



GASBOY

CFN SERIES

SITE CONTROLLER II

INSTALLATION MANUAL

C01918

GASBOY INTERNATIONAL LLC

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GASBOY INTERNATIONAL LLC LANSDALE, PA

FCC INFORMATION

The US Federal Communications Commission (FCC) requires specific information be supplied to the users of any equipment which may emit radio frequency energy. Please read the following information.

FCC PART 15

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 device is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed 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.

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Section 1

INTRODUCTION

PURPOSE

The GASBOY *Site Controller II Installation Manual* is provided to assist you in installing your CFN System. This manual should be supplied to the electrician prior to the installation of conduit and wiring to ensure 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. Please read this entire manual before starting installation.



GASBOY provides a toll-free number for customers and installers having any questions pertaining to the installation:

1-800-444-5529

SYSTEM OVERVIEW

The GASBOY CFN System is a microprocessor-based automated fueling system. Consisting 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. System flexibility allows for debit, credit, club, and fleet card usage; as well as cash operation.

System application determines the components required, therefore, your system may consist of several or all of the following components:

- Site Controller II
- RS-485 junction box(es)
- Pump control unit(s)
- Island card reader(s)
- Island receipt printer(s)
- POS console(s)
- Standalone receipt printer(s)
- Cash drawer(s)
- Pin pad(s)
- POS Distribution Box (D-Box)
- Speakers
- Scanner
- RS-485 to RS-232 converter
- Data terminal
- Modem
- Power conditioner
- AC Surge Protector Outlet Strip
- Voltage regulator/backup power supply (UPS)

Section 2, **System Layout**, provides a brief description of each component.

SYSTEM LAYOUT

PURPOSE

Use this section for detailed planning of the installation of your system. This section covers a basic description, location requirements, and the environmental requirements of the CFN components. A dimensional drawing is included for components manufactured by GASBOY. This section also covers conduit requirements and gives conduit layout examples for the basic system configurations. Careful planning for the layout of the site will help eliminate possible problems with the start-up of your system and will help ensure continued, reliable system operation.

SITE CONTROLLER II

Description

The Site Controller II is the heart of the CFN System at the fueling site. It controls and allows interaction between all your automated fueling equipment, including electronic pumps, pump control devices, and terminals that are activated by a customer. The unit uses advanced microprocessor technology and incorporates multiple hardware and software safeguards. The Site Controller II comes standard with a hard disk drive and one 3-1/2" disk drive for mass storage of data and loading in operating system programs. The site controller can be ordered optionally with two 3-1/2" drives. A built-in keyswitch can be used to limit access to specified commands.

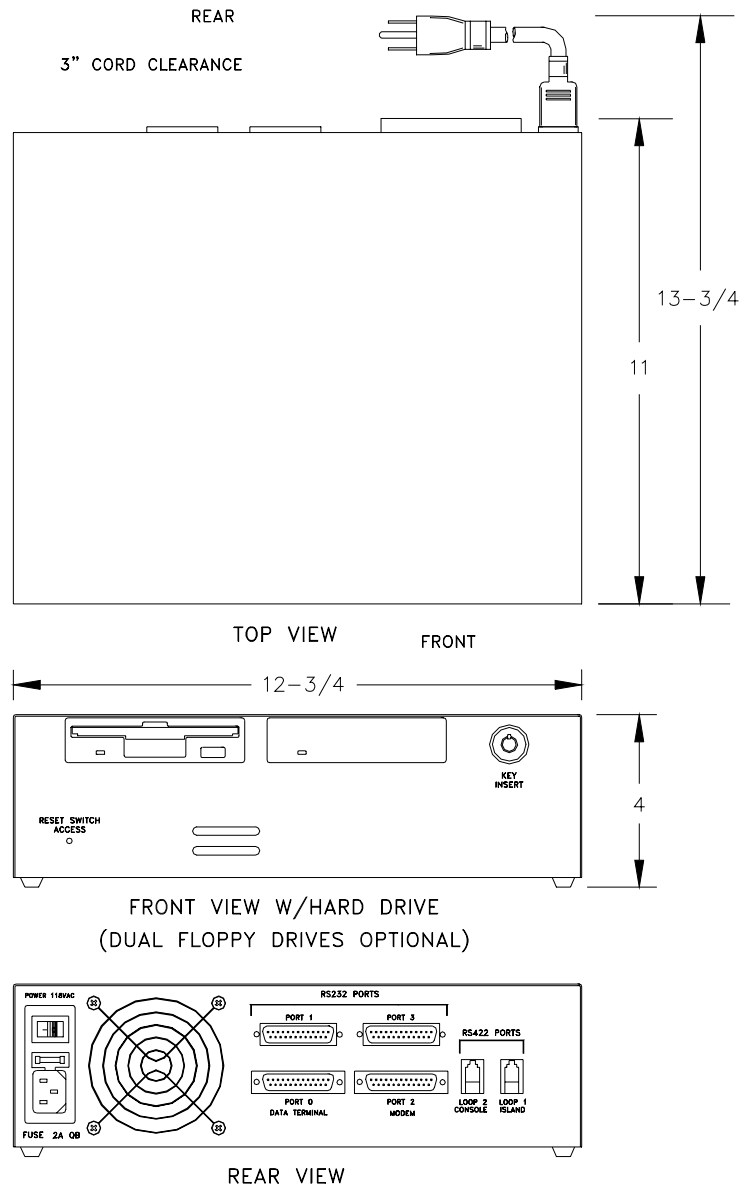
The Site Controller II contains four asynchronous RS-232 ports. Port 0 is used for communication to a data terminal (logger). Port 2 is used for communication through a modem or to a computer. Ports 1 and 3 are additional RS-232 ports which can be programmed according to the application. A logger eliminator (P/N C05593) must be connected to Port 0 when a logger is not used.

Two RS-485 ports are provided for communication with the other CFN devices at the fueling site. One of these ports connects to the CFN RS-485 junction box. The RS-485 junction box provides a means for hard-wire connections while incorporating protection circuitry to prevent electrostatic surges (which may occur on the field wiring) from reaching the site controller. The other RS-485 port connects to the POS console (when available).

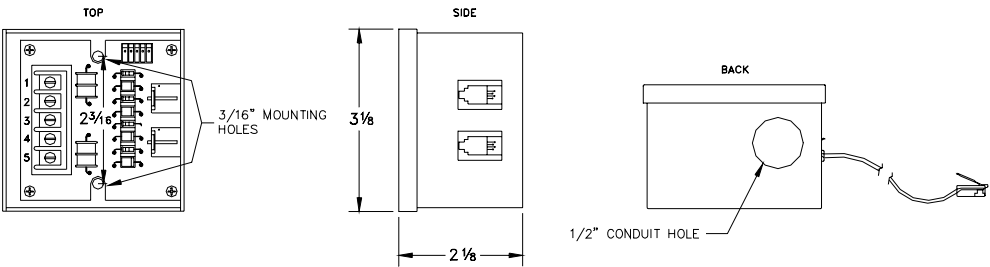
Location

The Site Controller II should be located in an office-type environment and in an area protected from direct contact with the weather. Do not install over a hazardous location. The unit is designed for an operating temperature range of 35°F to 110°F with a relative humidity of 20% to 80% non-condensing. Locating the site controller in a dirty environment may cause premature failures. The RS-485 junction box must be located within eight feet of the Site Controller. The site controller should not sit on top of any other components and no other equipment should be placed on top of the site controller unit.

SITE CONTROLLER II



RS-485 JUNCTION BOX



PUMP CONTROL UNIT (PCU)

Description

The pump control unit (PCU) controls most mechanical pumps and some electronic pumps. The unit is controlled by a microprocessor and communicates to the site controller via the RS-485 loop.

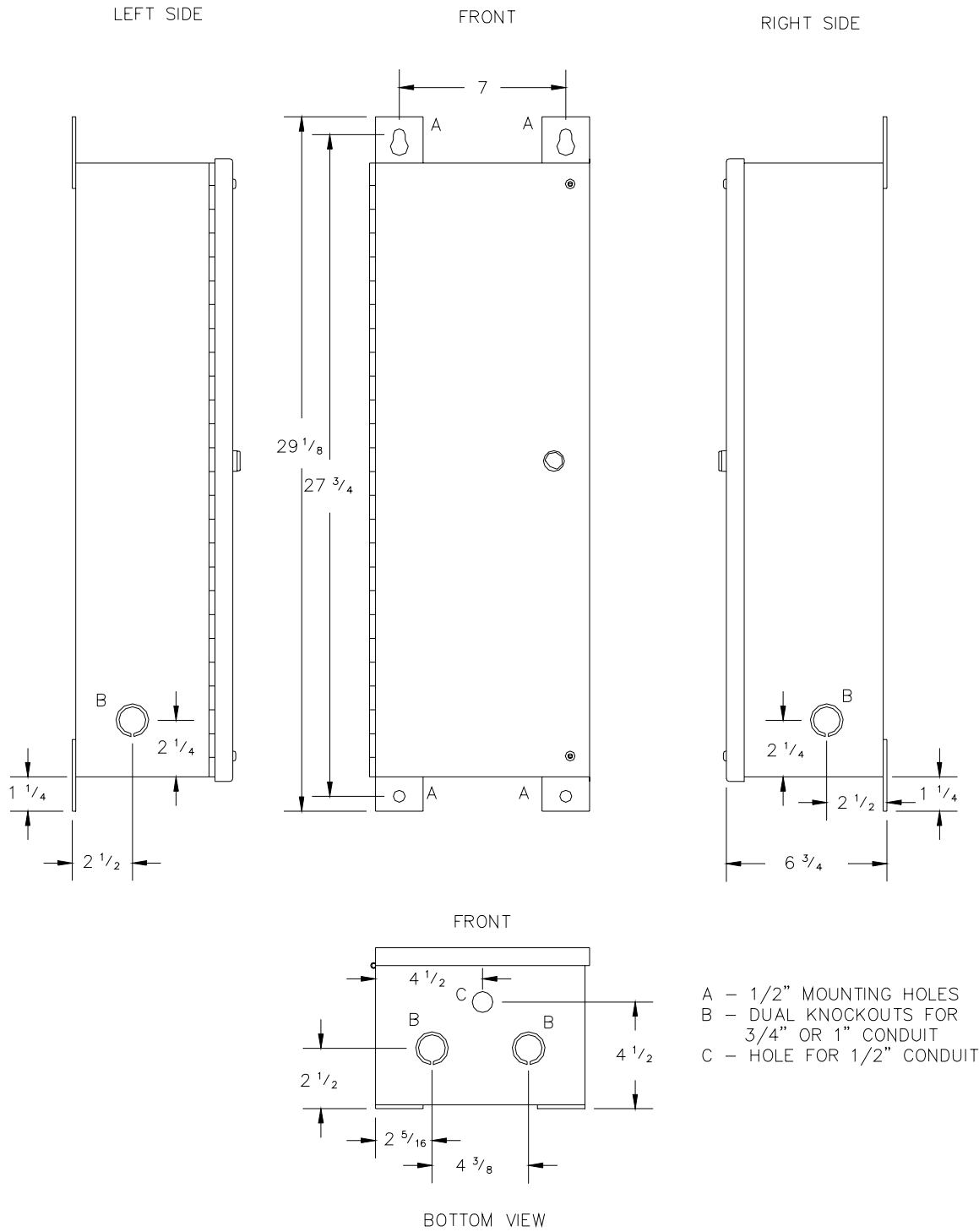
Each pump control unit can control up to four pumps or remote dispensers. There are two different versions of the pump control unit: the retail version (Weights & Measures) and the fleet version. Hardware features on the retail version include a battery backup, three solid state relays for each pump or remote dispenser (slow flow, fast flow and submersible pump), manual override switches, and diagnostic capabilities. The fleet version 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 via easy to wire terminal blocks.

