



CFN Series

Site Controller III Installation Manual

MDE-4298D

Computer Programs and Documentation

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Federal Communications Commission (FCC) Warning

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

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
MH6418	Power operated Transfer Pump Models 25, 25C, 26, 27, 28, 72, 72S, 72SP, 72X, 73 and 1820
MH7404	Hand operated Transfer Pump Models 1230 Series, 1243 Series, 1520 and 1720 Series
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

New York City Fire Department (NYFD):

NYFD C of A #	Product
4823	9100A, 9140A, 9152A, 9153A, 9800A, 9840A, 9850A, 9852A, 9853A, 9140
4997	9822A, 9823A
5046	9100Q, 9140Q, 9152Q, 9153Q, 9800Q, 9840Q, 9852Q, 9853Q
5087	8753K, 8853K, 9153K, 9853K (restricted to diesel and non-retail gasoline sales)
5091	8752K, 9152K
5129	9122K, 9123K, 9822K, 9823K

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			

Patents

Gasboy products are manufactured or sold under one or more of the following US patents:

Dispensers

5,257,720

Point of Sale/Back Office Equipment

D335,673

Additional US and foreign patents pending.

Trademarks

Non-registered trademarks

Atlas™
Consola™
Infinity™

Registered trademarks

ASTRA®
Fuel Point®
Gasboy®
Keytrol®
Slimline®

Additional US and foreign trademarks pending.

Other brand or product names shown may be trademarks or registered trademarks of their respective holders.

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1 – Introduction

Purpose

The Gasboy® Site Controller (SC) III Installation Manual is provided to assist you in installing your Cash Flow Network (CFN) System. This manual should be supplied to the electrician prior to conduit and wiring installation to ensure that your CFN System is installed properly. Faulty installations are the major cause of system malfunctions. The system must be installed as described in this manual to ensure the reliability and proper operation of your Gasboy CFN System. Read this entire manual before you begin the installation.

Gasboy provides a toll-free number (1-800-444-5529) for customers and installers who have queries pertaining to the installation.

Related Documents

Document Number	Title	GOLD Library
C01759	CFN Diagnostic Manual	CFN Series Controllers and POS
C09146	Site Controller Pump Interface Manual	CFN Series Networks, Card Handlers, and Pump Interface
C35628	Fuel Point Reader Installation and Retrofit Instructions Manual	RFID Wireless and TCP IP
MDE-2713	Universal Distribution Box Installation Manual	G-SITE®
MDE-4255	Gasboy's Warranty Policy Statement	<ul style="list-style-type: none"> • Policy Documents • Safety and Warranty
MDE-4299	CFN Series Profit Point PLUS Installation Manual	CFN Series Controllers and POS
MDE-4331	Atlas™ Installation Manual	Gasboy Atlas Pumps/Dispensers
MDE-4337	CFN Series Gilbarco® CRIND® Interface for Site Controller III with Windows®	CFN Series Networks, Card Handlers, and Pump Interface
MDE-4501	Wayne® CAT PC Interface for Site Controller III with Windows NT®	CFN Series Networks, Card Handlers, and Pump Interface
MDE-4559	Insight Interface Installation Guide	CFN Series Networks, Card Handlers, and Pump Interface
MDE-4624	Gasboy CFN Series Tokheim® Pump PC Interface	CFN Series Networks, Card Handlers, and Pump Interface
MDE-4634	CFN Series Gilbarco Pump PC Interface	CFN Series Networks, Card Handlers, and Pump Interface
MDE-4651	Wayne Pump PC Interface for SC III Windows NT	CFN Series Networks, Card Handlers, and Pump Interface

Abbreviations and Acronyms

Term	Description
CFN	Cash Flow Network
CRIND	Card Reader IN Dispenser
DPT	Dispenser Payment Terminal
EIA	Electronics Industries Association
EMI	Electromagnetic Interference
FPR	Fuel Point® Reader
I/O	Input/Output
ICR	Island Card Reader
PC	Personal Computer
PCB	Printed Circuit Board
PCU	Pump Control Unit
PIN	Personal Identification Number
POS	Point Of Sale
RFI	Radio Frequency Interference
SC	Site Controller
SHM	Short Haul Modem
UPS	Uninterruptible Power Supply

System Overview

The Gasboy CFN System is a microprocessor-based automated fueling system. It consists of modular components and configurable software. The CFN System can be tailored to meet the needs of retail petroleum marketers - unattended or self-service, government fleets, or private fleet owners. The system flexibility allows for debit, credit, club, and fleet card usage as well as cash operation.

The system application determines the components required. Therefore, your system may consist of several or all of the following components:

- RS-485 Junction Box(es)
- Pump Control Unit(s) (PCUs)
- Island Card Reader(s) (ICRs)
- Island Card Reader 2 (ICR2)
- Island Receipt Printer(s)
- Point Of Sale (POS) console(s)
- Standalone Receipt Printer(s)
- Cash Drawer(s)
- Personal Identification Number (PIN) Pad(s)
- Scanner
- RS-485 to RS-232 Converter
- Data Terminal/Printer

- Modem
- Power Conditioner
- Voltage Regulator/Backup Uninterruptible Power Supply (UPS)

“[System Layout](#)” on [page 9](#) provides a brief description of each component.

Warranty

For information on warranty, refer to MDE-4255 Gasboy’s Warranty Policy Statement. If you have any warranty-related questions, contact Gasboy’s Warranty Department at its Greensboro location.

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2 – Important Safety Information

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 Service 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 Hazard Association (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.

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 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



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

WARNING



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

WARNING






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

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

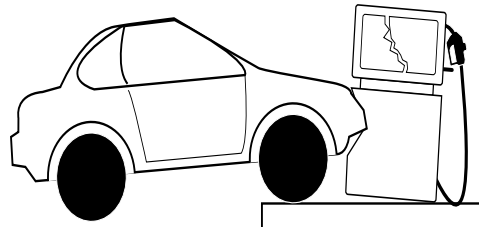
Lockout/Tagout

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

Hazards and Actions

 WARNING	
	Spilled fuels, accidents involving pumps/dispensers, or uncontrolled fuel flow create a serious hazard.
	Fire or explosion may result, causing serious injury or death. Follow established emergency procedures.

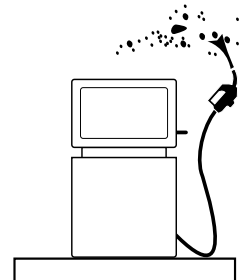
The following actions are recommended regarding these hazards:



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 – System Layout

Purpose

The purpose of this section is as follows:

- It provides a basic description, location, and environmental requirements of the CFN components. Dimensional drawings are included for the components manufactured by Gasboy.
- It covers conduit requirements and provides conduit layout examples for basic system configurations. Careful planning for the layout of the site will help you eliminate possible problems with the startup of your system and will ensure continued, reliable system operation.

SC III

Description

The SC III is the heart of the CFN System present at the fueling site. It controls and allows interaction between the automated fueling equipment, including electronic pumps, pump control devices, card readers, registers, tank monitors, and customer-activated terminals. The unit uses advanced microprocessor technology and incorporates multiple hardware and software safeguards.

The standard SC III unit consists of a hard disk drive for mass storage of data, a 3-1/2" disk drive, and a CD-ROM drive. The SC III provides the following ports:

- Ports 1, 4, 5, and 6 - These are local RS-232 ports. They can accept a modem, printer, or other devices.
- Port 3 - Currently this port is not used.
- Loop 1 - It is an island port and connects to the RS-485 junction box. All Gasboy devices (PCUs, ICRs, and so on) must connect to this port.
- Loop 2 - It is an alternate island RS-485 port. The factory setting for this loop is Two-wire (RS-485 half duplex), which enables communication to Tokheim Dispenser Payment Terminals (DPT). For additional information on Tokheim DPT wiring, refer to C09146 Site Controller Pump Interface Manual.

CAUTION

If a Two-wire device (for example, DPT) is connected to a loop that is set for Four-wire, the SC will not operate correctly. Four-wire devices on a Two-wire loop may not communicate with the SC. Refer to C01759 CFN Diagnostic Manual for appropriate jumper settings for two or Four-wire operation of these ports.

- Loop 3 - It is the POS high speed port. It is the only port to which a modular POS terminal can be connected.

In addition to SC ports, Personal Computer (PC) peripherals (monitor, mouse, and so on) are connected as per the manufacturer's instructions. Figure 3-1 shows SC ports as installed on a representative PC (your actual PC layout may differ).

Location

The SC III should be located in an office-like environment and in an area protected from direct contact with the weather. Do not install the SC unit in a hazardous location. The unit is designed for an operating temperature range of 40 °F to 95 °F with a relative humidity of 20% to 80% (non-condensing). Placing the SC unit in a dirty environment may cause premature failures. The RS-485 junction box must be located within 8 feet of the SC unit. The RS-485 junction box must be grounded as specified in “Power Requirements” on page 32. The SC unit should not be placed on top of any other components and no other equipment should be placed on top of the SC unit.

Figure 3-1: SC III

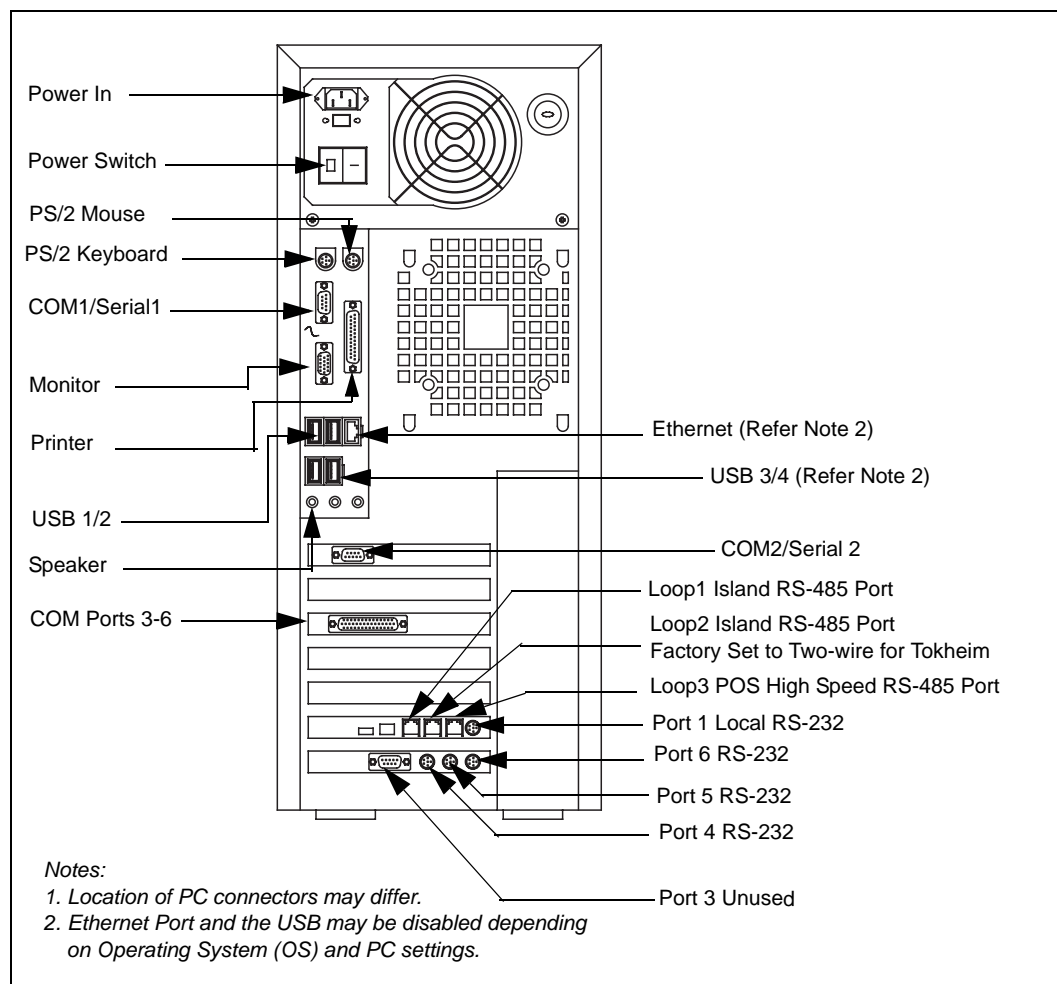
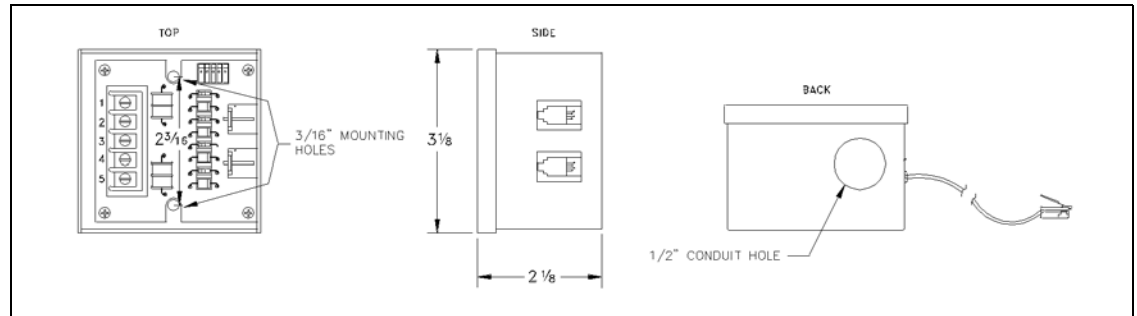


Figure 3-2: RS-485 Junction Box

PCU

Description

The PCU controls most mechanical pumps and some electronic pumps. The unit is controlled by a microprocessor and communicates with the SC through the RS-485 loop.

Each PCU can control up to four pumps or remote dispensers. There are two different versions of the PCU:

- Retail version (Weights and Measures) - Hardware features on the retail version include a battery backup, three solid state relays for each pump or remote dispenser (slow flow, fast flow, and submersible pump), manual override switches, and diagnostic capabilities.
- Fleet version - It does not have a battery backup, and has only two solid state relays for each pump and remote dispenser.

Field wiring connections are made to the unit using easy-to-wire terminal blocks.

The PCU can be ordered as follows:

- Mounted in a wall-mount box (standard) or in the ICR's post
- Standalone unit to be located on the island

Location

The wall-mount version of the PCU must be located in an area protected from direct contact with the weather. The post and standalone versions of the PCU should be located on the fueling island, no closer than 18" from the nearest dispenser. The unit is designed for an operating temperature of -40 to 104 °F with a relative humidity of 2 to 99% (non-condensing).

Figure 3-3: Wall-mount PCU

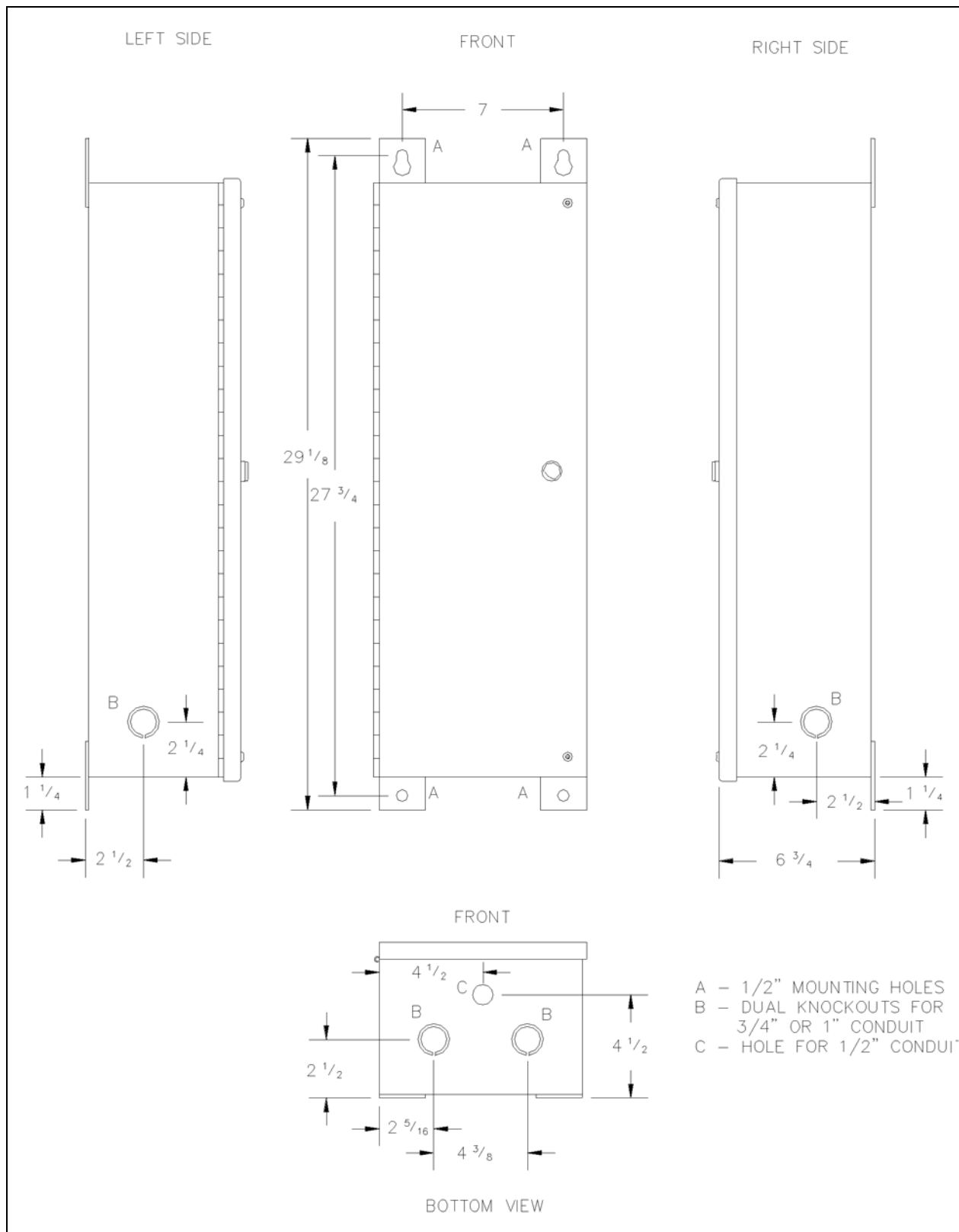
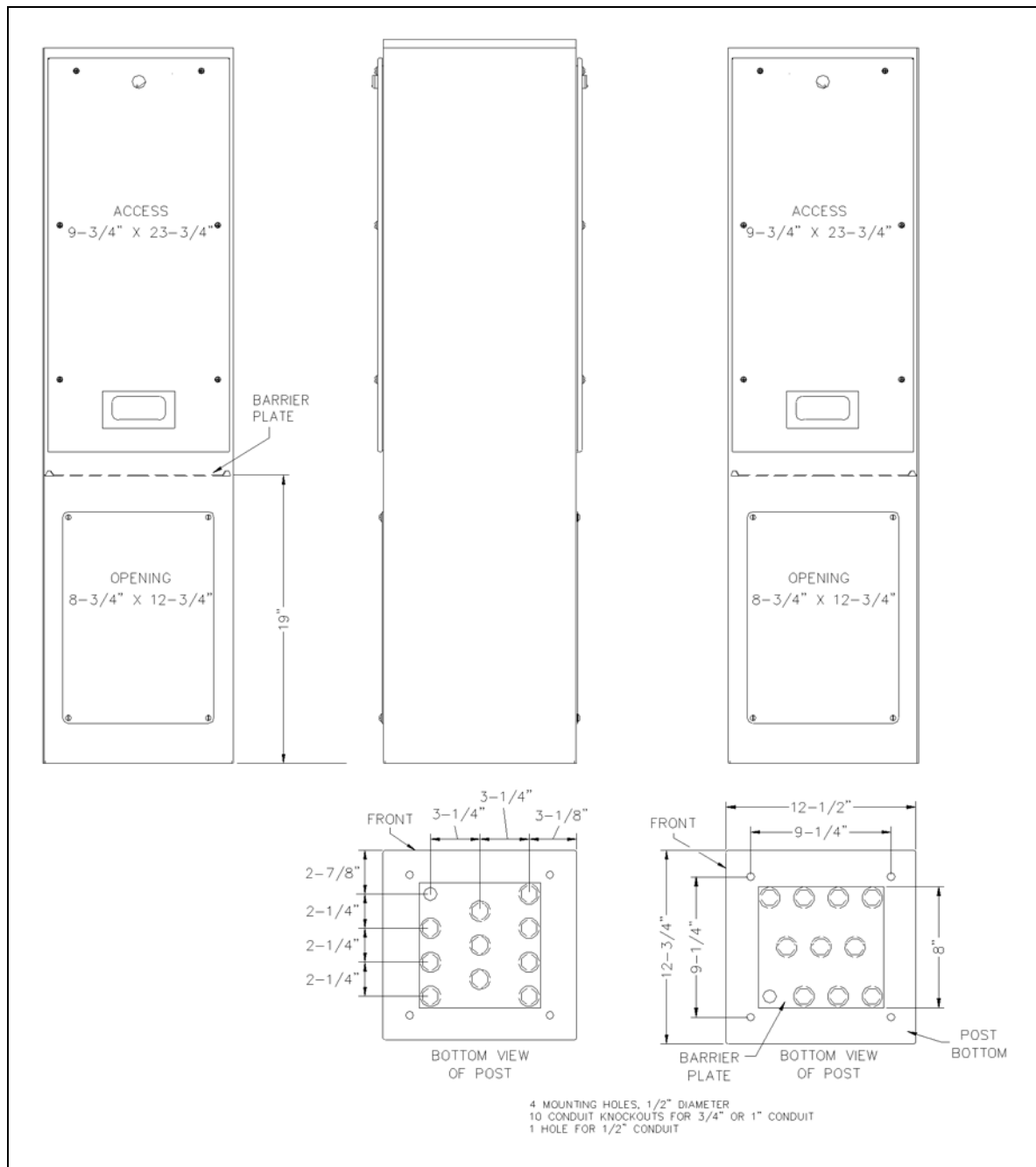


Figure 3-4: Standalone Island-mount PCU



ICR

Description

The ICR is a rugged and well-designed data entry terminal that gives users access to self-service gas pumps. The unit is controlled by a microprocessor and communicates with the SC using the RS-485 loop.

The unit is available with an ABA Track 2 magnetic stripe card reader. A 20-character Liquid Crystal Display (LCD) is used to guide the user through the transaction. The display is backlit so that it can be read at night. A membrane keypad incorporates easy-to-read legends and provides the user with means to input data to the system.

Three different types of posts are available with the ICR. The standard unit has a blank post. This post is used for mounting the ICR to the island. The ICR is also available with a receipt printer post or a pump control post.

Special ICR for CNG

A special version of the CFN ICR is available for use in the Class 1, Division 2 area of CNG sites (Model DETC). The dimensions of this unit are the same as those mentioned in [Figure 3-5 on page 15](#). This unit is not available with an internal receipt printer or a PCU.

Location

The ICR should be located on the fuel island. The unit has been designed for an operating temperature range of -40 to 104 °F with a relative humidity of 2 to 99% (non-condensing). Adequate clearance must be provided to allow easy access to the post's access covers. An ICR with a receipt printer post or a pump control post requires a minimum of 18" clearance between the post and any of the pumps/remote dispensers on the island.

