the terminal block and transformer, the system uses a line filter to attenuate conducted radio frequencies - Radio Frequency Interference (RFI), Electromagnetic Interference (EMI) - between the line and equipment. AC power is then supplied to an AC/AC high to low transformer - 110/220 to 25 VAC.

Figure 1-11 shows the AC setup in electronic pumps configuration without the protective cover.

**Figure 1-11: AC Setup (Electronic Configuration)**



# Available Configurations

## General

TopKAT PLUS is available in several configurations, in accordance with its intended use and with the components installed. All configurations are manufactured in accordance with specific customer request and receive a part number (refer to “Configurations”). Following paragraphs describe the several configurations and their device composition:

## Optional Printer

The printer in the TopKAT PLUS is provided as an option. The printer issues a printout of the transaction to the driver.

## Dispensers

TopKAT PLUS can support either mechanical or electronic dispensers, in accordance with its configuration.

Mechanical dispensers require the installation of an MPIC card on the 8-port CommVerter. Electronic dispensers require installation of an interface card (RS-485) on the 8-port CommVerter.

## Configurations

Following table defines all the available product numbers for the different TopKAT PLUS configurations:

Part Number	Name	Dispenser		PRN
		Electronic	Mechanic 2	Printer
PA040500000	TopKAT PLUS (E)	+	-	-
PA040501000	TopKAT PLUS (2M)	-	+	-
PA040500010	TopKAT PLUS (E, PRN)*	+	-	+
PA040501010	TopKAT PLUS (2M, PRN)*	-	+	+

\*TopKAT PLUS with printer is for installation over class 1, division 2.

*Note: TopKAT PLUS does not support Tank Level Gauges (TLG) or additional electronic dispensers. Those devices require an external box or another solution.*

In the order form, customers are required to define the part number for the specific pump card in use (MPI-C or RS-485, refer to the following table).

No.	Pump Card Description	Gilbarco® Part Number
1	RS-485 Interface (8P) P.B.	M09680B014
2	MPI-C + Sub Interface (8P) P.B.	M09680B105

# Security and Protection

## General

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

## Authorization Security

The contactless tags include Triple-Data Encryption Standard (TDES) encrypted data for user identification and billing. Consequently, TopKAT PLUS includes a special Security Application Module (SAM) for decryption and matching identification. On tag reading, TopKAT PLUS attempts to decrypt the string from the tag. TopKAT PLUS disregards tags whose security scheme does not match the TopKAT PLUS internal SAM.

## Network Security

The Ethernet LAN is isolated from the external Wide Area Network (WAN) by the site controller (OrCU). In case of remote maintenance, a firewall must be applied either at the router level or preferably at the home base station level.

## Maintenance Security

TopKAT PLUS maintenance and setup procedures require inserting a user name and password for access. For more information, refer to *MDE-4817 SiteOmat In-House Station Controller Setup and Maintenance Manual*.

## Housing

TopKAT PLUS system enclosure is made of a metal cabinet for factory installation on top of the pump. It includes a front plastic panel and a supportive base.

The enclosure is weather-proof to sustain the harsh environment of a home base station. TopKAT PLUS payment panel is made of rugged plastic. The devices in its front panel are sealed to prevent humidity and dust penetration.

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

The cabinet also includes an electronic mechanism for preventing unauthorized personnel from opening the TopKAT PLUS box cover. The detection mechanism is set in the SiteOmat application, refer to *MDE-4817 SiteOmat In-house Station Controller Setup and Maintenance Manual*.

*Note: The top cover and frame are secured by a ground wire. Caution must be taken while removing the cover.*

## Specifications

The physical, electrical, and environmental specifications applicable to the TopKAT PLUS are displayed in the following table.

Description	Specification
Supply Voltage	120-240 VAC
Power Consumption	1 A max
Operating Temperature	-40 °F to +104 °F (-40 °C to +40 °C)
Storage Temperature	-40 °F to +158 °F (-40 °C to +70 °C)
Humidity	80% Non-condensing
Dimensions	W X H X D: 16.26 X 11.24 X 17.224" (413 X 285.5 X 437.5 mm)
Communication Interface	RS-485 - 9600 bps, Half-duplex RS-232 Ethernet RJ-45 - 10 mbps
Pump Control Maximum Current [2 Solid State Relay Channels, (see note)]	Motor Maximum: 3/4 HP at 115 VAC or 1-1/2 HP at 230 VAC
Power Supply Output Voltage to Pulsar Unit	12 VDC +/- 20%
Power Supply Maximum Output Current	30 mA max
Pulsar Input High Level Voltage	9 to 15 VDC
Pulsar Input High Level Sink Current (at 15 V)	3 mA
In Use "On" Level (Input)	100-240 VAC, 50/60 Hz, 2 W (20 mA)
In Use "Off" Level (Input)	0 to 20 VAC
UL® Recognition	Suitable for Use Over Class 1, Division 2, Group D

*Note: When controlling 230 VAC pumps the solid state relay only controls one leg of the 230 VAC.*

## Standards

### Communication Standards

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

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

### Security Standards

TDES encryption for payment devices (contactless tags, magnetic stripe cards, and so on).

## Using This Manual

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

### **WARNING**

An operating procedure, practice, and so on, that if not correctly followed, could result in an injury or loss of life.

### **CAUTION**

An operating procedure, practice, and so on, that if not strictly observed, could result in damage or destruction of equipment.

### **IMPORTANT INFORMATION**

More detailed technical/functional information in regard to relevant issue.

## Related Documents

Document Number	Description	GOLD <sup>SM</sup> Library
MDE-4331	Atlas Fuel Systems Installation Manual	<ul style="list-style-type: none"> <li>• Gasboy Atlas</li> <li>• Pumps/Dispensers</li> </ul>
MDE-4333	Atlas Fuel Systems Site Preparation Manual	<ul style="list-style-type: none"> <li>• Gasboy Atlas</li> <li>• Pumps/Dispensers</li> </ul>
MDE-4334	Commercial and Retail Series Atlas Start-up/Service Manual	<ul style="list-style-type: none"> <li>• Gasboy Atlas</li> <li>• Pumps/Dispensers</li> </ul>
MDE-4817	SiteOmat In-House Station Controller Setup and Maintenance Manual	Gasboy Fleet PLUS Systems
MDE-4818	SiteOmat In-House Station Controller User's Manual	Gasboy Fleet PLUS Systems
MDE-4819	OrPT Gasboy's Payment Terminal Installation, Setup and Operation Manual for Home-base Stations	Gasboy Fleet PLUS Systems
MDE-4820	8-port CommVerter Operation and Installation Manual	Gasboy Fleet PLUS Systems
PT-1963	Illustrated Spare Parts Manual	Gasboy Fleet PLUS System

# Abbreviations and Acronyms

<b>Term</b>	<b>Description</b>
ANSI	American National Standards Institute
ASC	Authorized Service Contractor
AWG	American Wire Gauge
CAT	Category
D-Box	Distribution Box
DES	Data Encryption Standard
EIA	Electronic Industries Alliance
EMI	Electromagnetic Interference
FHO	Fleet Head Office
GOLD	Gilbarco Online Documentation
J-box	Junction Box
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MPI	Mechanical Pump Interface
MPI-C	Mechanical Pump Interface Card
NEC®	National Electrical Code
NFPA	National Fire Protection Association
OrCU	Orpak Controller Unit
OrPT	Orpak/Outdoor Payment Terminal
PS	Pump Server
RFI	Radio Frequency Interference
RFID	Radio Frequency Identification
RTC	Real Time Clock
SAM	Security Application Module
SSE	Site Service Equipment
SSL	Secured Socket Layer
STP	Submersible Turbine Pump
TCP/IP	Transmission Control Protocol/Internet Protocol
TDES	Triple-Data Encryption Standard
TIA	Telecommunications Industry Association
TLG	Tank Level Gauges
UL	Underwriters Laboratories
VIT	Vehicle Information Transceiver
WAN	Wide Area Network

# 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 Gasboy Authorized Service Contractor or call the Gasboy Support Center at 1-800-444-5529. 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.

## Important Safety Information

### 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

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.

## 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.

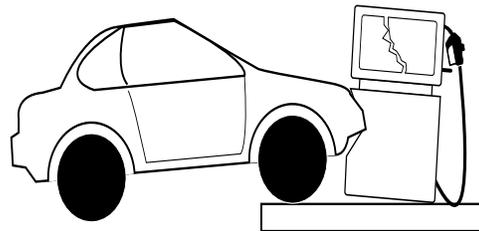
### Lockout/Tagout

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

 <b>WARNING</b>	
	<p>Spilled fuels, accidents involving pumps/dispensers, or uncontrolled fuel flow create a serious hazard.</p>
	<p>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.</p>

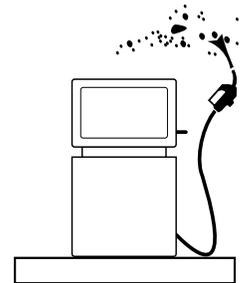
The following actions are recommended regarding these hazards:



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.

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## 3 – TopKAT PLUS Installation Procedures

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### General

TopKAT PLUS units can be supplied factory mounted on an Atlas pump/dispenser or with a pedestal for interface to mechanical or electronic register pumps/dispensers. This section provides installation procedures for both types.

These procedures include:

- TopKAT PLUS box installation
- Wiring
- Post installation check

### Installation Specifications

#### General

Installation procedures and requirements depend, to some extent, on the specific fuel dispenser models. Therefore, use the information in this section to develop factory installation plans for each specific dispenser or suction pump.

#### Precautions and Safety Notes

Before actual installation activities, carefully observe the following precautions and safety notes:

#### **WARNING**

Before installing or servicing equipment, carefully observe the warnings and precautions provided in [“Important Safety Information”](#) on [page 2-1](#).

- Ensure that actual installation is performed by experienced personnel as required by the National Fire Protection Association-30 (NFPA-30) “Flammable and Combustible Liquids Code”, NFPA-30A “Code for Motor Fuel Dispensing Facilities and Repair Garages”, NFPA-70A®, National Electric Code (NEC), federal, state, and local codes, and any other applicable safety codes and regulations.
- System power may come from more than one source. Disconnect all power sources, including pumps, before attempting to work on the system.
- Do not connect power to the TopKAT PLUS or pump, until the complete installation is inspected and certified.

## Types of Cables

Following table lists the types of cable in use for the wiring of the TopKAT PLUS system:

No.	Function	Type
1	AC Power Control to Pumps (Valves or Engine) In Use Signal	Power Cable, 3 X 1.5 mm <sup>2</sup> NYY (14 AWG), in accordance with local standards.
2	Pulser	Data Communication Cable, 300 V RMS, 194 °F (90 °C), Shielded Twisted-pair, Oil-resistant, 24 AWG, Low Capacitance below 60 PF/meter similar to Belden® 9729 Cable
3	LAN	Category-5E (CAT-5E), Four Conductor Insulator Cable (042GA00007 or 042GALF007 - Gilbarco part number M12673B001) or Shielded, 300 V RMS, 194 °F (90 °C) similar to Belden 121700A
4	GND	Ground Cable 0.4" (10.8 mm <sup>2</sup> )

*Note: Use the appropriate gauge wire size for the AC power for pumps, dispensers, and fueling equipment.*

## Types of TopKAT PLUS Units

There are three types of TopKAT PLUS configurations as follows:

- Electronic TopKAT PLUS mounted on an Atlas 9800 unit
- Electronic TopKAT PLUS mounted on a pedestal
- Mechanical TopKAT PLUS mounted on a pedestal

## Head Assembly Dimensions

The TopKat PLUS head assembly that is mounted on a pedestal or Atlas 9800 electronic pump is 116.5 X 11.4 X 18" (W X H X D).

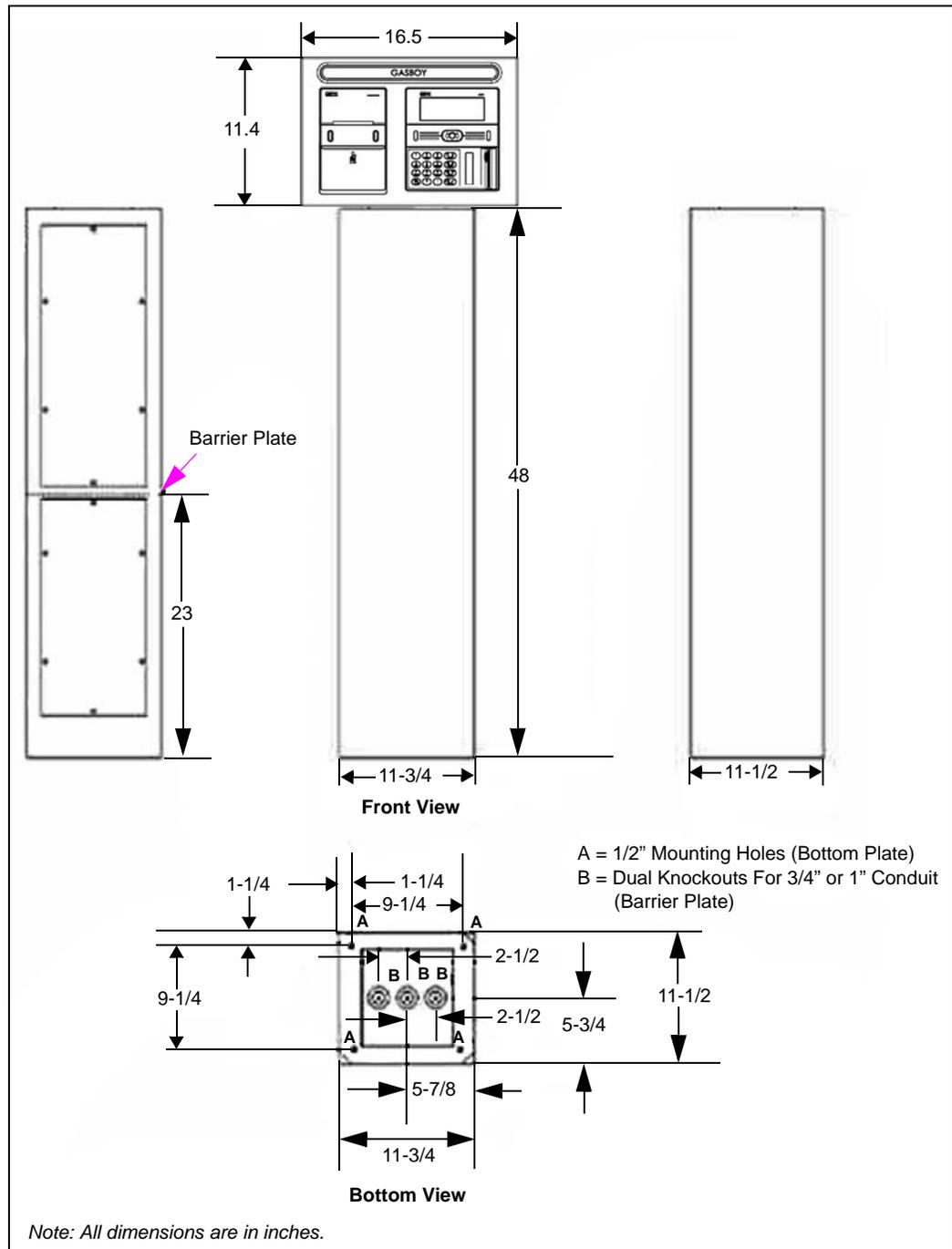
### IMPORTANT INFORMATION

Allow a minimum of 20-inches clearance at rear of the TopKat PLUS head assembly for pedestal and Atlas mounted units.

## Pedestal Dimensions

To ensure a reliable and proper installation it is very important to know the pedestal dimensions. The mechanical and electronic TopKAT PLUS assembly mounted on the pedestals are shown in [Figure 3-1](#).

**Figure 3-1: Pedestal Dimensions**



# Conduits

## General

The installation of the TopKAT PLUS at the island requires digging and setting several conduits in the station ground. The conduits are required for the routing and protection of the different types of cables in use in a home base station with TopKAT PLUS. In sites where the infrastructure is already set up, you can use the existing conduits only if they meet the requirements defined in “[Conduit Requirements](#)”.

## Conduit Requirements

Conduits must comply with:

- All conduits must be made and installed according to local regulations.
- High-voltage AC and low-voltage DC must NOT be combined in a common conduit, Junction Box (J-box) or wire through.
- The maximum distance for the LAN communication is 333 feet. Cables must be inserted in a separate low voltage conduit, away from AC wires. Communication range can be extended with third-party devices.
- All conduits must be inserted in the TopKAT PLUS pedestal through the holes and knockouts provided in the lower barrier plate.
- After completing the installation, there must not be any unused conduit openings in the barrier plate. The clearance between conduits and openings in the barrier plate must not be more than 1/64-inch.