The pump control unit can be ordered mounted in a wall-mount box (standard), in the island card reader's post, or as a standalone unit to be located on the island.

Location

The wall mount version of the pump control unit must be located in an area protected from direct contact with weather. Do not install over a hazardous location. The post and standalone version of the pump control unit 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°F to 104°F with a relative humidity of 2% to 99% non-condensing.

PUMP CONTROL UNIT (PCU), WALL MOUNT



ISLAND CARD READER

Description

The island card reader 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 via the RS-485 loop.

The unit is available with either an ABA Track 2 magnetic stripe card reader or an optical reader. A 20-character 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 incorporates easy-to-read legends and provides the user with the means to input data to the system.

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

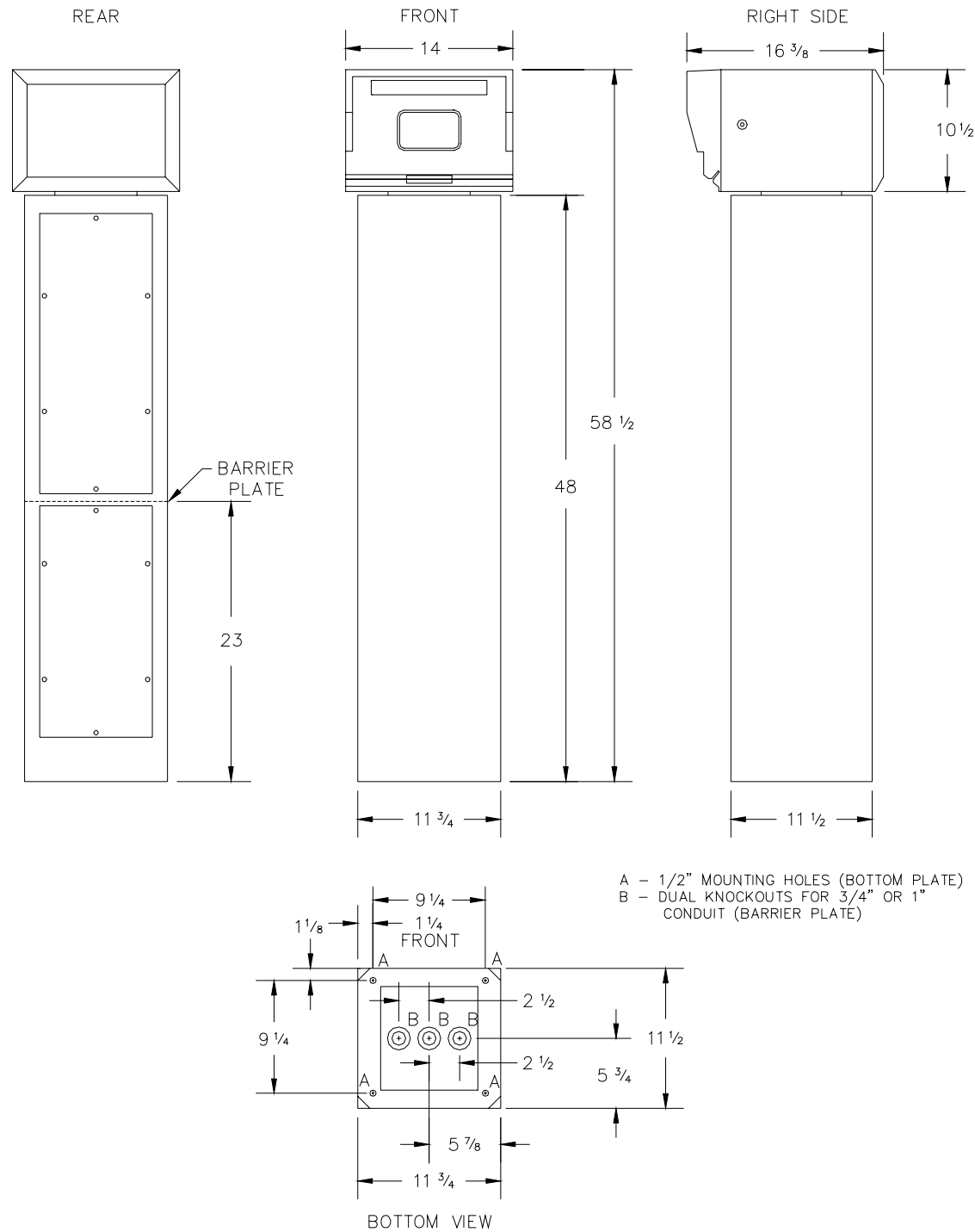
Special Island Card Reader for CNG

A special version of the CFN Island Card Reader 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 found in the Island Card Reader with Blank Post drawing. This unit is not available with an internal receipt printer or pump control unit.

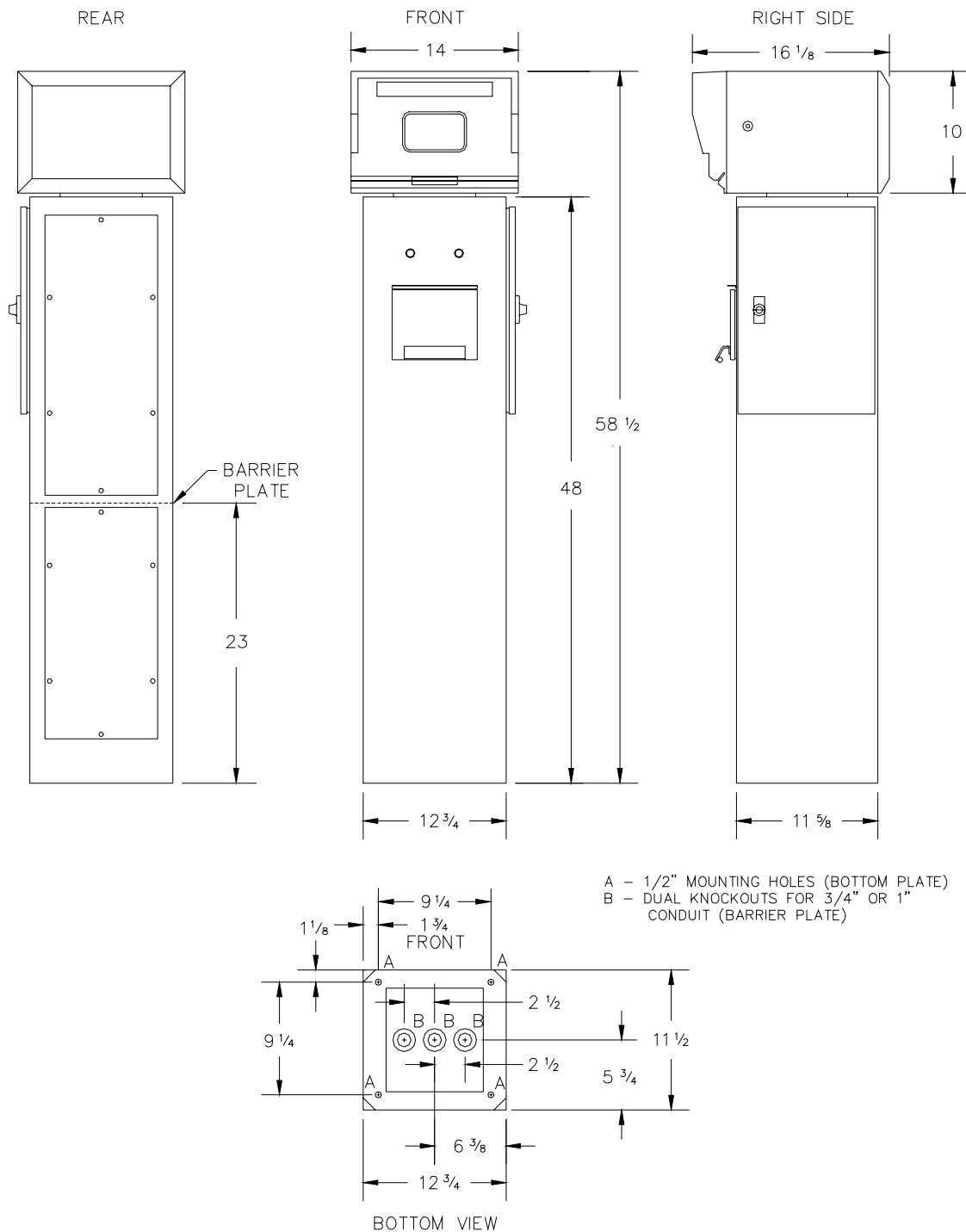
Location

The island card reader 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 island card reader with a receipt printer post or a pump control post requires a minimum of 18 inches clearance between the post and any of the pumps/remote dispensers on the island.