Figure 3-5: ICR with Blank Post

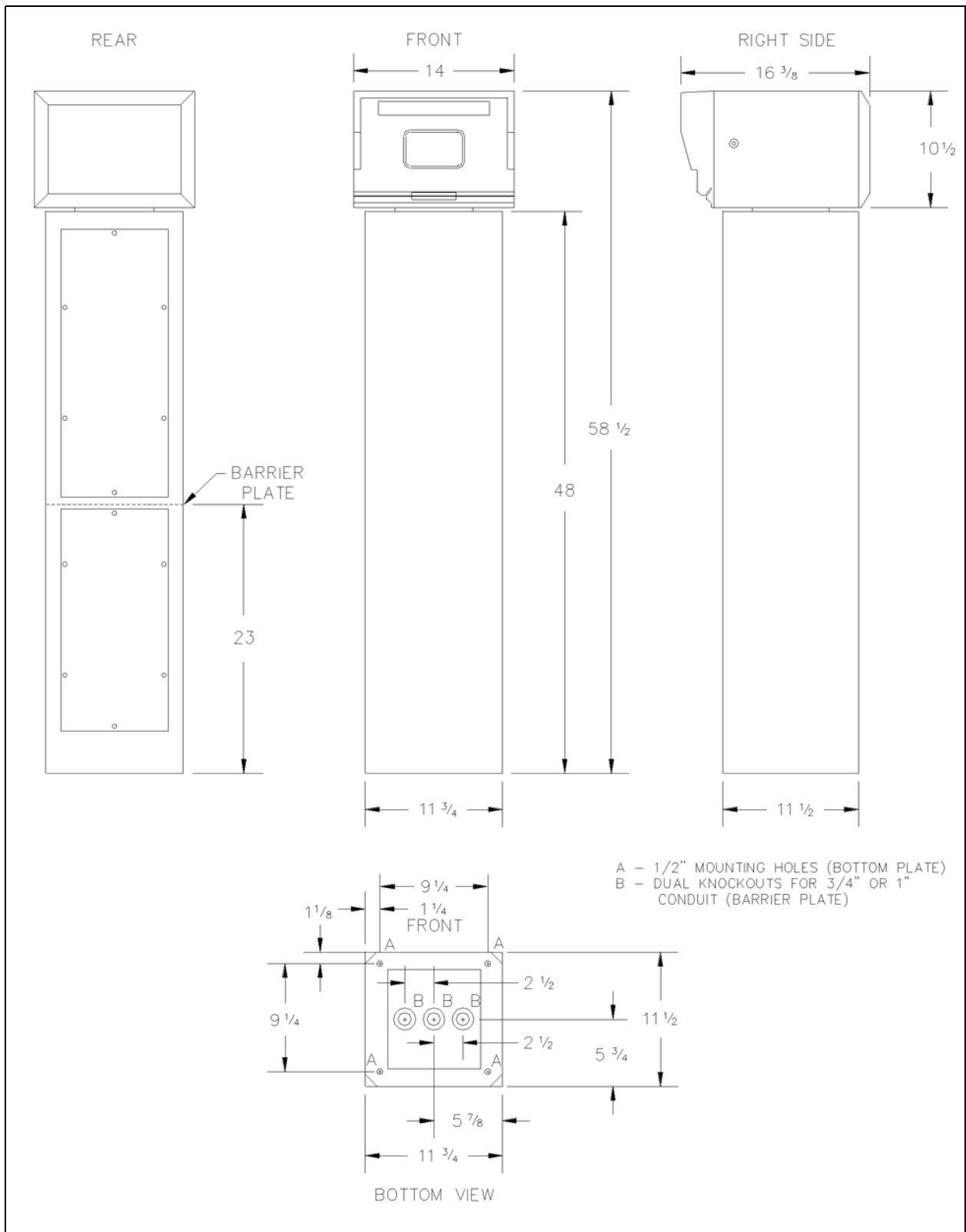


Figure 3-6: ICR with Receipt Printer Post

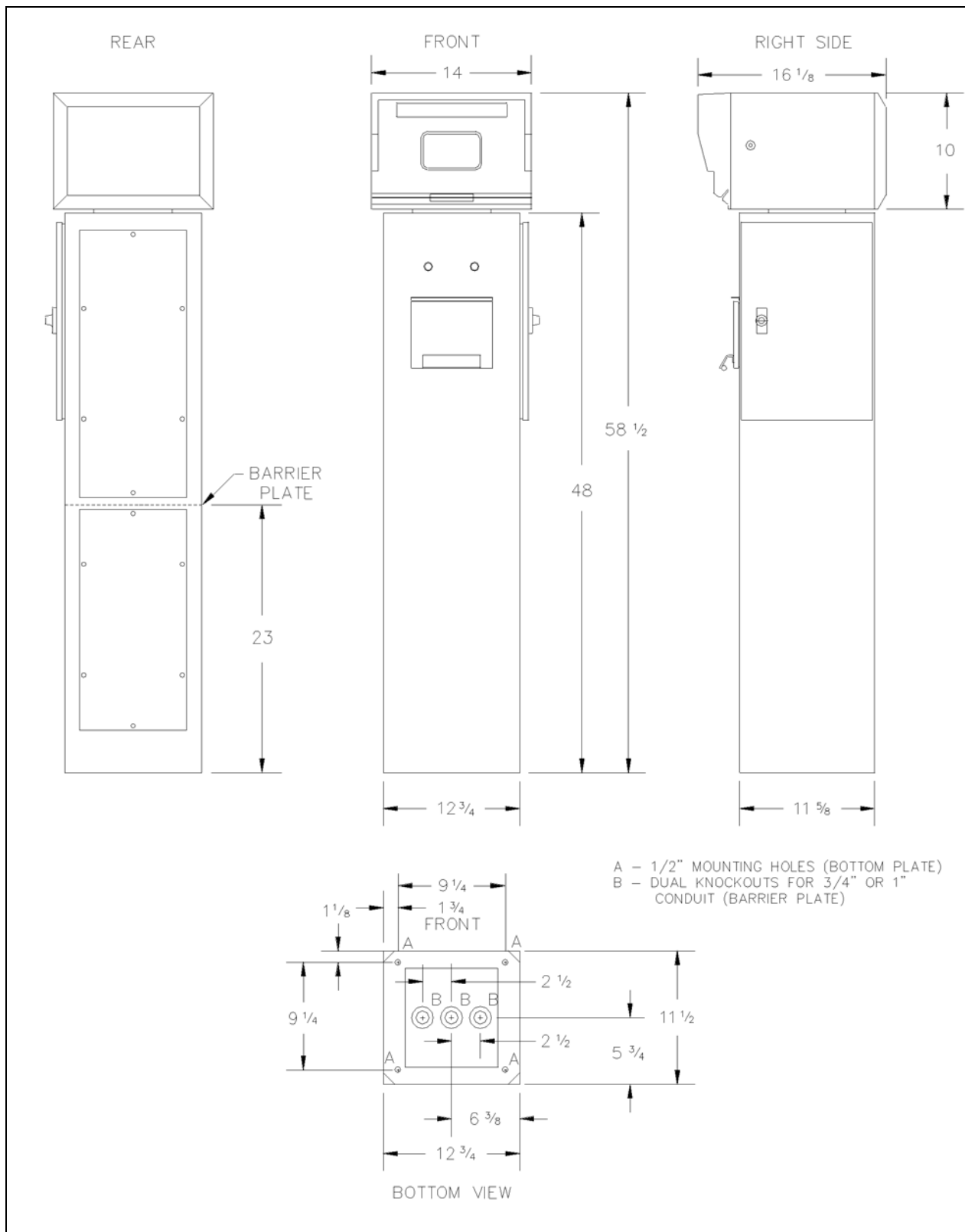
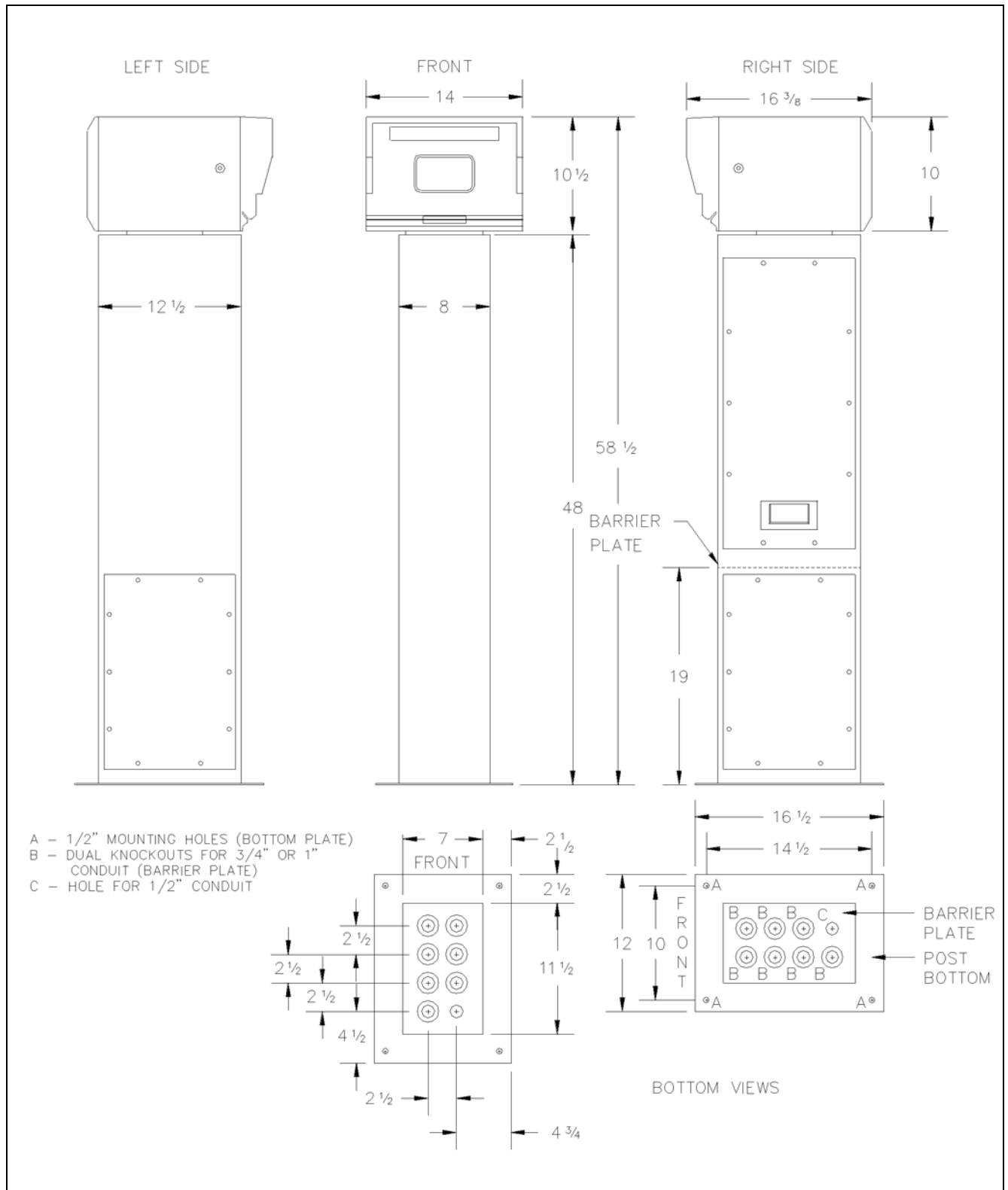


Figure 3-7: ICR with Pump Control Post



ICR2 (PA0398X0XXX0)

Description

The ICR2 is a rugged and well-designed data entry terminal that gives users access to self-service gas pumps. The unit is controlled by a microprocessor and communicates to the site controller through Two-wire Current Loop communications.

The unit is available with an ABA Track 2 magnetic stripe card reader. A graphic liquid crystal display is used to guide the user through the transaction. The display is backlit so that it can be read at night. A membrane keypad and soft keys incorporate easy-to-read legends and provide the user with the means to input data to the system.

The unit comes standard with a blank post. This post is used for mounting the ICR2 to the island. The ICR2 is also available with a receipt printer post and/or a PCU mounted in the post.

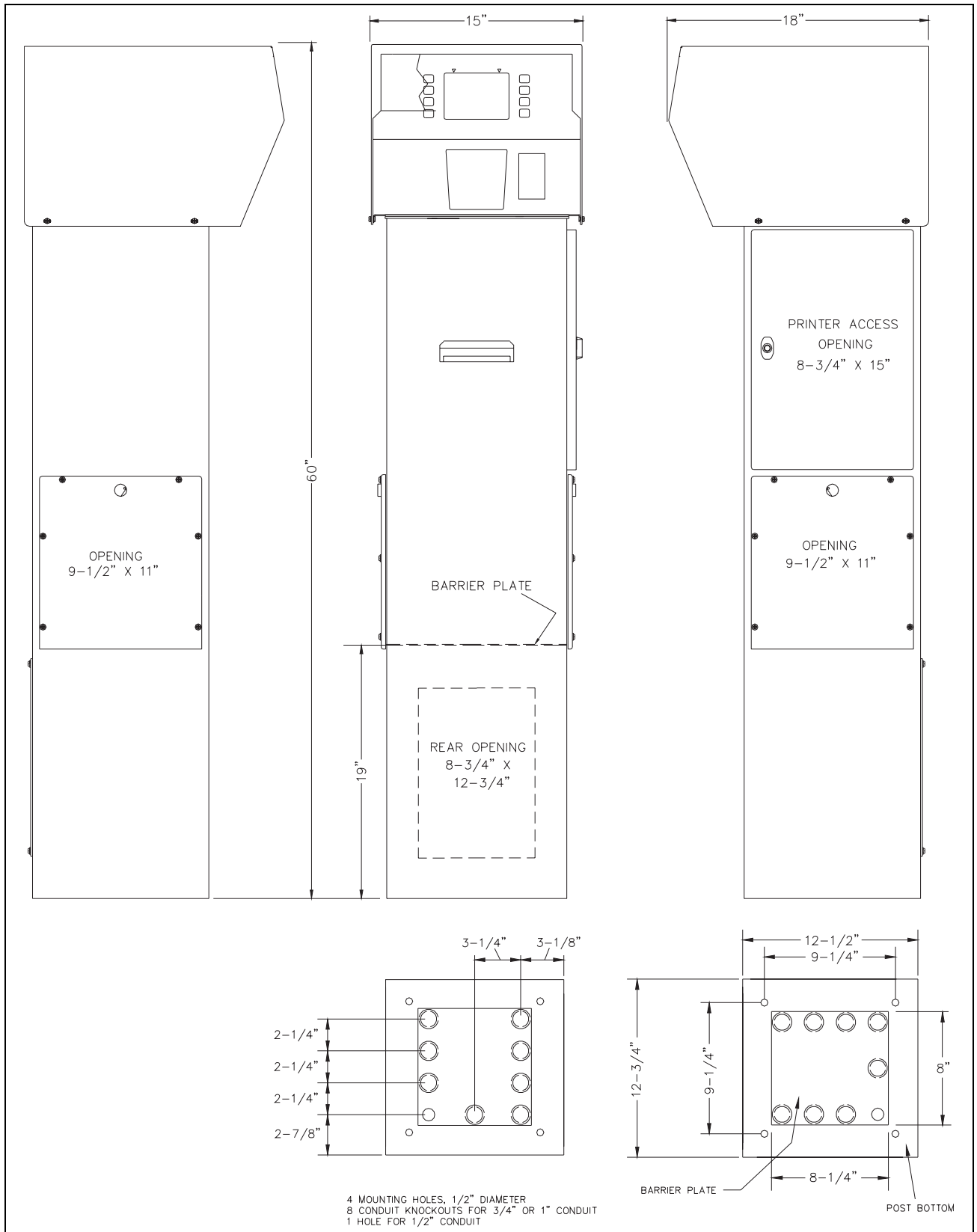
Communications to the ICR2 is through Two-wire Current Loop. If the ICR2 has a PCU in the post option, both the Two-wire Current Loop and four-wire RS-485 wiring will need to be installed between the Site Controller III and ICR2.

Location

The ICR2 should be located on the fuel island. The unit has been designed for an operating temperature range of -40 °F to 104 °F with a relative humidity of 2% to 99% non-condensing. Adequate clearance must be provided to allow easy access to the post's access covers. An ICR2 with a receipt printer or a pump control mounted in the post requires a minimum of 18" clearance between the post and any of the pumps or remote dispensers on the island.

ICR2 with Standard Post

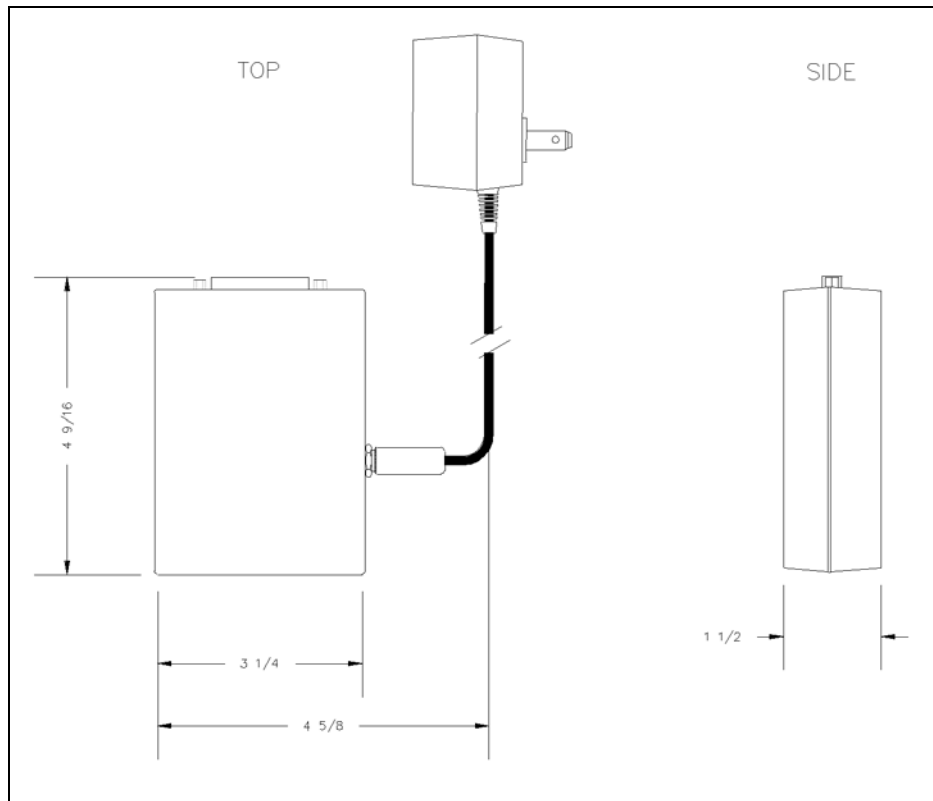
Figure 3-8: ICR2 with Standard Post



RS-485 to RS-232 Converter

An RS-485 to RS-232 converter is required for communication between the SC III, and a modular Profit Point or a tank monitor. It converts the format of the data from RS-232 to RS-485 and vice versa.

Figure 3-9: RS-485 to RS-232 Converter



Logger Printer

Description

A printer can be used as a logger for providing hard copy printouts of activities at the site. It can be directly connected to the printer port of the PC or to one of the SC's serial ports. If connected to the PC printer port (LPT 1), the cable length cannot exceed 25 feet.

Location

The printer should be located in a clean, office-like environment. Do not install the printer in a hazardous location. Printers supplied by Gasboy have an operating temperature range of 32 °F to 104 °F and 10% to 95% relative humidity (non-condensing). Locating the printer in a dirty environment may cause premature failure of the printer.

Modem

Description

Modems are used for communicating with the SC when the distance or conditions do not permit direct connection to the unit. Various types of modems can be used depending on the maximum baud rate and connection method required. Modems used for dial-out to a bank network require a dedicated phone line. Only Gasboy supplied modems are supported for use with the CFN system.

Location

The modem should be located in an office-like environment. However, if this is not possible, it should be housed in a protective enclosure. Do not install the modem in a hazardous location. Modems supplied by Gasboy have an operating temperature range of 32 °F to 104 °F.

IMPORTANT INFORMATION
The AC Surge Protector, Power Conditioner, and the Voltage Regulator/UPS should be installed independently and not combined between the AC outlet and the SC III.

AC Surge Protector Outlet Strip

Description

The AC Surge Protector Outlet Strip protects the SC and any equipment directly connected to it (printer, monitor, and so on) from line surges, and filters out the Electromagnetic Interference (EMI)/Radio Frequency Interference (RFI) noise.

Location

The AC Surge Protector Outlet Strip should be located within 6 feet of the SC. It must be located in an area protected from direct contact with the weather. Do not install the Surge Protector in a hazardous location.

Power Conditioner (optional)

Description

A UL®-listed power conditioner should be used when there is an unstable source of power. When used, the power conditioner helps provide clean power to the SC and other CFN devices located near the SC. Poor power condition is a key cause for system malfunction or failure. The power conditioner provides a transient and common mode of protection to the CFN system, although it cannot totally compensate for extremely poor power conditions.

IMPORTANT INFORMATION
If present, the power conditioner should be used in place of the AC Surge Protector Outlet Strip.

Location

The power conditioner should be located within 50 feet of the SC, but not in a hazardous location. It must be located in an area protected from direct contact with the weather (typically the system circuit breakers). The unit is designed for an operating temperature range of 0 to 104 °F.

Voltage Regulator/Backup Power Supply-UPS

Description

The voltage regulator/backup power supply protects line-operated equipment from low line voltage (brownout) and total line power failure by providing emergency power almost instantaneously. The voltage regulator/backup power supply also protects line-operated equipment from potentially dangerous voltage spikes coming in on the commercial AC power. Although it helps in conditioning the power to the CFN system, it cannot totally compensate for extremely poor power conditions.

Location

The voltage regulator/backup power supply should be located in an area protected from direct contact with the weather (typically near the system circuit breakers) and should be located within 50 feet of the CFN system for optimum protection. The unit is designed for an operating temperature range of 0 to 50 °C.

Conduit Requirements

The conduit requirements outlined in this section are relevant to all components that make up the Gasboy system including, but not limited to, CFN system units, pumps, remote dispensers, submersible pumps, submersible starter relays, and the circuit breaker panels. The Gasboy Warranty will not apply to any system deviating from the requirements outlined in this section.

All wiring and conduit runs must conform with all building/fire codes, all Federal, State, and Local codes, National Electrical Code, (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.

All wiring (AC and DC) connecting the different components of the CFN System, and all communication equipment signal wires must be installed underground in threaded, rigid, metal conduits. Poly Vinyl Chloride (PVC) conduits are not acceptable. High voltage AC power wires and low voltage DC signal wires are recommended to be installed in separate conduits. However, if AC and DC wires share the conduit, DC wiring must use the cable specified in the sections, “[Communication Requirements](#)” on [page 33](#), “[Short Haul Modem \(SHM\) RS-422](#)” on [page 39](#), and “[Pulser Wiring and Configuration](#)” on [page 53](#). When AC wires and RS-485 or RS-422 wires share the same conduit, only the AC wires for the system and pumps can be used in that conduit.

Wiring between the Fuel Point Reader (FPR) and the Pre-amp junction box is intrinsically safe and must be run in a conduit with only other intrinsically safe wiring. It cannot be run in a conduit with AC, DC, RS-485 or pulser wiring, regardless of the cable type used. Refer to C35628 Fuel Point Reader Installation and Retrofit Instructions Manual for details.

All conduits must be connected to the CFN components through the holes and knockouts provided by the factory. Do not make any other holes in these units. If alternate holes are required, contact Gasboy for approval first.

Refer to MDE-2713 Universal Distribution Box Installation Manual for conduit and wire requirements of the Two-wire Current Loop communications to the ICR2. For an overview of ICR2 Communication wiring, refer to “[ICR2 Communication Wiring](#)” on [page 37](#).

THHN/THWN Wire Areas

Gauge	Diameter		Area (sq units)	
	in	mm	in	mm
18	0.090	2.29	0.007	4.1
16	0.104	2.64	0.009	5.5
14	0.118	2.95	0.011	6.8
12	0.135	3.43	0.014	9.2
10	0.169	4.29	0.022	14.5
8	0.216	5.49	0.037	23.7
6	0.259	6.60	0.053	34.2
4	0.331	8.41	0.086	55.5
3	0.359	9.14	0.102	65.6
2	0.394	10.01	0.122	78.7
1063A	0.417	10.59	0.137	88.4

Areas of Trade Size Conduit

Trade Size (in)	Internal Diameter		Area (sq. units)		Fill Area (sq. units) 25% Fill	
	in	mm	in	mm	in	mm
1/2	0.629	16	0.303	196	0.076	49
3/4	0.826	21	0.532	343	0.133	86
1	1.063	27	0.862	556	0.215	139
1-1/4	1.378	35	1.50	968	0.375	242
1-1/2	1.614	41	2.04	1314	0.509	329
2	2.087	53	3.36	2165	0.839	541

To determine the conduit size required, refer to the table, “[THHN/THWN Wire Areas](#)” on [page 23](#), to find the area for each wire gauge. Add up all wire areas. Refer to the table “[Areas of Trade Size Conduit](#)” and select the smallest number in the Fill Area (sq. units) 25% Fill column (based on NEC 501-1) that comes closest to the total wire area but does not exceed it.

Conduit Layout/Installation Specifications

- All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.
- All peripheral equipment connected to the RS-232 ports must be listed, have an Electronics Industries Association (EIA) standard RS-232 communications protocol, and should not be installed in a hazardous location.
- Power for the system components, data terminal, and modem must come from a separate dedicated circuit breaker rated at no less than 10 Amp.
- All conduits must be made of metal to provide the necessary shielding.
- All conduit should be run underground, not overhead.
- DC pulser, DC RS-485 and/or RS-422 communication wires can be combined in the same conduit. It is recommended that the DC pulser, RS-485 and/or RS-422 wiring be in a separate metal conduit from any AC wires. However, the DC pulser, RS-485 and/or RS-422 wires can share the conduit with AC wires if shielded cable is used as specified in “[Communication Requirements](#)” on [page 33](#), “[Short Haul Modem \(SHM\) RS-422](#)” on [page 39](#), and “[Pulser Wiring and Configuration](#)” on [page 53](#).
- Use the chart in “[Wire Size](#)” on [page 44](#) to determine the wire gauge.
- Refer to “[Conduit Requirements](#)” on [page 23](#) to determine the conduit size according to the number of wires and wire gauge.
- RS-232 communication must not exceed 100 feet. RS-232 communication wires must be in a metal conduit separate from any AC wires.
- For communication distances exceeding 100 feet, you must use Gasboy Short Haul Modems (SHMs).
- In submersible applications, starter relays are always recommended; however, the system can directly drive motors up to 3/4 HP at 120 VAC, or 1-1/2 HP at 240 VAC.
- Suction pumps over 3/4 HP at 120/240 VAC, or 1-1/2 HP at 240 VAC must use a starter relay. Wire the starter relay in place of the motor in the applicable pump wiring drawing.
- A minimum distance of 18” must be maintained between the ICR post and any of the pumps/remote dispensers.
- In the conduit layouts, disregard the submersible pumps in the drawings if the hose outlets are suction pumps.

- Consult the applicable section of this manual for specific system installation requirements.
- The RS-485 junction box must be grounded as specified in [“Power Requirements”](#) on [page 32](#).
- When used with Fuel Point, an extra dedicated junction box is supplied and should be installed in the pump/dispenser. A separate, dedicated conduit should be run between the junction box and the FPR. Refer to C35628 Fuel Point Reader Installation and Retrofit Instructions Manual, for details.
- When using an ICR2, refer to MDE-2713 Universal Distribution Box Installation Manual for conduit layout/installation requirements of the Two-wire Current Loop communications. For an overview of ICR2 Communication wiring, refer to [“ICR2 Communication Wiring”](#) on [page 37](#).