**Figure 3-2: Conduit Layout for Mechanical Pump**

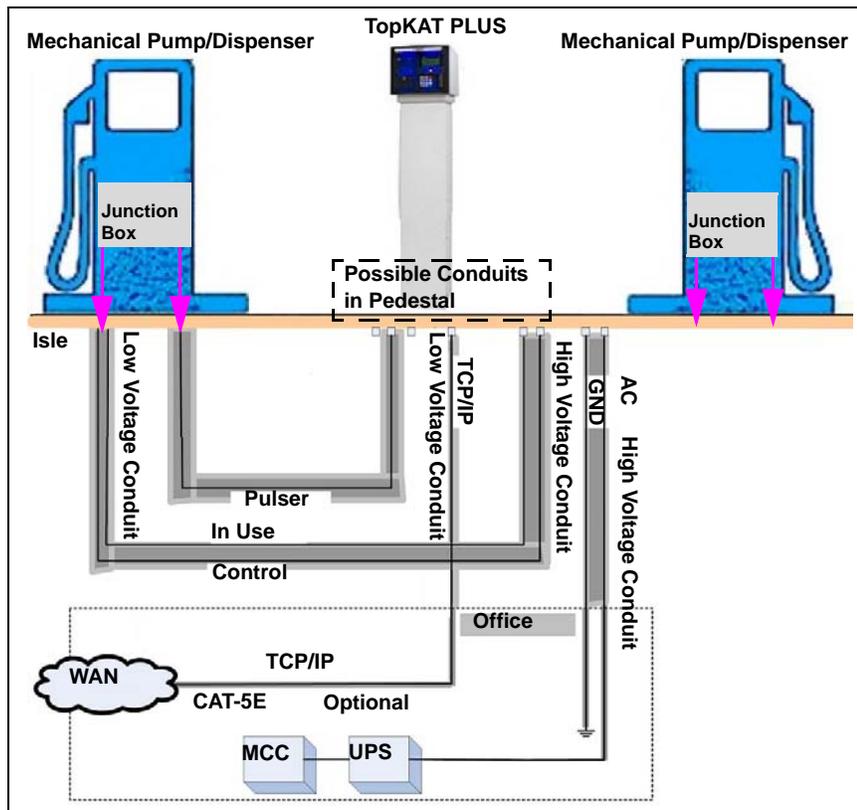
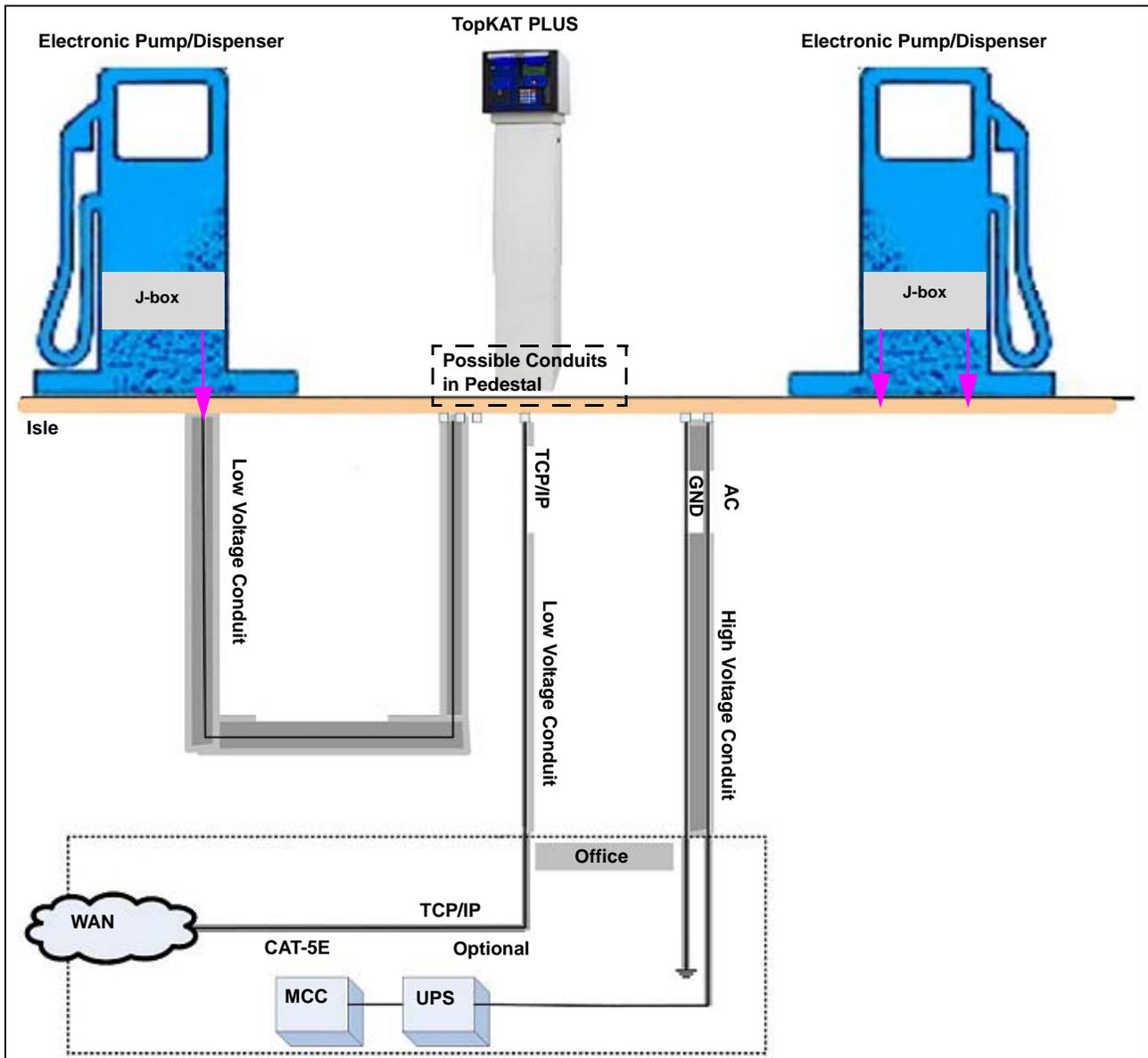


Figure 3-3: Conduit Layout for Electronic Pump



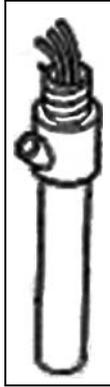
## Barrier Plate Conduit Penetration

The pedestal barrier plate makes the pedestal mounted TopKAT PLUS suitable for installation over a class 1, division 2 hazardous location. Field installed conduit must run completely up through the barrier plate. The conduit must be threaded where it passes through the barrier plate. There must be no unused conduit openings in the barrier plate when installation is completed. Clearance between conduits and openings in the barrier plate through which conduit passes must not be more than 1/64-inch.

## Sealing Conduits

The conduits must be sealed in accordance with NFPA requirements and local regulations, to prevent the passage of gases through conduits, cables, and conductors. The fittings are requested wherever volatile liquids or gases are present in the surroundings (see [Figure 3-4](#)).

**Figure 3-4: Conduit Fitting**



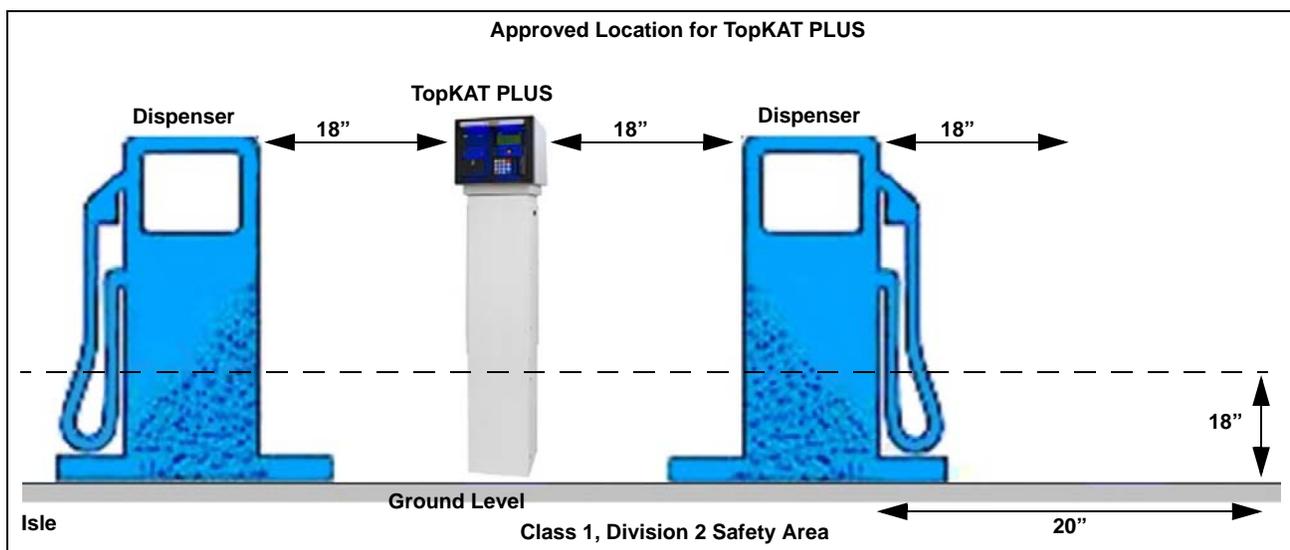
## Safety Distance

[Figure 3-5](#) shows the safety distances required for the installation of the TopKAT PLUS adjacent to the dispensers. When mounting the TopKAT PLUS, a minimum clearance of 18 inches (0.5 m) between the unit and any of the pumps or the dispensers must be maintained. This clearance allows room for the wiring and maintenance of the system.

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

- Where hazardous location is classified as class 1, division 2 and it does not extend higher than 18 inches (0.5 m) from surface and
- A minimum safety separation of 18 inches (0.5 m) from any nearest pump/dispenser.

**Figure 3-5: TopKAT PLUS - Installation Control Drawing**



# TopKAT PLUS Pedestal Mounting Instructions

The TopKAT PLUS head assembly and pedestal assembly are packaged in their own boxes and shipped in a large box. After removing them from the large box, the two units must be connected together using the following procedure.

## Parts List

Following parts are required for the TopKAT PLUS pedestal mounting:

- Pedestal and Head Assembly

Description		TopKAT PLUS Pedestal Assembly	TopKAT PLUS Head Part Number	Orpak OrTOP Part Number
TopKAT PLUS Pedestal - Electronic Dispenser	OrTOP (E)	PA040500000	PA040500100	800938970
TopKAT PLUS Pedestal - Mechanical Dispenser	OrTOP (2M)	PA040501000	PA040501100	800938972
TopKAT PLUS Pedestal - Electronic Dispenser with Printer	OrTOP (E, PRN)	PA040500010	PA040500110	800938971
TopKAT PLUS Pedestal - Mechanical Dispenser with Printer	OrTOP (2M, PRN)	PA040501010	PA040501110	800938973
TopKAT Pedestal		M12706002	-	-

- Hardware Kit
- Gasket
- Installation Instructions

To install the TopKAT PLUS pedestal, proceed as follows:

- 1 Install and secure the pedestal to the island using the four holes at the bottom of the pedestal with anchor bolts before installing the head assembly. This will prevent the completed assembly from possibly falling over.  
*Note: To access the four inside bottom mounting holes, remove the rear lower door panel.*
- 2 Position the pedestal so that the front side faces the fueling lane. Secure the pedestal to the island using the four mounting holes inside the base of the unit.
- 3 Install the black rubber gasket on top of the pedestal ensuring that the holes for the wiring are aligned properly and not blocked.
- 4 Mount the TopKAT head assembly onto the top of the pedestal using the four threaded studs as a guide. Secure the head assembly using a flat washer, lockwasher, and 1/4-20-inch nut onto each of the four post and tighten.
  - a Remove the TopKAT cover by unlocking the rear key lock and slide the cover to the rear side of the unit.

- b** Ensure that you do not remove the cover completely until the yellow ground wire that connects the cover to the grounding lug of the unit is removed.

*Note: The front of the pedestal has the overhang, and the mounting studs are arranged in such a manner that the TopKAT head assembly can only be mounted one way, facing frontwards (see [Figure 3-6](#)).*

**Figure 3-6: TopKAT PLUS Pedestal**

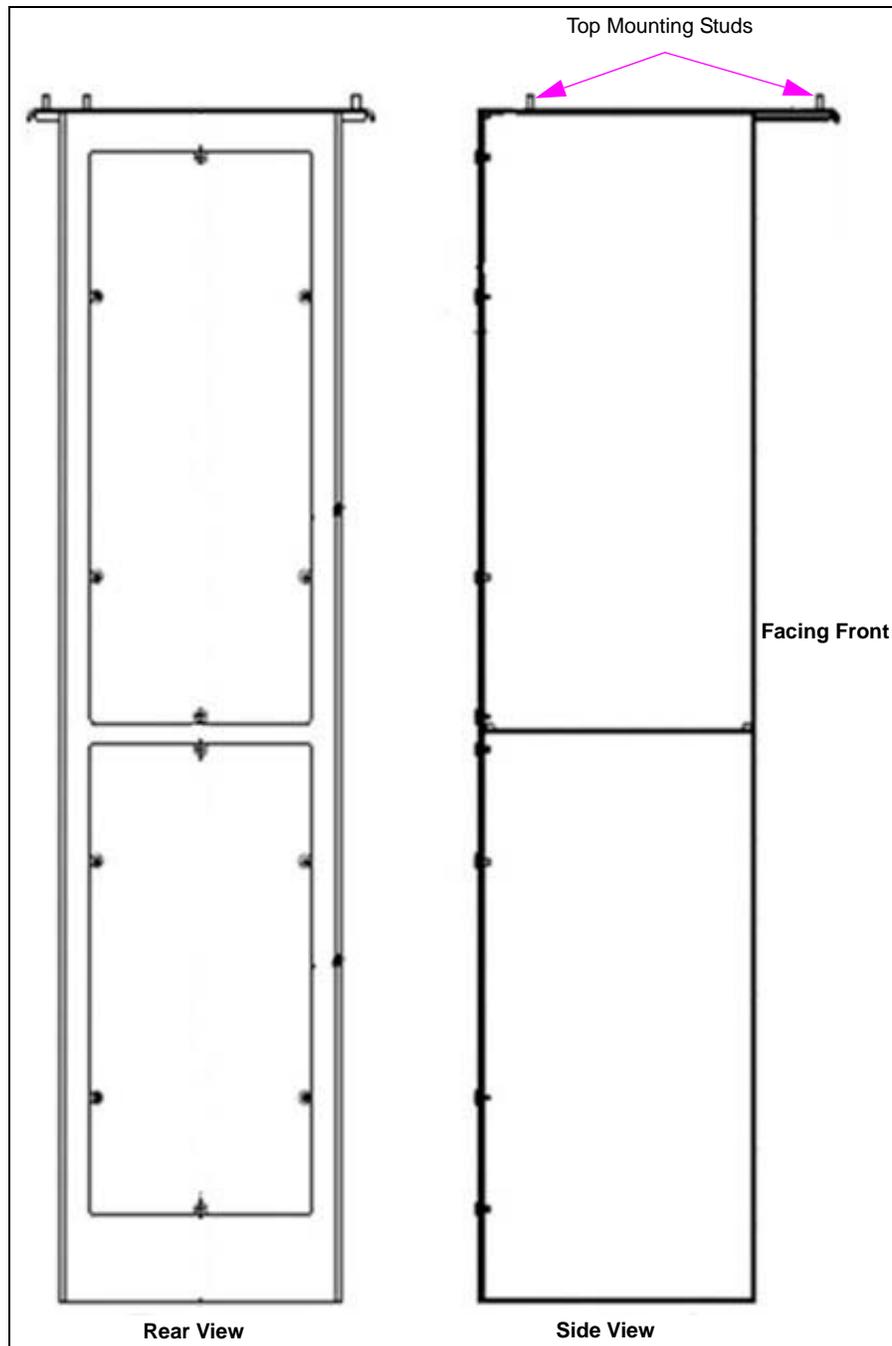
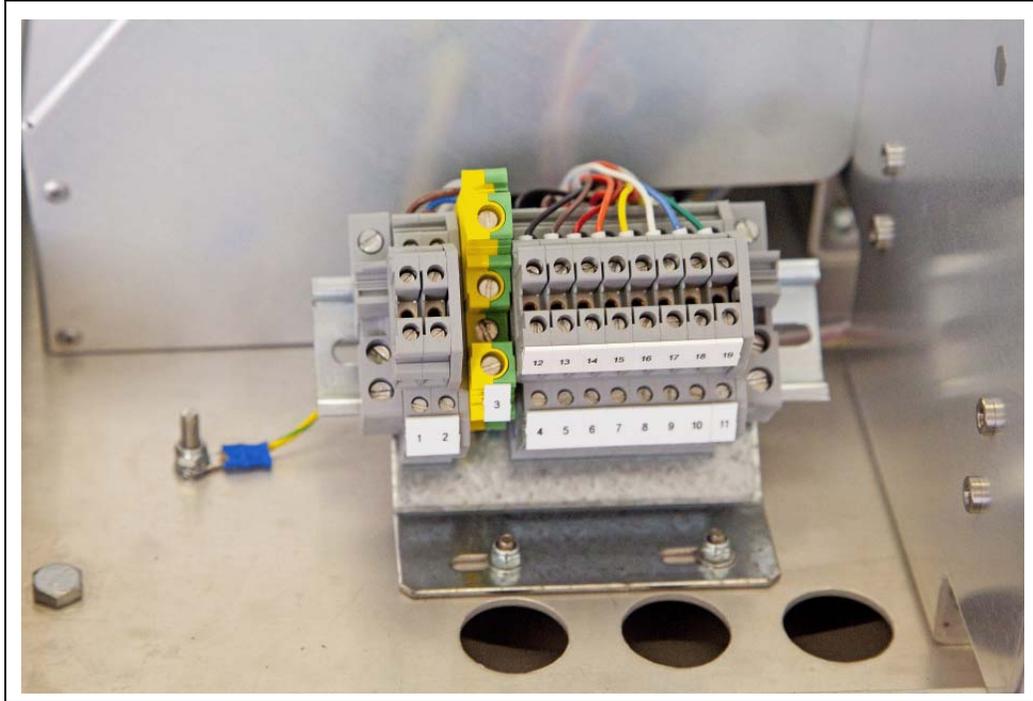




Figure 3-8: TopKAT PLUS Terminal Block - Electronic Pump (Pedestal Mount)



### IMPORTANT INFORMATION

For the electronic TopKAT factory-installed on top of an Atlas 9800, all the required wiring for the 9800 electronic pumps including the RS-485 communication, the LAN communications, and AC power is pre-wired from the factory. **No** other connections are made to the terminal blocks.