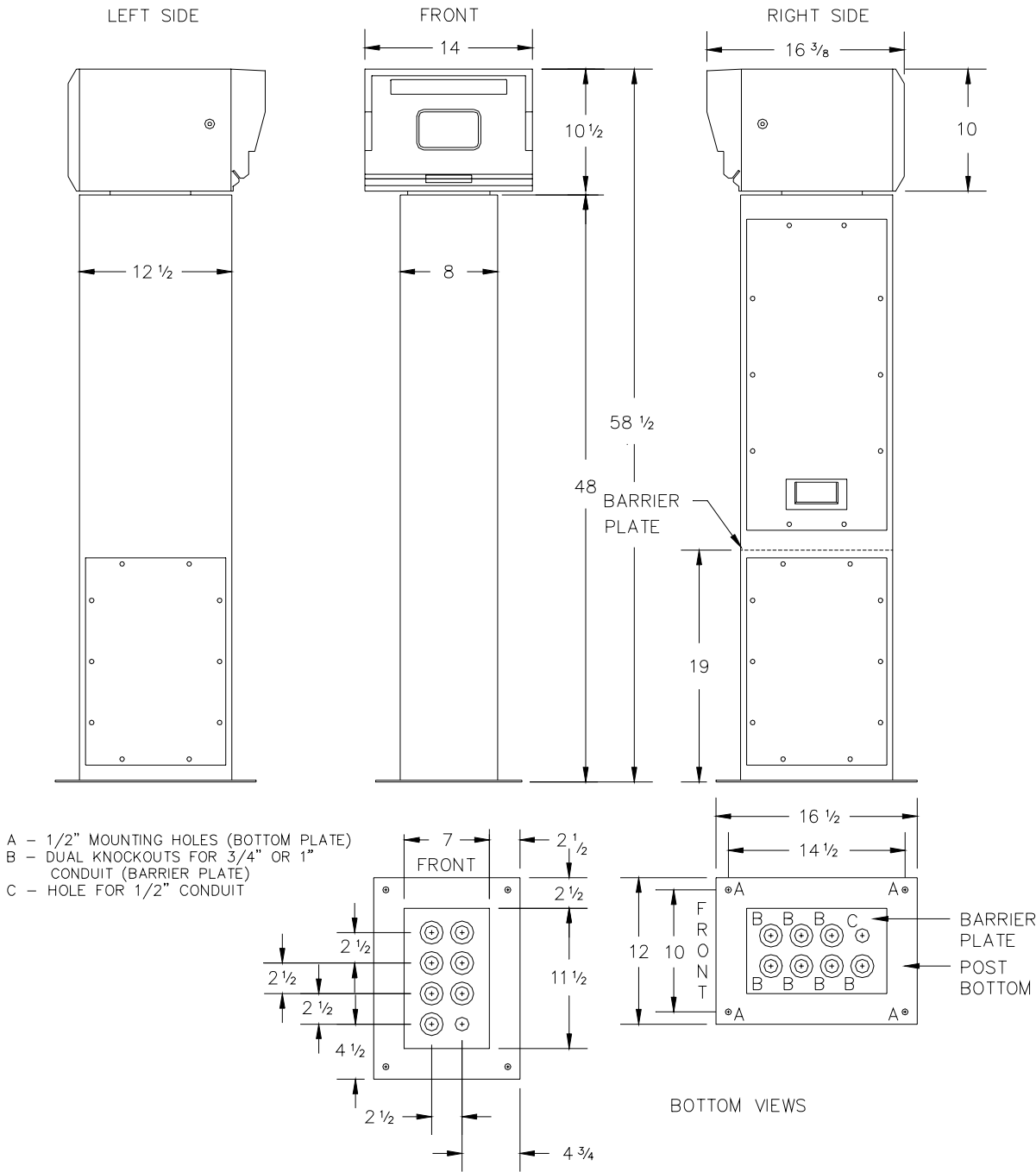
ISLAND CARD READER WITH BLANK POST



ISLAND CARD READER WITH RECEIPT PRINTER POST



ISLAND CARD READER WITH PUMP CONTROL POST



CHECKPOINT CONSOLE

Description

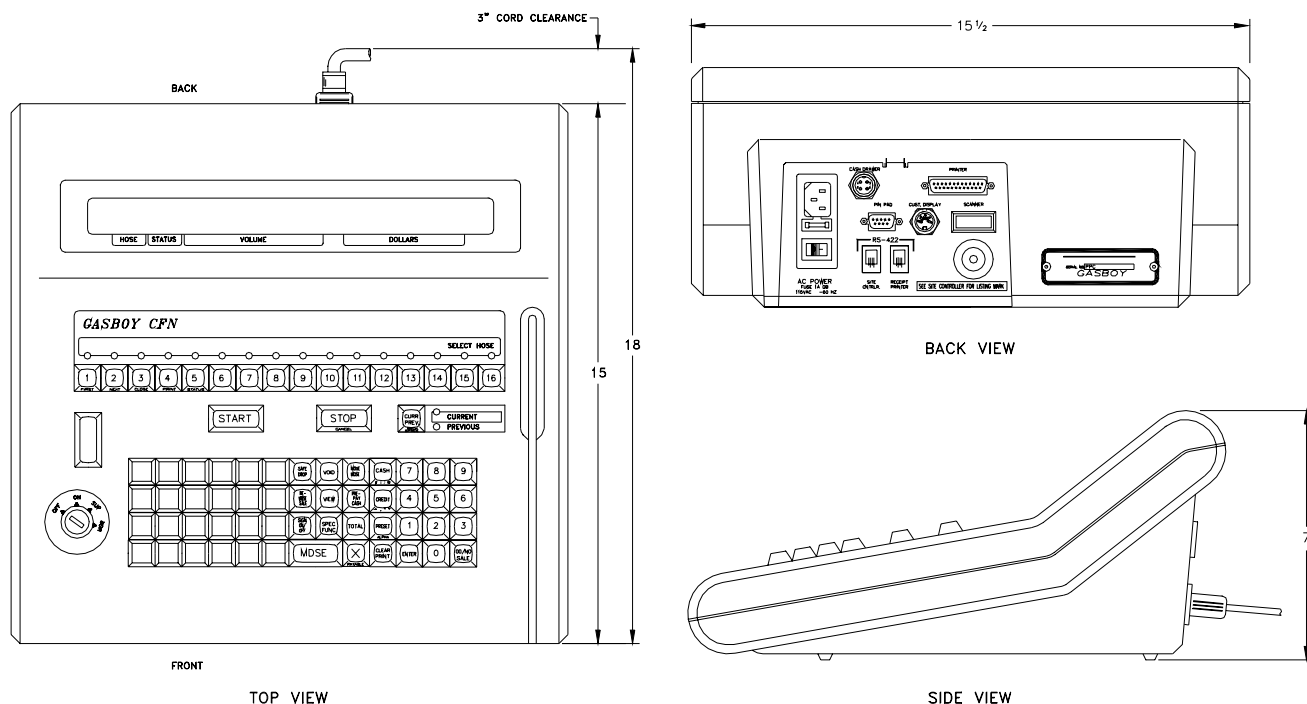
The Checkpoint console is used to initiate and monitor fuel and non-fuel retail (convenience) sales at the fuel island. The unit is controlled by a microprocessor and communicates to the site controller via a direct RS-485 connection.

Each Checkpoint console can control up to 16 pumps or remote dispensers. A 20-character alphanumeric display along with pump status LEDs are used to provide the operator with current information regarding the site. Full-travel keys are used in the operation of the unit. An ABA track 2 magnetic stripe reader is provided for use in reading magnetic stripe cards for credit or debit purchases.

An optional standalone receipt printer, a PIN (personal identification number) pad, a cash drawer, and a customer display are available for use with the Checkpoint console. The optional standalone receipt printer is used for generating receipts in the building where the Checkpoint console is located. The optional PIN pad can be used to allow customers to secretly enter their PINs for Checkpoint console transactions. The optional cash drawer is used for storage of cash at the site. The customer display allows you to display console sales so they are visible to the customer.

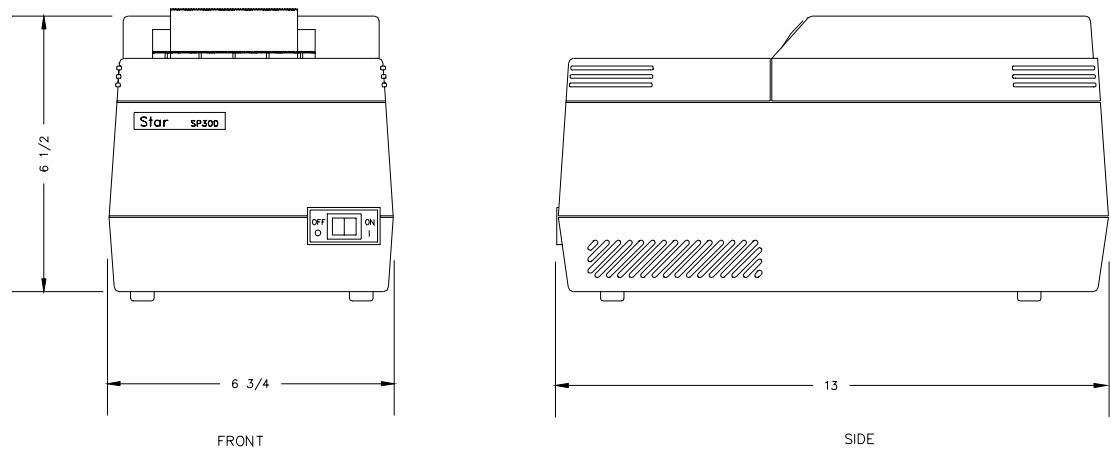
Location

The Checkpoint console and options should be located in an office-type environment. The unit must be located in an area protected from direct contact with the weather. Do not install over a hazardous location. The unit is designed for an operating temperature range of 4°F to 104°F with a relative humidity of 5% to 95% non-condensing. The operative temperature range for the optional standalone receipt printer is 40°F to 104°F. While it is customary for the console to be positioned close to the site controller, you can locate it in a location up to 1000 feet away by using supplemental equipment. See **Remote Console Wiring** in Section 3.

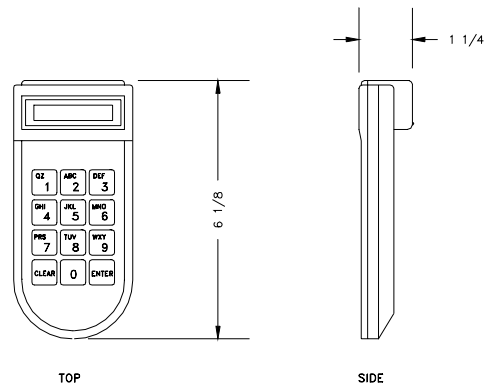


CONSOLE OPTIONS - CHECKPOINT AND PROFIT POINT

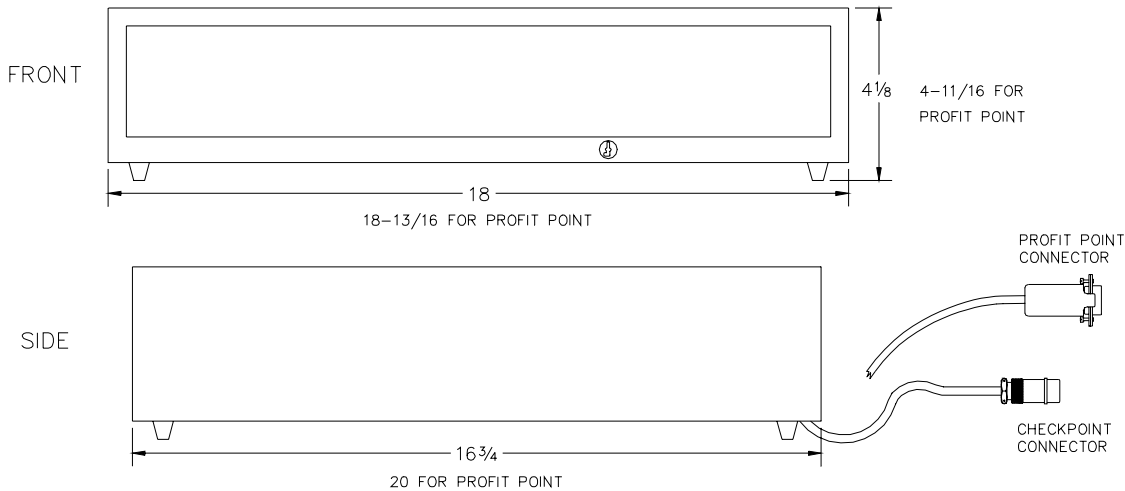
Standalone Receipt Printer



PIN Pad



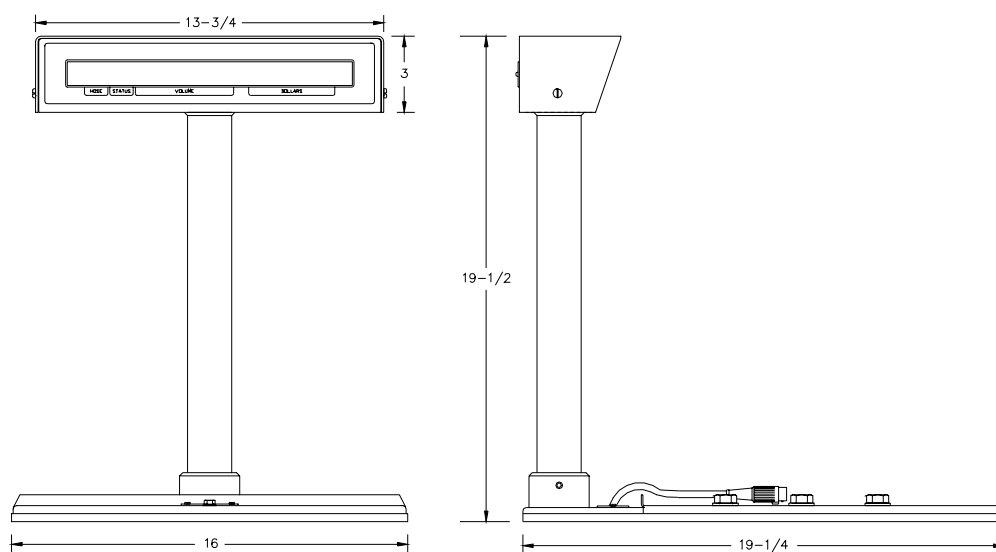
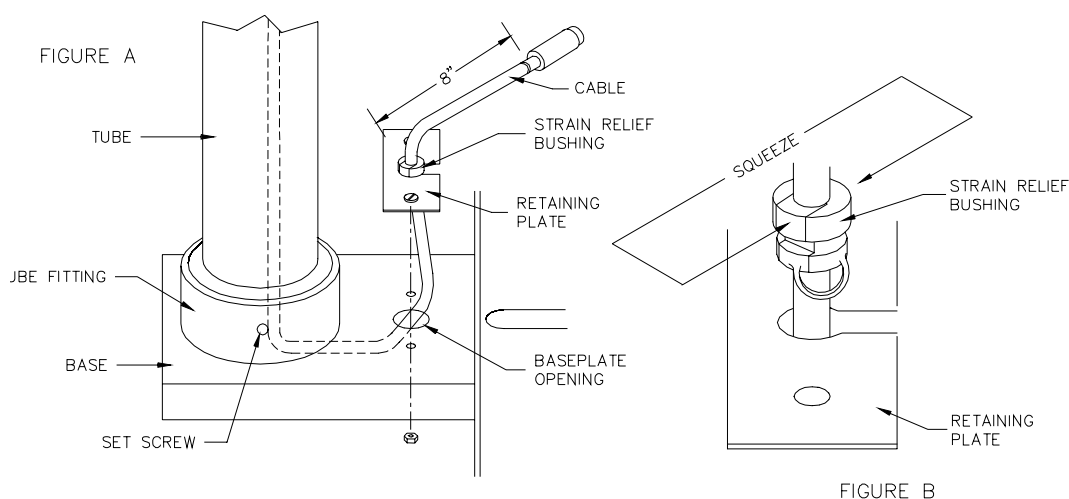
Cash Drawer