Figure 3-10: Conduit Layout - Electronic Pumps/Remote Dispensers, Electronic Hose Outlets

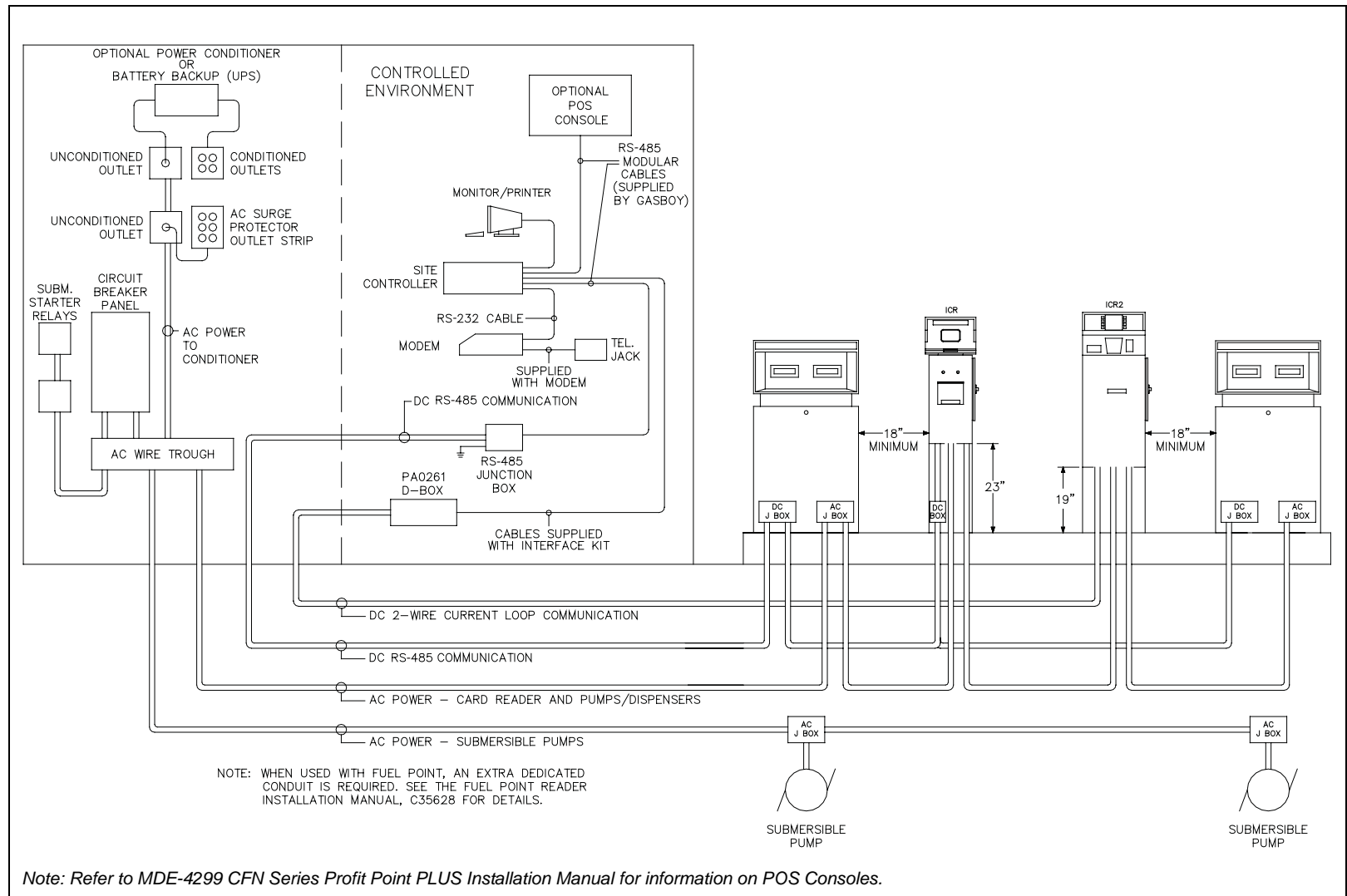


Figure 3-11: Conduit Layout - Wall-mount Pump Control, Mechanical Hose Outlets

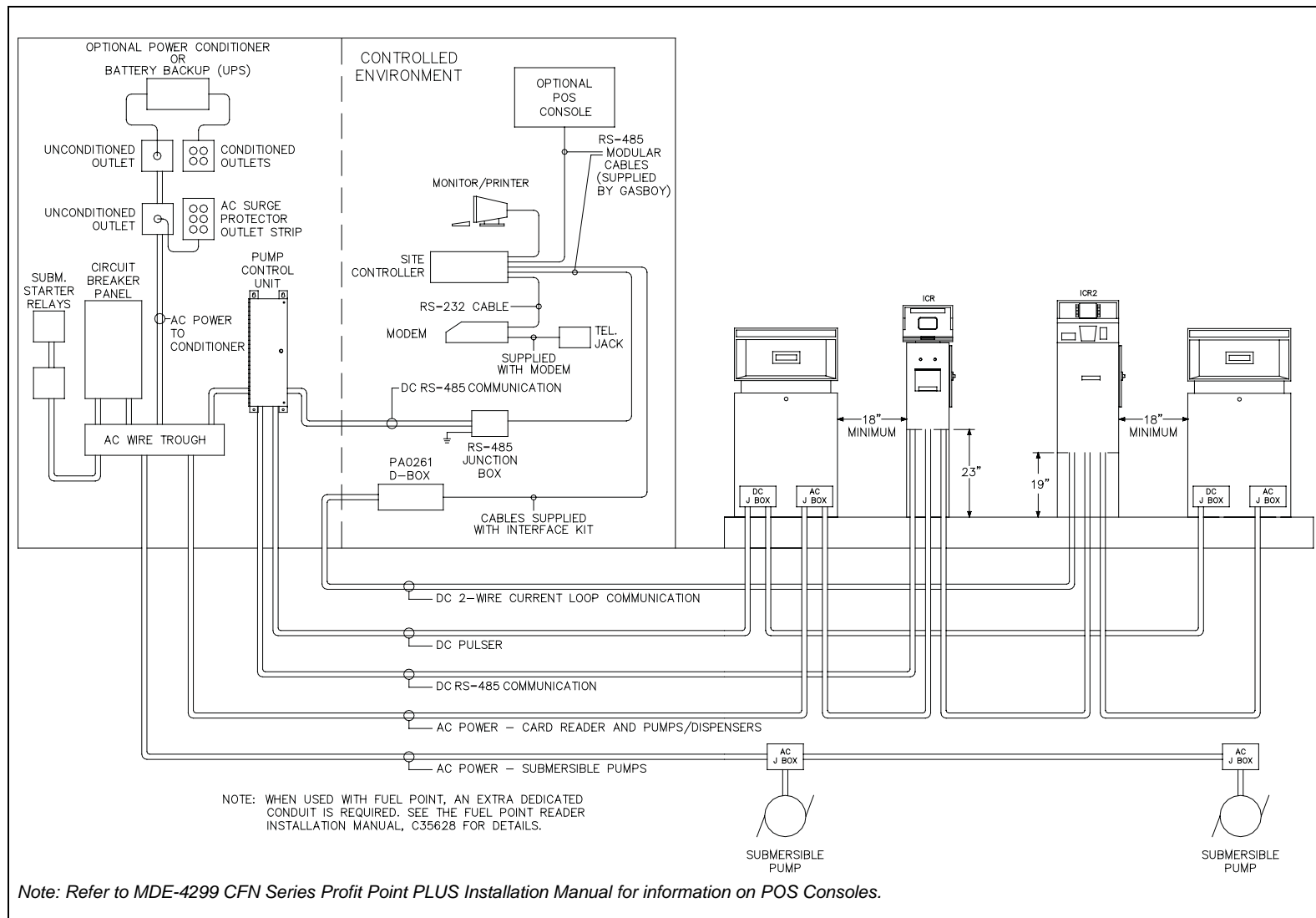


Figure 3-12: Conduit Layout - Pump Control Post, Mechanical Hose Outlets

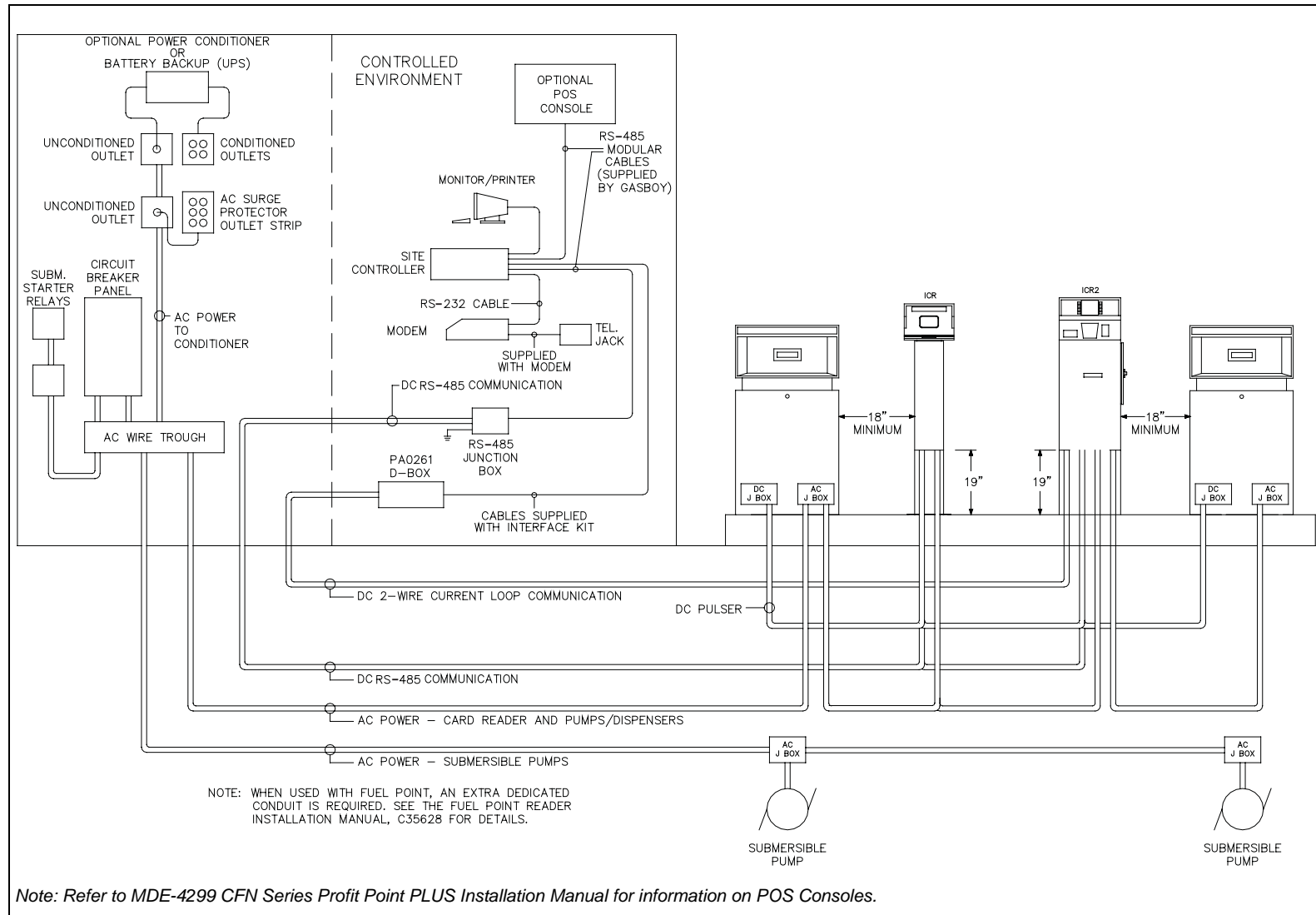
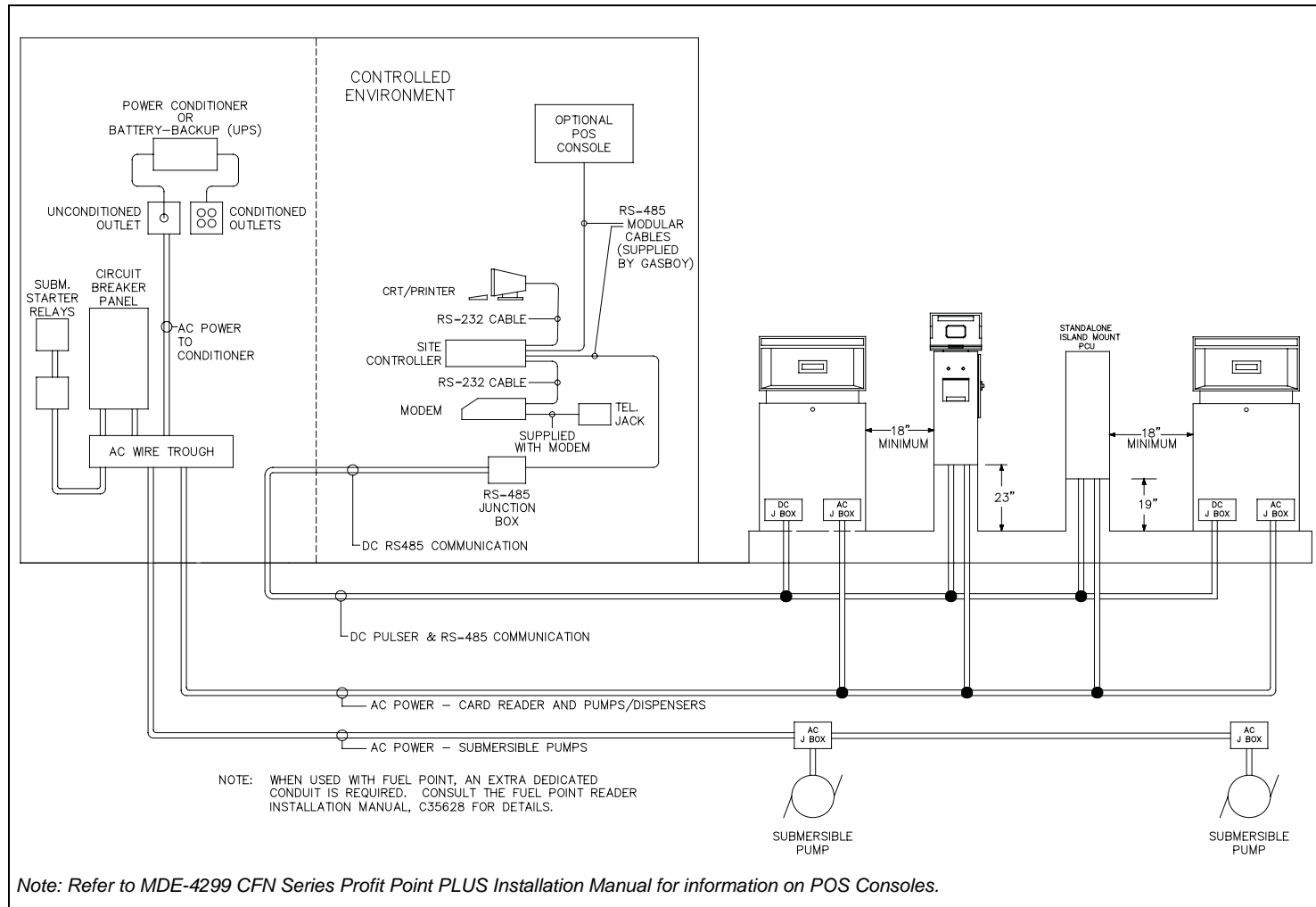


Figure 3-13: Conduit Layout - Standalone Pump Control Post, Mechanical Hose Outlets



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4 – System Components Wiring

General Wiring Precautions

The quality of the electrical installation is a major factor in maintaining proper safety levels and providing trouble-free operation of your Gasboy CFN System. To ensure a quality installation, follow these rules:

- All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must comply with the Canadian Electrical Code also. Wiring must conform to the wiring diagram supplied with the pump/remote dispenser.
- Use approved conduits and insulated gasoline and oil-resistant wiring of the proper size.
- Wire connections must be tightly spliced and secured with a wire nut. Close the open end of the wire nut with an electrical tape.
- Install an emergency power cutoff switch. In addition to circuit breaker requirements of NFPA 70, NFPA 30, and NFPA 30A, a single control that simultaneously removes AC power from all site dispensing equipment is recommended. This control must be readily accessible, clearly labeled, and must be in accordance with all local codes.

In a fuel management system application, the Disable Pumps and Stop keys on the console, and/or the optional Disable Pumps button on the ICR do not remove AC power from the equipment and will not stop product flow under certain conditions.

In order to provide the highest level of safety to you, your employees, and customers, Gasboy recommends that all employees be aware of the location and are trained on the procedure for turning off power to the entire system.

WARNING

To reduce the risk of electrical shock when servicing, turn off all power to the pump/remote dispenser. In submersible pump applications, turn off all power to the submersible pump and any other remote dispensers that use the submersible pump. AC power can feed back into a shut-off remote dispenser when dispensers share a common submersible pump or starter relay.

AVERTISSEMENT

Pour réduire le risque de choc électrique lors de l'entretien/révision, coupez totalement le courant à la pompe/distributeur. Dans les applications de pompe immerisible, coupez totalement le courant à la pompe immerisible et tous autres distributeurs qui utilisent la pompe immerisible. Le courant alternatif peut alimenter de nouveau un distributeur à l'arrêt quand les distributeurs partagent une pompe immerisible commune ou un relais de démarrage.

Power Requirements

AC Power for the CFN system components, data terminal, and external modem must come from a separate, dedicated circuit breaker. No other equipment, including the system's pumps or remote dispensers, may be powered from this breaker. Whenever possible, a single breaker should be used to supply the CFN system components, data terminal, and modem. However, it is acceptable to supply power to the different CFN system components and accessories from multiple breakers within the same breaker panel and the same phase of power. When necessary, power for the data terminal or modem may be supplied from a separate, dedicated breaker located in a different breaker panel.

The system requires 120 VAC \pm 10% 47-63 Hz for power. An SC and its attached components (printer, monitor, and so on) must draw power from an AC Surge Protector Outlet Strip that cannot be plugged into the optional power conditioner. A power conditioner may be used in place of the AC Surge Protector. Whenever possible, the AC Surge Protector Outlet Strip or optional power conditioner must draw their power from the same source.

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

While most of the CFN system components operate on 120 VAC, the ICR2 without a pedestal PCU (PA039810X0X0) will accept 120/240 VAC \pm 10% 47-63 Hz.

Wire Size

The AC wire size for power to the CFN system components must be 14 AWG or larger. This gauge of wire is sufficient for runs of up to 300 feet from the breaker panel to the system. Components with distances over 300 feet must use 12 AWG wire or larger. All wiring should be stranded.

The specifications for the RS-485 data loop and RS-232 communication wire/cable size can be found in [“Communication Requirements”](#) on [page 33](#).

Communication Requirements

The CFN System utilizes RS-485, RS-232, RS-422, and Two-wire Current Loop modes of communication for communicating to other CFN system components and peripheral equipment. Phone line (modem) communication may also be used when remote communication to the site is preferred. The specific requirements for each of these modes of communication are listed below.

RS-485

RS-485 wiring is used for communication between the CFN system components. This communication takes place over RS-485 modular cables provided with system components and the RS-485 data loop field wiring. The following installation requirements must be followed when installing CFN RS-485 communication lines:

- All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must comply with the Canadian Electrical Code also.
- **Cable:** A twisted-pair shielded cable is highly recommended for RS-485 wiring. Although it is recommended that wires be run in a conduit away from AC wires, they can be combined in the same conduit with AC wires if a UL-listed cable with the following specifications is used.

Conductor	18 AWG stranded wire; 2 twisted-pairs
Shield	Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
Drain Wire	Stranded, tinned copper, 20 AWG or larger/or braided shield
Voltage Rating	Maximum operating voltage of 600 V
Environmental	Gas and oil-resistant; suitable for wet or dry locations

Gasboy can supply Belden® 1063A (Part Number C09655), which is a UL-listed, 4-conductor cable that meets the requirements listed above.

Note: Belden 1063A is UL-listed but not CSA-listed.

When a cable with a voltage rating of less than 600 V is used, it must be installed in a conduit separate from all AC wires.

- **Conduit:** When you use the recommended shielded, twisted-pair cable described above, the cable can be run with AC wires in a metal conduit. The shield drain wire must be connected to the system AC ground. Only AC wires for the system and pumps can be installed in the AC conduit. Do not run the cable outdoors without the use of a metal conduit. Do not run this cable overhead when outdoors.

The cable can be run indoors without the use of a metal conduit. The shield drain wire must be connected to the system AC ground.

If you are using a cable other than the one recommended above, the RS-485 field wires must be installed in a metal conduit away from any AC wires.

- **Distance:** The following distances must be adhered to when installing the RS-485 field wiring:
 - Wiring over 100 feet must follow the specifications outlined above.
 - The distance from the RS-485 junction box to the farthest CFN component is limited to 1000 feet.
 - The total length of the RS-485 field wiring to all the CFN components cannot exceed 1500 feet.

- **RS-485 Modular Cable:** The RS-485 modular cables required are supplied with the system. These cables are not compatible with standard phone cables that are obtained from other sources.

Gasboy-supplied cables are 8 feet long. If you need to connect a CFN component with a modular connector (console) that is more than 8 feet from the system, you must use an RS-485 junction box to connect the device to the RS-485 communication wiring.
- **Connections:** Refer to “[System Components Wiring Diagram](#)” on [page 35](#) for proper connection of the RS-485 field wiring to the CFN system components.

RS-232

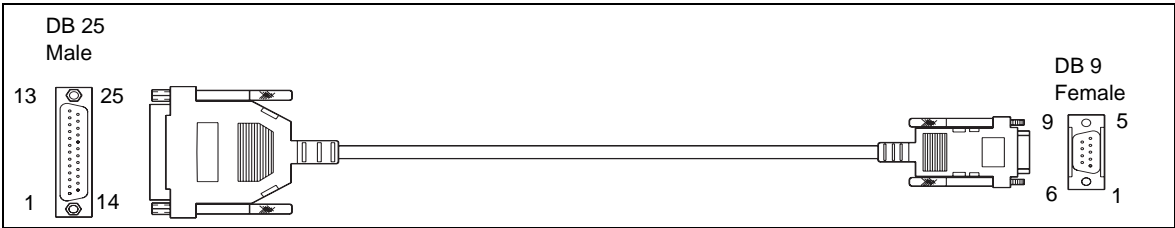
RS-232 wiring can be used for communication between the CFN SC and EIA RS-232 compatible peripheral devices (printer, modem, and so on). The remote end of the wiring can be terminated with either an RS-232D connector or a Gasboy termination box. You must follow these installation requirements when installing the CFN RS-232 communication lines:

- All peripheral equipment connected to the RS-232 ports must be listed, have an EIA standard RS-232 communication protocol and should not be installed in a hazardous location.
- **Distance:** The following distances must be adhered to when installing the RS-232 communication lines:
 - 1 - 100 feet: RS-232 can be directly connected to a peripheral device.
 - 101 - 1500 feet: An RS-422 Cable and a Gasboy SHM are required (refer to “[Short Haul Modem \(SHM\) RS-422](#)” on [page 39](#)).
- **Conduit:** All direct connect RS-232 Cables over 15 feet must be in a metal conduit away from any AC wires. For conduit requirements of SHMs, see the installation sheet that applies to the device being used.
- **Cables:** RS-232 Cables can be purchased from Gasboy. The type of cable required will vary according to the devices it connects.

Connection	Cable Type	Gasboy Part Number
Port 1, 4, 5, and 6 to modem	MiniDIN to 25DB	C05995
Port 1, 4, 5, and 6 to terminal	MindDIN to 25DB	C05994

** All electronic pumps and controls must be installed according to the manufacturer’s specifications.*

Figure 4-1: RS-232 1:1 Cable (Part Number Q13240-09 - 6-feet M/F)



RS-422

For guidelines and restrictions on RS-422 wiring, refer to “[Short Haul Modem \(SHM\) RS-422](#)” on [page 39](#).

Two-wire Current Loop

For guidelines and restrictions on the Two-wire Current Loop used for ICR2, refer to MDE-2713 Universal Distribution Box Installation manual.

System Components Wiring Diagram

Figure 4-2: System Components Wiring Diagram (Part 1 of 2)

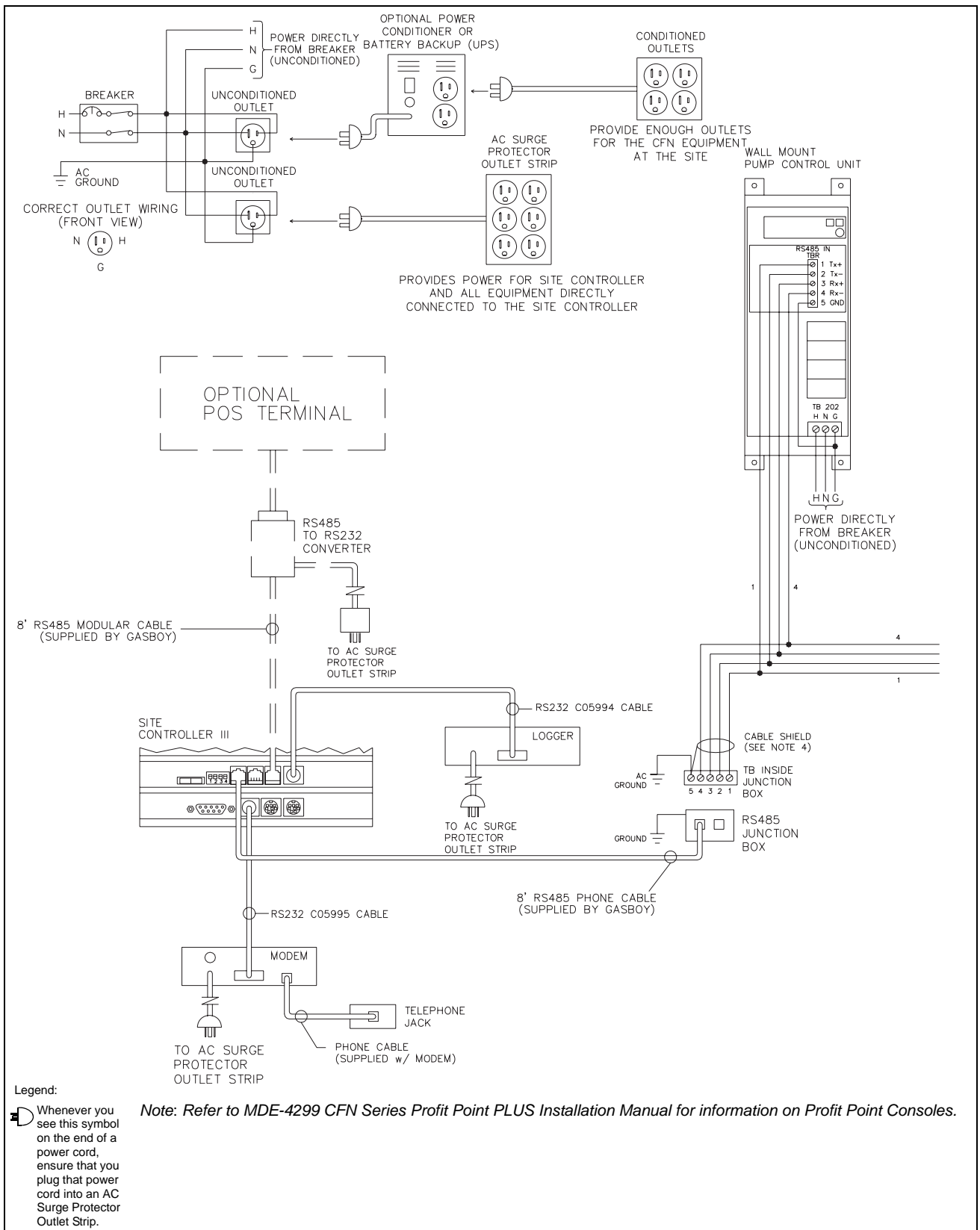
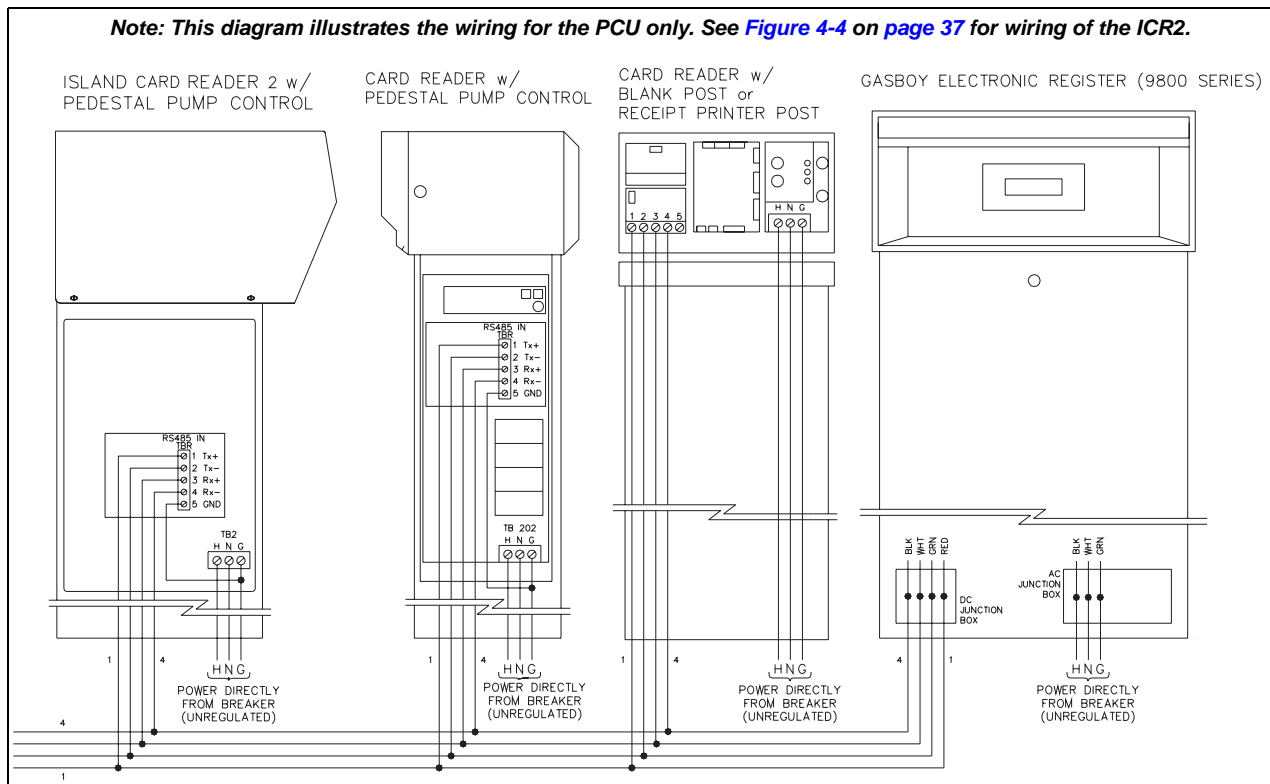


Figure 4-3: System Components Wiring Diagram (Part 2 of 2)



Notes: 1) All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must comply with the Canadian Electrical Code also. Wiring must also conform to the wiring diagram supplied with the pump/remote dispenser.