# Wiring

## Types of Wiring

The wiring in the terminal block differs in accordance with the type of pump controlled by the TopKAT PLUS. There are several types of pumps:

- Mechanical pumps
- Electronic pumps

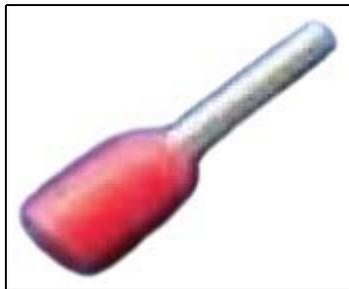
Following section provides the “[Wiring Requirements](#)” for each type of pump:

## Wiring Requirements

Before inserting any wire to the terminal block, proceed as follows:

- 1 Insert the wire with a terminal lug only (see [Figure 3-9](#)).
- 2 Attach the lug to the wire using the proper terminal crimper.
- 3 For UL-listing, the terminal lug must be a UL recognized component.

**Figure 3-9: Terminal Lug**



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

## Types of Cables

Following cables are required for the TopKAT PLUS installation:

- Power cable: In accordance with local regulations
- LAN cable: CAT-5E [refer to “[Field Wiring Requirements \(LAN/WAN\)](#)” on [page 3-12](#)]
- RS-485/pulser: Communication cable, twisted-pair, separately shielded, low capacitance. For example, Belden 8723 or equivalent.

*Note: The shield must be connected to ground on one side of the cable only, preferably on the TopKAT PLUS side.*

## Field Wiring Requirements (LAN/WAN)

Wiring must be installed in accordance with ANSI/TIA/EIA 568 B standards and amendments.

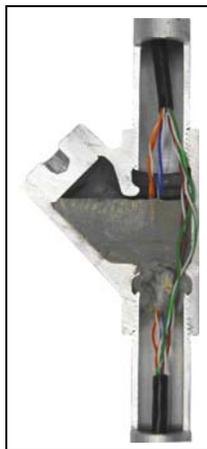
### Recommendations for CAT-5E Cable

Following are Gasboy recommendations for installing the CAT-5E cable (gas-and oil-resistant) for Site Service Equipment (SSE):

- The Ethernet cable to the pumps/dispensers is designed to comply with forecourt wiring requirements, for example, gas- and oil-resistant, and vapor-resistant properties.
- CAT-5E cable is viable for typical installations under 280 feet of cable length, if the cable is not run near the equipment that generates electrical noise such as large motors and power switching equipment. An example of a noise source to avoid is a variable speed Submersible Turbine Pump (STP).
- It is crucial that the installer follows the NEC, Article 501 requirements by removing the outer jacket and spreading the wire pairs at the seal-off points, so that a good vapor seal is achieved. This is required because most CAT-5E cables will conduct vapors inside their outer jacket (see [Figure 3-10](#)).

*Note: This is not required if Four Conductor Insulator Cable (042GA00007 or 042GALF007 - Gilbarco part number M12673B001) is used. This cable will not conduct vapors inside the outer jacket.*

**Figure 3-10: CAT-5E Cable Installation**



- CAT-5E cable must not share the conduit with AC, but can share the conduit with pulsers or other CAT-5E cables.
- If an Ethernet hub is used, it must be of commercial quality. Commercial Ethernet switches are a family of fixed configuration standalone devices that provide desktop, 10/100 fast Ethernet and 10/100/1000 Gigabit Ethernet connectivity for entry level enterprise, medium-sized, and branch office networks to enable enhanced LAN services.
- The recommended CAT-5E cable is Four Conductor Insulator Cable (042GA00007 or 042GALF007 - Gilbarco part number M12673B001) or an equivalent. The CAT-5E qualified cable has gas and oil-resistant inner and outer insulation, and vapor resistant properties.
- A patch panel is recommended (optional) to connect the CAT-5E cable to the network RJ-45. The patch panel and LAN wiring must be LAN-certified and follow TIA/EIA LAN 568-B wiring standards.

## AC Power Connection

### WARNING

TopKAT PLUS is shipped configured for 115 VAC power supply. Ensure care to set it accordingly to your local AC power supply specifications. Failure to do so may result in damages.

The AC power input is connected to the terminal block. Between the terminal block and transformer, the system uses a line filter to attenuate conducted RFI and EMI - between the line and equipment. AC power is then supplied to an AC/AC high to low transformer -110/220 to 25 VAC. Transformer can be fed either to 110 or 220 VAC. The power supply setup jumpers shown in [Figure 3-11](#) must be set to match the AC power input to the TopKAT PLUS. A settings label is also found beside the terminal block. For dispenser mounted TopKAT PLUS, the power supply setup jumpers must be set to match the micro feed input to the Atlas pump/dispenser.

- For 115 VAC input (default setting), there must be a jumper wire from position 1 of the setup jumper to position 5 and from position 2 to position 6.
- For 230 VAC input, there must be a jumper wire from position 5 of the setup jumper to position 2.

**Figure 3-11: Power Supply Setup Jumpers**



# Mechanical Pump - Wiring

## WARNING

Dangerous AC voltages that can cause death or serious personal injury are used to power the product. Always disconnect power before starting any work.

## General

This device is intended to be connected to UL-listed dispensers equipped with a J-box of sufficient volume. These connections are not suitable for direct connection to intrinsically safe devices. All wiring is to be in compliance with NFPA 70 and NFPA 30A.

The wiring for mechanical pumps is provided in two modes:

- Following table lists the wiring in the sequential order of the terminals. This table provides the signal name and a functional description of the signal.
- [Figure 3-12 on page 3-15](#) shows the wiring list for connection to the terminal, as published in the wiring label attached to the inner side of the unit. The wiring label follows the physical location of the wires in the terminal block.

## Terminal Block - Pin-out Connections for Mechanical Pumps

Following table lists the TopKAT PLUS terminal block connections for mechanical pumps:

Terminal No.	Signal Name	Functional Description
1	LINE_IN_(115/230 V)	Line Connection, TopKAT PLUS Power Input
2	NEUTRAL_IN_(115/230 V)	Neutral Connection, TopKAT PLUS Power Input
3	GROUND_IN_(115/230 V)	Ground Connection, TopKAT PLUS Power Input
4	LINE_1	Pump Control 220/110 VAC Input - Nozzle 1
5	LOAD_1	Pump Control Output - Nozzle 1
6	LINE_2	Pump Control 220/110 VAC Input - Nozzle 2
7	LOAD_2	Pump Control Output - Nozzle 2
8	IN_USE_1_ A(AC)	Handle Up - In Use Signal Input - Nozzle 1
9	IN_USE_1_ B(RETURN)	Handle Up - AC In Use Signal Return - Nozzle 1
10	IN_USE_2_ A(AC)	Handle Up - In Use Signal Input - Nozzle 2
11	IN_USE_2_ B(RETURN)	Handle Up - AC In Use Signal Return - Nozzle 2
12	-DC OUT FOR BY-PASS_2	Connection to External Bypass Nozzle 2
13	BY-PASS_2_IN	Connection to External Bypass Nozzle 2
14	PULSER_1	Pulser Input - Nozzle 1
15	PULSER_2	Pulser Input - Nozzle 2
16	+12 V_2_P	+12 VDC Output to Pulser - Nozzle 2
17	-DC OUT FOR BY-PASS_1	Connection to External Bypass Nozzle 1
18	BY-PASS_1_IN	Connection to External Bypass Nozzle 1
19	GND_1_P	Nozzle Grounding - Nozzle 1
20	GND_2_P	Nozzle Grounding - Nozzle 2
21	+12 V_1_P	+12 VDC Output to Pulser - Nozzle 1

Figure 3-12: TopKAT PLUS - Mechanical Pump Wiring List Label

TERMINAL BLOCK CONNECTION			
1	LINE_IN_(115/230V)		
2	NEUTRAL_IN_(115/230V)		
3	GROUND_IN_(115/230V)		
4	LINE_1		
5	LOAD_1		
6	LINE_2		
7	LOAD_2		
8	IN_USE_1_A(AC)	9	IN_USE_1_B(RETURN)
10	IN_USE_2_A(AC)	11	IN_USE_2_B(RETURN)
17	-DC OUT FOR BY-PASS_1	12	-DC OUT FOR BY-PASS_2
18	BY-PASS_1_IN	13	BY-PASS_2_IN
19	GND_1_P	14	PULSER_1
20	GND_2_P	15	PULSER_2
21	+12V_1_P	16	+12V_2_P

### Mechanical Pump - Required Connections

This paragraph describes the required wiring connections between the mechanical pump and TopKAT PLUS. Figure 3-13 and Figure 3-14 on page 3-16 show a schematic diagram of the connections between the TopKAT PLUS and the mechanical pump components. Figure 3-15 on page 3-17 shows a detailed wiring diagram between the TopKAT PLUS terminal block and pump components.

- Pulse Input Wires**      The dispenser outputs pulses to the system by means of the pulser unit, installed in accordance with the manufacturer instructions. The pulse rate per volume (liter/gallon) is determined by the pulser unit. It is programmed as a “factor” in the SiteOmat.
- Handle Status Input Wires**      The handle signal is used to signal the system that the pump is “In Use” mode. When the dispenser handle is lifted, this contact closes. This signals the system that the pump is “In Use” or that the transaction ended.
- Authorization Output Wires**      The dispenser requires an authorization signal from the TopKAT PLUS to start a sale transaction. Without this authorization signal, the electric valve (or pump) does not open and the sale transaction does not begin. The TopKAT PLUS switches the AC power signal to the valve. When the dispenser receives the authorization signal, fuel starts to flow. This signal is also referred to as the LOAD.

TopKAT PLUS ratings for above signals are as follows:

Signal	TopKAT PLUS Rating
Pulser Input	3 mA, 15 VDC max.
Pulser Power Output	12 VDC, 30 mA max.
In Use Input	100-240 VAC, 50/60 Hz, 2 W (20 mA)
Load	3/4 HP @115 V 1.5 HP @ 240 V

Figure 3-13: Mechanical Pump - Single Dispenser Connections

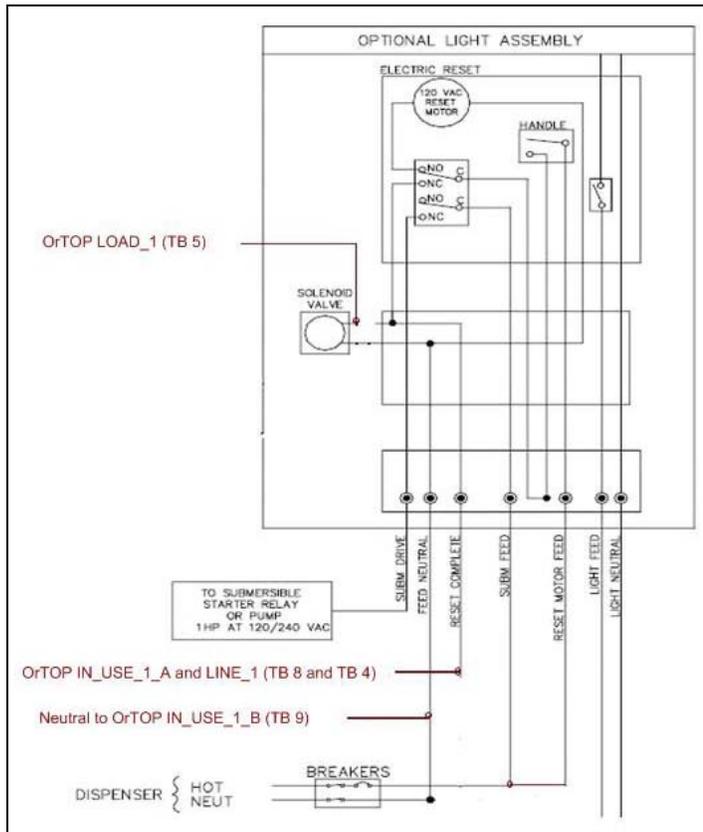


Figure 3-14: Mechanical Pump - Twin Dispenser Connections

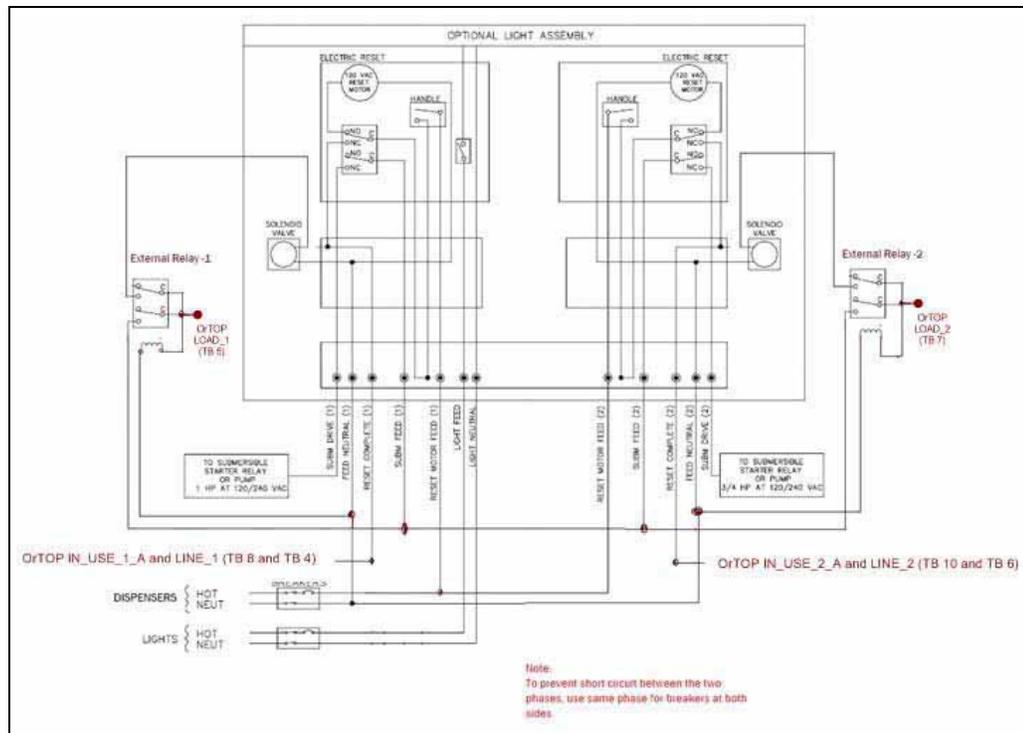
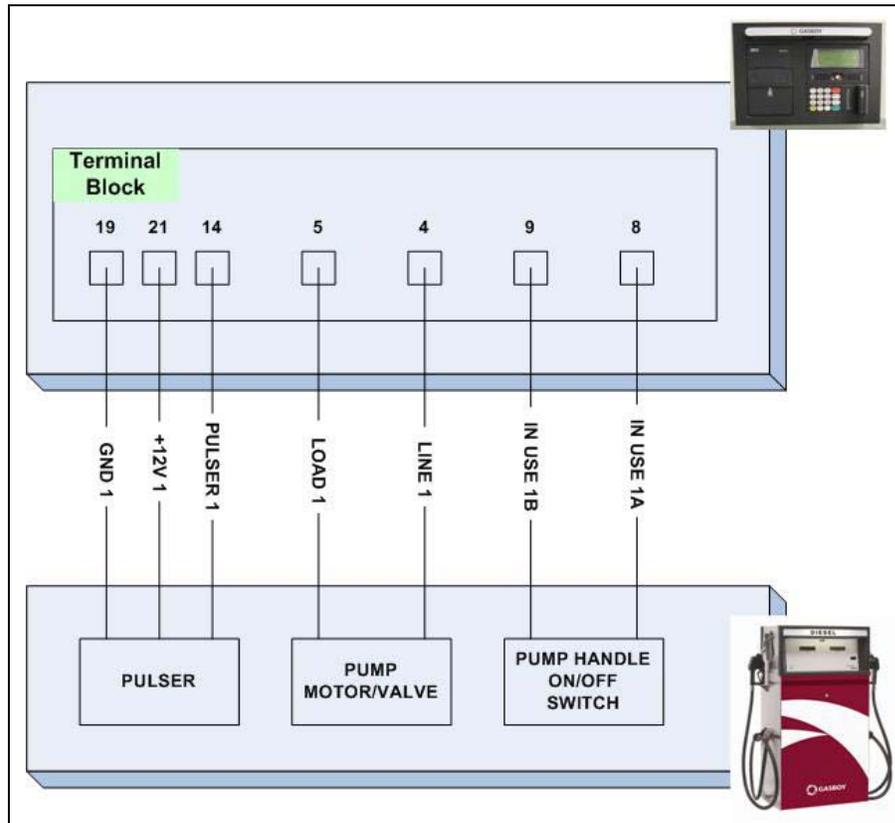