INSTALLING THE OPTIONAL CUSTOMER DISPLAY - CHECKPOINT

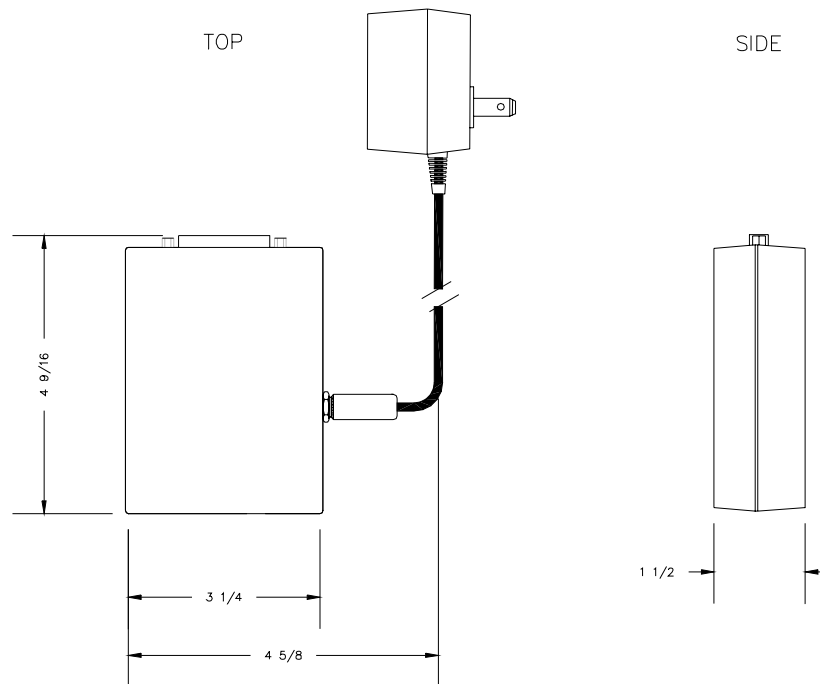
Install the customer display as follows:

1. Remove the protective tape holding the connecting cable to the tube.
2. Thread the connecting cable from the tube down through the tube fitting in the base, under the base and up through the opening in the base plate (Figure A). Be careful not to drop display.
3. Install the tube in the tube fitting, position the display, and tighten the set screw in the tube fitting.
4. Take the strain relief bushing and, using pliers, squeeze the bushing onto the wire. Snap the bushing into the retaining plate (Figure B).
5. Screw the retaining plate to the base as shown in Figure A.



RS-485 TO RS-232 CONVERTER

The RS-485 to RS-232 converter is required for communication between the Site Controller II and the Profit Point or the Site Controller II and a tank monitor. It converts the format of the data from RS-232 to RS-485 and vice versa.



PROFIT POINT CONSOLE

Description

The Profit Point console is used to initiate and monitor fuel and non-fuel retail (convenience) sales at the fuel island. The unit is controlled by a microprocessor and communicates to the Site Controller II through a RS-485 to RS-232 converter.

Each Profit Point console can control up to 32 pumps or remote dispensers, although 16 pumps is the factory default. A 9-inch (or optional 14-inch) easy-read, black and white, VGA, CRT screen is used to provide the operator with current transaction information and pump status regarding the site. The keyboard consists of 112 full-travel programmable keys, with 102 keys being the factory default. An ABA track 2 magnetic stripe reader allows you to accept credit, debit and proprietary card purchases right at the keyboard. Speakers provide audio feedback to the operator, such as when a sale becomes payable, or a pump is taken offhook.

A cash drawer is used for storage of cash at the site and a customer display allows you to display console sales so they are visible to the customer. The cash drawer and customer display are connected to the Profit Point through the POS Distribution Box (D-Box).

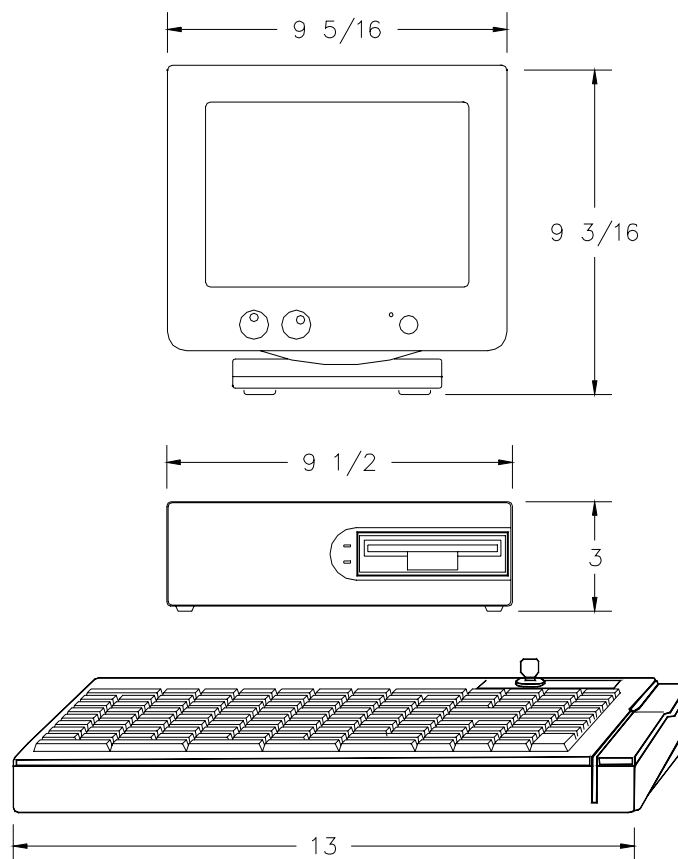
Available options for the Profit Point console include a standalone receipt printer, for generating receipts at the console; a PIN (personal identification number) pad for private, individual, PIN entry; and a scanner, which provides quick, accurate entry of merchandise sales and also allows entry of new UPC codes by scanning, thus eliminating time-consuming key entry.

Location

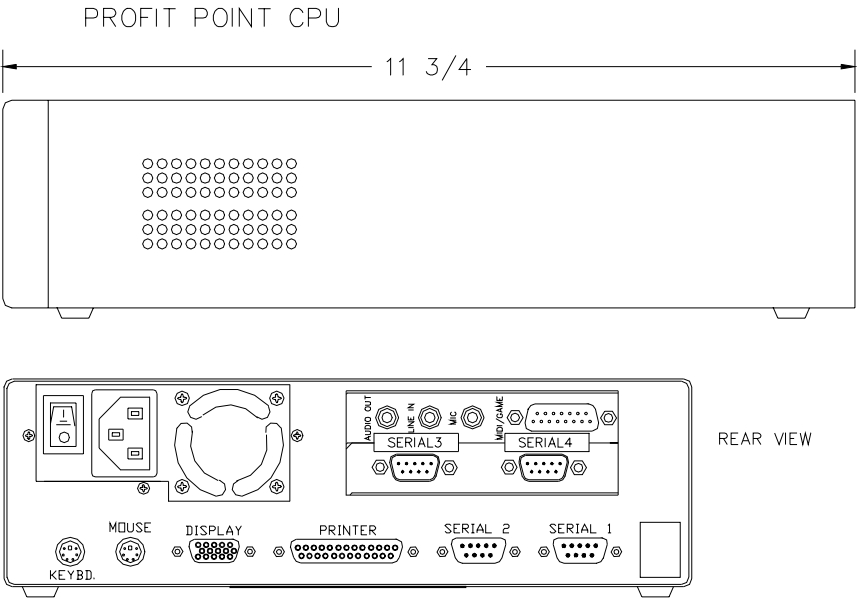
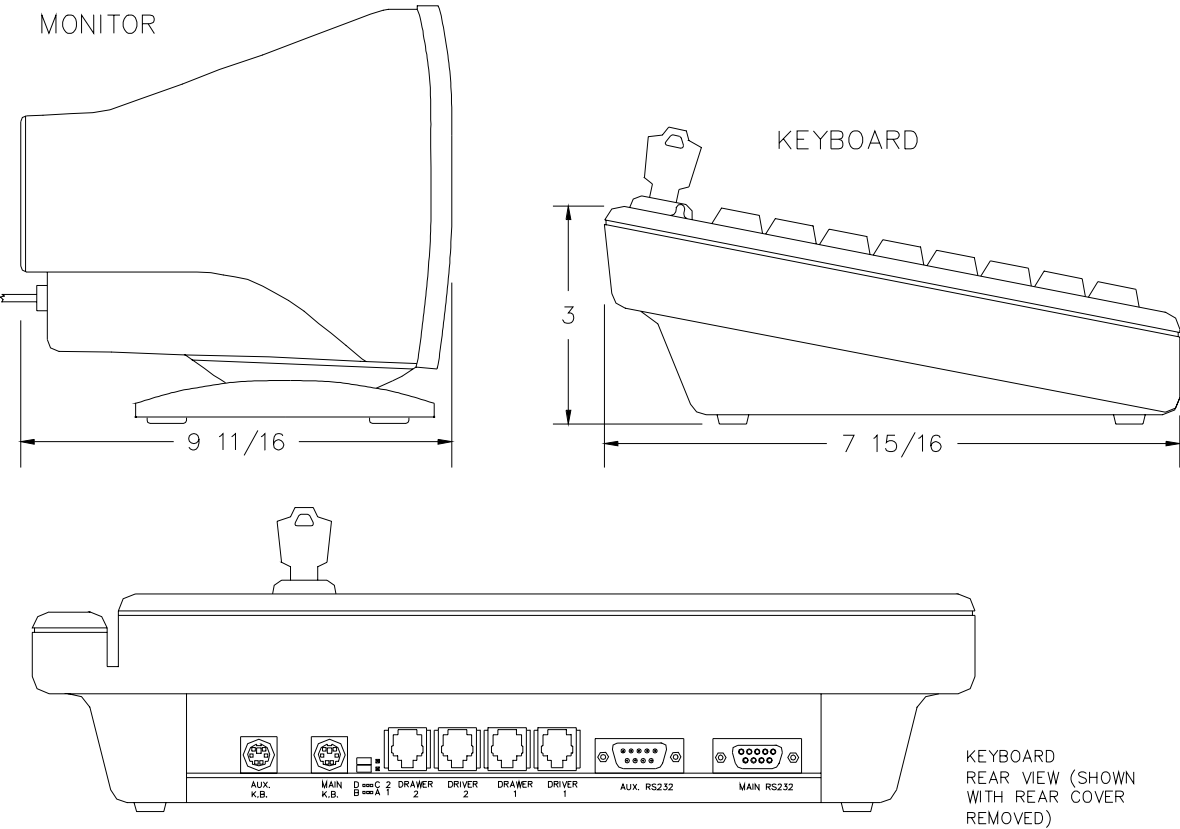
The Profit Point console and options should be located in an office-type environment. The unit must be located in an area protected from direct contact with the weather. Do not install over a hazardous location. The unit is designed for an operating temperature of 40°F to 100°F with a relative humidity of 5% to 95% non-condensing. The operative temperature range for the optional standalone receipt printer is 40°F to 104°F. While it is customary for the Profit Point to be positioned close to the site controller, you can locate it in a location up to 1000 feet away by using supplemental equipment.