2) All peripheral equipment connected to the RS-232 ports must be UL-listed, have an EIA standard RS-232 communications protocol and not be installed in a hazardous location.

3) This wiring diagram illustrates a CFN System and its components (except monitor, keyboard, and mouse) to indicate how they are interconnected. Components that are not a part of your system should be ignored.

4) When using a shielded cable for the RS-422/RS-485 communication wiring, ground the shield to the AC ground used for the system components (on one end only).

5) Communications to an ICR2 are made through the Two-wire Current Loop. Refer to [“ICR2 Communication Wiring”](#) on [page 37](#).

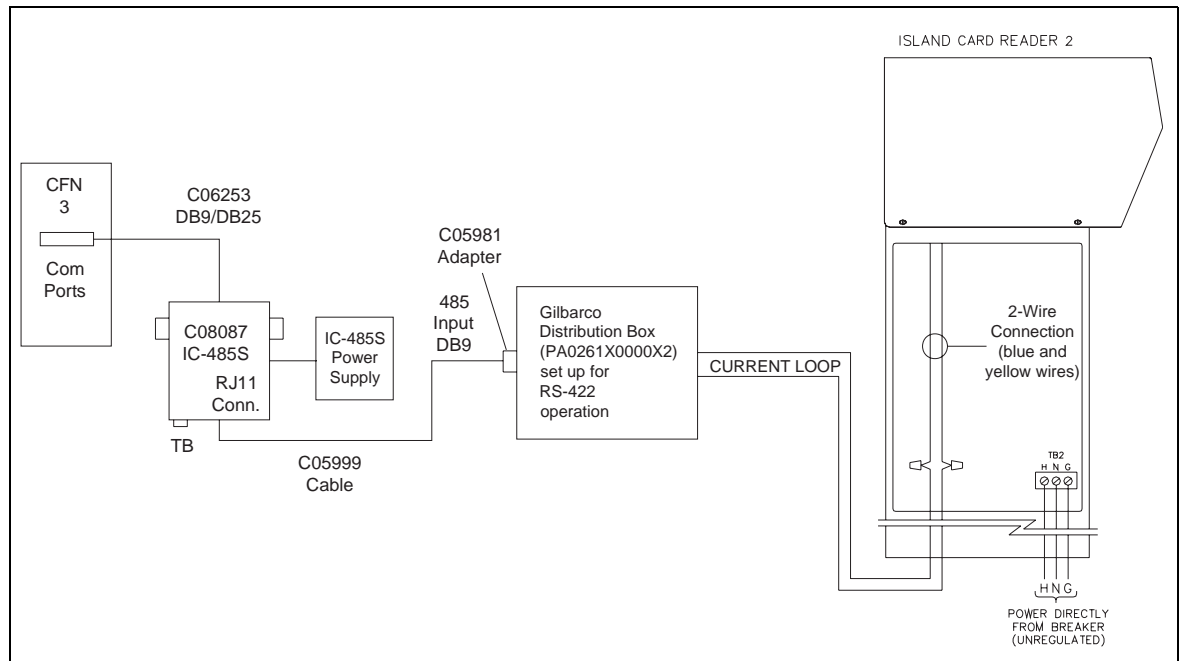
6) Refer to the applicable section of this manual for specific system installation requirements.

7) If you are connecting to:

- Tokheim Insight DPTs, refer to MDE-4559 Insight Interface Installation Guide.
- Card Reader IN Dispenser (CRIND) devices, refer to MDE-4337 CFN Series Gilbarco CRIND Interface for SC III with Windows.
- Wayne CATs, refer to MDE-4501 Wayne CAT PC Interface for Site Controller III with Windows NT.

ICR2 Communication Wiring

Figure 4-4: ICR2 Wiring



The Gilbarco Distribution Box (PA0261X0000X2) must be installed according to MDE-2713 Universal Distribution Box Installation Manual. For more information, refer to MDE-4337 CFN Series Gilbarco CRIND Interface for SC III with Windows.

If the distance between the CFN 3 and the Gilbarco Distribution Box is greater than 8 feet, the cable may be extended using an RJ-11 1:1 telephone cable or the pinout (see [Figure 4-5](#)). This pinout allows you to hard wire the DB9 connector of the D-Box to the terminal block of the converter. This installation must be done according to RS-485 guidelines (refer to “[RS-485](#)” on [page 33](#)).

Figure 4-5: Converter-to-D-Box Pinouts

CONVERTER TB POSITION		D-BOX CONNECTION
1	_____	3
2	_____	7
3	_____	6
4	_____	2

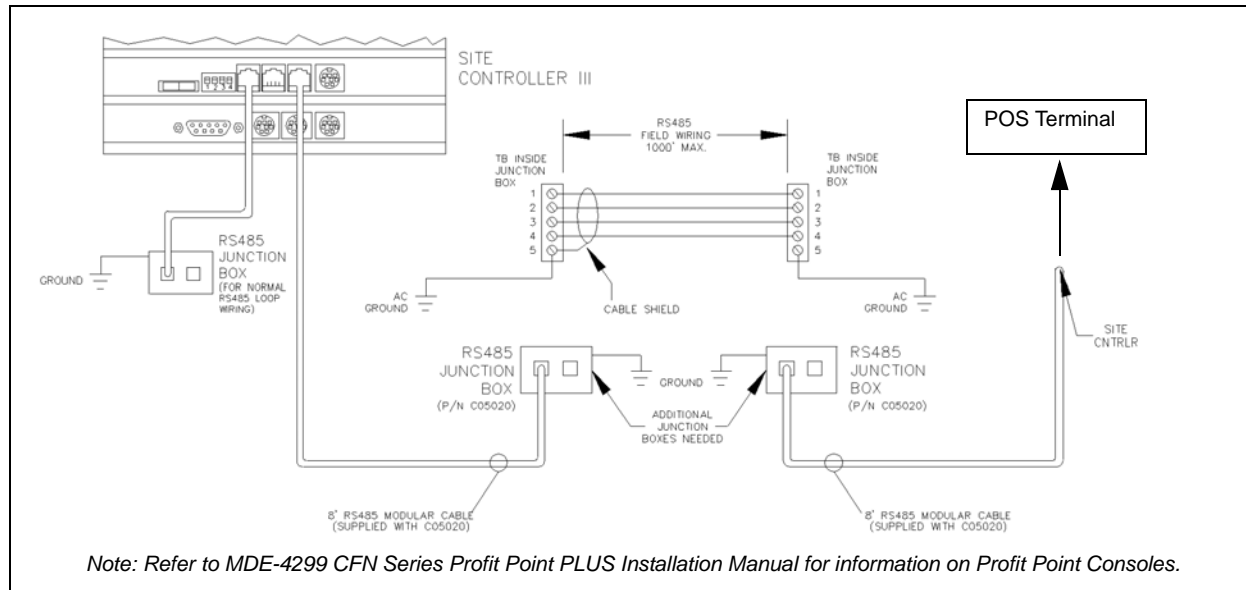
Multiple Console Wiring

Note: Refer to MDE-4299 CFN Series Profit Point PLUS Installation Manual for information on multiple Profit Point Consoles.

Remote Console Wiring

Consoles are located within 8 feet of the SC and are wired using the supplied cables. You can, however, place your console up to 1000 feet away from the SC. To do this, you must use two additional junction boxes and wire the site as shown below. All wiring must be installed according to the RS-232 and RS-485 wiring specifications.

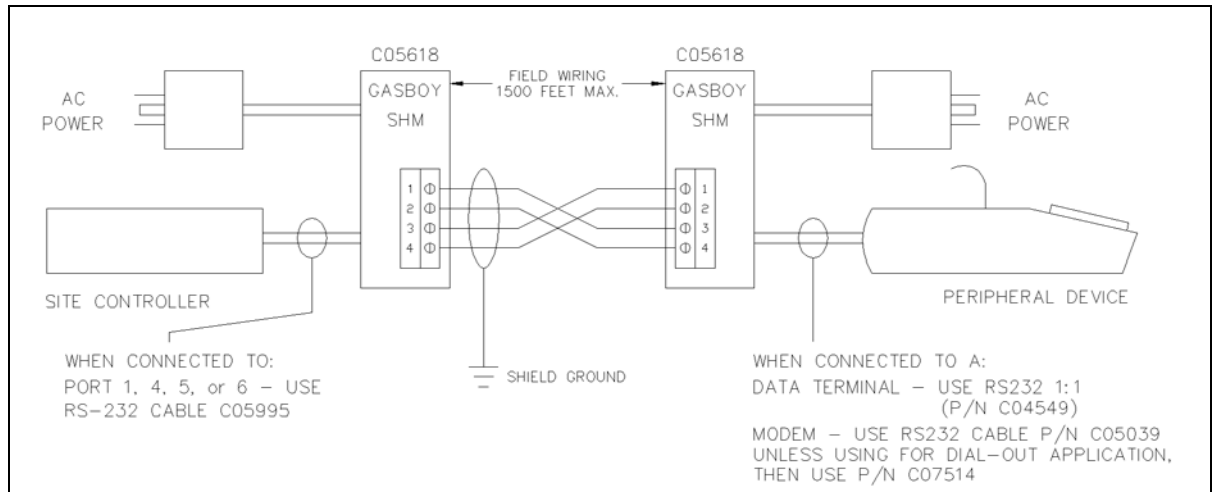
Figure 4-6: Remote Console Wiring



Short Haul Modem (SHM) RS-422

A Gasboy SHM and the appropriate interconnect cable must be used when the RS-422 communication mode is being used. It should be used for distances between 100 and 1500 feet. It can be used for distances under 100 feet in place of RS-232 wiring. One SHM is required at each end of the communication line.

Figure 4-7: SHM Connections



- All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Wiring must conform to the wiring diagram supplied with the pump/remote dispenser also. Canadian users must also comply with the Canadian Electrical Code.
- **Power:** The AC power for the SHM should come from the same breaker that supplies the peripheral device or the system.
- **Cable:** Twisted-pair shielded cable is highly recommended for RS-422 wiring. Although it is recommended that wires be run in a conduit separate from AC wires, they can be combined in the same conduit with AC wires if a UL-listed cable with the following specifications is used.

Conductor	18 AWG stranded wire; 2 twisted-pairs
Shield	Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
Drain Wire	Stranded, tinned copper, 20 AWG or larger/or braided shield
Voltage Rating	Maximum operating voltage of 600 V
Environmental	Gas and oil-resistant; suitable for wet or dry locations

Gasboy can supply Belden 1063A (Part Number C09655) which is a UL-listed, 4-conductor cable that meets the requirements listed above.

Note: Belden 1063A is UL-listed but not CSA-listed.

If a cable with a voltage rating of less than 600 V is used, it must be installed in a conduit away from all AC wires.

These modems must be connected with private lines and will not work if connected into a telephone network.

- **Conduit:** When using the recommended shielded twisted-pair cable described in “[Short Haul Modem \(SHM\) RS-422](#)” on [page 39](#), RS-422 wires can be run with AC wires in a metal conduit. The shield drain wire must be connected to the system AC ground. Only AC wires for the system and pumps can be installed in the AC conduit. Do not run the cable outdoors without the use of metal conduit. Do not run this cable overhead when outdoors.

The cable can be run indoors without the use of a metal conduit. The shield drain wire must be connected to the system AC ground.

If you are using a cable other than the one recommended previously, the RS-422 field wires must be installed in a metal conduit separate from any AC wires. This cable must also meet the other previously specified requirements.

- **Distance:** The maximum field wiring cable length must not exceed 1500 feet.

Phone Modems

The type of phone line required for remote communication using a modem depends on the type of modem used and the method of communication preferred. Consult the manual provided with the modem for specific requirements.

Wiring for a Tank Monitoring System

The following diagrams show the wiring schemes when connecting the SC to a Tank Monitoring System. All wiring must be installed according to the RS-232 and RS-485 wiring specifications described in “[Communication Requirements](#)” on [page 33](#). Consult the manufacturer’s documentation for installation instructions before connecting a tank gauge to your CFN system. For EECO monitors, use a C07476 Cable in place of the C04549 Cable.

Figure 4-8: Wiring for a Tank Monitoring System (8 feet or less)

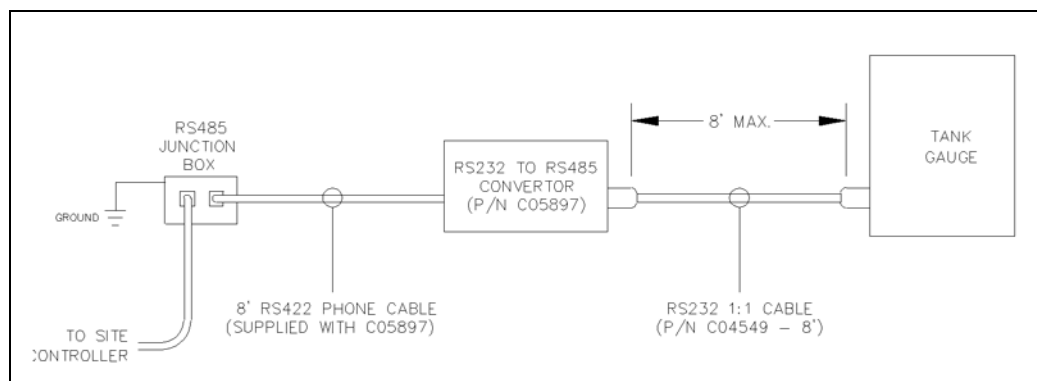


Figure 4-9: Wiring for a Tank Monitoring System (over 8 feet)

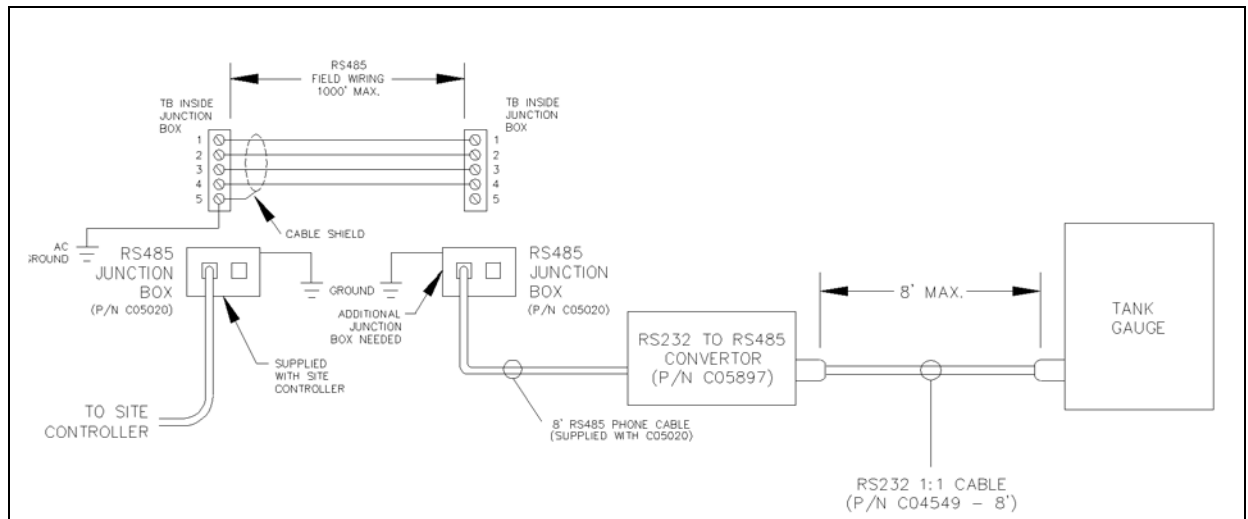
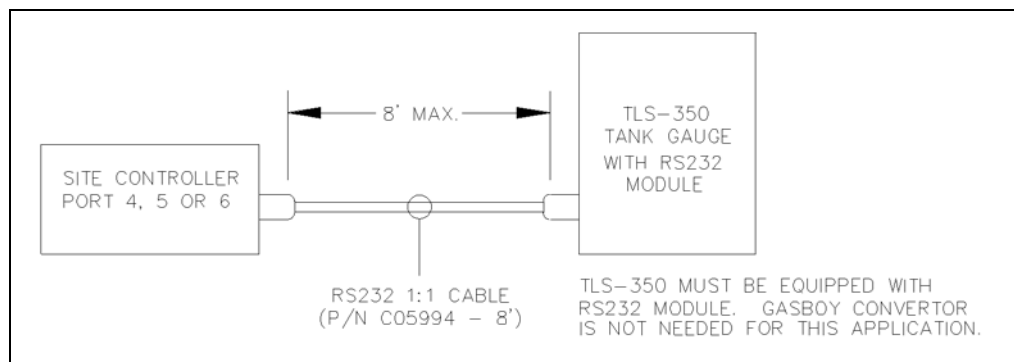


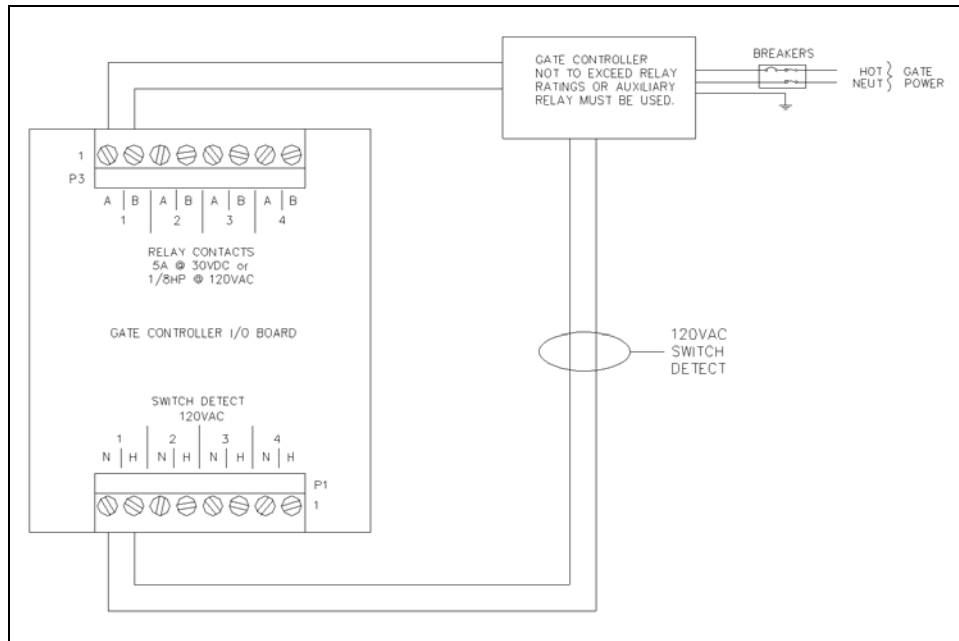
Figure 4-10: Serial Wiring for a TLS-350 with RS-232 Module



Gate Controller Wiring using Gate Reader

The CFN system can activate a gate controller by using the CFN Gate Island Reader or Gate Satellite Reader. Both the Gate Readers allow activation by card, Fuel Point, or terminal command, but not using the console or POS terminal.

Figure 4-11: CFN Gate Controller Wiring



- The CFN Gate ICR can directly switch power to a gate controller. The maximum ratings of the switched power should not exceed 5 Amp @ 30 VDC or 1/8 HP @ 120 VAC. If the gate controller switch control exceeds these ratings, an auxiliary relay must be installed to handle the load. The auxiliary relay coil should not exceed the ratings mentioned above.
- The CFN system allows a loadable timeout value up to 2 minutes during which time the relays are energized. The selected time depends on the gate controller manufacturer's specification.
- Instead of a timed closure, the system also allows relays to stay energized indefinitely until a signal returns to turn them off. The signal is 120 VAC only, and is connected to the Input/Output (I/O) Board's Switch Detect connector.

5 – Pump/Remote Dispenser Wiring

Wiring Precautions

The quality of the electrical installation is a major factor in maintaining proper safety levels and providing trouble-free operation of your Gasboy CFN System. To ensure a quality installation, follow the rules below:

- All wiring must be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station (NFPA 30A) codes and regulations. Canadian users must comply with the Canadian Electrical Code also. Wiring must also conform to the wiring diagram supplied with the pump/remote dispenser.
- Use approved conduits and insulated gasoline and oil-resistant wiring of the proper size.
- Wire connections must be tightly spliced and secured with a wire nut; close the open end of the wire nut with electrical tape.
- The line to the motor should be on a separate circuit and fused to carry 20 to 30 Amp depending on the motor size and/or the voltage setting.
- Install an emergency power cutoff switch. In addition to circuit breaker requirements of NFPA 70 and NFPA 30A, a single control which simultaneously removes AC power from all site dispensing equipment is recommended. This control must be readily accessible, clearly labeled, and in accordance with all local codes.

In a fuel management system application, the Disable Pumps and Stop keys on the console and/or the optional Disable Pumps button on the ICR do not remove AC power from the equipment and will not stop product flow under certain conditions.

In order to provide the highest level of safety to you, your employees, and customers, Gasboy recommends that all employees be aware of the location and be trained on the procedure for turning off power to the entire system.

WARNING

To reduce the risk of electrical shock when servicing, turn off all power to the pump/remote dispenser. In submersible pump applications, turn off all power to the submersible pump and any other remote dispensers that use that submersible pump. AC power can feed back into a shut-off remote dispenser when dispensers share a common submersible pump or starter relay.

AVERTISSEMENT

Pour réduire le risque de choc électrique lors de l'entretien/révision, coupez totalement le courant à la pompe/distributeur. Dans les applications de pompe immerisible, coupez totalement le courant à la pompe immerisible et tous autres distributeurs qui utilisent la pompe immerisible. Le courant alternatif peut alimenter de nouveau un distributeur à l'arrêt quand les distributeurs partagent une pompe immerisible commune ou un relais de démarrage.

Power Requirements

Electronic Pumps

All electronic register pumps/remote dispensers must be installed according to the manufacturer's instructions.

Suction Pumps

The CFN PCU is capable of directly driving pump motors up to 3/4 HP at 120/240 VAC, or 1-1/2 HP at 240 VAC. A starter relay must be used with pump motors exceeding these limitations. A separate circuit breaker should be supplied for each pump to meet the current requirements and to allow for isolated control with the circuit breaker panel in case of problems.

Remote Dispensers

The CFN PCU is capable of directly driving submersible pumps up to 3/4 HP at 120/240 VAC, or 1-1/2 HP at 240 VAC. A remote dispenser with a submersible pump exceeding these limitations requires the use of a submersible starter relay. A separate circuit breaker should be supplied for each remote dispenser in cases where it will directly drive the submersible pump. Remote dispensers may be grouped together on a single breaker when the submersible pump has its own breaker. It is recommended that no more than two remote dispensers be powered from one breaker to maintain isolated control with the circuit breaker panel in case of problems.

Gasboy 9800 Pumps/Remote Dispensers

Gasboy 9800 Series pumps and remote dispensers do not use the CFN PCU. They are wired as standalone units. Refer to MDE-4331 Atlas Installation Manual, for wiring diagrams and instructions.

Wire Size

The table below lists the required AC wire size for suction and submersible pumps based on the HP rating of the pump motor and the distance from the circuit breaker to the pump/remote dispenser for both 120 and 240 V units. Use this table as a guide for selecting the proper size wire for your installation. All wiring should be stranded.

The wire size for the switch detect from the pump should be 14 AWG. The wire size for control lines of a remote dispenser should be 12 AWG. These control lines are used to supply power for the reset mechanism, solenoid valve, and submersible starter relay (when the submersible pump is not directly powered by the remote dispenser). The wire size for DC pulsers should be 18 AWG and must meet the wiring requirements outlined in [“Pulser Wiring and Configuration”](#) on [page 53](#).

120 Volt Wire Gauge Sizes per Feet of Run (see Note)

Motor H.P.	25'	50'	100'	150'	200'	250'	300'
1/4	14	14	12	10	10	8	8
1/3	14	14	12	10	8	8	8
1/2	14	12	10	8	8	8	8
3/4	14	12	10	8	8	6	4

Note: For run over 300 feet, use relay at motor location.

240 Volt Wire Gauge Sizes per Feet of Run (see Note)

Motor H.P.	25'	50'	100'	150'	200'	250'	300'
1/4	14	14	14	12	12	12	12
1/3	14	14	12	12	12	12	12
1/2	14	12	12	12	10	10	10
3/4	14	12	12	10	10	10	8
1-1/2	12	12	10	10	8	8	8

Note: For run over 300 feet, use relay at motor location.

Wiring Electronic or Mechanical Pumps

The remainder of this section shows wiring schematics for electronic and mechanical pumps. All electronic and mechanical pumps must be installed according to the manufacturer's instructions. Depending on the type of electronic pump to which you are connecting, you may require additional information. Contact Gasboy Technical Service for information on various pump interfaces.

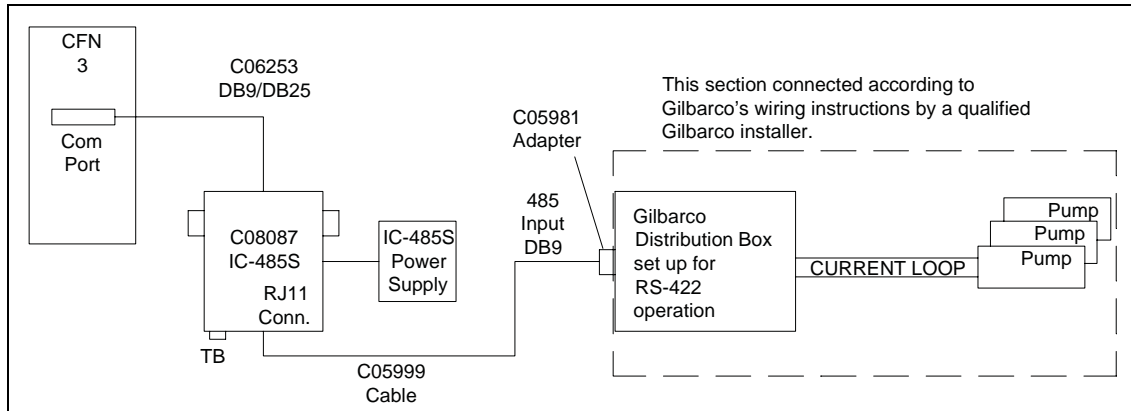
Fleet Mechanical PCU

The fleet mechanical PCU does not contain the hardware for controlling fast flow valves. It cannot handle auxiliary switch detects for console systems.

Gilbarco Pump PC Interface

See [Figure 5-1](#) to establish an interface between the SC III and Gilbarco pumps/dispensers.

Figure 5-1: Gilbarco Pumps/Dispensers Electronic Interface



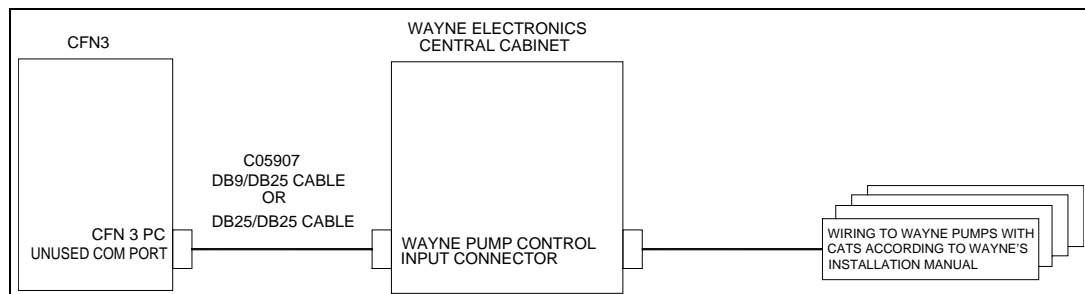
Note: Refer to MDE-4634 CFN Series Gilbarco Pump PC Interface for information on connecting the Atlas 8800 to a CFN SC III.