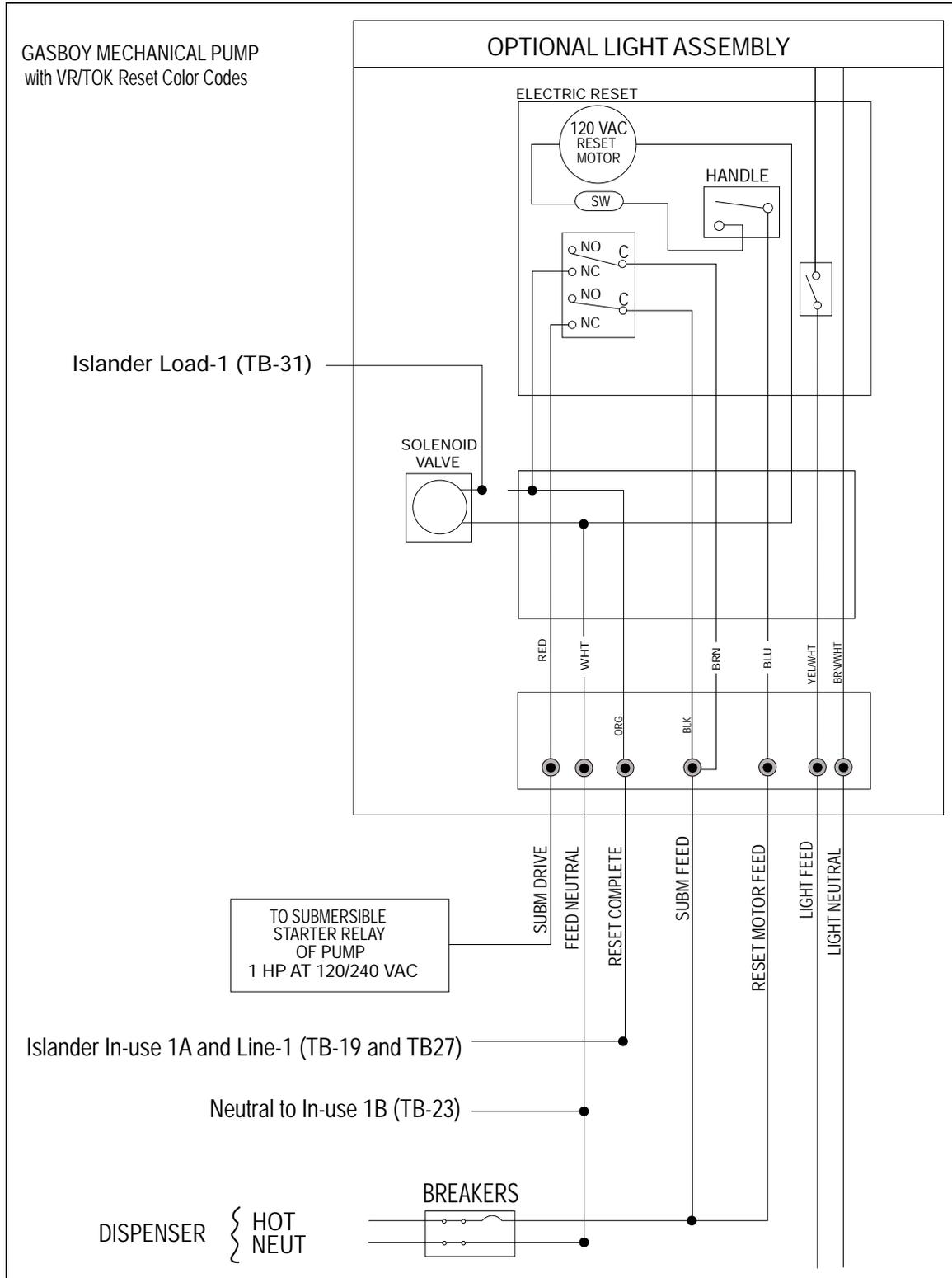
Figure 3-15: TopKAT PLUS and Mechanical Pump - Terminal Block Detailed Connections



# Single Suction Pump

Figure 3-16 shows the connections to the single suction pump.

**Figure 3-16: Single Suction Pump 1 HP 115 VAC/230 VAC**



## Mechanical Pump - Pulser Connections

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

- Electronic pulser
- Mechanical pulser

Connect the TopKAT PLUS to the pulser in accordance with its characteristics.

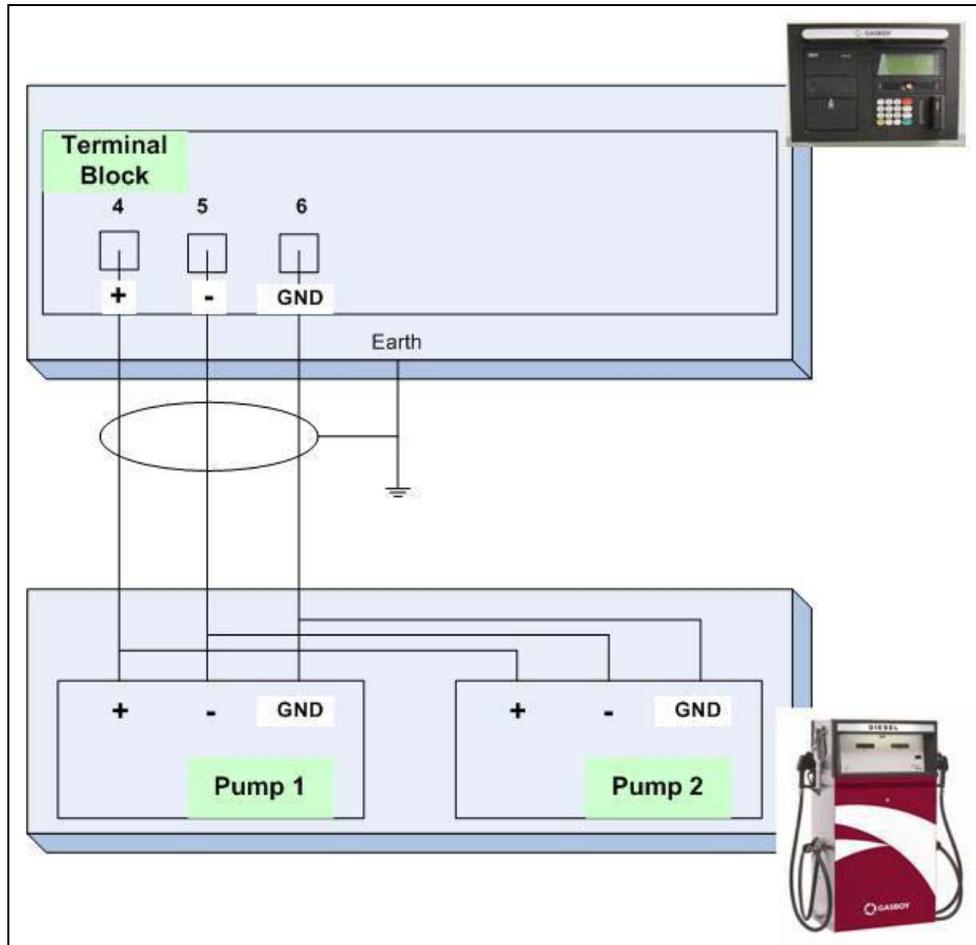
Following are the TopKAT PLUS ratings for above signals:

<b>Signal</b>	<b>TopKAT PLUS Rating</b>
Pulser Input	3 mA, 15 VDC max.
Pulser Power Output	12 VDC, 30 mA max.
In Use Input	100-200 VAC, 50/60 Hz, 2 W (20 mA)
Load	3/4 HP @ 115 V 1.5 HP @ 240 V

## RS-485 Electronic - TopKAT PLUS on Gasboy 9800 Atlas (Factory Installed)

Figure 3-17 shows the internal wiring connections between TopKAT PLUS and the RS-485 pump nozzle.

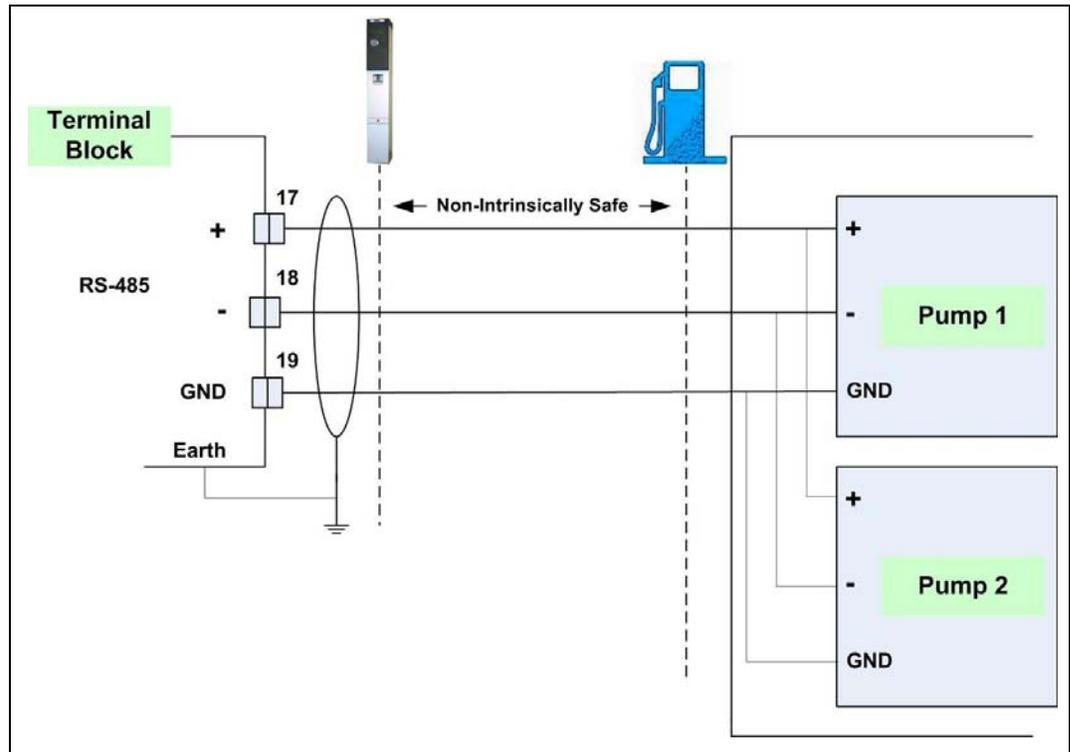
Figure 3-17: RS-485 Electronic Pump - Wiring Diagram - 1



## Electronic Pump Wiring - TopKAT PLUS on Pedestal

Figure 3-18 shows the external wiring connections between TopKAT PLUS and Gasboy Atlas 9800 unit(s).

Figure 3-18: RS-485 Electronic Pump - Wiring Diagram - 2



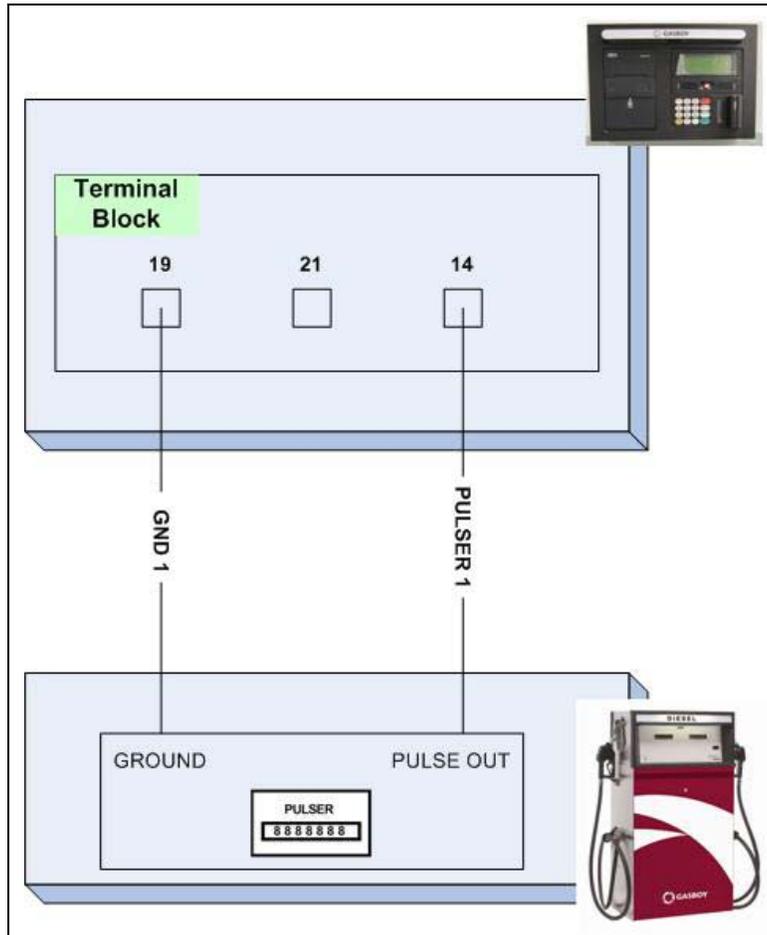
In Gasboy electronic J-box for pump 1, connect the red Tx+ to white Rx+ and connect the green Tx- to black Rx- as shown in Figure 3-18.

Connect one wire from “+” and one wire from “-” to proper terminal blocks in the Islander™ PLUS unit. For proper pump location, refer to Figure 3-18.

## Mechanical Pulser

The two-wire pulser is powered by the TopKAT PLUS. [Figure 3-19](#) shows a schematic diagram of the connections between the terminal block and two-wire pulser.

**Figure 3-19: Terminal Block and Two-wire Pulser - Wiring Connections**



# Electronic Pump - Wiring Description (Pedestal Mount)

## General

The wiring in the terminal block differs in accordance with the type of electronic pump installed in the home base station. There are several types of electronic pumps. The wiring required for the following pumps is described below:

- RS-485

For the wiring list label attached to the inner side of the unit, see [Figure 3-20](#).

- The rows are the connection ports in the terminal block in an ascending order.
- Each column is dedicated for a specific pump.
- Each cell defines the signal attached to the terminal block port.