See **Remote Profit Point Console Wiring** in Section 3.

NOTE: Monitor dimensions shown are for the standard 9-inch monitor. For the optional 14-inch monitor, the dimensions are W=14-1/2, H=14-3/4, and D=16-3/4.



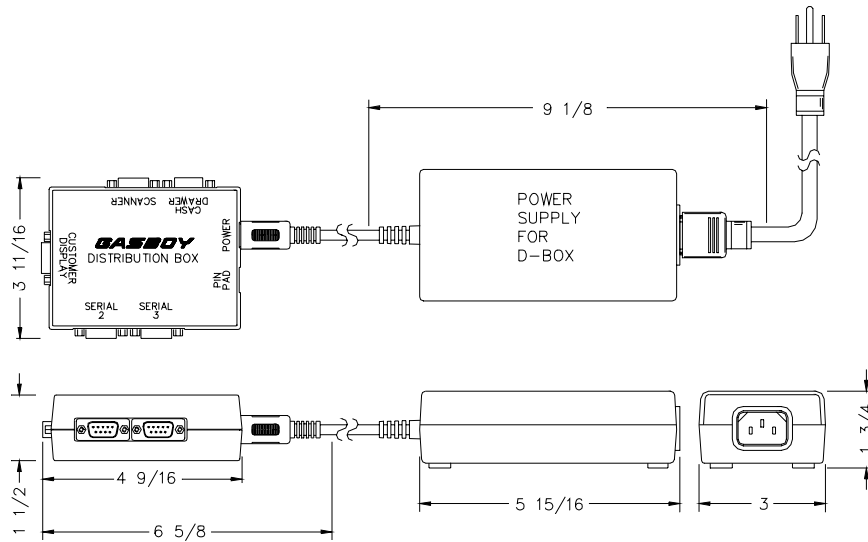
PROFIT POINT CONSOLE DIMENSIONS



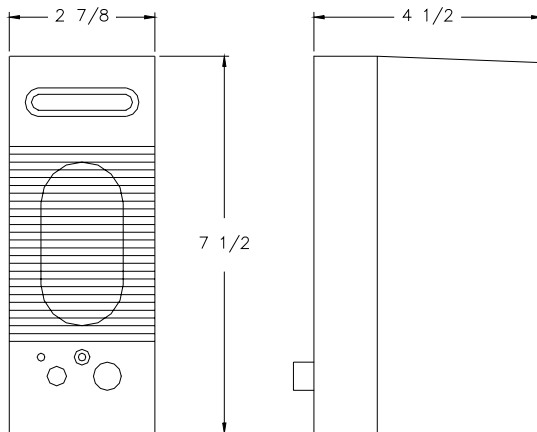
CONSOLE OPTIONS - PROFIT POINT

Console options for the Profit Point are the same as those for the Checkpoint (shown earlier in this section). In addition, the Profit Point will always have a POS Distribution Box (D-Box), speakers, and can have an optional bar code scanner.

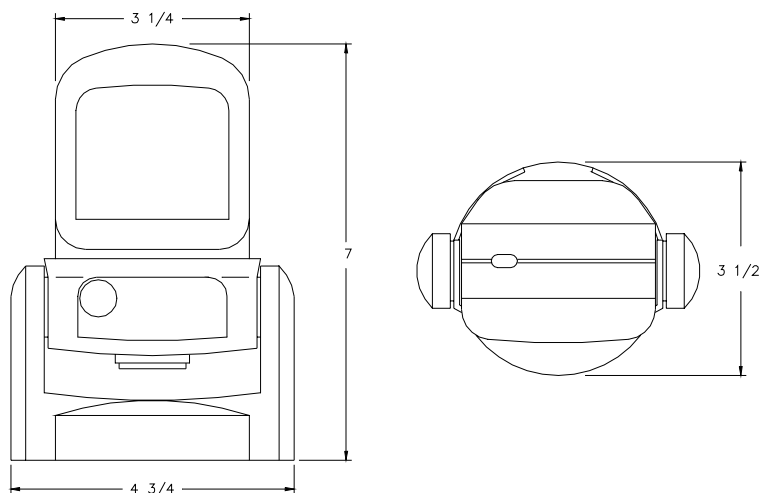
POS D-Box



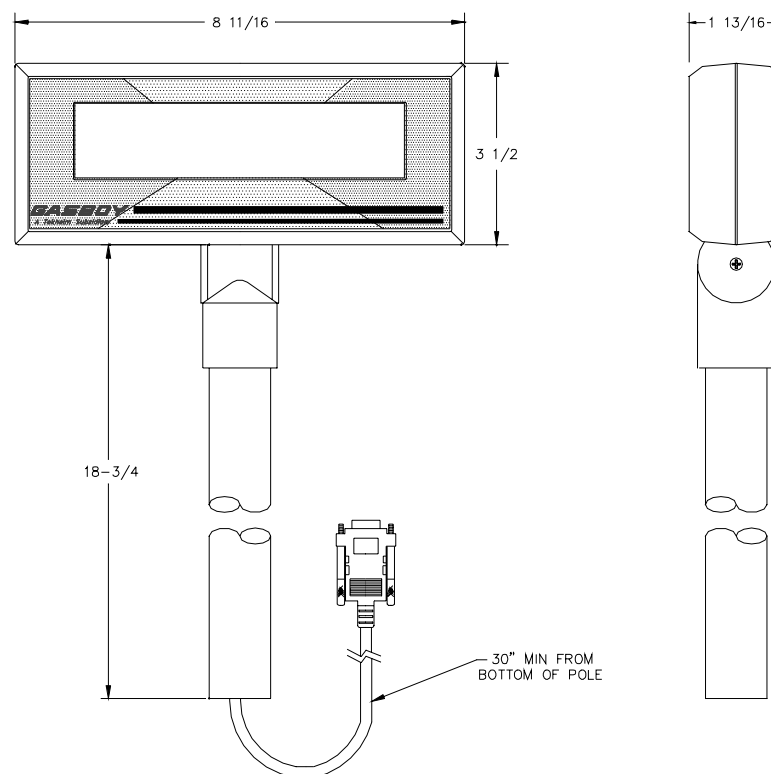
Speakers



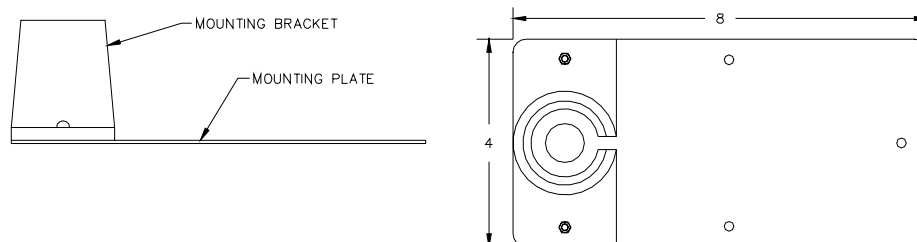
Bar Code Scanner



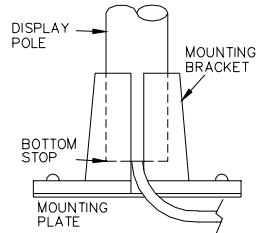
INSTALLING THE CUSTOMER DISPLAY - PROFIT POINT



The Profit Point customer display comes with a mounting device consisting of a mounting bracket and mounting plate. The mounting plate can be placed under the cash drawer or the Profit Point CPU. The mounting bracket can be moved to the center of the mounting plate and the plate attached to a solid counter top, or the mounting bracket can be attached without the mounting plate.



Once the mounting bracket has been installed, insert the display pole into the mounting bracket using a back and forth twisting motion to ensure a secure fit. **Avoid placing pressure of any kind on the display head.** Ensure that the cable clears all obstructions when inserting the pole into the mounting bracket. The pole should be inserted until it reaches the bottom stop. The stop is located 1/4" from the bottom of the bracket.



CRT/PRINTER

Description

The CRT terminal is used for communication to and from the site controller. A CRT/printer combination can be used as a logger for providing hard-copy printouts of action at the site or as an interrogation device to extract information from the system via the system's commands. A CRT can be directly connected to the site controller, connected via short haul modems, or connected via telephone modems.

Location

The CRT/printer should be located in a clean, office-type environment. Do not install over a hazardous location. CRT/printer combinations supplied by GASBOY have an operating temperature range of 32°F to 104°F, 10% to 95% relative humidity, non-condensing. Locating the data terminal in a dirty environment may cause premature failures.

MODEM

Description

Modems are used for communication to the site controller where distance or conditions will not permit direct connection to the unit. There are various types of modems that can be used according to the maximum baud rate required and the connection method desired. Modems to be used for dial-out to a bank network require a dedicated phone line.

Location

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

POWER CONDITIONER

Description

A 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 site controller and other CFN devices located near the site controller. Poor power conditions are a key cause to system malfunction or failure. The power conditioner provides transient and common mode protection for the CFN system, although it cannot totally compensate for extremely poor power conditions.

Location

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

VOLTAGE REGULATOR/BACKUP POWER SUPPLY (UPS)

The voltage regulator/backup power supply protects line-operated equipment from low line voltage (brownout) and total line power failure by providing virtually instant emergency power. 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 does help to condition the power to the CFN system, it cannot totally compensate for extremely poor power conditions.

Location

The voltage regulator/backup power supply must be located in an area protected from direct contact with weather (typically near the system circuit breakers) and should be no further than 50 feet from the CFN system for optimum protection. The unit is designed for an operating temperature range of 0°C to 50°C.

AC SURGE PROTECTOR OUTLET STRIP (Profit Point and Accessories Only)

Description

The AC Surge Protector Outlet Strip helps protect the Profit Point and any equipment directly connected to the Profit Point (receipt printer, RS-485 to RS-232 converter, POS D-Box, and possibly a scanner) from line surges while filtering away EMI/RFI noise. The site controller and other devices not mentioned here will not be connected to the AC Surge Protector Outlet Strip, only to the power conditioner.

Location

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

CONDUIT REQUIREMENTS

The conduit requirements outlined in this section are relevant to all components making 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 Code (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 conduit**. **PVC IS NOT ACCEPTABLE**. It is recommended that high voltage AC power wires be installed in separate conduit from the low voltage DC signal wires. However, if AC and DC wires share conduit, DC wiring must use the cable specified in Section 3, **Communication Requirements (RS-485), Short Haul Modems (RS-422)**, and Section 4, **Pulser Wiring and Configuration**. When AC and RS-485 or RS-422 wires **are** combined in the same conduit, only AC wires for the system and pumps may be 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 AK, DC, RS-485 or pulser wiring regardless of the cable type used. Refer to the *Fuel Point Reader Installation Manual, C35628* for details.