Wayne Pump PC Interface

See [Figure 5-2](#) to establish an interface between the SC III and Wayne pumps.

Use a PC DB9 to DB25 Cable (Gasboy Part Number C05907) to connect the selected PC comm port of the SC III to the male DB25 Connector of the Wayne Electronics Central Cabinet.

Figure 5-2: Wayne Pumps Electronic Interface



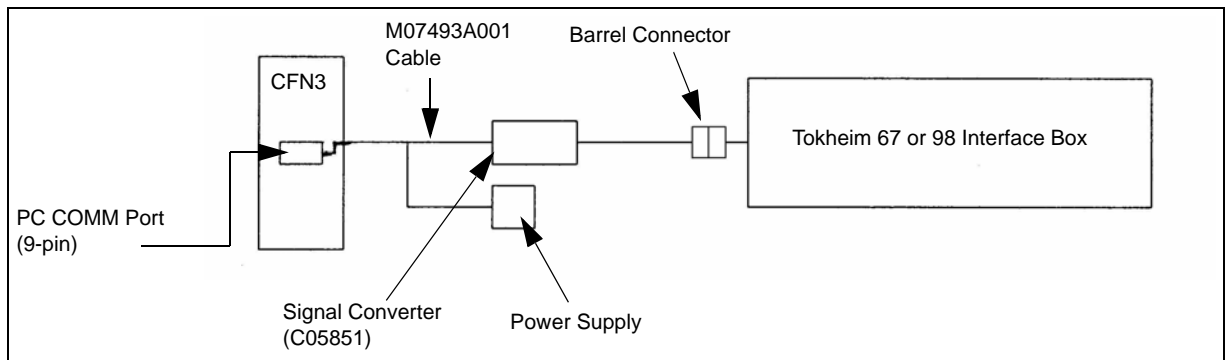
Note: Use DB9-DB25 Cable if needed. Else, remove the DB9-DB25 Cable and use the DB25-DB25 Cable.

Tokheim Pump PC Interface

See [Figure 5-3](#) and [Figure 5-4](#) to establish an interface between the SCIII and Tokheim pumps/dispensers.

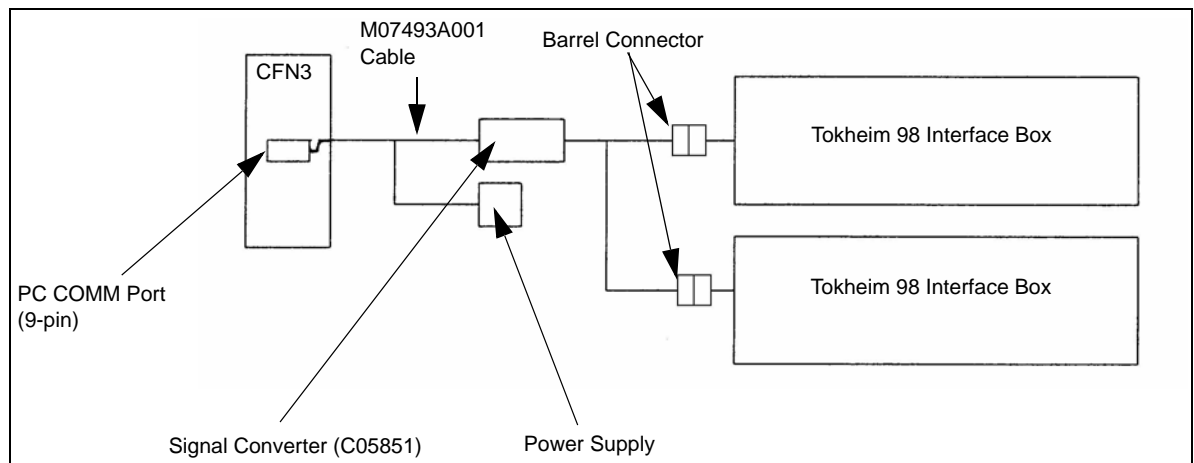
Use the C05578 CFN to Tokheim 67/98 D-Box Cable Assembly and see [Figure 5-3](#) to connect the selected PC COMM port of the SC III to a single Tokheim 67 or 98 Interface Box. If there are more than 16 dispensers connected through two Tokheim 67 boxes, another COMM port on the PC must be used and the wiring connections must be duplicated as shown in [Figure 5-3](#).

Figure 5-3: Tokheim Pumps Electronic Interface: One Tokheim 67 or 98 Interface Box



Use the C05577 CFN to Tokheim 98 D-Box Cable Assembly and see [Figure 5-4](#) to connect the selected PC COMM port of the SC III to two Tokheim 98 Interface Boxes.

Figure 5-4: Tokheim Pumps Electronic Interface: Two Tokheim 98 Interface Boxes



If there are more than two Tokheim 98 Interface Boxes, the site will be required to use another COMM port on the SC III PC and the connections must be duplicated as shown in [Figure 5-4](#), depending on whether there are three or four Tokheim 98 Interface Boxes.

Refer to the manufacturer's instructions to connect Tokheim 67 or 98 Interface Boxes to the Tokheim pumps/dispensers.

Terminal Block ID

All mechanical pump/remote dispenser wiring for the CFN System is terminated in the PCU. Terminal connectors should be used on the stranded wire when connecting to the pump power and power input terminal blocks of the system. Connections made to the smaller screw terminal blocks (Pump Control I/O Printed Circuit Board (PCB) Assembly) do not require terminal connectors. The wire to these connectors must not be larger than 14 AWG. The orientation of the chassis assembly is shown in [Figure 5-5](#) and [Figure 5-6](#) on [page 49](#).

Figure 5-5: Pedestal or Wall-mount PCU - Terminal Block ID

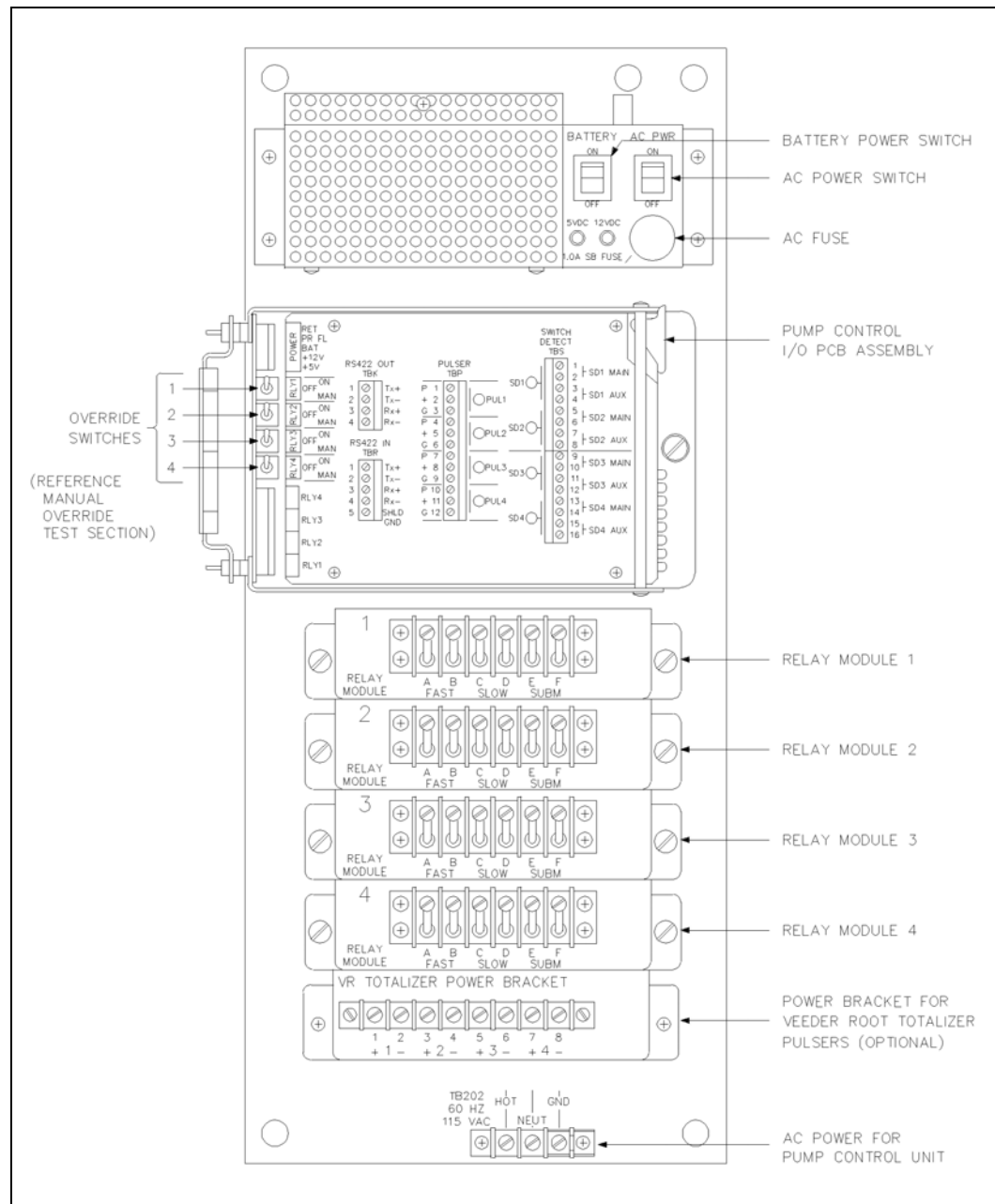
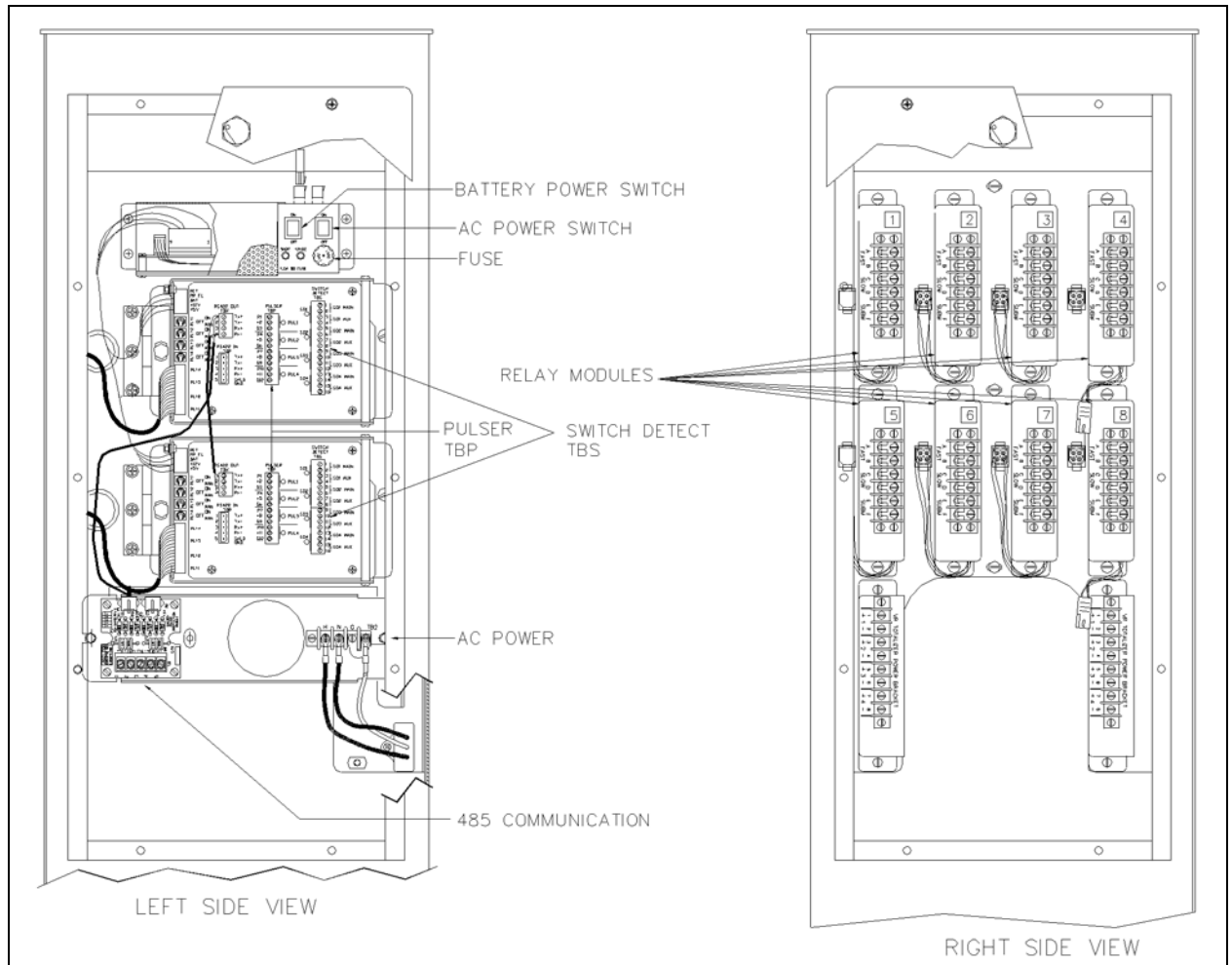
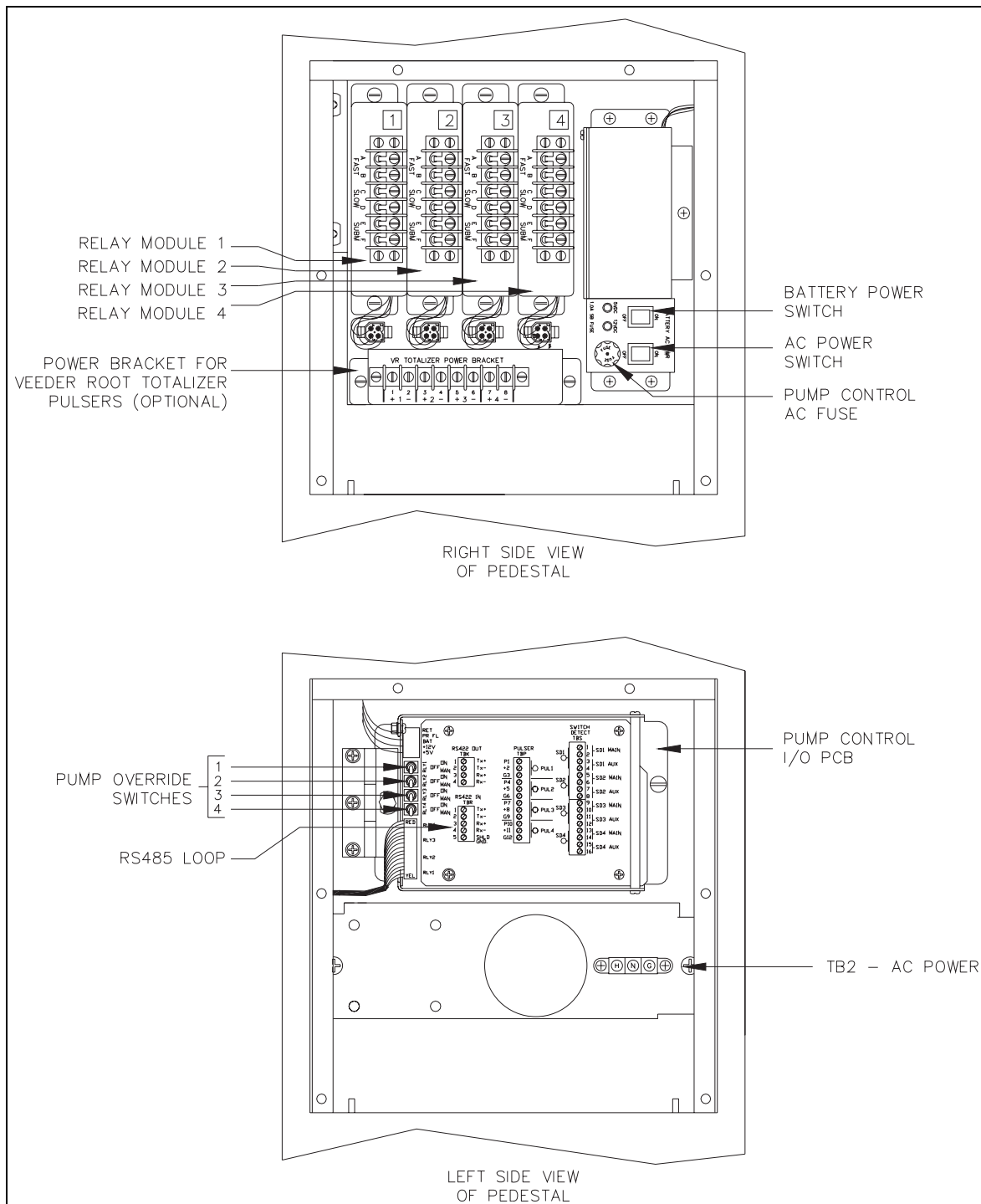


Figure 5-6: Island-mounted Standalone PCU - Terminal Block ID



ICR2 Pedestal PCU

Figure 5-7: ICR2 Pedestal PCU



Control Lines

Descriptions of control lines are provided to familiarize the installer with control inputs and outputs that are used to control a mechanical pump/remote dispenser. It is recommended that the installer read these descriptions to obtain a better working knowledge of the system, to plan the site wiring.

Grounding

To ensure proper operation of the equipment and provide the necessary safety factors, the unit must be grounded. A ground wire (preferably green) must be connected between the unit's AC junction box ground lug and the main electrical service panel. One earth ground connection is required per unit. A ground rod must be installed at the main electrical panel in accordance with the National Electrical Code. This ground rod must be a solid, corrosion-resistant conductor. It should be properly tied into the ground bus strip of the panel. It is recommended that the neutral and ground bus strips be bonded together (unless prohibited by local codes).

Reset Motor Feed

Reset Motor Feed is a 120 VAC input that is supplied through the pump handle switch to activate the reset motor. This line should be switched through the CFN System and only be on when the pump/remote dispenser is authorized or in the manual mode. Without power supplied to this line, the pump/remote dispenser will not reset when the pump handle is turned on. Two feed lines are provided for twins. This feed is also connected to the input of one of the internal switches of the electric reset. When the reset finishes its cycle, the 120 VAC input to the switch should be passed through as an output, which causes the solenoid valve (optional in some models) to open and the Reset Complete line to indicate 120 VAC.

Note: This line is also used to sense the closing of the pump handle for console operation. A low current 120 VAC is supplied through this line in order to sense the condition of the handle. This low current voltage is not capable of driving the reset motor or operating a solenoid valve.

Pump Motor Feed

Pump Motor Feed is a 120 VAC input that is supplied to the input side of one of the internal switches of the electric reset. This line should be switched through the CFN System and should only be turned on when the pump/remote dispenser is authorized or in the manual mode. When the reset finishes its cycle, the 120 VAC input to the switch is passed through as an output causing the pump motor to receive power and begin running. Without power to this line, the unit will reset. However, it will not be able to fuel. Two feed lines are provided in twins which contain two motors. The gauge of this wire (and its neutral wire) should be determined according to the size of the motor, the voltage at which the motor will be powered (120 VAC or 240 VAC), and the distance from the breaker panel to the pump. It is possible to combine the pump motor feeds for twins and supply them from one breaker. However, the gauge of the wire must be adjusted to handle the load of two motors.

Note: 240 VAC is developed across a motor when the other leg of the motor is connected to a Phase 2 Feed.

Neutral Feed

Neutral Feed is the AC current return line back to the breaker panel for all attached devices (pump motor, reset motor, solenoid valves). The gauge of this wire must be equal to that of the Pump Motor Feed (suction pumps) or Submersible Feed (remote dispensers).

Submersible Feed, Submersible Drive

Submersible Feed is a 120 VAC input that is supplied to the input side of one of the internal switches of the electric reset. This line should be switched through the CFN System and only be on when the pump/remote dispenser is authorized or in the manual mode. When the reset finishes its cycle, the 120 VAC input to the switch is passed through as an output (submersible drive) to drive a starter relay, or to directly drive a submersible motor up to 3/4 HP at 120/240 VAC or 1-1/2 HP at 240 VAC. Any submersible motor exceeding these limitations must use a starter relay.

Note: 240 VAC is developed across a motor when the other leg of the motor is connected to a Phase 2 Feed.

Reset Complete (Switch Detect)/Slow Flow

Reset Complete is a 120 VAC output that is used to indicate that the reset is complete and the pump/remote dispenser is ready to dispense the product. Two lines are provided for twins. This line should only be used when monitoring of the pump/remote dispenser is desired (such as with a fuel management system). This line must be capped when not in use. This line is connected to the slow flow stage of the solenoid in the pump.

Fast Flow

Fast Flow is a 120 VAC input that controls the fast flow valve of the pump/remote dispenser (when a slow/fast flow valve is available). If slow/fast flow control is not desired, this line should be tied to the Reset Complete/slow flow line. This line should be switched through the CFN System and be on only if the pump/remote dispenser is authorized and the pump/remote dispenser is in the fast flow mode. This line will also be turned on when the pump/remote dispenser is in the manual mode.

Light Feed

Light Feed is a 120 VAC input required to power optional fluorescent lights that may be available in a pump/remote dispenser. In a site configuration using multiple remote dispensers (or pumps), the power for lights of up to 8 units can be supplied by one breaker. The light feed is not controlled by the CFN System.

Light Neutral

Light Neutral is a return line for AC current from lights to the breaker panel.

Phase 2 Feed

Phase 2 Feed is a hot feed that is the opposite phase of the pump motor feed. This line and the pump motor feed are used for 240 VAC motor applications.

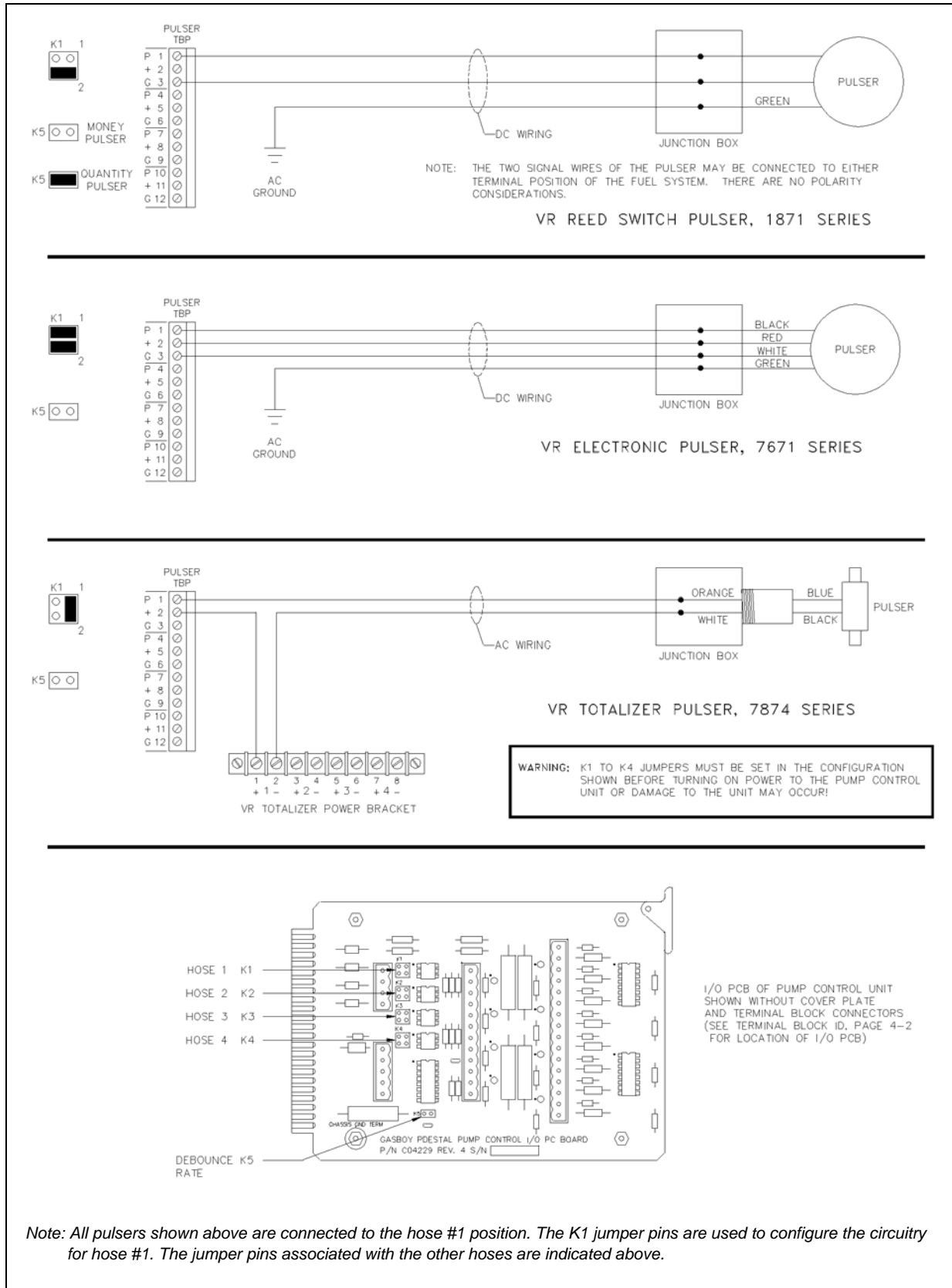
Pulser

Pulser supplies a DC output that is provided to indicate the quantity dispensed. This line must be capped when not in use. DC pulser and DC RS-422 and RS-485 communication wires can be combined in the same conduit. DC wires must be in a separate metal conduit away from AC wires, except as noted in [“Short Haul Modem \(SHM\) RS-422”](#) on [page 39](#), and [“Pulser Wiring and Configuration”](#).

Pulser Wiring and Configuration

For pulser wiring diagrams, see [Figure 5-8](#) on [page 54](#). Pulser wiring requirements are described in [“Pulser Wiring Requirements”](#) on [page 55](#).

Figure 5-8: Pulser Wiring and Configuration Diagrams



Pulser Wiring Requirements

18 AWG wires are required for the installation of a pulser in a separate DC conduit. Although it is recommended that DC pulser wires be run in a conduit away from AC wires, they can be combined in the same conduit with AC wires if a UL-listed cable with the following specifications is used:

Conductor	18 AWG stranded wire. Number of conductors to be determined by the pulser.
Shield	Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
Drain Wire	Stranded, tinned copper, 20 AWG or larger/or braided shield
Voltage Rating	Maximum operating voltage of 600 V
Environmental	Gas and oil-resistant; suitable for wet or dry locations

Gasboy can supply Belden 1063A (Part Number C09655) which is a UL-listed, 4-conductor cable that meets the requirements listed above.

Note: Belden 1063A is UL-listed but not CSA-listed.

Wiring Diagrams

This section contains the following wiring diagrams.