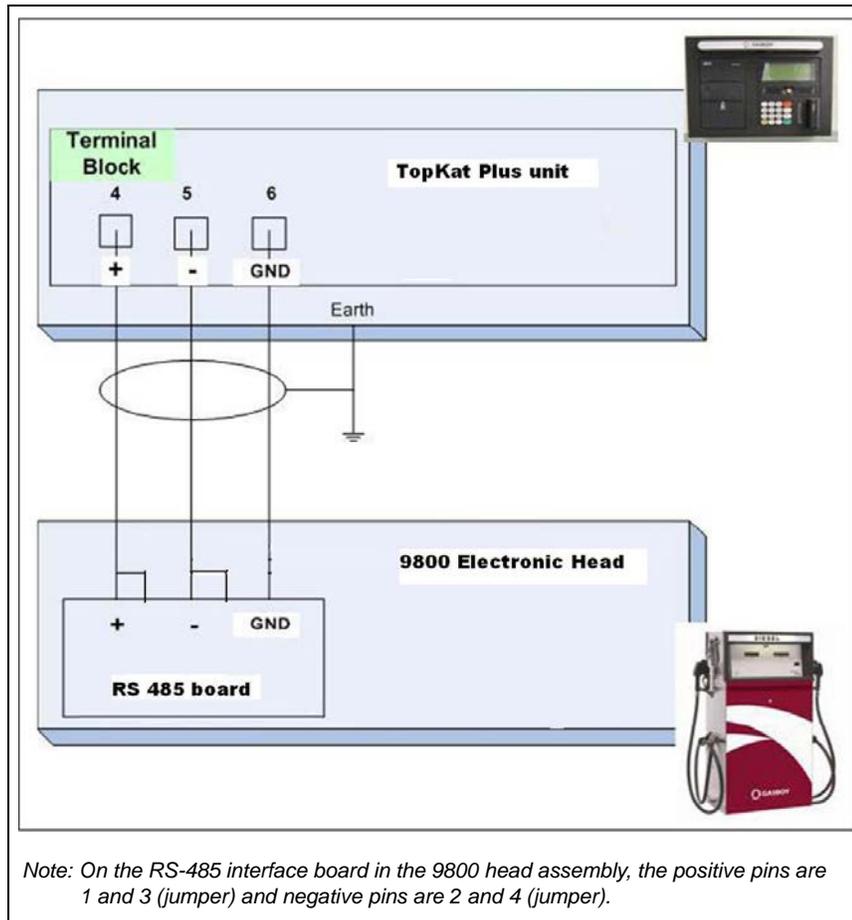
**Figure 3-20: TopKAT PLUS Terminal Block - Wiring List Label**

1	LINE	
2	NEUTRAL	
3	GND	
TB#	P#	RS-485
4	P1-1	+
5	P1-2	-
6	P1-3	G
7	P1-4	
8	P1-5	+
9	P1-6	-
10	P1-7	G
11	P1-8	
12	P2-1	+
13	P2-2	-
14	P2-3	G
15	P2-4	
16	P2-5	+
17	P2-6	-
18	P2-7	G
19	P2-8	

## RS-485 Electronic Pump

Figure 3-21 shows the specific internal wiring connections between the TopKAT PLUS and RS-485 interface board in the Atlas electronic head assembly.

Figure 3-21: RS-485 Electronic Pump - Internal Wiring Diagram



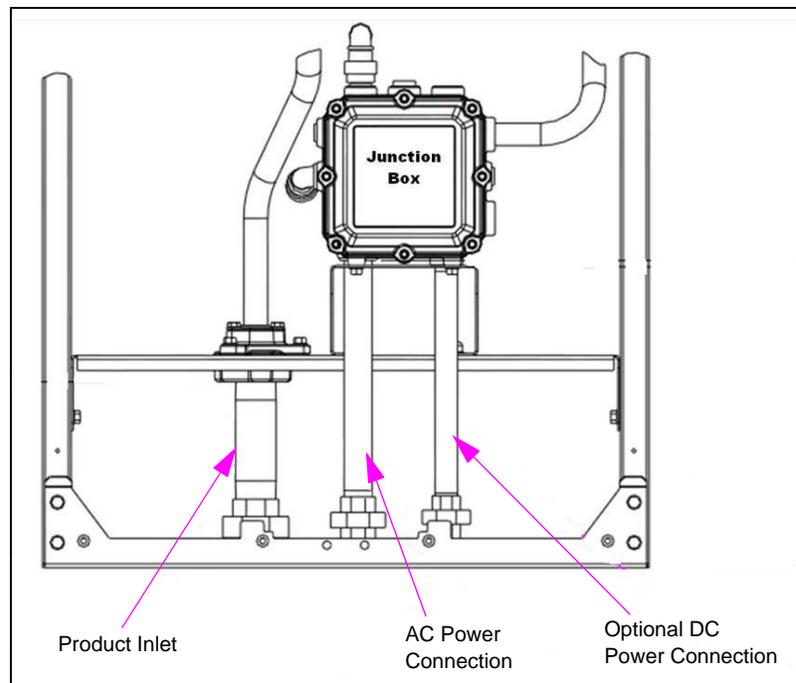
## Electronic Pump - Wiring Description (Atlas Mounted TopKAT PLUS)

Atlas pumps/dispensers must be installed and wired according to *MDE-4331 Atlas Fuel Systems Installation Manual*. When the TopKAT PLUS is factory mounted on an Atlas unit, all required wiring including RS-485 communications to the pump, device interconnection, and AC power (it receives its power from the Atlas micro feed lines) is prewired from the factory. The only external connections required to the TopKAT PLUS are the LAN connections. For more information on the LAN connections, refer to “[Field Wiring Requirements \(LAN/WAN\)](#)” on [page 3-12](#).

### Electronic Pump - External wiring

The J-box located on side A in the bottom of the unit allows the installer to make all the required AC wiring connection including the low voltage LAN communication. For AC wiring connections, refer to *MDE-4331 Atlas Fuel Systems Installation Manual*.

**Figure 3-22: Atlas 9800 J-box Connections - AC/DC Connections**



- **AC Power connections** - AC voltage with two separate circuits, pump power and micro feed in rigid metal conduit from the circuit breaker panel.
- **DC Power connections** - CAT-5 LAN communication cable from a network jack from the FHO, ran in separate rigid metal conduit.

## Post-installation Checklist

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

In particular, pay attention to the following issues:

- Correct wiring
  - Check if all the wiring is inserted in metal conduits.
  - Check if the system is grounded properly.
  - Check if the cables are correctly routed in the dispenser.
- Clean dirt and wire remnant
- Verify if power supply setup jumpers (see [Figure 3-11](#) on [page 3-13](#)) are properly set BEFORE applying power to the TopKAT PLUS. In case problems are detected after installation or during operation, repeat the post-installation checks listed above.

## Completion Checklist

Following information will help in verifying if the TopKAT PLUS is properly installed. Review it before testing the pumps and/or dispensers in the manual override position.

Check if all the conduit is metal conduit (refer to the “Reference Information” section in *MDE-4331 Atlas Fuel Systems Installation Manual*).

- Check if AC and DC wirings are in separate conduits and troughs.
- Check if the systems/peripheral equipment is there on a separate dedicated breaker.
- Check if the system is grounded properly (refer to the “Reference Information” section in *MDE-4331 Atlas Fuel Systems Installation Manual*).
- Check if the correct wire gauge wire is installed (refer to the “Reference Information” section in *MDE-4331 Atlas Fuel Systems Installation Manual*).
- Check if the communication lines are under the maximum allowable distance - LAN:280', RS-485 = 1500' MAX, and RS-232 = 100'.
- Check if the AC power for the systems and pumps is on the same phase in the breaker panel.

## TopKAT PLUS Setup

For TopKAT PLUS setup, refer to *MDE-4817 SiteOmat In-House Station Controller Setup and Maintenance Manual*.

### Manager Tag

Following paragraphs describe the manager tag provided with TopKAT PLUS controllers. The manager tag (see [Figure 3-23](#)) enables technicians to perform test transactions to verify the proper integration of the controller and pump. In addition, the manager tag opens the printer front panel for maintenance purposes such as paper roll replacement.

**Figure 3-23: TopKAT PLUS Manager Tag**



### Performing a Test Transaction

To perform a test transaction, proceed as follows:

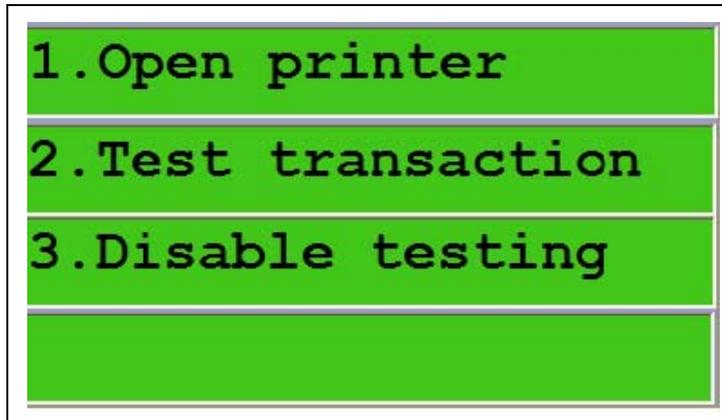
- 1 The OrPT Welcome screen is displayed (see [Figure 3-24](#)). Present the tag to the OrPT reader.

**Figure 3-24: OrPT Welcome Screen**



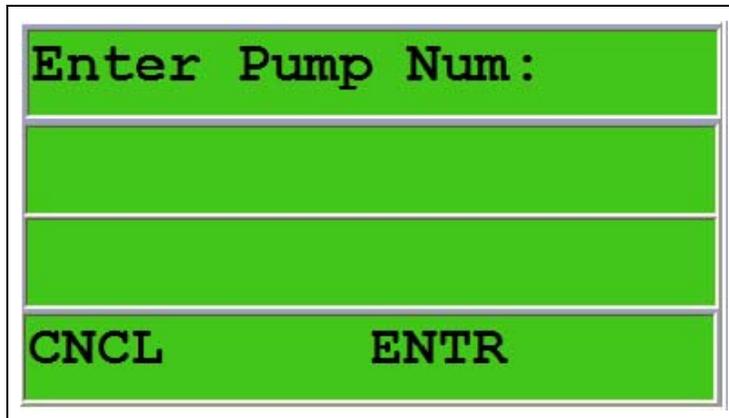
The manager screen is displayed (see [Figure 3-25](#)).

**Figure 3-25: OrPT Manager Screen**



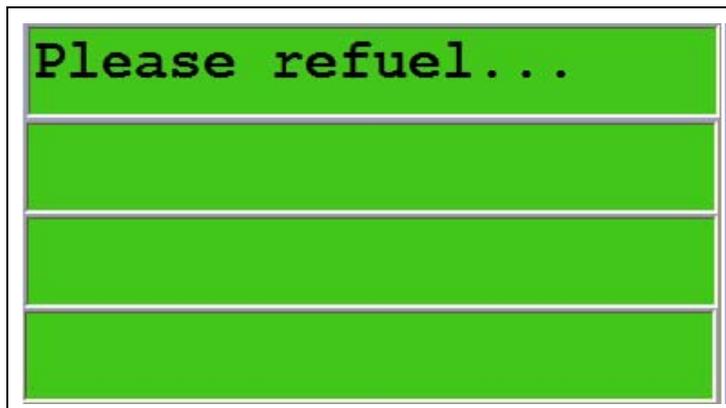
- 2 Press 2 on the keypad and press **OK**. [Figure 3-26](#) is displayed.

**Figure 3-26: OrPT Pump Selection Screen**



- 3 Enter the pump number and press **OK**. The fueling is authorized and the [Figure 3-27](#) appears.

**Figure 3-27: OrPT Refueling Screen**



- 4 Lift the nozzle and refuel.
- 5 Verify if the transaction details on SiteOmat Pump Status screen matches to the actual transaction.

*Note: For more information on SiteOmat, refer to MDE-4818 SiteOmat In House Station Controller User's Manual.*

## Disabling Test Transaction Option

After testing the unit, the technician may disable the test transaction option. In this case, the system cleans all test transactions, initializes all counters in the database and deactivates the test transaction option.

If the manager tag is presented after disabling the option, the system automatically opens the printer door (refer to [“Opening Printer Front Panel”](#)).

To disable the test transaction option, proceed as follows:

- 1 Present the tag to the OrPT reader. The manager screen is displayed (see [Figure 3-25](#) on [page 3-28](#)).
- 2 Press **3** on the keypad and press **OK**. The OrPT welcome screen is displayed (see [Figure 3-24](#) on [page 3-28](#)).

*Note: The manager screen on the OrPT may be reactivated by selecting the activate manager tag check box on SiteOmat's station parameters dialog box. Go to **Setup > Advanced Mode > Global > Advanced**. For more information on SiteOmat, refer to MDE-4817 SiteOmat In-House Station Controller Setup and Maintenance Manual.*

## Opening Printer Front Panel

To open the printer front panel for maintenance purposes such as paper roll replacement, proceed as follows:

*Note: In cases where the test transaction option was disabled (refer to [“Disabling Test Transaction Option”](#)), the printer front panel is automatically unlocked after presenting the tag.*

- 1 Present the tag to the OrPT reader. The manager screen is displayed (see [Figure 3-25](#) on [page 3-28](#)).
- 2 Press **1** on the keypad and press **OK**.
- 3 The front panel lock is unlocked and buzzer provides sound feedback.
- 4 Press in on the top of the receipt printer panel and pull to open.

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## 4 – Printer

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### General

This section provides a general overview of the optional printer module G2. It includes general information regarding the printer module G2, its components, and functionality.

It describes the printer module G2, its technical characteristics, and its operation. It includes instructions on replacing the printer paper roll as well as instructions regarding several recommended steps for checking the printer operability.

**Figure 4-1: Printer Module G2 Unit**



#### **IMPORTANT INFORMATION**

The receipt printer comes factory-installed per order in the TopKAT PLUS assembly and there are no provisions to add one to an existing unit.

## Description

The printer module G2 is a compact, ruggedized thermal printer suitable for the harsh environment of the gas station. It uses thermal printer paper only (55 gr., 40 X 57 mm).

The printer module G2 is connected to the station controller through an RS-485 link and it requires a 24-26 VDC power supply input.

The printer module G2 is packed in a compact aluminum enclosure designed to survive the harsh forecourt environment. It uses spark gaps protection for the links and 1.5 KV isolation between the forecourt devices.

The printer includes two sensors for paper usage alerts:

- Low paper sensor - activated when there is approximately 25% of the paper roll left
- End paper sensor - activated when printer paper runs out completely

The paper usage and receipt indications include a buzzer sound, LED indicators or the combination of both, dependent on the station controller.

[Figure 4-2](#) and [Figure 4-3](#) on [page 4-3](#) show front and rear view of the printer module G2, respectively.

**Figure 4-2: Printer Module G2 Unit - General View**

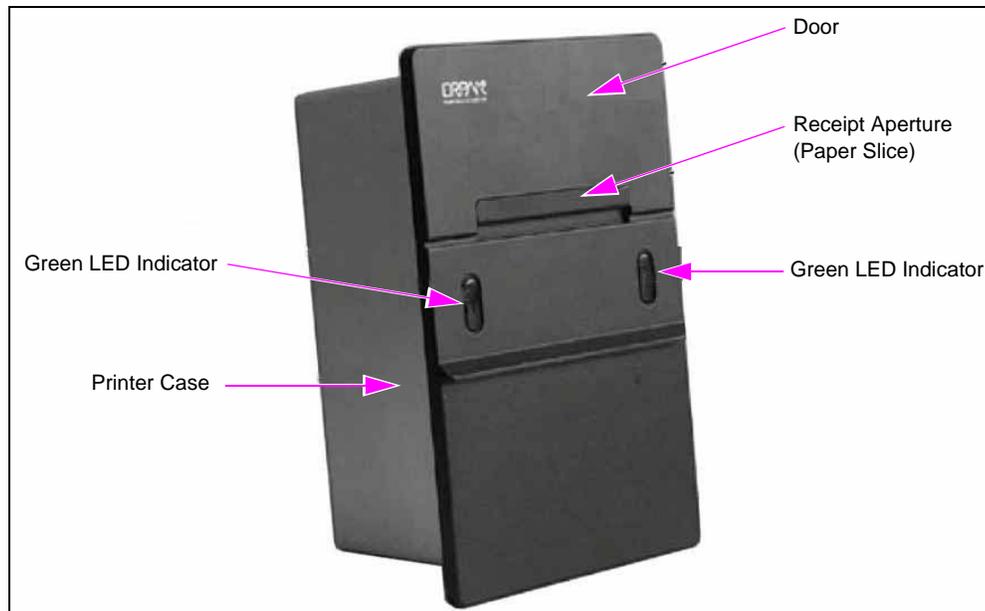


Figure 4-3: Printer Module G2 Unit - Rear View

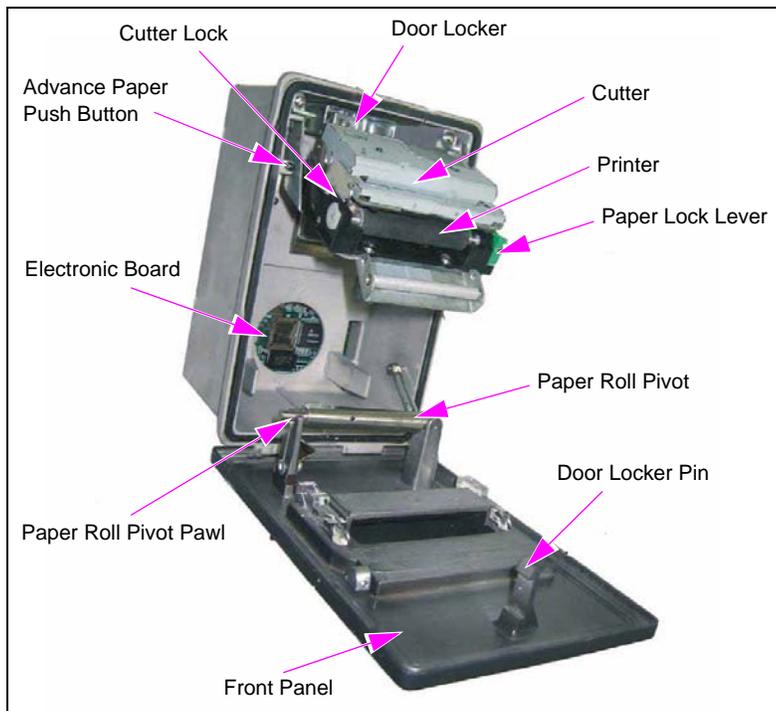


## Main Components

The printer module G2 consists of the following main items (refer to the following table, [Figure 4-4](#), and [Figure 4-5](#) on page 4-4):

Item	Functionality
Advance Paper Push Button	Advances the paper into the printer.
Printer Cutter Lock	Unlocks the cutter lock.
Printer Cutter	Cuts the paper.
Thermal Printer	Prints the text on the thermal paper by means of the thermal head.
Paper Lock Lever	Unlocks the paper lock by pushing the lock down.
Paper Roll Pivot Pawl	Releases the paper pivot and enables insertion of a new paper roll.
Front Panel Lock Lever	Bypasses the solenoid lock (for technician use only).
Electronic Board	Printer controller.