All conduit 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.

Use the charts below as a guideline to determine the proper conduit sizes for the GASBOY CFN Series system. When planning the orientation of the wiring runs, follow the applicable GASBOY wiring diagram and consider the layout of the components at the site. Long runs or a large number of bends may require you to increase conduit size over what is listed.

THHN/THWN Wire Areas				
Gauge	Diameter		Area (Sq units)	
	in	mm	in	mm
18	.090	2.29	.007	4.1
16	.104	2.64	.009	5.5
14	.118	2.95	.011	6.8
12	.135	3.43	.014	9.2
10	.169	4.29	.022	14.5
8	.216	5.49	.037	23.7
6	.259	6.60	.053	34.2
4	.331	8.41	.086	55.5
3	.359	9.14	.102	65.6
2	.394	10.01	.122	78.7
1063A	.417	10.59	.137	88.4

Areas of Trade Size Conduit						
Trade Size	Int. Diameter		Area (Sq units)		Fill Area (sq units) 25% Fill	
	in	mm	in	mm	in	mm
1/2	.629	16	.303	196	.076	49
3/4	.826	21	.532	343	.133	86
1	1.063	27	.862	556	.215	139
1-1/4	1.378	35	1.50	968	.375	242
1-1/2	1.614	41	2.04	1314	.509	329
2	2.087	53	3.36	2165	.839	541

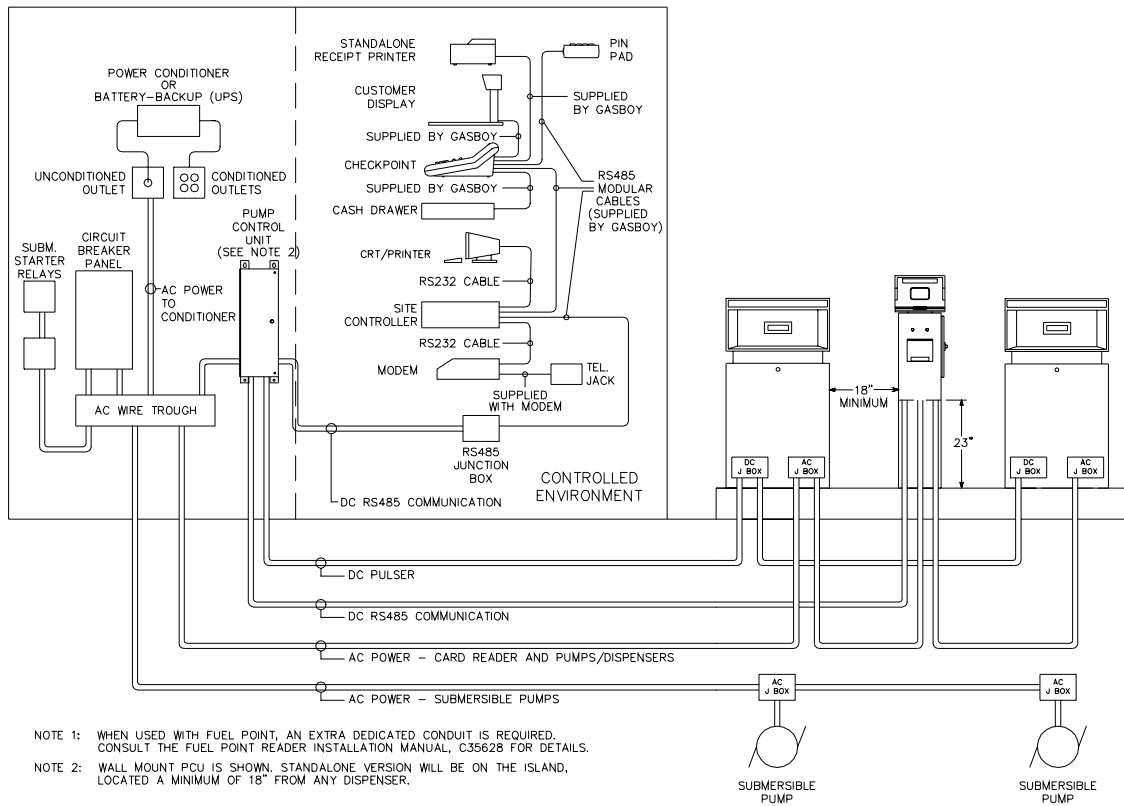
To determine conduit size needed, use the THHN/THWN Wire Areas table (left) to find the area for each wire gauge. Add up all wire areas. Use the Areas of Trade Size Conduit Table (right) to select the smallest number in the 25% fill area (based on NEC 501-1) that comes closest without exceeding the total wire area.

CONDUIT LAYOUT/INSTALLATION SPECIFICATIONS

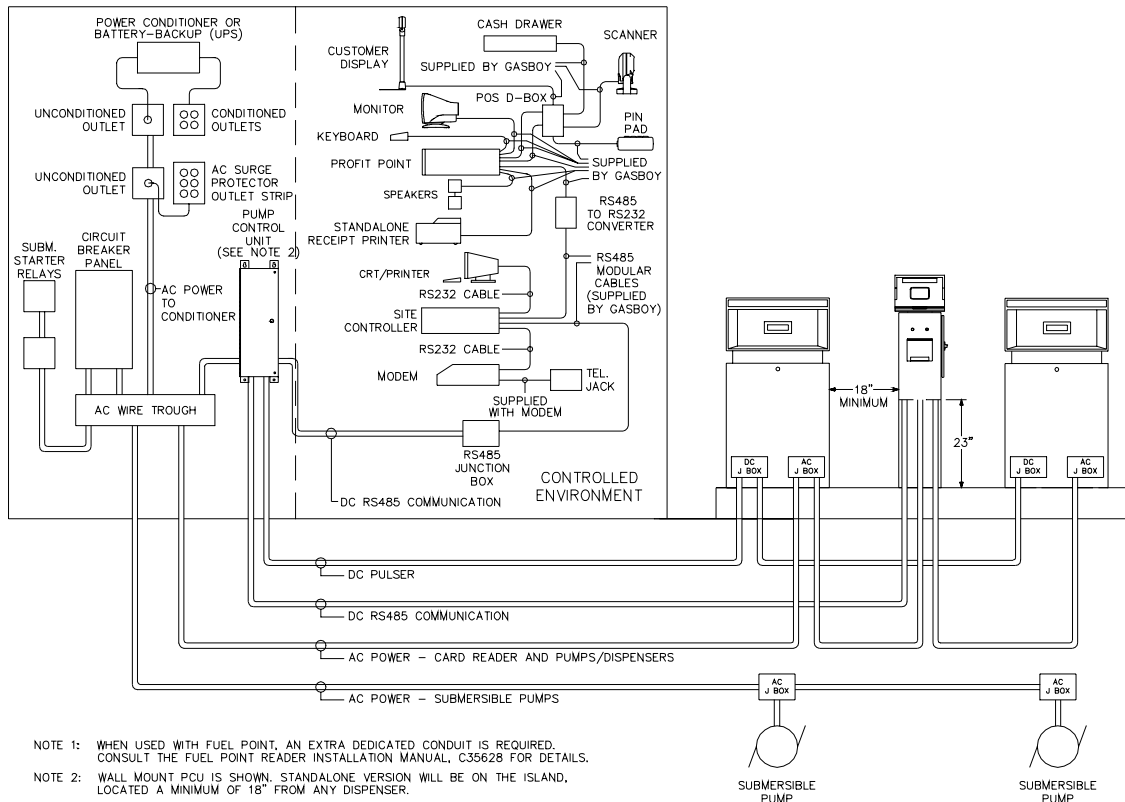
1. All wiring is to be installed and used in accordance with all building/fire codes, all Federal, State, and Local codes, National Electrical Code (NFPA 70), NFPA 30, and Automotive and Marine Service Station Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.
2. All peripheral equipment connected to the RS-232 ports must be Listed, have an Electronics Industrial Association (EIA) standard RS-232 communications protocol and not be installed over a hazardous location.
3. Power for the system components, data terminal, and modem must come from a separate dedicated circuit breaker rated at no less than 10 AMPS.
4. All conduit must be metal to provide the necessary shielding.
5. All conduit should be run underground, not overhead.
6. DC pulser and DC RS-485 and 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 conduit with AC wires if shielded cable is used as specified in Section 3, **Communication Requirements (RS-485), Short Haul Modems (RS-422)**, and/or Section 4, **Pulser Wiring and Configuration**.
7. Use the wire size chart (Table 4-1) to determine the wire gauge.
8. Use the conduit size charts to determine the size according to the number of wires and wire gauge.
9. RS-232 communication must not exceed 100 feet. RS-232 communication wires must be in a metal conduit separate from any AC wires.
10. For communication distances exceeding 100 feet, you must use GASBOY short haul modems.
11. 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.
12. 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.
13. A minimum distance of 18 inches must be maintained between the island card reader post and any of the pumps/remote dispensers.
14. In the conduit layouts, disregard the submersible pumps in the drawings if the hose outlets are suction pumps.
15. Consult the applicable section of this manual for specific system installation requirements.
16. When used with Fuel Point, an extra dedicated junction box is supplied to be installed in the pump/dispenser. A separate dedicated conduit is to be run between the junction box and the Fuel Point Reader. Consult the *Fuel Point Reader Installation Manual C35628* for details.