- [Figure 5-9: Single Suction Pump, VR Reset on page 56](#)
- [Figure 5-10: Twin Suction Pump, VR Reset on page 57](#)
- [Figure 5-11: Twin Suction Pump, Single Motor, VR Reset on page 58](#)
- [Figure 5-12: Single Remote Dispenser, VR Reset on page 59](#)
- [Figure 5-13: Twin Remote Dispenser, VR Reset on page 60](#)
- [Figure 5-14: Single Suction Pump, Console, VR Reset on page 61](#)
- [Figure 5-15: Twin Suction Pump, Console, VR Reset on page 62](#)
- [Figure 5-16: Twin Suction Pump, Single Motor, Console, VR Reset on page 63](#)
- [Figure 5-17: Single Remote Dispenser, Console, VR Reset on page 64](#)
- [Figure 5-18: Twin Remote Dispenser, Console, VR Reset on page 65](#)
- [Figure 5-19: Single Suction Pump, Gasboy Reset on page 66](#)
- [Figure 5-20: Twin Suction Pump, Gasboy Reset on page 67](#)
- [Figure 5-21: Twin Suction Pump, Single Motor, Gasboy Reset on page 68](#)
- [Figure 5-22: Single Remote Dispenser, Gasboy Reset on page 69](#)
- [Figure 5-23: Twin Remote Dispenser, Gasboy Reset on page 70](#)
- [Figure 5-24: Single Suction Pump, Console, Gasboy Reset on page 71](#)
- [Figure 5-25: Twin Suction Pump, Console, Gasboy Reset on page 72](#)
- [Figure 5-26: Twin Suction Pump, Single Motor, Console, Gasboy Reset on page 73](#)
- [Figure 5-27: Single Remote Dispenser, Console, Gasboy Reset on page 74](#)
- [Figure 5-28: Twin Remote Dispenser, Console, Gasboy Reset on page 75](#)