**Figure 4-4: Printer Module G2 Unit - Main Components**



Item	Functionality
Jumpers	Enables to determine the RS-485 address and number of copies.
Flash Memory Device	Stores the printer software.
AVR Connector	Enables to download/upload printer software/data.

*Note: These components are intended for maintenance purposes only.*

**Figure 4-5: Printer Module G2 Unit - Internal Components**

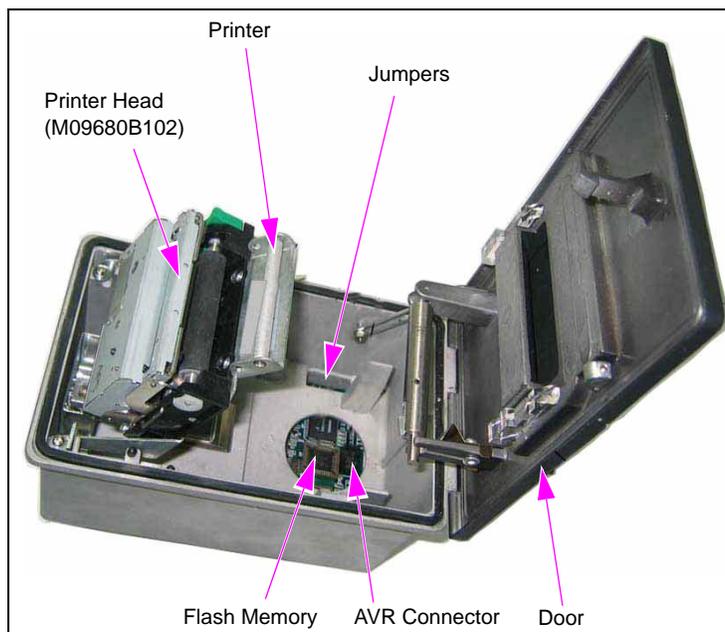
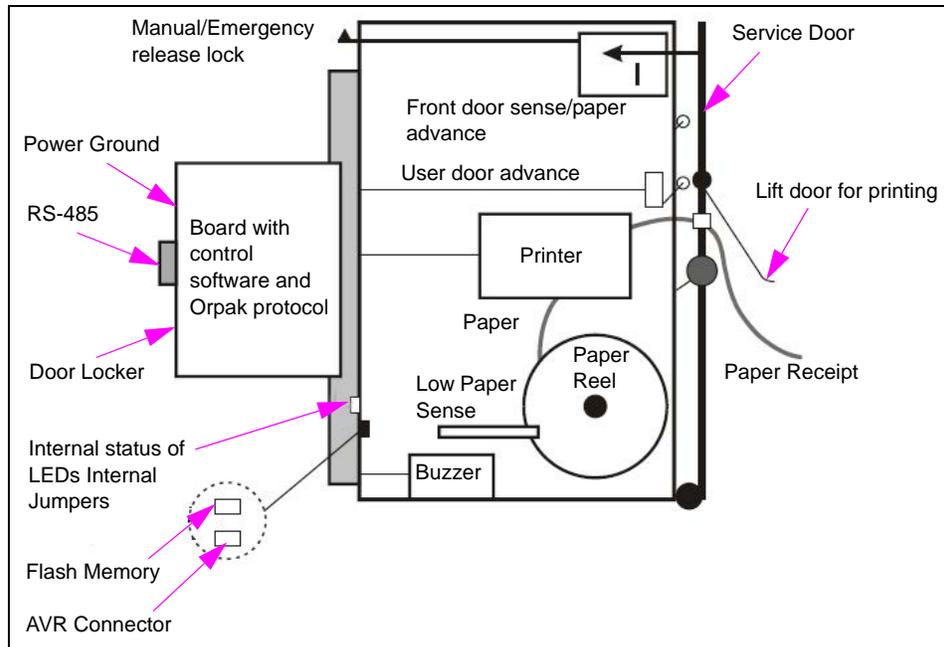


Figure 4-6 shows an internal diagram of the printer module G2, indicating the sensors, paper path within the printer, and internal electronic components.

**Figure 4-6: Printer Module G2 Unit - Internal View**

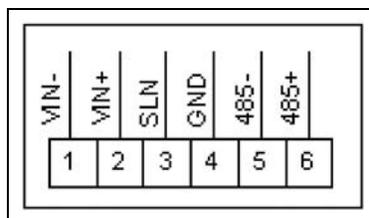


## Printer Connector Pin-out

The printer connector is located on the printer rear panel. It provides the printer both the communication link and power supply input (24-26 VDC). The power is supplied through an external power supply.

Figure 4-7 and the following table show the G2 printer connector pin-out description.

**Figure 4-7: Printer Module G2 Connector - Pin-out Description**



Pin Number	Functionality	Description
1	VIN -	DC Power Supply GND
2	VIN +	DC Plus Voltage
3	SLN	For technician use, when connected to ground, opens the front panel - optional external key for maintenance
4	GND	RS-485 GND
5	485 -	RS-485 Communication Line
6	485 +	RS-485 Communication Line

## Housing

The printer module enclosure is made of aluminum. The front panel includes two green LED indicators and receipt aperture, protected behind a metal lid, see [Figure 4-2 on page 4-2](#).

The rear panel includes the printer connector and front panel lock, see [Figure 4-3 on page 4-3](#). The printer lock is an electro-mechanic lock (solenoid type) controlled by the station controller.

## Indicators

The printer module includes two green LED indicators located on its front panel and a buzzer. The printer indicators provide visual and audio display on the following events:

- Printing is in progress
- Paper alerts - paper run out or approximately 25% left (refer to “General” on [page 4-10](#))
- Receipt ready

*Note: The indicators activation is controlled by the station controller.*

The printer also includes LEDs under its front door for monitoring communication.

At turn on, the LEDs and buzzer are activated for a short period of time.

## Protection

Two types of protections are included in the printer module:

- Isolation of 1.5 KV DC to protect against galvanic connection between the host side and printer side.
- The printer side is protected against high voltage transient and lightning by using spark gaps and transorbs for RS-485 communication. This allows the use of long communication cables.

## Specifications

Following table lists the printer physical, electrical, and environmental specifications:

<b>Printer Specification</b>	
Power Consumption:	10 W Without Heater (21 W with Heater on)
Maximum Current Without Heater	0.7 A
Maximum Current with Heater	1.4 A
Operating Temperature	-4 °F (-20 °C) to 158 °F (70 °C) [Optional -40 °F (-40 °C) to 158 °F (70 °C) with Internal Heater]
Storage Temperature	-4 °F (-20 °C) to 158 °F (70 °C)
Humidity	80% Non-condensing
Communication Interface	RS-485 - 9600 bps Half-duplex Ethernet RJ-45 10 mbps (X2) RS-232 (X2) GPIO (DB9)
Dimensions	H 197 X W 179 X D 162 mm, W: 950 g

# Setting Printing Parameters

## Jumpers Configuration

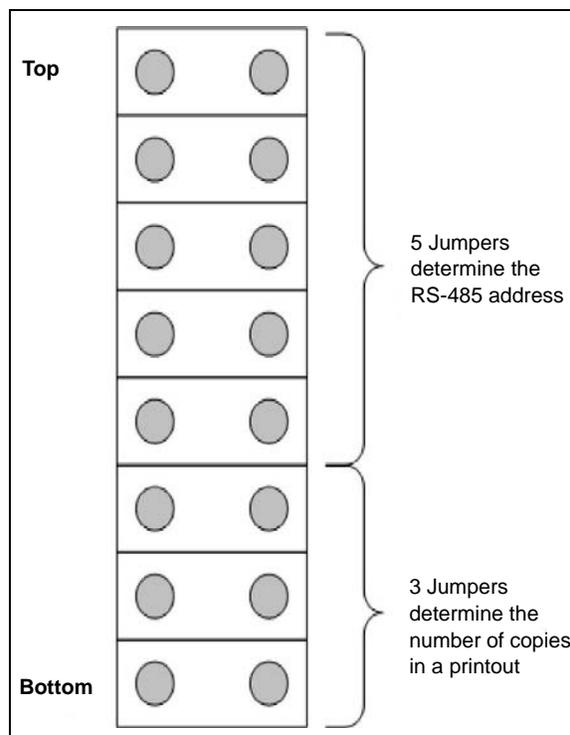
The printer includes jumpers that enable setting the RS-485 address and selecting the number of copies automatically produced during each printout.

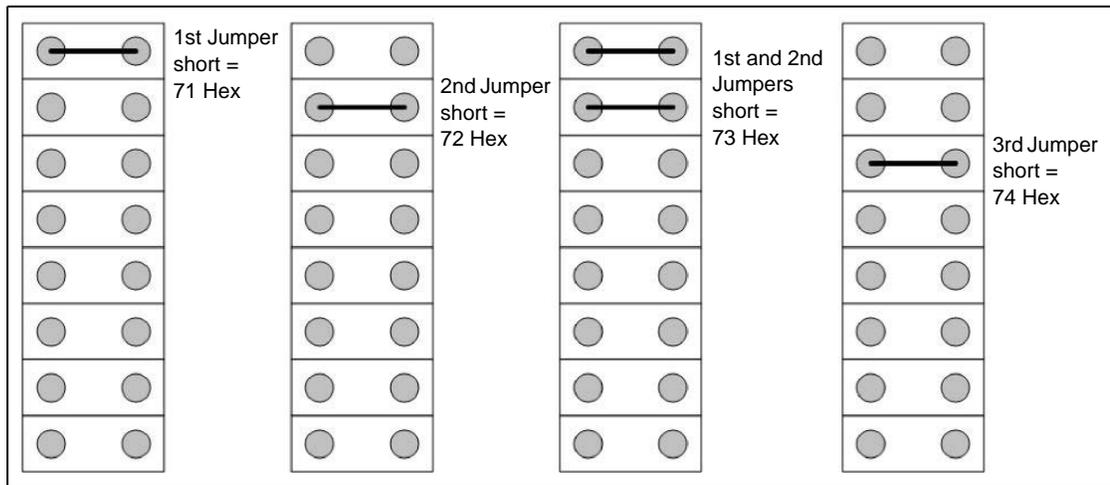
The jumpers are set in a matrix of eight jumpers, where the first five jumpers determine the RS-485 address. The last three jumpers determine the number of copies. [Figure 4-8](#) shows the jumpers default configuration, where the RS-485 address = 70 Hex. [Figure 4-9](#) on [page 4-8](#) provides examples of jumpers configuration and corresponding RS-485 address.

### CAUTION

On a single RS-485 bus, each device must be assigned a different address.

**Figure 4-8: Printer Module - Jumpers Default Configuration**



**Figure 4-9: Printer Module - Example Jumpers Configuration**

## Parameters for Printing

The printer features two printing modes, as determined by the controller:

- Print only when the door is lifted - Paper save mode
- Print always

## Cutter

The paper cutter may be set to one of the following three modes, as determined by the controller:

- No Cut
- Full Cut
- Partial Cut

## Printing Status Report

The G2 printer enables producing a printer status report. To produce a printer status report, proceed as follows:

- 1 Turn off the printer.
- 2 Open the printer's service door.
- 3 Turn on power to the printer.
- 4 The G2 printer prints a status report.

## Replacement - Installation

Following table lists the items required for the printer installation (see [Figure 4-10](#)):

No.	Description	Part Number	Quantity
1	Connector Screw MC1.5/6-STF-3.81 mm	813326106	1
2	Clamp Housing, Printer Module	814935500	1
3	Wing Screw M6 X 12	815200100	2

### Installing Printer

To install the printer in the TopKAT PLUS dedicated aperture, proceed as follows:

- 1 Shut down any power source at the installation and working area.
- 2 Insert the printer into the designated aperture.
- 3 Secure the printer using the clamp housing, two flat washers, two spring washers, and two wing screws as shown in the above table.
- 4 Prepare the power and communication cables to be connected as described in the following paragraph.

**Figure 4-10: Installation Clamp**



## Installing Cable

*Note: Use shielded twisted-pair cable, designated for RS-485 communication, such as Belden 9729/8723.*

To connect the power and communication cables to the printer, proceed as follows:

- 1 Connect the power and communication cables to the connector in accordance with the pin-out description in the table in [“Printer Connector Pin-out”](#) on [page 4-5](#) and [Figure 4-7](#) on [page 4-5](#).
- 2 Connect the connector to the printer connector located on the printer rear panel (see [Figure 4-3](#) on [page 4-3](#)).

## Paper Roll Replacement

### General

The printer module is a thermal printer and uses thermal printer paper only. The printer is equipped with two sensors for paper usage alerts as follows:

- Low paper sensor - warns when there is approximately 25% of the paper roll left
- End paper sensor - warns when printer paper runs out completely

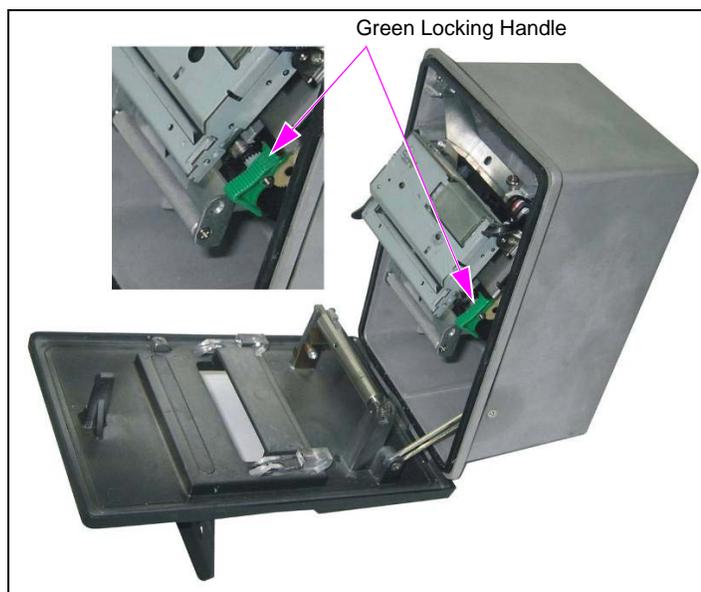
### Replacing Paper Roll

This procedure applies when the printer is online and connected to a power source. In that state, the printer pulls the paper automatically and cuts it when paper feeding is completed.

To replace the printer paper roll, proceed as follows:

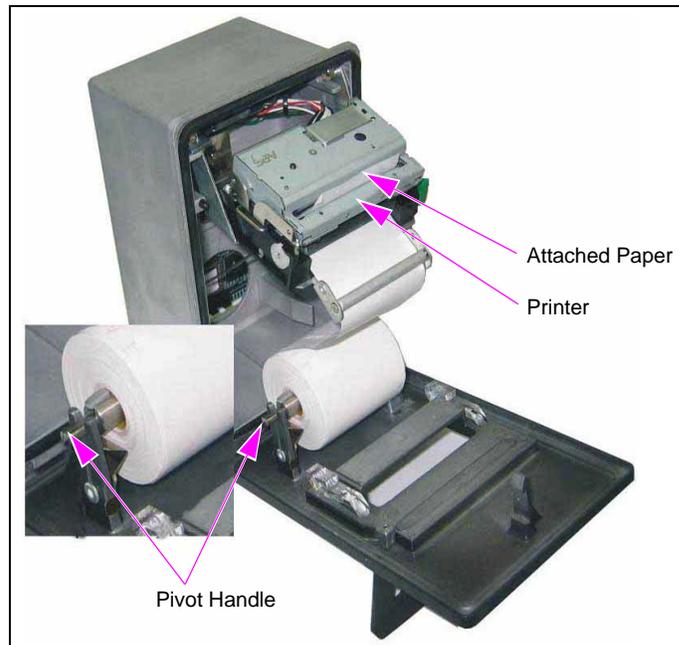
- 1 Open the printer front panel. The front panel lock is an electro mechanic lock (solenoid type) that can be opened from the station controller.
- 2 Release the green locking handle (see [Figure 4-11](#)) and release the printer (see [Figure 4-12](#) on [page 4-11](#)).

**Figure 4-11: Locking Handle**



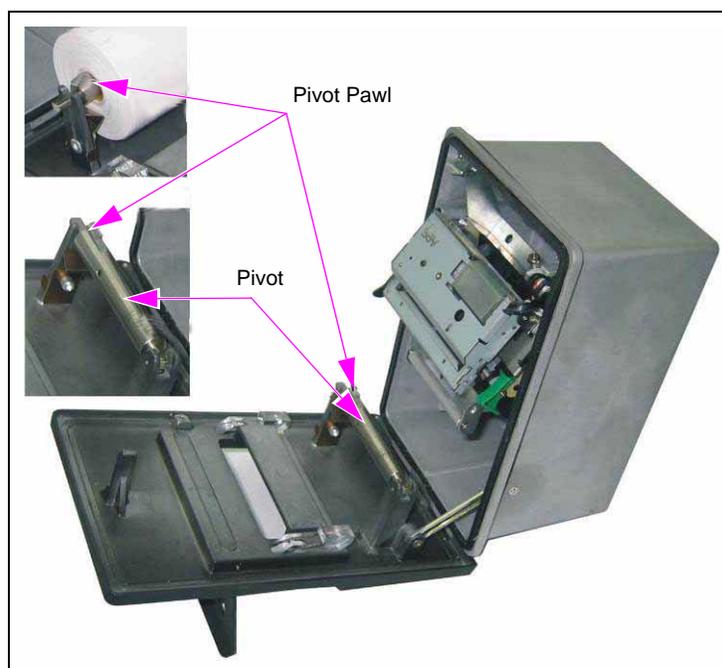
- 3 Lift the printer and release the attached paper (see [Figure 4-12](#)).

**Figure 4-12: Released Printer**



- 4 Press the paper roll pivot handle (see [Figure 4-12](#)) and release the handle.
- 5 Lift the paper roll pivot (see [Figure 4-13](#)).
- 6 Press the paper roll pivot pawl (see [Figure 4-13](#)) and remove the paper roll.

**Figure 4-13: Paper Roll Pivot Handle**



- 7 Prepare a new paper roll facing down.
- 8 Press the paper roll pivot pawl (see [Figure 4-13](#) on [page 4-11](#)) and slide back the new paper roll when it is facing down.  
*Note: Insert the paper as shown in [Figure 4-12](#) on [page 4-11](#), with the thermal (shining) side facing out.*
- 9 Lock the paper roll pivot back (see [Figure 4-12](#) on [page 4-11](#)).

The paper can be inserted into the printer automatically or manually.

### Automatic Insertion of Paper

To insert the paper automatically, proceed as follows:

*Note: Ensure that the green locking handle is closed.*

- 1 Slide the paper gently along the grooves until the printer motor starts pulling the paper. At the end of the process, the paper will exit from the cutter.  
*Note: Do not pull the paper. The printer pulls the paper automatically and cuts it.*
- 2 Slide the paper from the printer door slice (see [Figure 4-14](#)).

### Manual Insertion of Paper

To insert the paper manually, proceed as follows:

- 1 Release the green locking handle (see [Figure 4-11](#) on [page 4-10](#)).
- 2 Slide the paper gently along the grooves until the paper exits from the cutter.
- 3 Lock back the green locking handle and let the printer fall back in its place.
- 4 Slide the paper from the printer door slice and close the door (see [Figure 4-14](#)).

**Figure 4-14: Protruding Paper from Slice in Door**



## Cleaning Printer

The printer must be cleaned periodically at short intervals due to the harsh environment of the home base station.

Clean the printer front panel with a damp cloth only.

### CAUTION

DO NOT use any solvents such as thinner or benzene to clean the printer front panel.

## Troubleshooting

In case problems are detected after installation or during operation, repeat the installation procedures listed in [“Replacement - Installation”](#) on [page 4-9](#).

### CAUTION

If the problem persists, contact Gasboy. Do not attempt to dismantle the printer under any circumstances. The printer module G2 unit repair must be performed at Gasboy laboratories only.

The G2 printer module indicates a faulty operation by means of its LEDs on the front panel. For the recommended corrective actions to troubleshoot and repair the unit, refer to the following table:

No.	Failure Indication	Probable Cause of Failure	Recommended Corrective Action
1	Left-hand green LED flickers constantly.	The printer unit is stuck.	1 Check paper roll. 2 Replace unit.
2	Right-hand green LED flickers constantly.	The printer module G2 unit is stuck.	1 Check paper roll. 2 Replace unit.

## Releasing Jammed or Crumpled Paper

This procedure applies when a paper is crumpled or jammed inside the printer. In this case, the printer is disabled and all actions must be performed manually. To release the paper, proceed as follows:

- Notes:*
- 1) Do not attempt to release the paper using sharp objects such as a knife or a screwdriver. Doing so might damage the printer paper cutter and void your warranty.
  - 2) Do not attempt to pull the paper from the printer.
  - 3) Doing so might damage the printer.

To release the paper when a paper jam occurs, proceed as follows:

- 1 Open the printer front panel. The front panel lock is an electro mechanic lock (solenoid type) that can be opened from the controller.
- 2 Pull up the printer cover and release the green locking handle (see [Figure 4-11](#) on [page 4-10](#)).

- 3 Pull out any crumpled paper.
- 4 Clean the printer area from any paper remnants.
- 5 Push the green locking handle to its original state.
- 6 Slide the new paper roll into the pivot handle 2 in [Figure 4-12](#) on [page 4-11](#). Ensure that the paper roll to be inserted is not crumpled.
- 7 Insert the paper into the printer either automatically (refer to [“Automatic Insertion of Paper”](#) on [page 4-12](#)) or manually (refer to [“Manual Insertion of Paper”](#) on [page 4-12](#)).

## Thermal Paper Storage

The thermal paper is sensitive to the environmental conditions. Printer module operation is sensitive to the type of paper inserted. To store the thermal paper, proceed as follows:

- Use the right paper, as specified.
- Insert the paper edge to the printer.
- Insert the paper in the correct side.
- Store the paper in a dry, shaded area, at 64 °F (18 °C) to 68 °F (20 °C).
- During paper replacement, avoid dust, moisture, and rain.

*Note: Dispose of wet or damp paper. It may jam in the printer.*

# 5 – Maintenance

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## General

This section provides general maintenance instructions for the TopKAT PLUS.

The TopKAT PLUS cabinet is specially designed for the ease of maintenance. In case of malfunction, unlock the lock located on the rear part of the box and pull out the cover. The cabinet layout (refer to [“TopKAT PLUS Main Components Location”](#) on [page 1-9](#)) is intended to grant the technician full and fast access to any defective component.

*Note: Only Gasboy certified technicians must perform maintenance tasks on the TopKAT PLUS cabinets.*

## Troubleshooting

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

- TopKAT PLUS (refer to [“TopKAT PLUS Troubleshooting”](#) on [page 5-2](#))
- OrPT (refer to [“OrPT Troubleshooting”](#) on [page 5-5](#))
- Printer (refer to [“Printer Troubleshooting”](#) on [page 5-6](#))
- Communication (refer to [“Communication Troubleshooting”](#) on [page 5-7](#))

## TopKAT PLUS Troubleshooting

TopKAT PLUS troubleshooting procedure and consequent corrective actions are described in the following table:

Fault	Probable Cause	Checks	Corrective Action
<b>System is down</b>			
LCD display is blank	TopKAT PLUS main switch is off		Turn main switch on.
Does not accept key/card/keypad input	No 115 VAC feed to the unit	<ol style="list-style-type: none"> <li>1 Check power at the Distribution Box (D-Box).</li> <li>2 Check cabling from D-Box to the unit.</li> <li>3 Ensure that power cable is properly connected to unit terminal block.</li> <li>4 Is 115 V measured at the power input terminal block?</li> </ol>	Correct wiring problems if 115 VAC is not measured.
No communication			
OrCU LEDs are not lit	Power failure	Does the unit shut down immediately after being turned on?	<ol style="list-style-type: none"> <li>1 Check for shorts in the power line cable.</li> <li>2 Check grounding.</li> </ol>
	External circuit breaker is off	Is breaker off or tripped?	Turn breaker on, if off.
		Is 115 V being switched through breaker?	Replace breaker if 115 V is not being switched.
		Is 115 V measured at the power input terminal block?	Correct wiring problems if 115 V is not measured.
		Does the breaker turn off immediately after being turned on?	Check for loads or shorts in the power line.
	Internal fuse blown	Check the two fuses inside the protective cover using an ohmmeter.	Replace the fuse if it is blown.
	Power supply failure	Check the power supply using an voltmeter.	<ol style="list-style-type: none"> <li>1 Replace fuse.</li> <li>2 Replace power supply.</li> </ol>
Does not accept key/card/keypad input No communication	OrPT setup is incorrect	Login to OrPT and check communication parameters.	<ol style="list-style-type: none"> <li>1 Set communication parameters.</li> <li>2 Submit and check again.</li> </ol>
	OrCU setup is incorrect	Check OrCU setup: <ul style="list-style-type: none"> <li>• OrPT bus</li> <li>• OrPT parameters</li> <li>• OrCU administrator parameters</li> </ul>	<ol style="list-style-type: none"> <li>1 Set communication parameters.</li> <li>2 Save and reload check again.</li> </ol>
No magnetic card response	Dirty or faulty magnetic card reader faulty magnetic cards	<ol style="list-style-type: none"> <li>1 Visually check magnetic card reader.</li> <li>2 Present several magnetic cards.</li> </ol>	<ol style="list-style-type: none"> <li>1 Clean magnetic card reader.</li> <li>2 Replace magnetic card reader.</li> <li>3 Replace OrPT.</li> </ol>
No key response	Loose cable faulty key receptacle	<ol style="list-style-type: none"> <li>1 Visually check key receptacle.</li> <li>2 Insert several keys.</li> </ol>	<ol style="list-style-type: none"> <li>1 Replace Key receptacle.</li> <li>2 Replace OrPT.</li> </ol>
Customer display is blank	Faulty customer display Faulty OrPT	Ensure that the customer display board is properly connected to OrPT interface board.	<ol style="list-style-type: none"> <li>1 Replace customer display.</li> <li>2 Replace OrPT.</li> </ol>

Fault	Probable Cause	Checks	Corrective Action
<b>Mechanic pump does not refuel</b>			
Pump does not supply fuel	Device is not allowed to refuel	1 Open the pump from SiteOmat status screen. 2 Ensure that the vehicle/device has no limitation in FHO setup.	Enable the device to refuel.
	Pump setup is incorrect	Check pump setup: <ul style="list-style-type: none"> <li>• Pump Server</li> <li>• Buses</li> <li>• Prices</li> <li>• Pulse rate</li> </ul>	1 Set pump parameters. 2 Save and reload. 3 Check again.
	Faulty connection to pump	Check control cables from TopKAT PLUS to pump.	Make good electrical connection.
	8-port failure	Ensure that power LED is lit.	If it is off, use a voltmeter to check power supply to the unit: If power supply is OK, then replace the 8-port board. If power supply is faulty, replace the power supply.
		Ensure that control red LED on MPI-C board is lit.	1 Replace MPI-C board. 2 Replace 8-port.
	Pump malfunction	Turn the external bypass switch on, lift the nozzle, and check that the pump supplies fuel.	If the problem persists: 1 Check Handle-On switch. 2 Repair pump.
Handle-on switch problem	Is the In Use red LED in MPI-C board lit when nozzle is lifted?	1 Check in use cable and repair, if required. 2 Check terminal wires and repair, if required. 3 Check the in use switch in the pump and repair, if required.	
Pump is authorized but call state is not detected (nozzle icon in SiteOmat status screen does not display Call state)	Faulty in use switch in pump	Power off the pump using a ohmmeter, measure the switch in on and off states.	Replace pump switch in cases where no short was detected.
	Faulty connections	Check In Use cable	Make good electrical connection if faulty one exists.
		Check In Use terminal block connections.	
	Faulty in use terminal block		Replace in use terminal block.
	Faulty MPI-C board	Ensure that the call red LED is lit when nozzle is lifted.	If the red LED is not lit, replace MPI-C board. If the LED is lit, the problem is external to the controller.
Faulty 8-port		Replace 8-port.	
Pump is authorized, pump motor is running, but no fuel is supplied	Faulty solenoid valve	Does the pump solenoid valve produce a clicking sound?	1 Replace valve. 2 Repair pump.
	Faulty pump		

<b>Fault</b>	<b>Probable Cause</b>	<b>Checks</b>	<b>Corrective Action</b>
Payment device (card, key, tag, and fuel ring) is not accepted	Communication fault between OrPT and SO	1 Check LAN cable. 2 Check OrPT setup. 3 Check SO setup.	1 Replace LAN cable, if required. 2 Set OrPT parameters properly. 3 Set SO parameters properly.
	Communication fault between FHO and SO	1 Check connection path with FHO 2 Ensure that the station is available and synchronized with FHO in FHO stations status screen.	Repair communication between FHO and SO, providing a reliable communication line.
	Device was not defined/incorrectly defined in FHO	1 Login to FHO as Fleet manager. 2 Check that the device is defined. 3 Check device parameters. 4 Check that device rules does not limit refueling.	Define the device parameters in FHO properly.
	Device limit was passed	Ensure that the device is within the limits of its rule.	For testing only, remove any rule associated to this device.
	Device was set as driver	1 Login to FHO and go to devices management. 2 Select the specific device and check if it was configured as driver.	Change the device setting to <b>Vehicle</b> .
	Device is blocked	1 Login to FHO and go to devices management. 2 Check the status of the device in the status column in the devices grid (blocked/unblocked).	Change device status to <b>Unblocked</b> .
<b>Pump is Authorized and refueling but volume remains zero</b>			
Pump is refueling but volume remains zero	Pulse factor is zero	Check SO pump setup.	Change pump settings to correct the factor for the relevant pump.
	Faulty MPI-C board	Disconnect the pulser and short the pulse-in wires to simulate pulses.	If pulses are received during refueling, replace pump pulser.
	Faulty pulser		If not, replace MPI-C board.
<b>No control on refueling</b>			
Pump is refueling without any control	Pump is in bypass	Ensure that external bypass switch is off.	Turn bypass switch off, if on.
	Faulty SSR		Replace the relevant SSR unit inside the TopKAT PLUS.
	If an external relay is used to control the pump/valve, it may be stuck due to a small current leak		Add a snubber (capacitor + resistor) in parallel to relay input.

## OrPT Troubleshooting

The OrPT troubleshooting procedure and consequent corrective actions are described in the following table:

<b>Fault</b>	<b>Probable Cause</b>	<b>Checks</b>	<b>Corrective Action</b>
<b>OrPT display is not lit</b>			
OrPT display is blank.	Internal fuse blown.	Check the mini fuse at the bottom of the power supply using an ohmmeter.	Replace the fuse if it is blown.
	Power supply failure.	Ensure that green LED on power supply is lit.	Replace power supply.
	Faulty OrPT.		Replace OrPT.
<b>OrPT does not accept card</b>			
OrPT display does not respond correctly to cards.	Bad card.	Present several cards to see if problem is consistent.	Replace card and test again.
	Dirty card reader.	Ensure that the card reader is clean.	Clean the card reader using a cleaner card and try again.
	OrPT is busy performing another task.	Ensure that the display presents the idle message.	1 Press <b>Cancel</b> . 2 Present the card while the idle message is displayed.
	Faulty card reader.		Replace OrPT.
<b>OrPT does not accept RFID tag</b>			
OrPT display does not respond correctly to tags.	Bad tag.		Replace tag and test again.
	Tag is not close to the OrPT antenna.		Bring the key close to the antenna located on the red circle.
	OrPT is busy performing another task.	Ensure that the display presents the idle message.	1 Press <b>Cancel</b> . 2 Present the tag while the idle message is displayed.
	Faulty OrPT.		Replace OrPT.
<b>OrPT does not respond to keypad entries</b>			
Pressing the keypad buttons does not generate any sound and does not affect the display.	Dirty keyboard.		Clean the keyboard.
	Damaged keypad.	Visually check the keypad surface for any damage.	Replace keypad if any damage is found.
	OrPT is busy performing another task.	Ensure that the display presents the idle message.	1 Press <b>Cancel</b> . 2 Present the tag while the idle message is displayed.
	Faulty OrPT.		Replace OrPT.
<b>OrPT displays "No communication" message</b>			
	Communication disconnected.	Open TopKAT PLUS cabinet and check LAN cable from OrPT to 5-LAN switch.	Make correct and good connection if it was incorrect.
<b>OrPT displays "No communication" message</b>			
5-LAN switch is dead.	No power to 8-port.	Are 8-port LEDs lit/blinking?	1 Check power connector to 8-port. 2 Replace 8-port.
		Is 5-LAN switch LEDs are lit/blinking?	1 Check connection of LAN switch on 8-port. It must be inserted in a socket on the 8-port main board. 2 Replace 5-LAN switch board.