Figure 5-9: Single Suction Pump, VR Reset

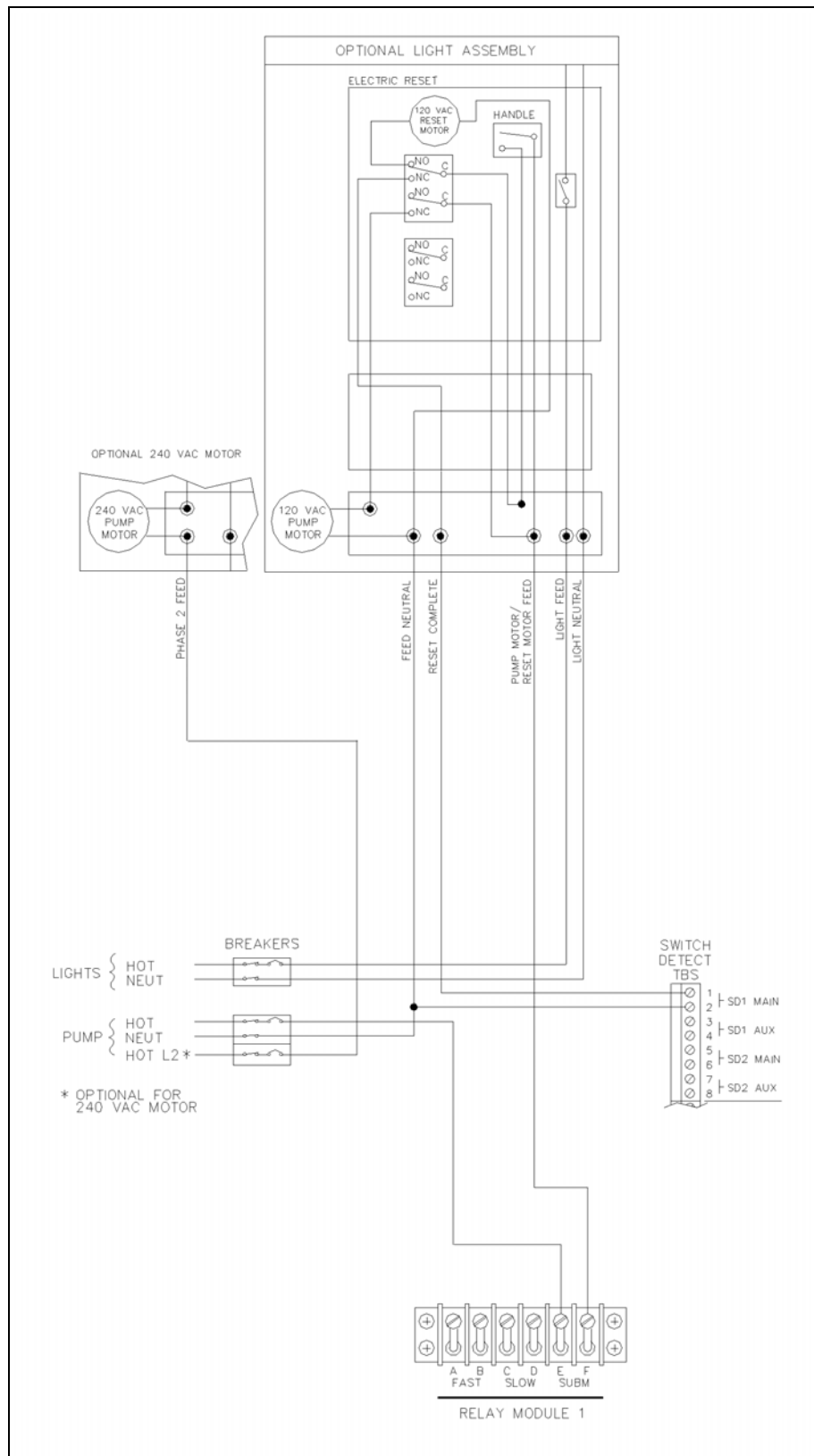


Figure 5-10: Twin Suction Pump, VR Reset

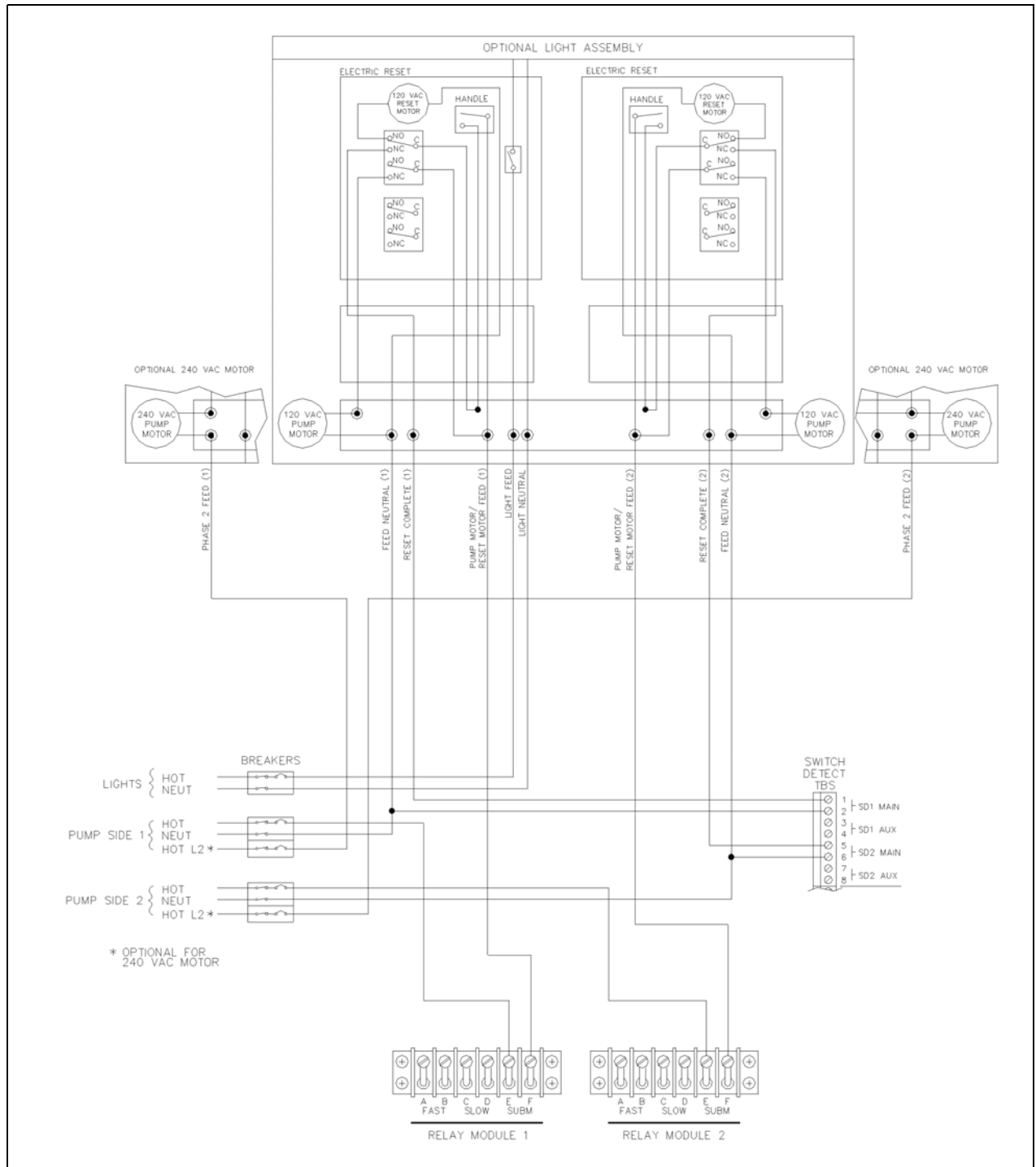


Figure 5-11: Twin Suction Pump, Single Motor, VR Reset

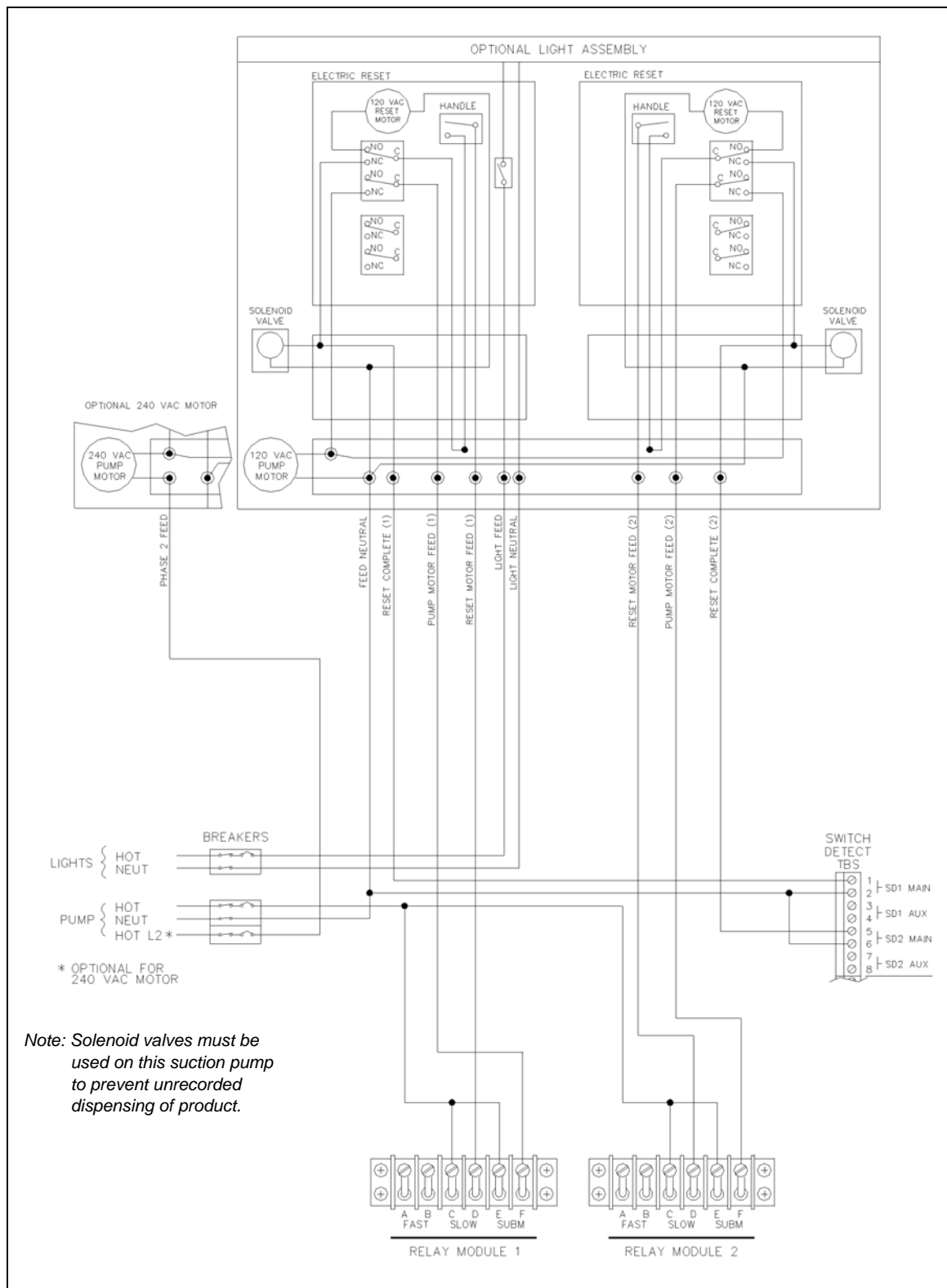


Figure 5-12: Single Remote Dispenser, VR Reset

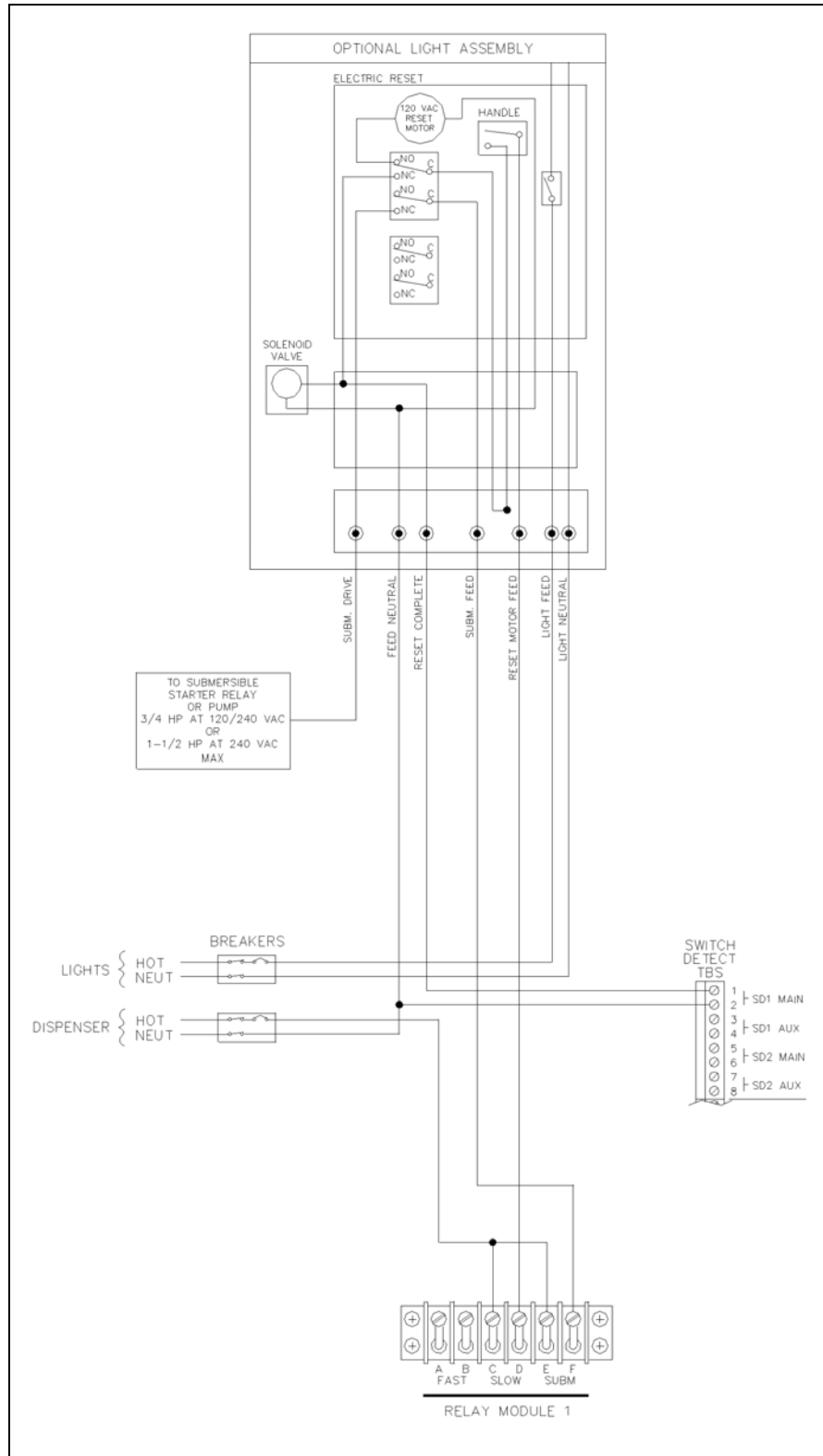


Figure 5-13: Twin Remote Dispenser, VR Reset

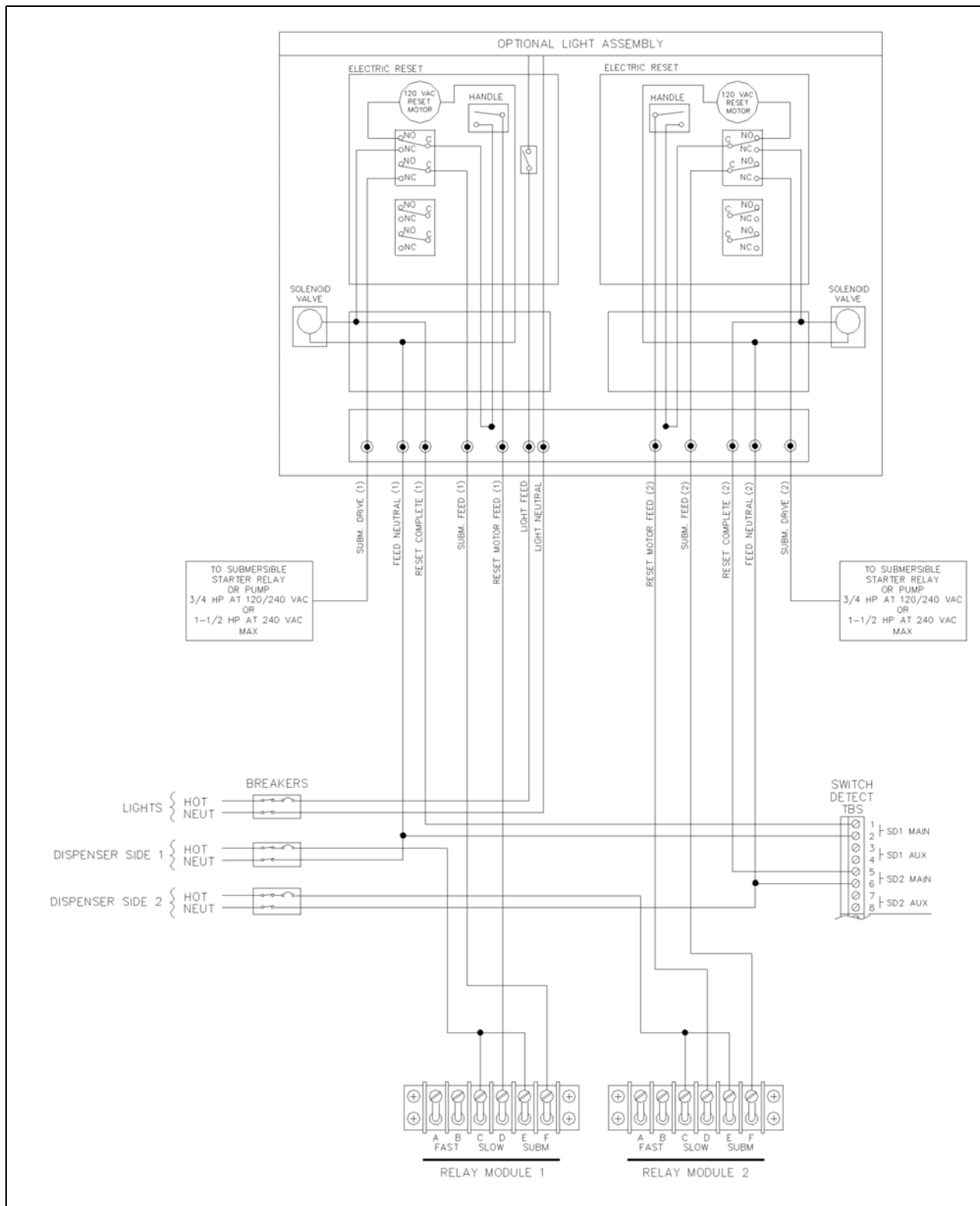


Figure 5-14: Single Suction Pump, Console, VR Reset

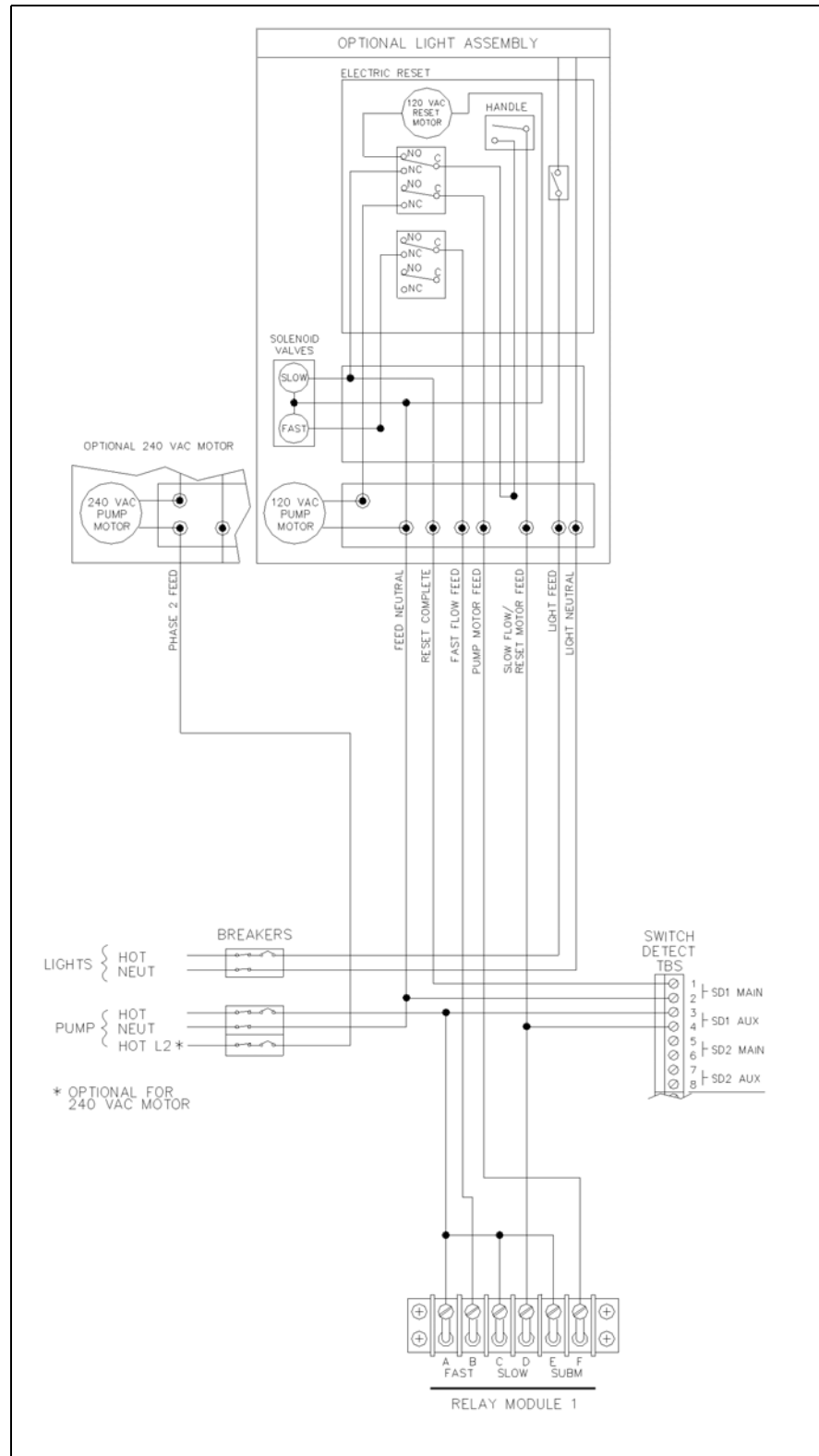


Figure 5-15: Twin Suction Pump, Console, VR Reset

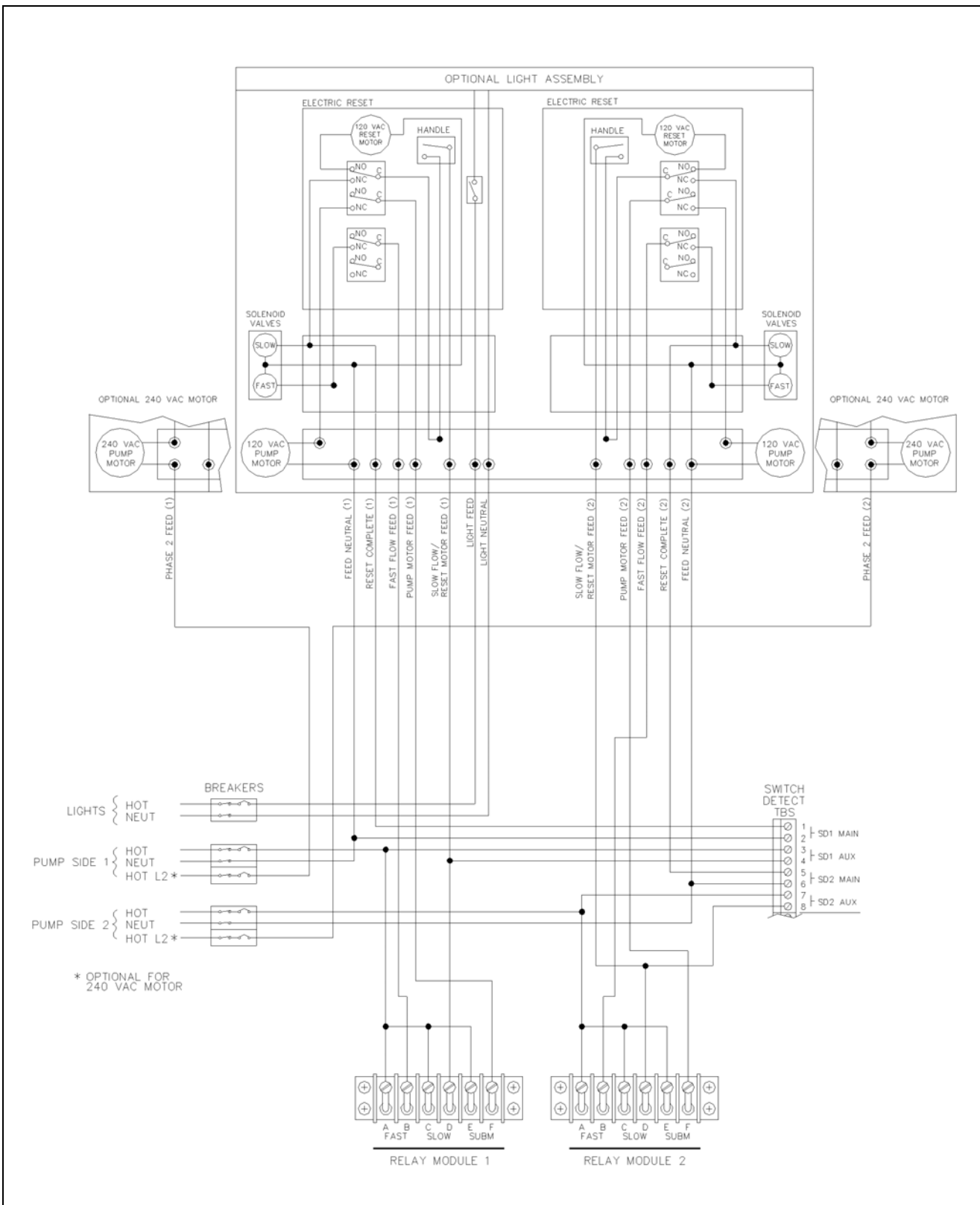


Figure 5-16: Twin Suction Pump, Single Motor, Console, VR Reset

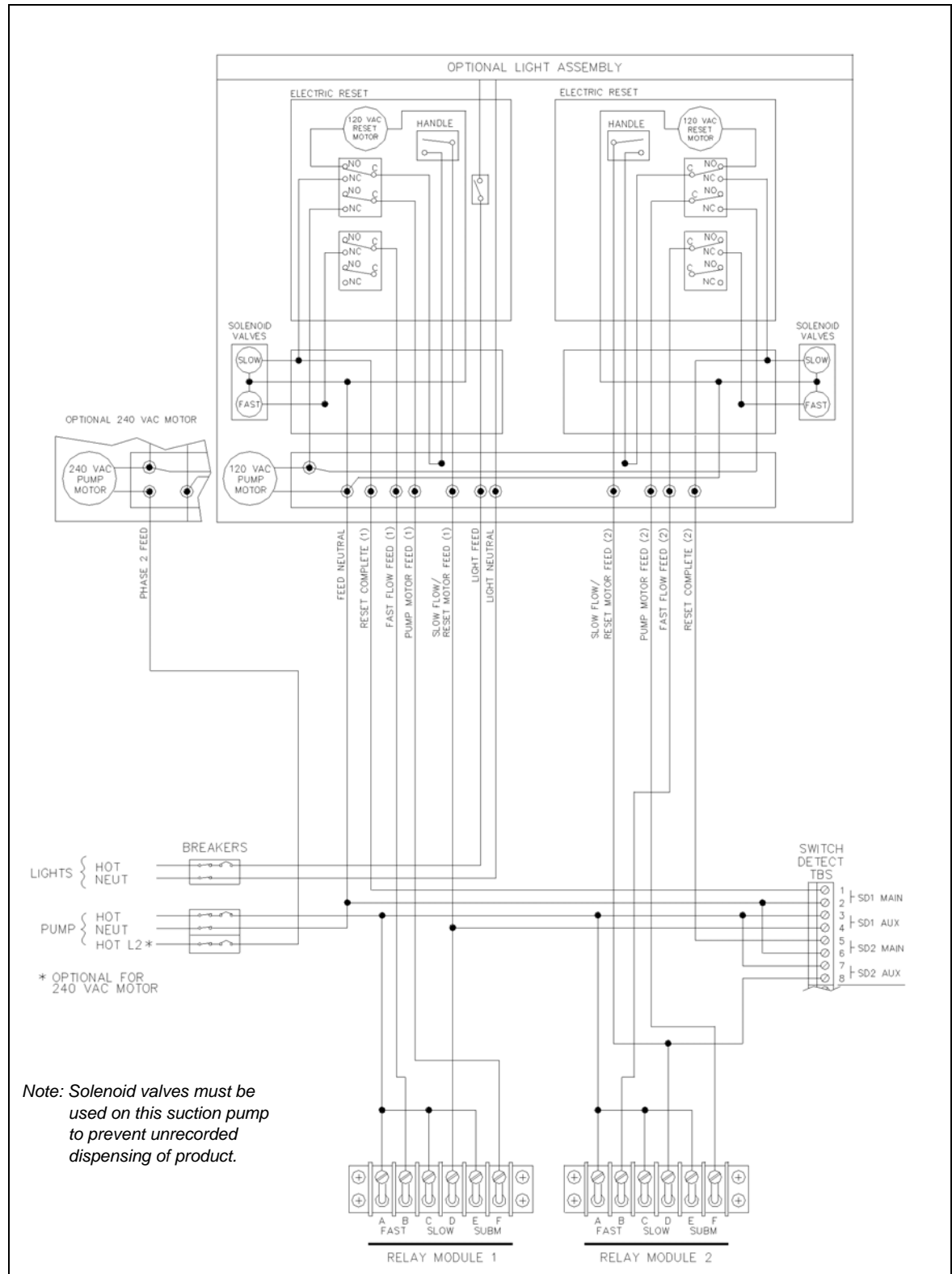


Figure 5-17: Single Remote Dispenser, Console, VR Reset

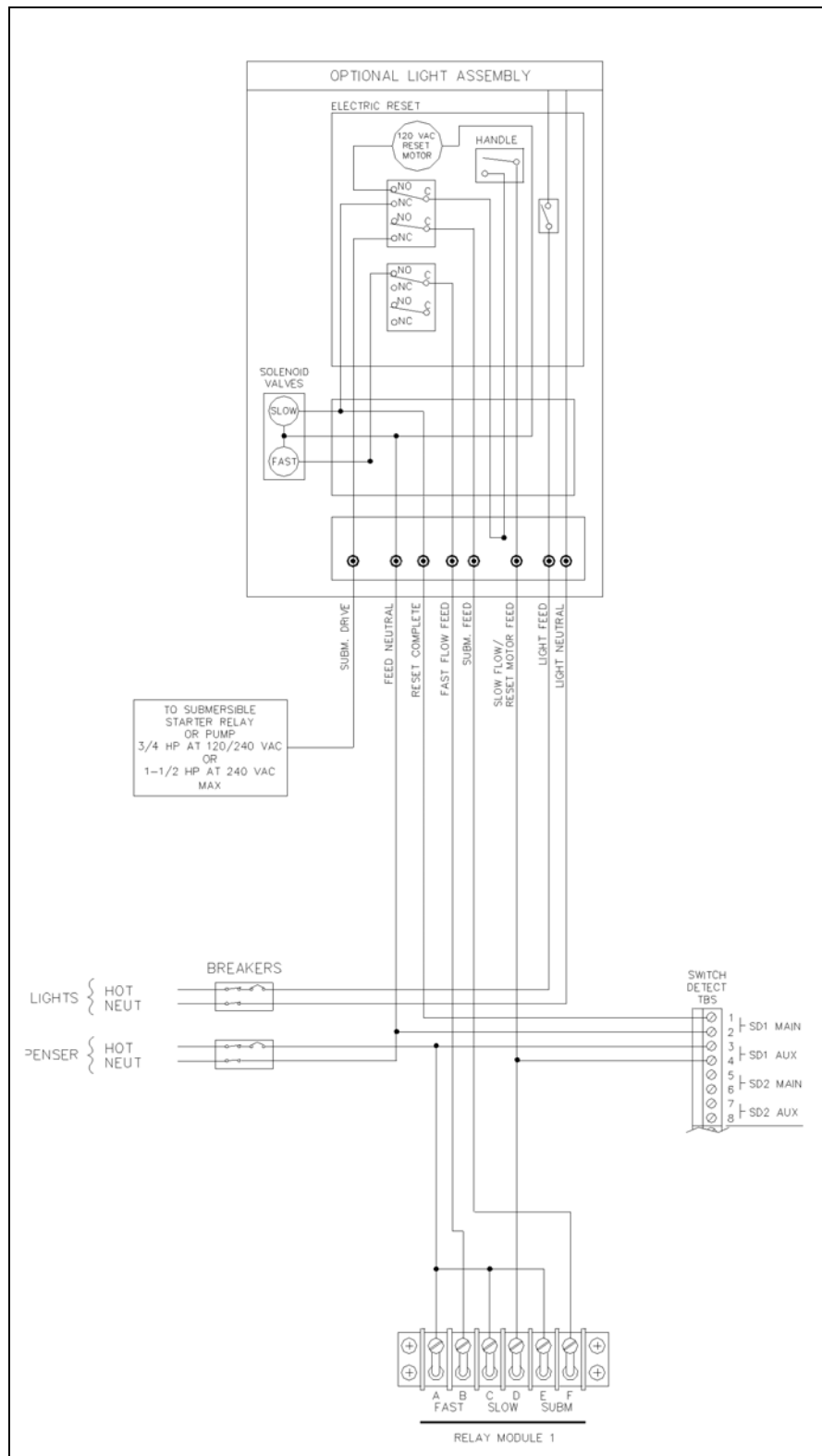


Figure 5-18: Twin Remote Dispenser, Console, VR Reset

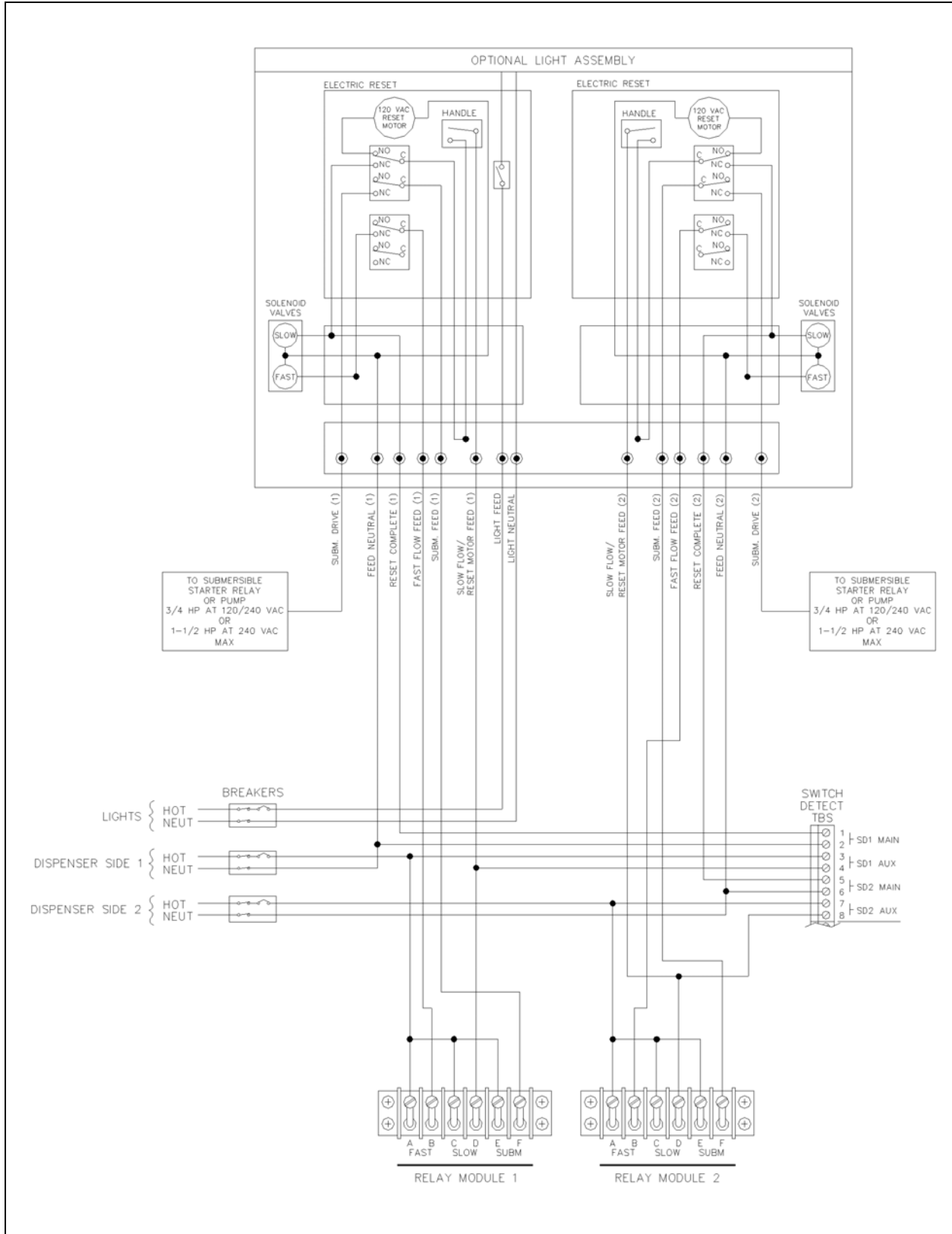


Figure 5-19: Single Suction Pump, Gasboy Reset

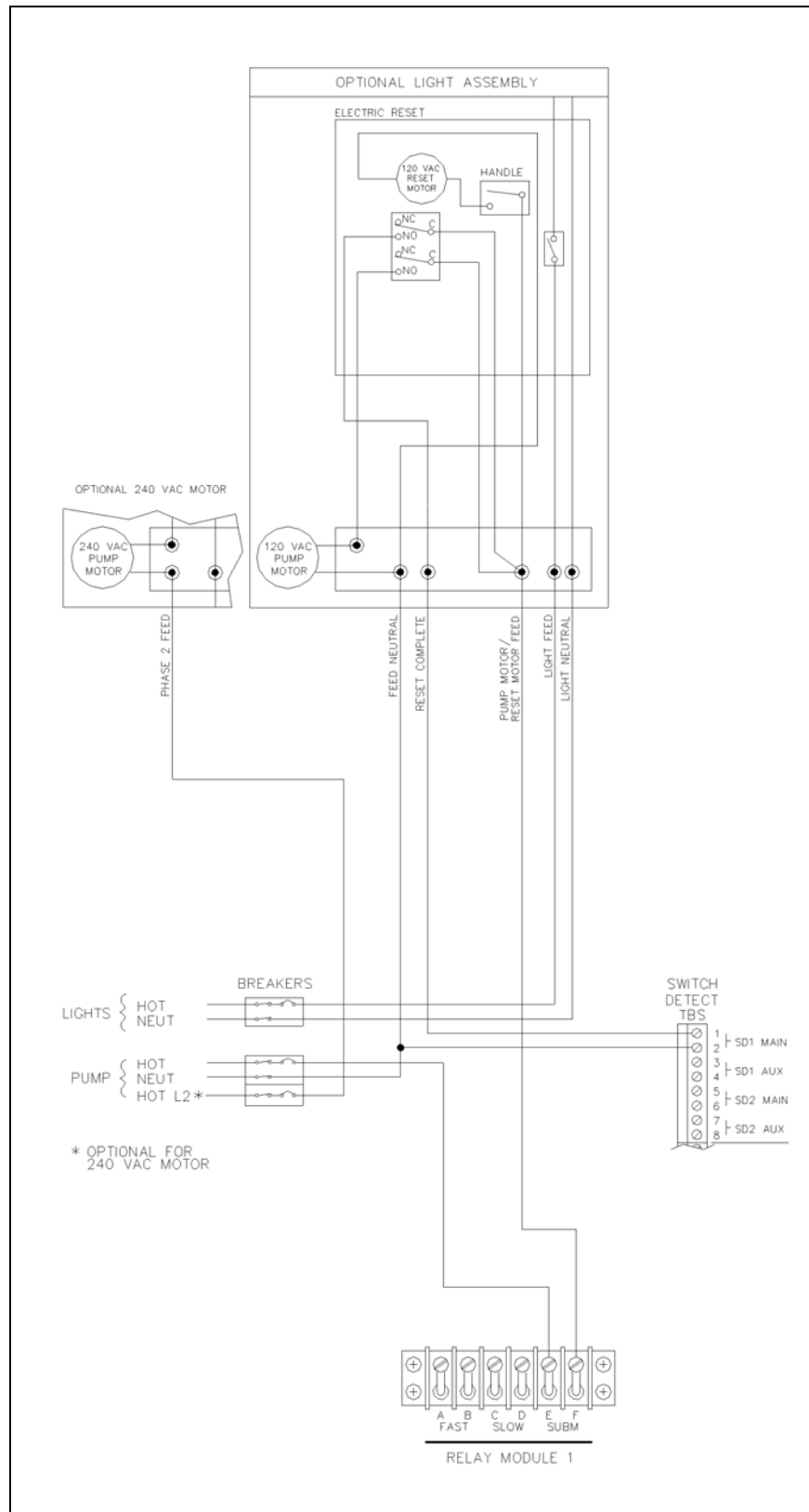


Figure 5-20: Twin Suction Pump, Gasboy Reset

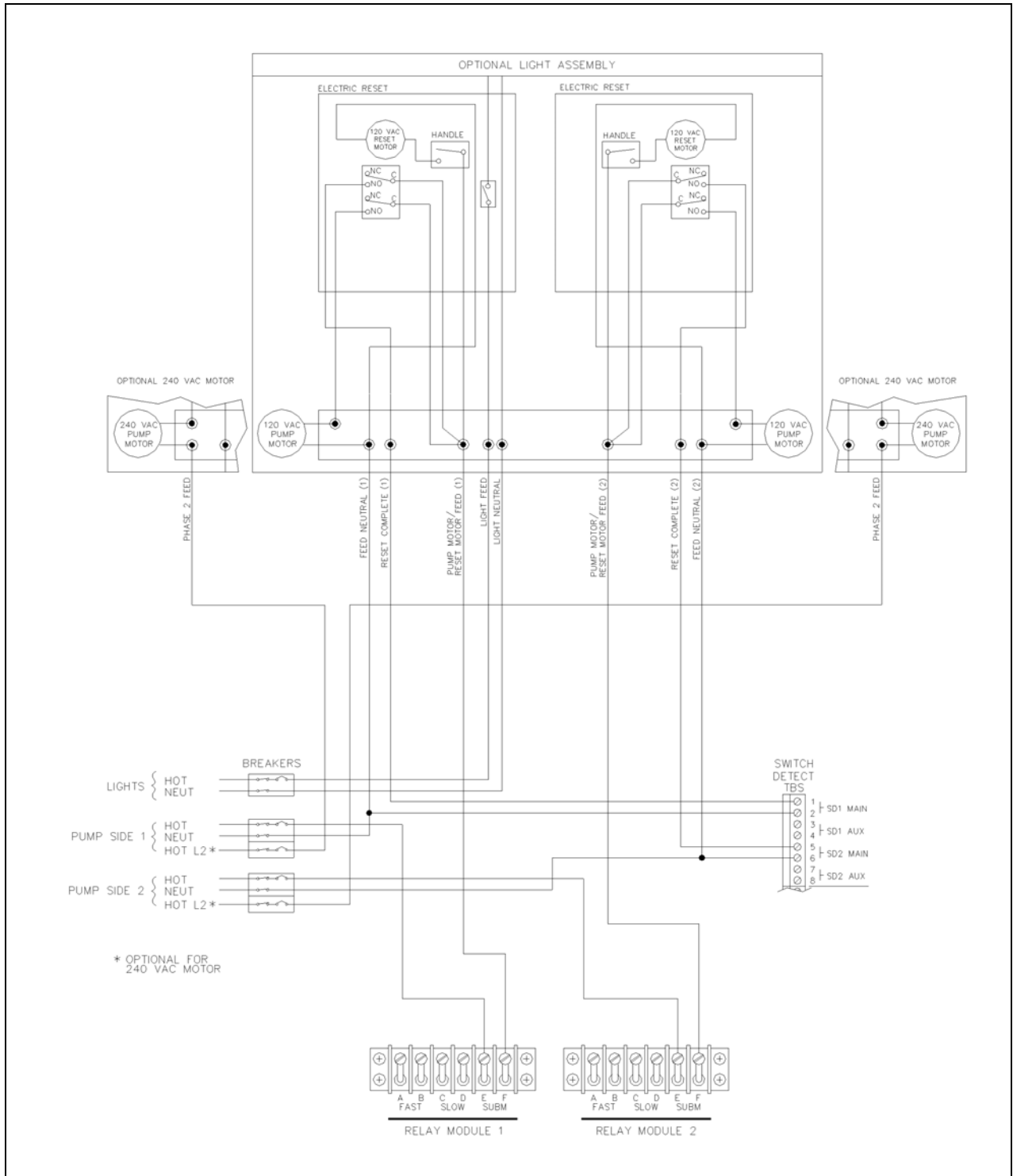


Figure 5-21: Twin Suction Pump, Single Motor, Gasboy Reset

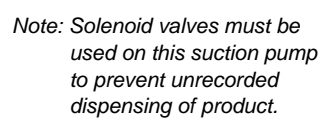


Figure 5-22: Single Remote Dispenser, Gasboy Reset

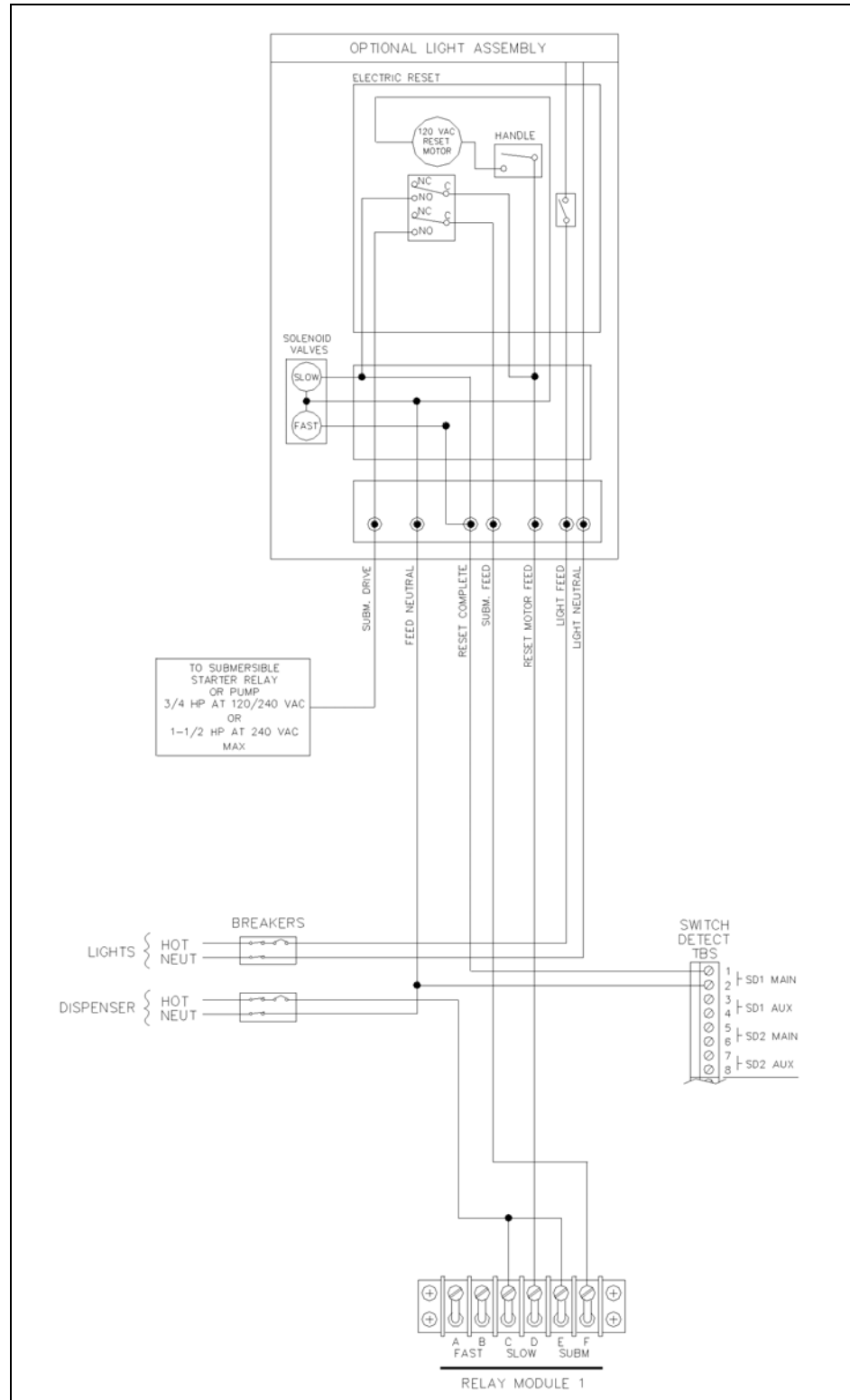


Figure 5-23: Twin Remote Dispenser, Gasboy Reset

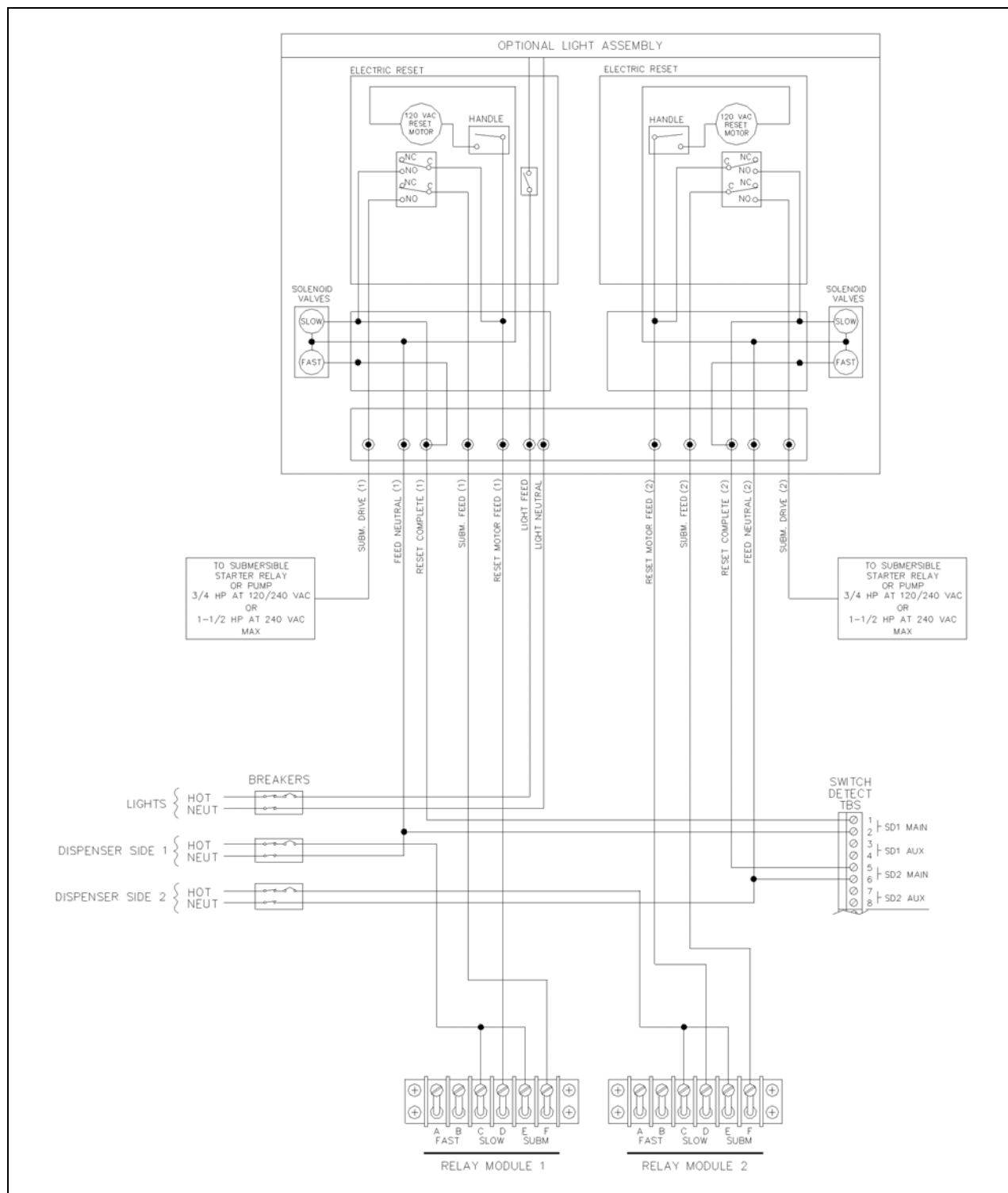


Figure 5-24: Single Suction Pump, Console, Gasboy Reset

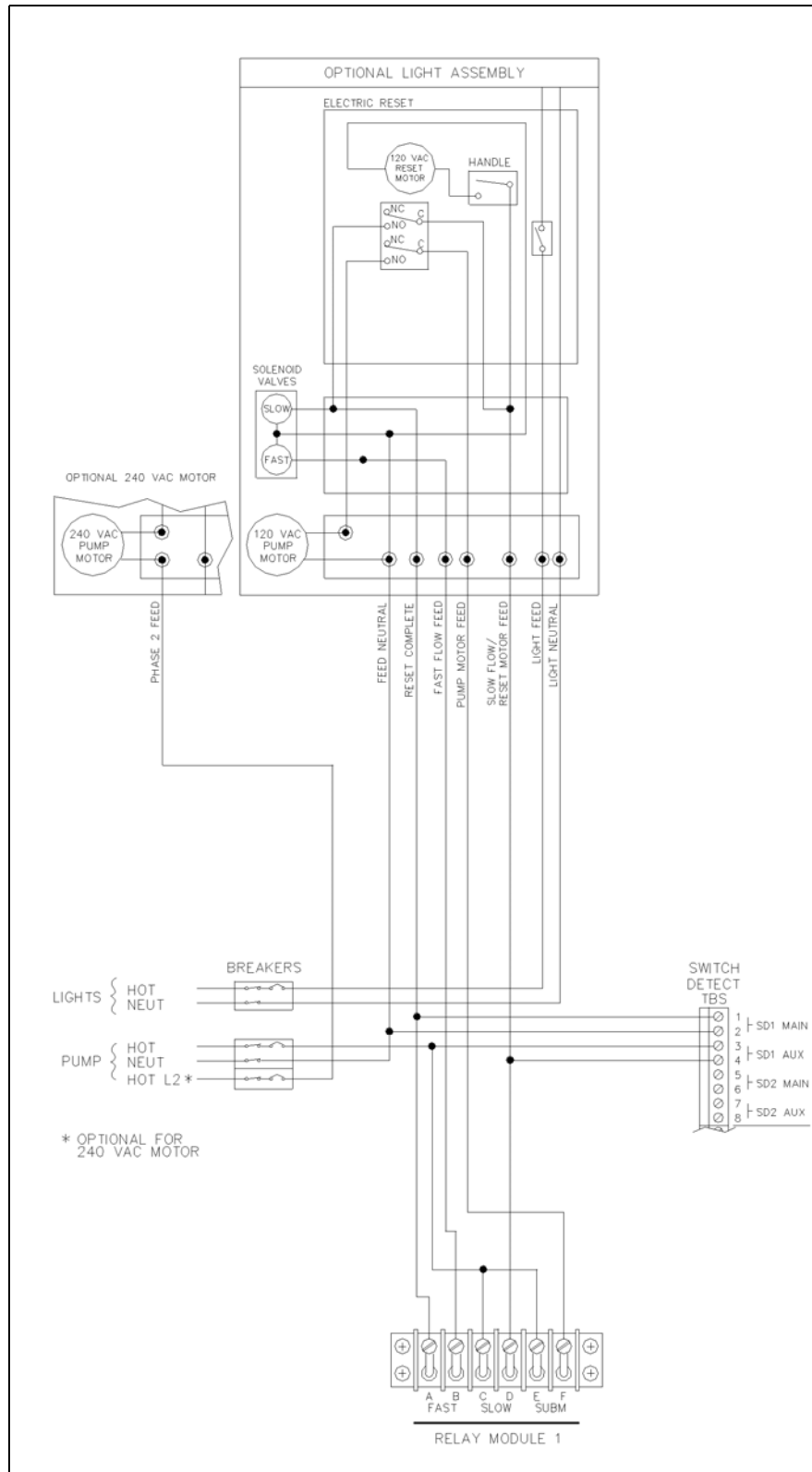


Figure 5-25: Twin Suction Pump, Console, Gasboy Reset

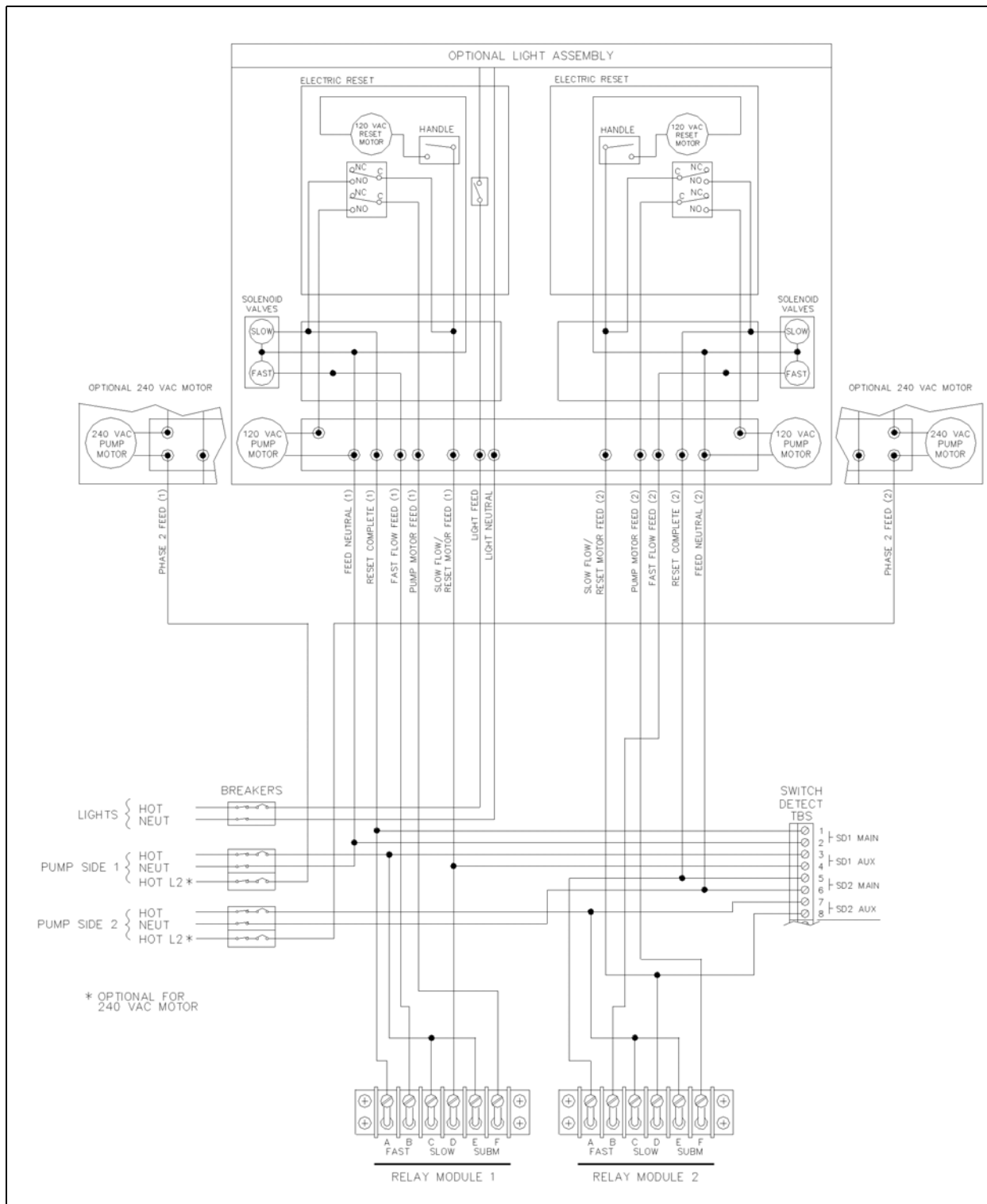


Figure 5-26: Twin Suction Pump, Single Motor, Console, Gasboy Reset

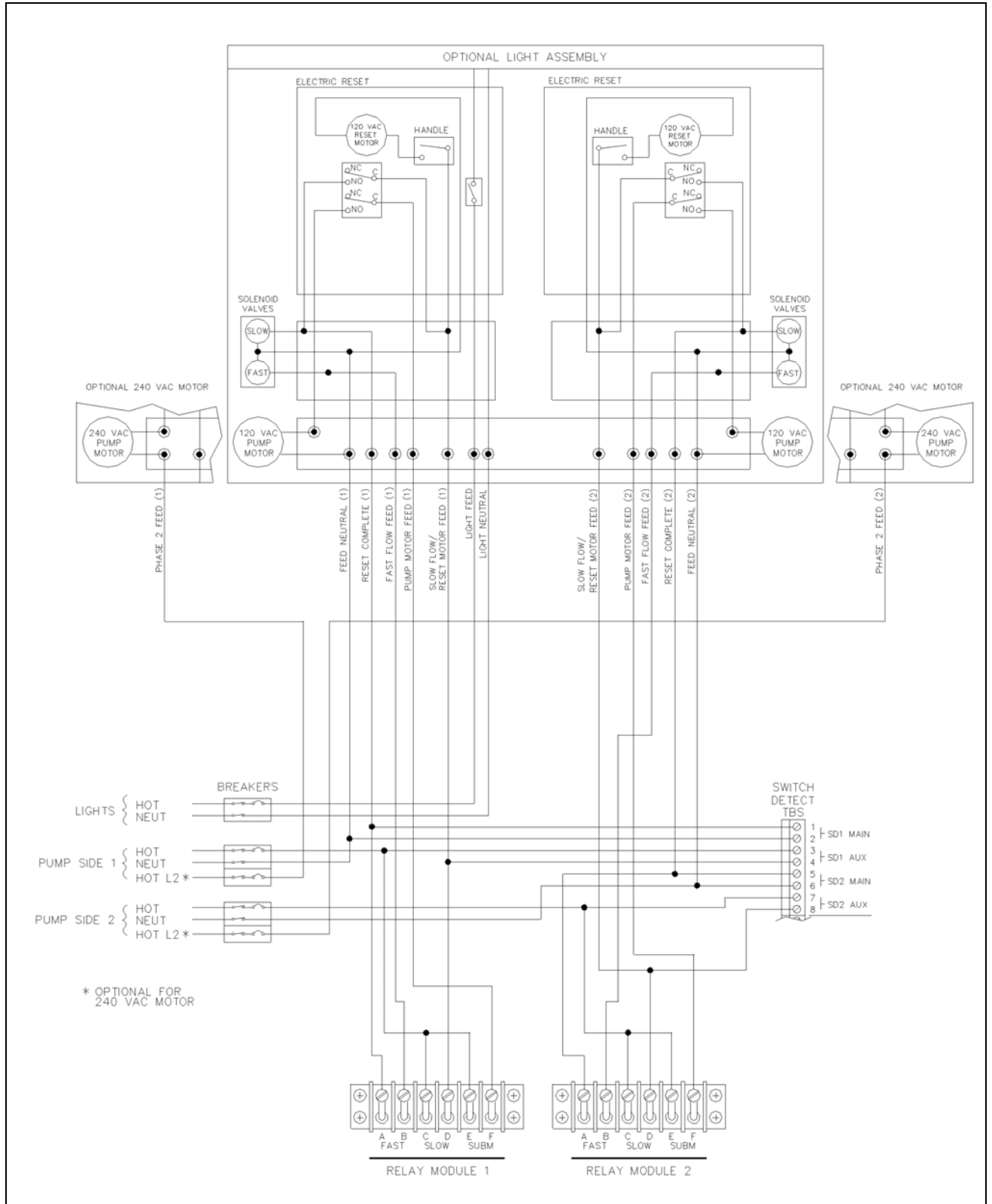


Figure 5-27: Single Remote Dispenser, Console, Gasboy Reset

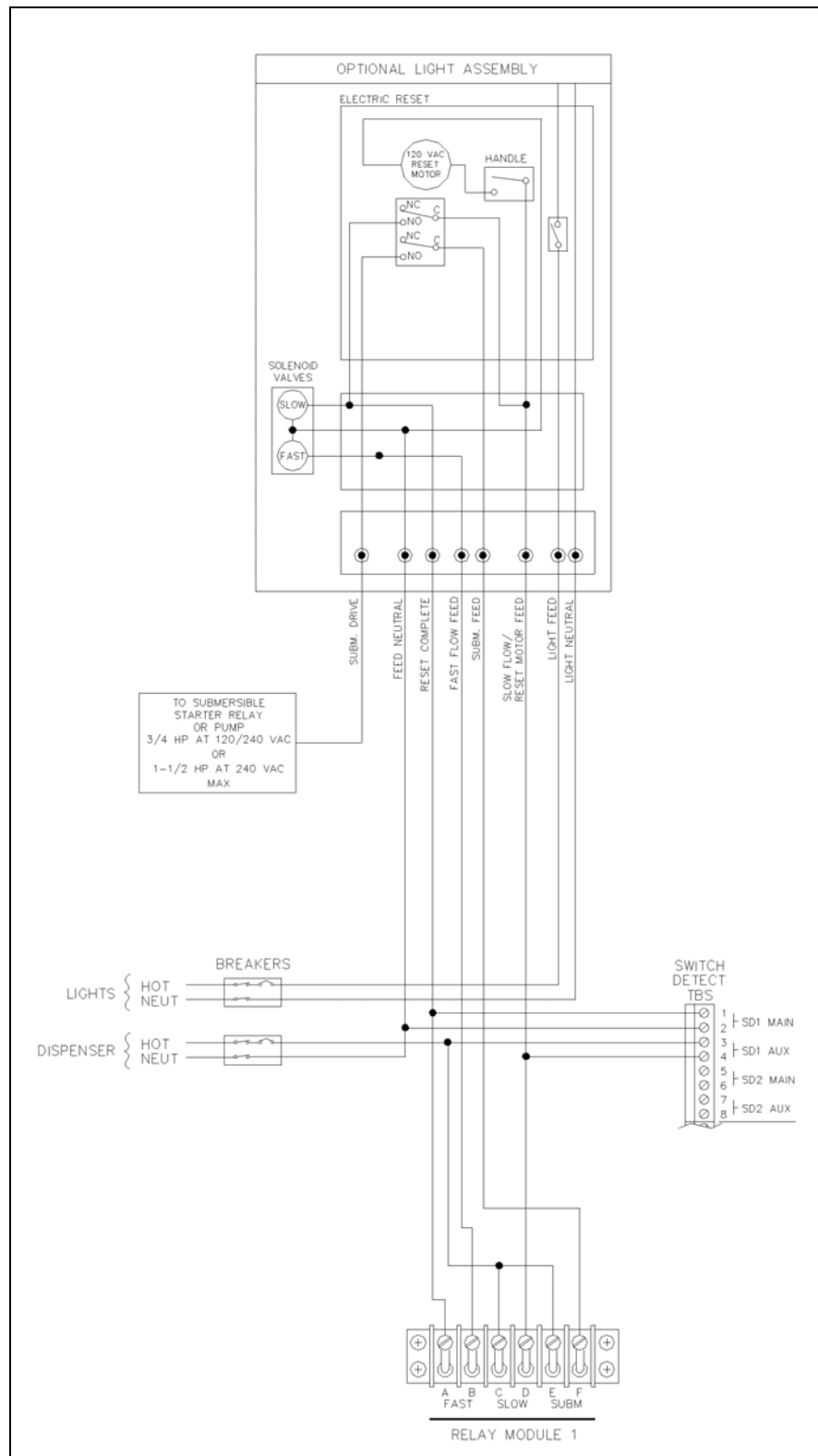
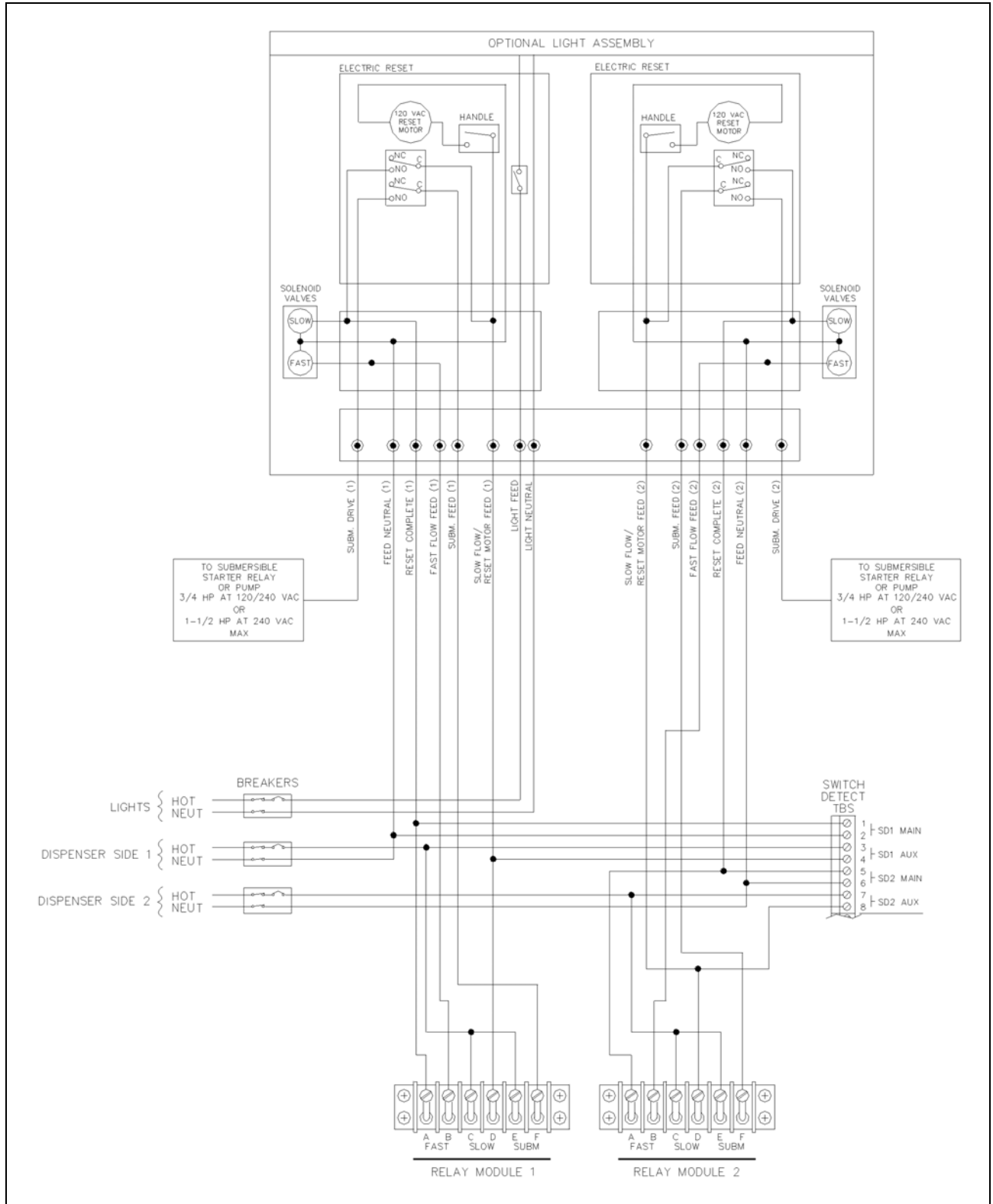


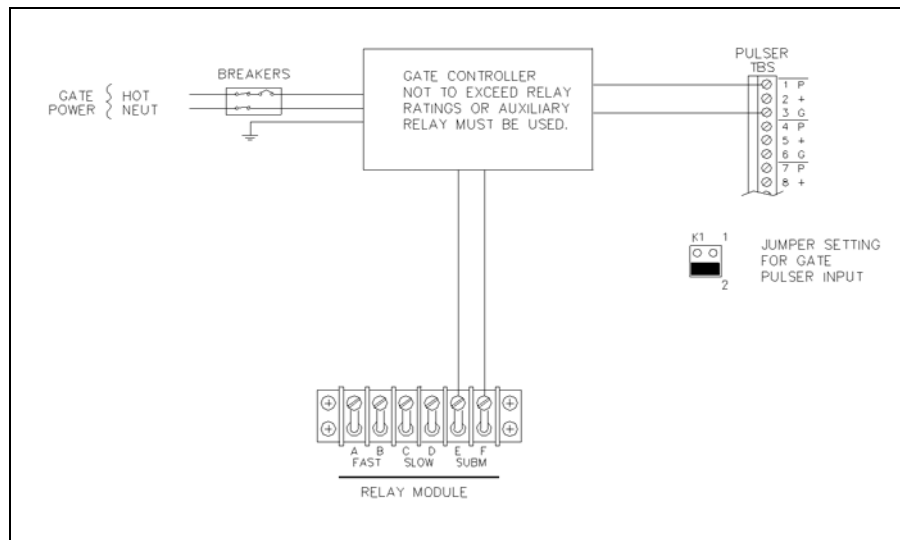
Figure 5-28: Twin Remote Dispenser, Console, Gasboy Reset



Activating a Gate Controller

You can use a relay position in the CFN Mechanical PCU to activate a gate controller. This is only available as a Fuel Point transaction and is not using a card, console, POS terminal, or terminal command.

Figure 5-29: Gate Controller with Relay Position, Fuel Point Transaction



Notes: 1) The CFN PCU can directly switch power to a gate controller. The maximum rating of the PCU relay is 3/4 HP @ 120 VAC. If your gate controller uses a different control voltage or exceeds the 3/4 HP rating, use an auxiliary mechanical relay with a 120 VAC coil to handle the load.

- 2) Up to four gate controllers can be accessed per PCU. You can also combine pumps and gates within the same PCU.*
- 3) Once the relay is closed, it will remain closed until one pulse is received on the pulser input, or until the switch timeout is reached, or the Fuel Point rings are separated, whichever comes first. If the transaction ends by the pulse, the transaction is stored in memory. If the transaction ends by timeout or ring separation, a message is logged. However, nothing is stored in the memory.*
- 4) The pulser signal can come from a dry-contact switch with no other voltage or circuits connected, or it can be a 12 VDC signal. Ensure that you set the appropriate pulser input jumper as shown. The jumpers are K1 through K4 and correspond to gates 1 through 4 respectively.*
- 5) Receipts are not available for these transactions.*

6 – Testing

Installation Completion Checklist

The information below should be reviewed to help verify proper installation of the CFN system prior to testing pumps and/or remote dispensers in the manual override position.

- Are the CFN system components located in the proper environment as described in [“Purpose”](#) on [page 9](#)?
- Is there adequate clearance around the ICRs (refer to [“Purpose”](#) on [page 9](#), [“ICR”](#) on [page 14](#), and [“ICR2 \(PA0398X0XXX0\)”](#) on [page 18](#))?
- Is all the wiring inside the metal conduit, except as noted in [“Short Haul Modem \(SHM\) RS-422”](#) on [page 39](#)?