Fault	Probable Cause	Checks	Corrective Action
OrCU problem	Faulty connection	Check power to OrCU.	Ensure that the white power connector is plugged into the OrCU POWER socket.
	Power supply failure	Is power supply on?	1 Replace fuse. 2 Replace power supply.
	Faulty OrCU		Replace OrCU.
	Incorrect SiteOmat setup	Ensure that OrPT parameters defined in SiteOmat match the values presented in OrPT display at power on.	Set the OrPT bus and parameters according to OrPT values presented in OrPT display at power on.
	Incorrect OrCU setup	Login to OrPT and ensure that all parameters match OrCU setup.	Login to OrPT and change setup so it suits OrCU setup.

## Printer Troubleshooting

Following table describes printer troubleshooting procedure and consequent corrective actions:

Fault	Probable Cause	Checks	Corrective Action
<b>Printer does not print</b>			
No printing at the end of transaction	Printer is out of paper	Check paper roll.	Replace paper roll.
	Paper lock (green) switch is open	Check paper lock switch position.	Close paper lock switch.
	Jammed paper		Release paper.
	Incorrect SiteOmat setting	Check SiteOmat printer settings.	Set printer parameters properly.
	Faulty printer		Replace printer.
<b>No power to Printer</b>			
No printing, printer does not produce a beep sound at power on	Power cable is disconnected	Check power cable connections between the printer and OrPT.	Make correct and good connection if it was incorrect.
	Faulty power supply	Check power supply outputs using a digital Voltmeter. The output voltage must be 24 VDC.	Replace power supply.
	Faulty printer		Replace printer.
<b>No Communication to Printer</b>			
	RS-485 cable is disconnected	Check the RS-485 cable connections between the printer and OrPT.	Make correct and good connection if it was incorrect.
	LAN cable is disconnected	Check the OrPT LAN cable.	Make correct and good connection if it was incorrect.
	Incorrect address settings	Check printer address jumpers (no jumper means address is 70 HEX).	Set the correct Hex address in SiteOmat.
	Faulty printer		Replace printer.
<b>Paper is not automatically cut</b>			
Paper is not being cut at the end of the printing	Incorrect SiteOmat setting	Check SiteOmat printing settings.	Set SiteOmat printing settings accordingly.
	Faulty printer cutter		Replace printer cutter.
	Faulty printer		Replace printer.

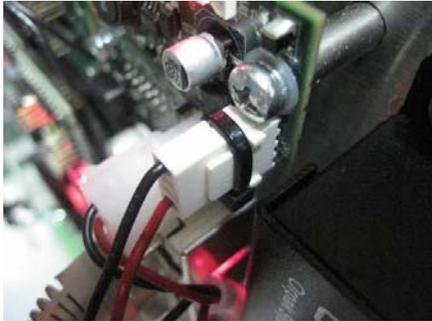
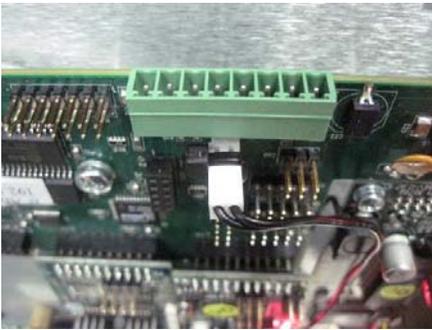
## Communication Troubleshooting

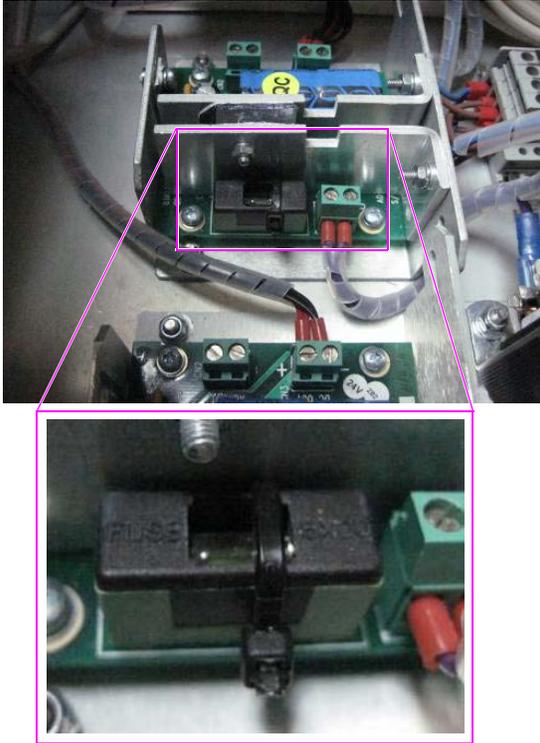
The troubleshooting procedure for problems related to communication to peripherals and consequent corrective actions are described in the following table:

Fault	Probable Cause	Checks	Corrective Action
<b>No communication between FHO and SO controller</b>			
No connection to the station from FHO stations screen	Cabling issue	Visually inspect the network cable to LAN2.	<ol style="list-style-type: none"> <li>1 Verify if LAN2 port LED is blinking.</li> <li>2 Unplug the cable and plug it back in.</li> <li>3 Replace LAN cable, if required.</li> <li>4 If the cable is in good condition, contact the IT department to confirm that the switch/router connected to the LAN cable is properly set.</li> <li>5 Check the controller network settings (IP addresses, mask, gateway, and so on).</li> </ol>
<b>No communication to the pump (8-port CommVerter)</b>			
A "Warning" sign for the pump is displayed on the SiteOmat status screen	Incorrect 8-port CommVerter setup	<p>Check the physical connection of the 8-port CommVerter to the local network (5-port switch activity).</p> <p>Check network connectivity by performing a "ping" command locally or remotely, through PuTTY application.</p>	<ol style="list-style-type: none"> <li>1 If no activity on the LAN port connected to the 8-port CommVerter, replace the short Ethernet cable or/and change the LAN port to confirm normal operation.</li> <li>2 Check the status of the LEDs on the 8-port (upper right corner of the board): the first and third LED must be lit to confirm power and network connection, while second LED must blink to confirm network activity. The last two LEDs (from left to right) must blink constantly to confirm communication with controller.</li> <li>3 In cases where all LEDs are lit periodically, (every 30 seconds), the unit is resetting due to connection loss to the controller.</li> <li>4 Reset the IP and reconfigure the Pump Server (PS) in controller setup.</li> </ol>
<b>No communication to OrPT</b>			
OrPT displays the message, "No Host Communication"	Incorrect OrPT communication and/or physical network setup	<p>Check the network cable for activity on 5-port switch.</p> <p>Ping the OrPT to confirm proper settings in the controller.</p>	<ol style="list-style-type: none"> <li>1 If no activity on the LAN port, check the cable and/or change the port on the 5-port switch.</li> <li>2 Reset the OrPT and follow the main screen messages for the IP address.</li> <li>3 Change the configuration of the OrPT according to the site setup (controller).</li> </ol>

## Safety Reinforcements

To comply with UL and cUL safety standards, the connectors and components enumerated in the following table are secured by tie-wraps. These reinforcements must be replaced, if removed when performing maintenance tasks.

Reinforcement	Description
	CN13 - P/S connector on 8-port board
	CN6 - Cover opening detection sensor connector on 8-port board
	CN1 - Illumination panel connectors (X2)

Reinforcement	Description
	<p>Fuse boxes on 24 V and 32 V regulators located inside the protective cover</p>

## Cleaning

### General

The TopKAT PLUS itself as a standalone unit must be cleaned periodically at short intervals, due to the harsh environment of the home base station where they operate.

### Cleaning

Following instructions are valid for the OrPT front panel and TopKAT PLUS pedestal.

- Clean the OrPT front plastic panel with a cloth lightly moistened with WD-40 or any other similar lubricant.
- Clean the pedestal metallic enclosure using a damp cloth and cleaning spray.

### CAUTION

DO NOT use any solvents such as thinner or benzene.

### **Magnetic Card Reader - Cleaning Instructions**

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

To clean the magnetic card reader, proceed as follows:

- 1 Remove the cleaning card from its packing.
- 2 Insert the cleaning card all the way in the reader and then pull it out slowly.
- 3 Perform the previous procedures several times, until the card gets dry.
- 4 Insert any magnetic card and ensure that its stored data is read by the magnetic card reader.

### **Printer - Cleaning Instructions**

Refer to [“Cleaning Printer”](#) on [page 4-13](#).

# Glossary

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## FuelOmat

Term	Description
CommVerter	LAN/232/485/422/C.L./Tokheim® Communication Converter
OrCU	Orpak embedded Controller Unit
OrPT	Orpak/Outdoor Payment Terminal (display, keyboard, key reader, magnetic card reader, LEDs, buzzer; install in fueling area)
SAM	Security Application Module (security card in the VIT/UPI)

## Communication

Term	Description
Data Encryption Standard (DES)	LANs with high level of security. A method of data encryption.
Ethernet	A popular local area data communications network, originally developed by Xerox Corporation, which accepts transmission from computers and terminals. Ethernet operates on 10/100 Mbps transmission rate over shielded coaxial cable or over shielded twisted-pair telephone wire.
TCP/IP	Communication protocol used in Ethernet/Internet.
Triple DES	Triple-Data Encryption Standard. A method of data encryption.

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## Appendix B: Parts List

Following table lists the TopKAT PLUS parts (for TopKAT PLUS parts illustrations, refer to “[TopKAT PLUS Parts Illustrated](#)” on [page C-1](#)):

Description	Part Number
Printer Head	M09680B102
PCB Card for Printer	M09680B033
Mechanical Printer Module	M09680B107
Line Filter	M09680B008
32 V Regulator	M09680B052
24 V Regulator	M09680B083
Transformer	M09680B022
Terminal Block	M09680B025
Printer G2	M09680B101
OrCU-N	M09680B004
Kit 5-port + Heat Sink	M09680B103 (see note 1)
8-port CommVerter	M09680B123 (see note 1)
RS485 P.B TopKAT PLUS	M09680B104 (see note 1)
OrPT	M09680B124 (see note 1)
MPI + SUB P.B TopKAT PLUS	M09680B105 (see note 1)
Paper TopKAT Printer	M09680B100
Lock	M09680B106
Sensor Islander Kit	M09680B096
Manual Override Switch	M09680B048
Relay SS 250 V 25 A	M09680B044

Notes: 1) New PCB per UL specifications with same functionality without jumpers.

2) The TopKAT PLUS system is NOT compatible with current loop pump communication and Tank Monitor™.

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# Appendix C: TopKAT PLUS Parts Illustrated

Figure C-1: TopKAT PLUS - Right Side Parts

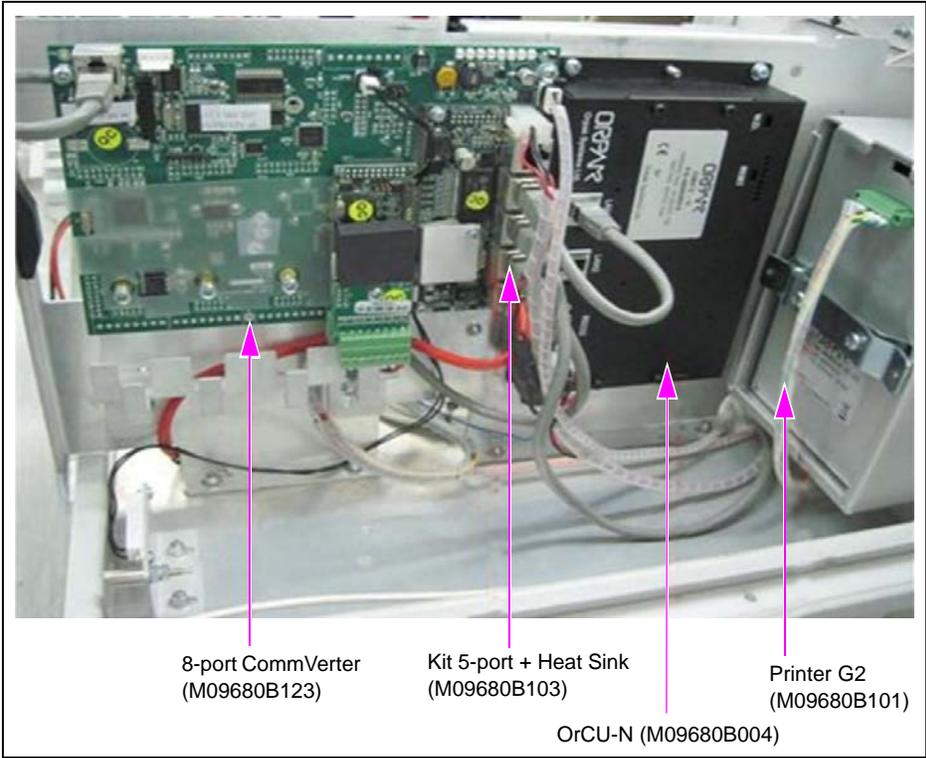


Figure C-2: TopKAT PLUS - Left Side Parts

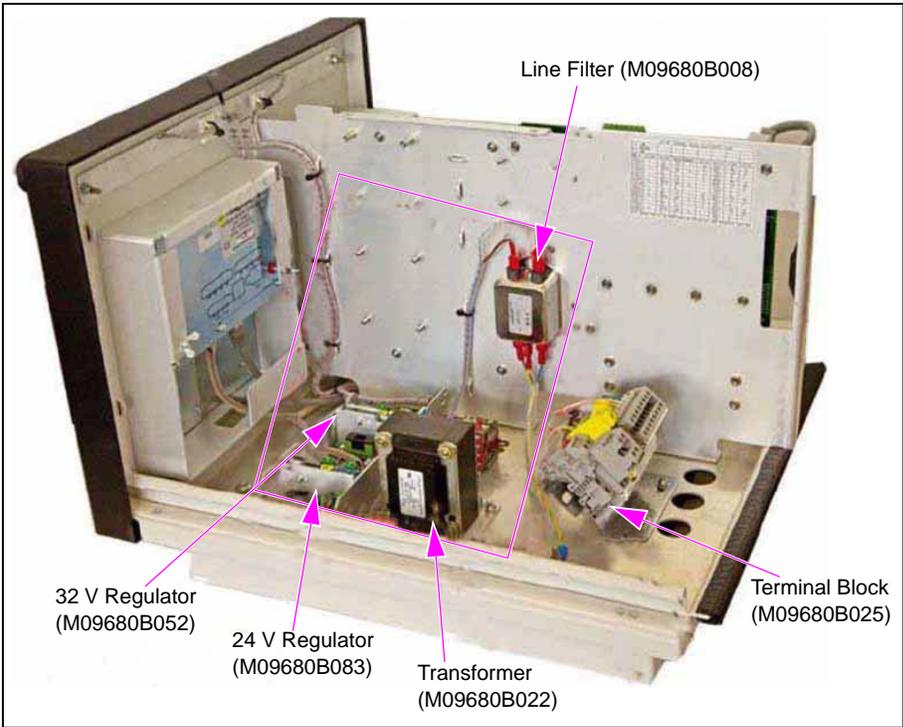
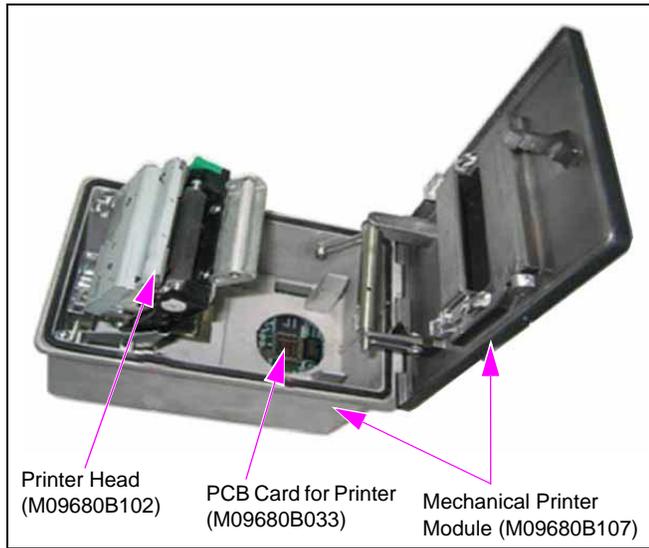


Figure C-3: TopKAT PLUS Receipt Printer



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