- Is the AC and DC wiring in separate conduits, troughs, and so on? If they are not, and if the AC and DC wires share the conduit, a shielded cable must be used as specified in [“Communication Requirements”](#) on [page 33](#), [“RS-485”](#) on [page 33](#), [“Short Haul Modem \(SHM\) RS-422”](#) on [page 39](#), or [“Pulser Wiring and Configuration”](#) on [page 53](#).
- Are the CFN system components on a separate dedicated breaker (refer to [“System Components Wiring”](#) on [page 31](#))?
- Are pumps over 3/4 HP at 120/240 VAC or 1-1/2 HP at 240 VAC equipped with a starter relay (refer to [“Pump/Remote Dispenser Wiring”](#) on [page 43](#))?
- Is the correct gauge wire installed for the following:
 - System (refer to [“System Components Wiring”](#) on [page 31](#))?
 - Pumps (refer to [“Pump/Remote Dispenser Wiring”](#) on [page 43](#))?
 - Remote dispensers (refer to [“Pump/Remote Dispenser Wiring”](#) on [page 43](#))?
 - Pulsers (refer to [“Pump/Remote Dispenser Wiring”](#) on [page 43](#))?
 - SHMs (refer to [“System Components Wiring”](#) on [page 31](#))?
- Are the communication lines under the maximum allowable distance for the following:
 - RS-232 - 100 feet (refer to [“System Components Wiring”](#) on [page 31](#))?
 - RS-485 - 1000/1500 feet (refer to [“System Components Wiring”](#) on [page 31](#))?
 - RS-422 (SHMs) - 1500 feet (refer to [“System Components Wiring”](#) on [page 31](#))?
- If the system has an external modem, is the phone line installed (refer to [“System Components Wiring”](#) on [page 31](#))?
- Is there fuel in the tanks?

Manual Override Test

Note: The manual override test can be performed only on pumps/remote dispensers that are connected to CFN PCUs. For testing of electronic pumps/remote dispensers, refer to manuals supplied with the pumps/remote dispensers.

The pumps and/or remote dispensers should be tested to verify AC wiring.

Note: Only PCUs should be powered up during these tests.

The steps below list the testing procedures and expected results. If any of these tests fail, correct the wiring and repeat the test. See the Terminal Block ID diagram in [“Pump/Remote Dispenser Wiring”](#) on [page 43](#) for the location of override switches.

- 1 Remove all wiring connectors (green) from the Pump Control I/O PCB assembly located in the front of the card cage. This will prevent damage to PCBs if the wiring is incorrect. Ensure that connectors are not touching any metal surfaces.
- 2 Turn on the breakers for all pumps and/or remote dispensers. If the SC and other components are powered from the same breaker as the PCU, ensure that they are turned off before proceeding.

WARNING

AC power is present on the terminal blocks of relay modules. Electrical shock may occur if the operator comes in contact with these connections.

- 3 In the PCU, turn the AC power and battery power switches to the **ON** position (up). These switches are located in the upper righthand corner of the power supply.
- 4 Place the system override switch for hose #1 in the **MAN** position.
- 5 Turn on hose 1. After completing reset, the hose should be able to dispense the product.
- 6 Turn on all other hoses. No other hoses besides hose 1 should activate.
- 7 Turn off all hoses.
- 8 Place the system override switch for hose 1 in the **ON** position.
- 9 Repeat steps 4 to 8 for all remaining hoses. Substitute the hose under test for hose 1.
- 10 Turn off the AC power and battery power switches in the PCU.

- 11 Turn off the breakers for all pumps and/or remote dispensers and the SC and other components.
- 12 Replace all wiring connectors (green) previously removed from the Pump Control I/O PCB assembly.

Note: The manual override test will uncover most point-to-point AC wiring mistakes that can occur. The automatic test performed during the system startup will complete the verification of correct AC wiring to the pump/remote dispensers. The automatic test should only be performed at the startup.

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