CONDUIT LAYOUT - ELECTRONIC PUMPS/REMOTE DISPENSERS, ELECTRONIC HOSE OUTLETS

Checkpoint

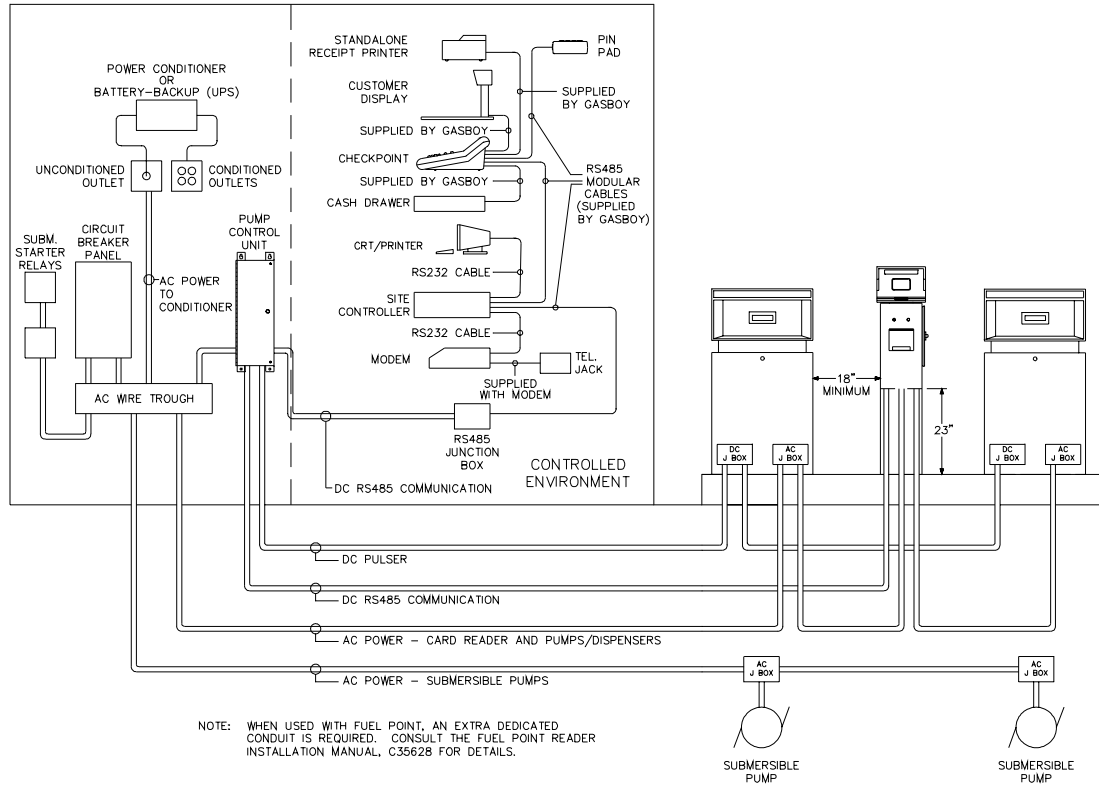


Profit Point

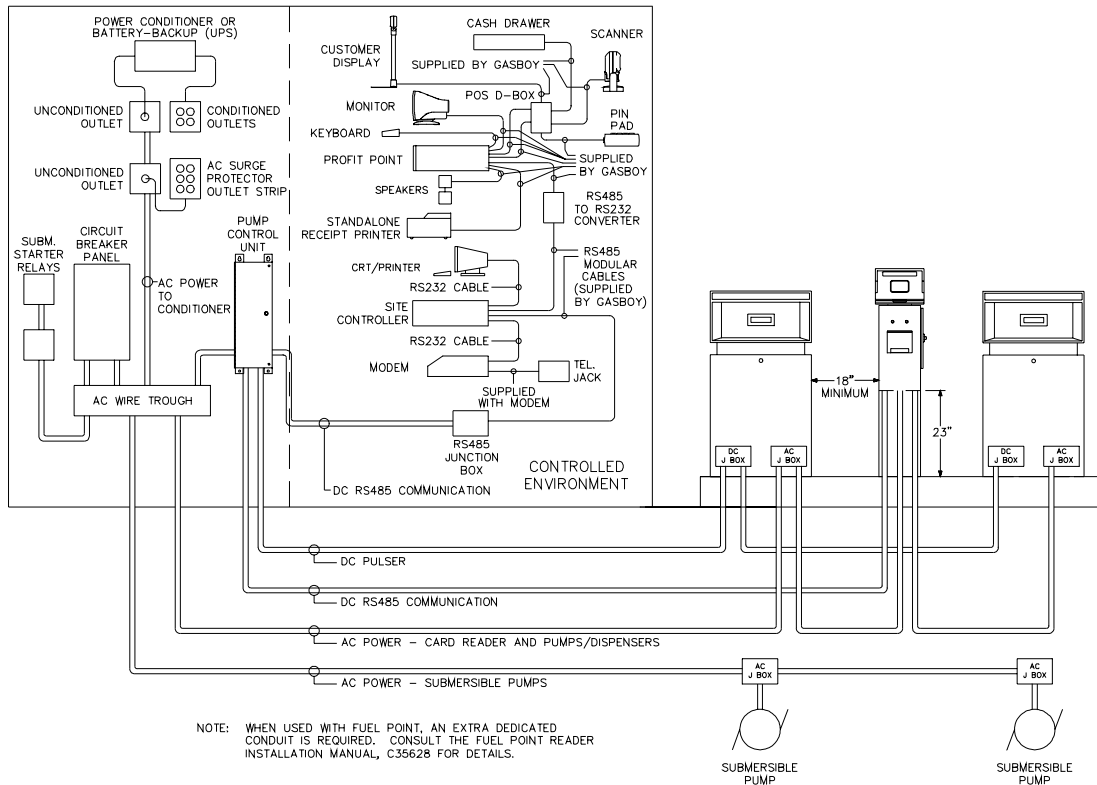


CONDUIT LAYOUT - PUMP CONTROL UNIT (WALL MOUNT OR STANDALONE), MECHANICAL HOSE OUTLETS

Checkpoint

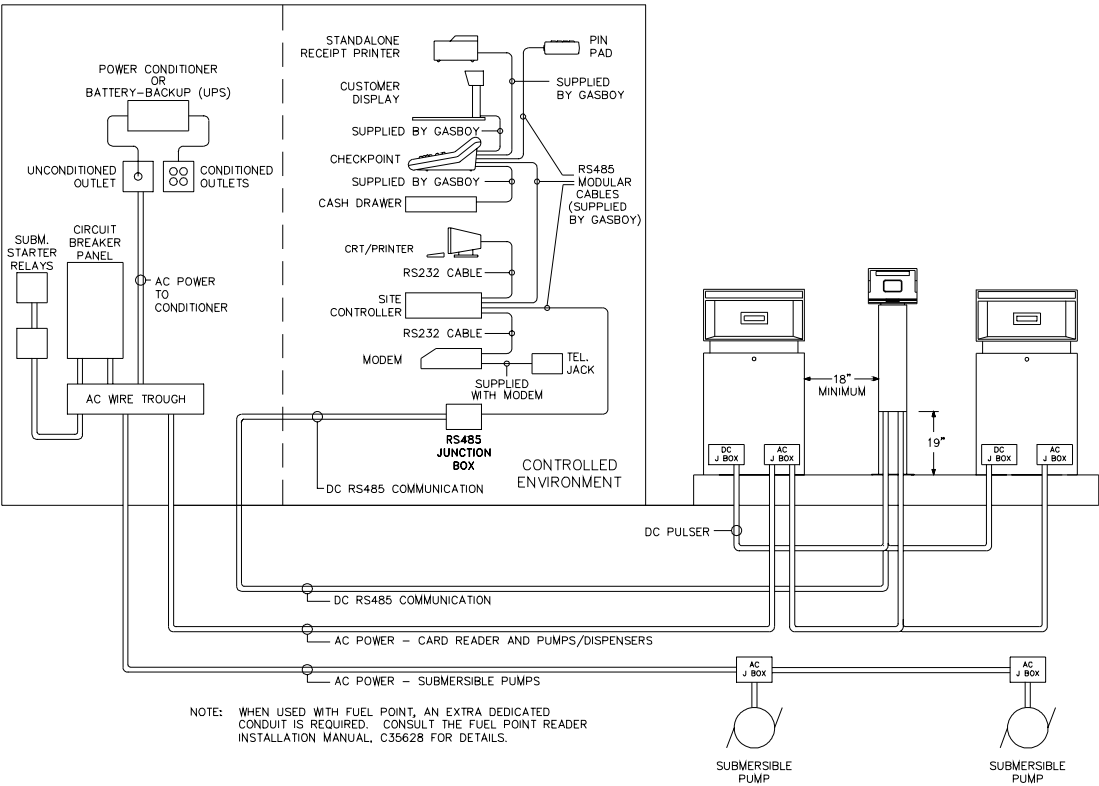


Profit Point

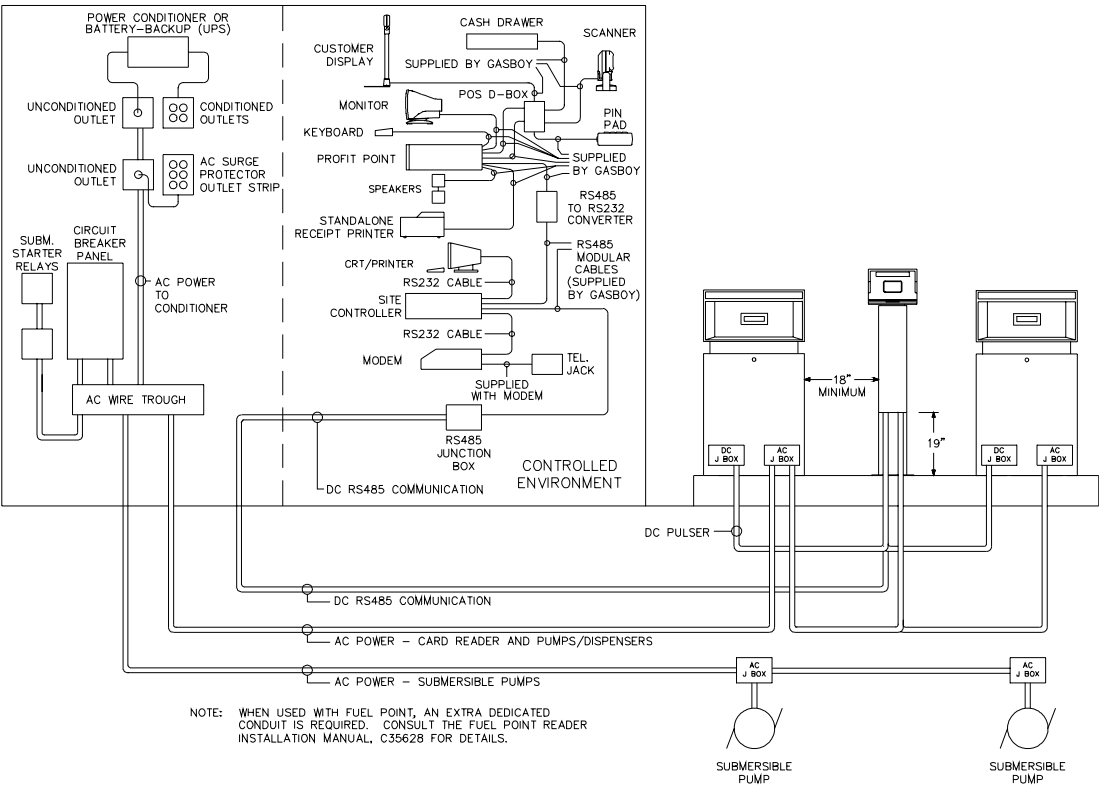


CONDUIT LAYOUT - PUMP CONTROL POST, MECHANICAL HOSE OUTLETS

Checkpoint

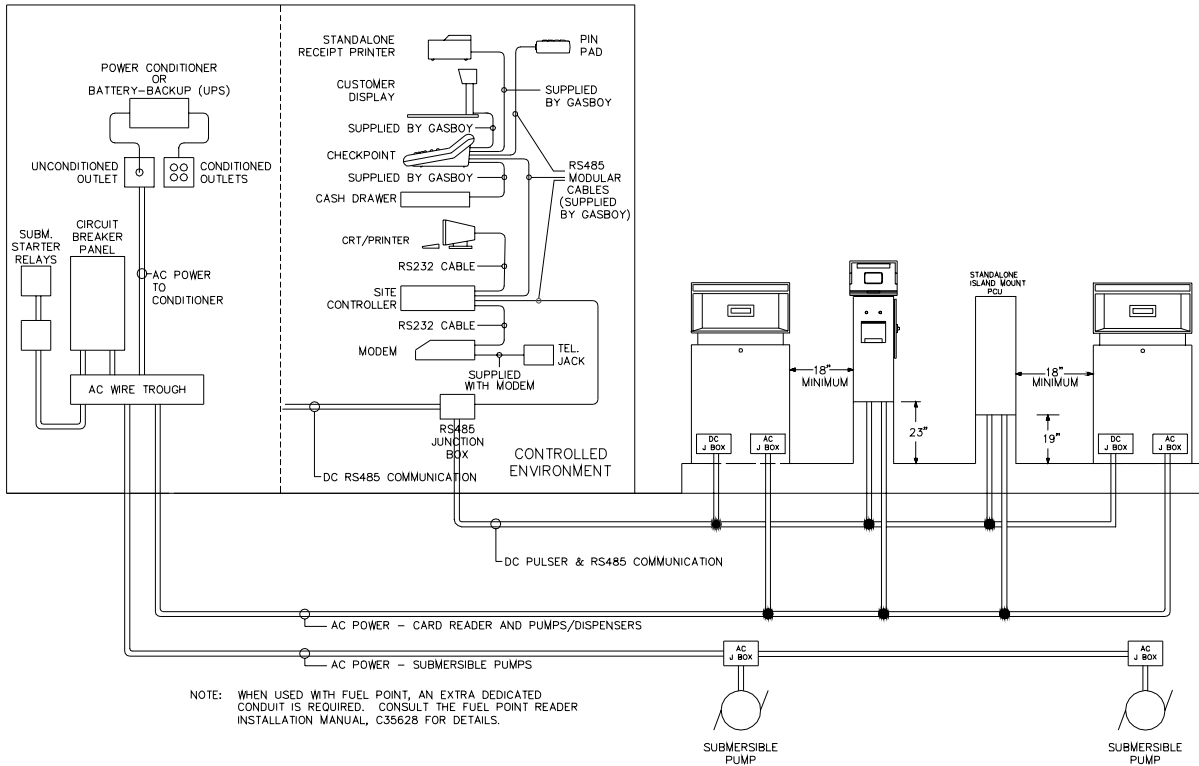


Profit Point

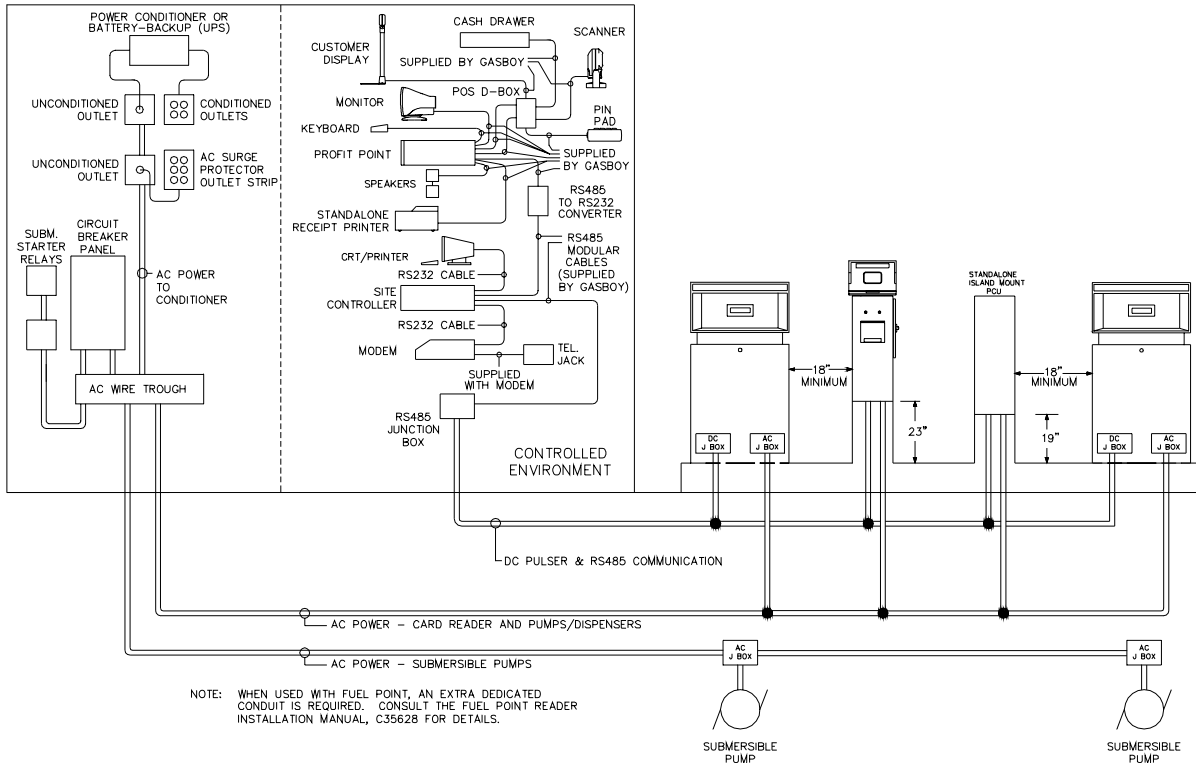


CONDUIT LAYOUT - STANDALONE ISLAND MOUNT PUMP CONTROL POST, MECHANICAL HOSE OUTLETS

Checkpoint



Profit Point



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:

1. All wiring is to 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 Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code. Wiring must also conform to the wiring diagram supplied with the pump/remote dispenser.
2. Use approved conduit and insulated gasoline- and oil-resistant wiring of the proper size.
3. Wire connections must be tightly spliced and secured with a wire nut; close off the open end of the wire nut with electrical tape.
4. Install an emergency power cutoff. In addition to circuit breaker requirements of NFPA 70, NFPA 30, 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 Island Card Reader do not remove AC power from equipment and under certain conditions, will not stop product flow.

In order to provide the highest level of safety to you, your employees, and customers, we recommend that all employees be trained as to the location and 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 which 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

System/Peripheral Equipment

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, one breaker should be used to supply the CFN system components, data terminal, and modem. However, it is acceptable to supply the 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. Power for the CFN system components (except for the pump control unit, island card reader and electronic register*) must come from the power conditioner supplied with the system. This is especially important for the Site Controller II.

- * A Profit Point and its attached components (receipt printer, RS-485 to RS-232 converter, POS D-Box, and possibly a scanner) must draw power from an AC Surge Protector outlet strip which **cannot** be plugged into the power conditioner. Whenever possible, the AC Surge Protector outlet strip and 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 helps to assure a common ground throughout the system which is necessary for 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.

WIRE SIZE

The AC wire size for power of the CFN system components must be 14 AWG or larger. This gauge of wire will be 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 wire should be stranded.

The specifications for the RS-485 data loop and RS-232 communication wire/cable size can be found in **Communication Requirements**.

COMMUNICATION REQUIREMENTS

The CFN System utilizes RS-485, RS-232, and RS-422 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 desired. 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 the RS-485 modular cables provided with the system components and the RS-485 data loop field wiring. The following installation requirements must be followed when installing the CFN RS-485 communication lines:

1. All wiring is to 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 Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.
2. **Cable:** Twisted pair shielded cable is highly recommended for RS-485 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 providing 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 600V
Environmental: Gas- and oil-resistant; suitable for wet or dry locations.

GASBOY can supply Belden 1063A (P/N 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.*

Cable with a voltage rating of less than 600V must be installed in a conduit separate from all AC wires.

3. **Conduit:** When using the recommended shielded, twisted-pair cable described above, the cable can be run with AC wires in 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, outdoors.

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

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

4. **Distance:** The following distances must be adhered to when installing the RS-485 field wiring.

- Wiring over 100 feet must meet the specifications outlined in **Cable** 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.

5. **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 can be obtained from other sources.

GASBOY-supplied cables are eight feet long. If you need to connect a CFN component with a modular connector (i.e., console) 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.

6. **Connections:** See the **System Components Wiring Diagram** later in this section 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 site controller and EIA RS-232 compatible peripheral devices (CRT/printer, modem, etc.). 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:

1. All peripheral equipment connected to the RS-232 ports must be Listed, have an Electronics Industry Association (EIA) standard RS-232 communication protocol and not be installed over a hazardous location.
2. **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:** RS-422 and GASBOY short haul modem (SHM) are required. See **Short Haul Modems** later in this section.
3. **Conduit:** All direct connect RS-232 cables over 15 feet must be in a metal conduit separate from any AC wires. For conduit requirements of short haul modems, see the installation sheet that applies to the device being used.
4. **Cables:** RS-232 cables can either be purchased from GASBOY or made by the installer. The type of cable needed will vary according to the devices it connects. When making cables, wire used must be stranded, not solid core.

Table 3-1. Cable Types

Connection	Cable Type	GASBOY P/N
Port 0 to CRT	RS-232 1:1 M/M	(P/N C04549)
Port 0 to SHM or modem	RS-232 DTE Cross M/M	(P/N C05039)
Port 2 to CRT	RS-232 DTE Cross M/M	(P/N C05039)
Port 2 to SHM or modem	RS-232 1:1 M/M	(P/N C04549)
Port 2 to PC	RS-232 DTE Cross M/F	(P/N C05928)

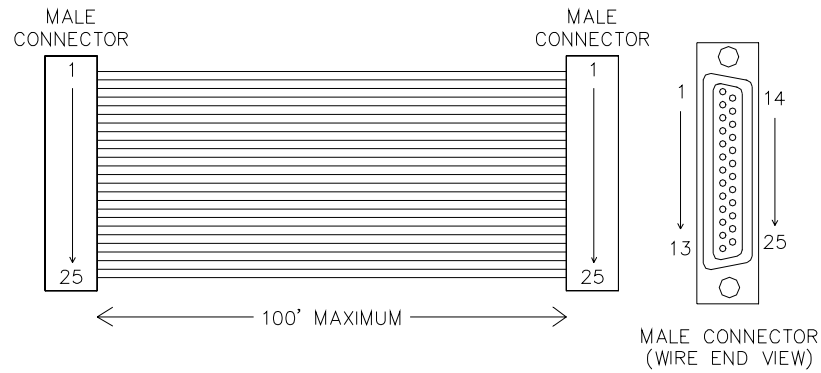
5. **Local Port:** A logger eliminator (P/N C05593) must be connected to port 0 of the site controller when a logger is not used.

RS-422

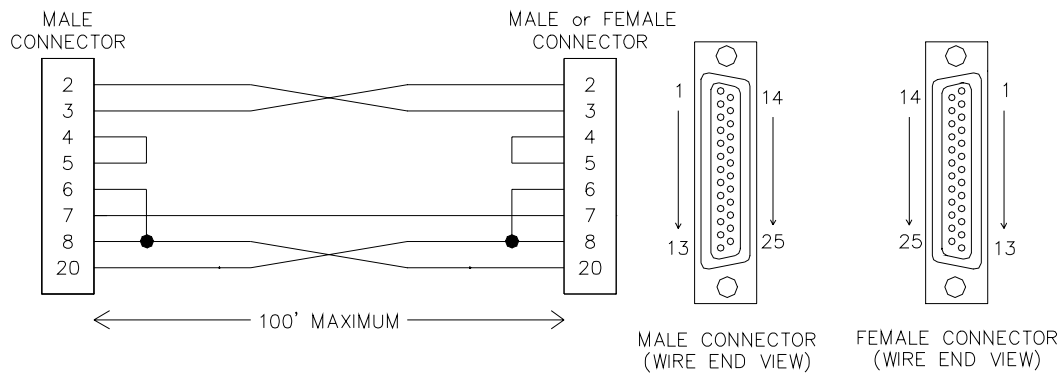
For guidelines and restrictions on RS-422 wiring, see **Short Haul Modems (RS-422)** later in this section.

RS-232 CABLES

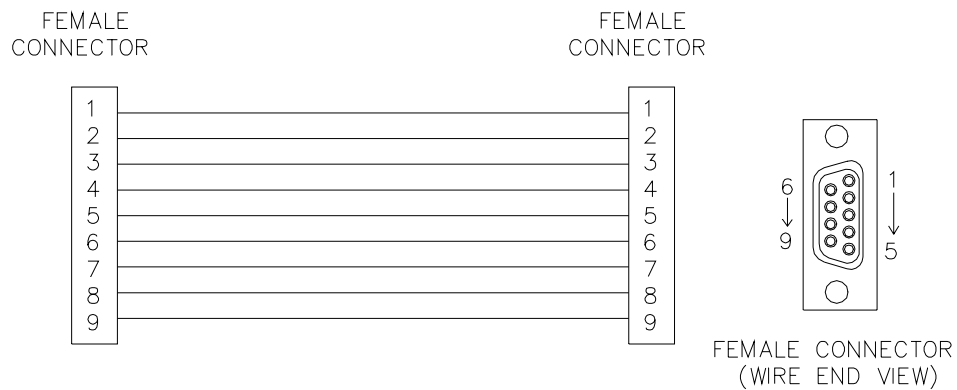
RS-232 1:1 Cable (P/N C04549 - 8-foot M/M)



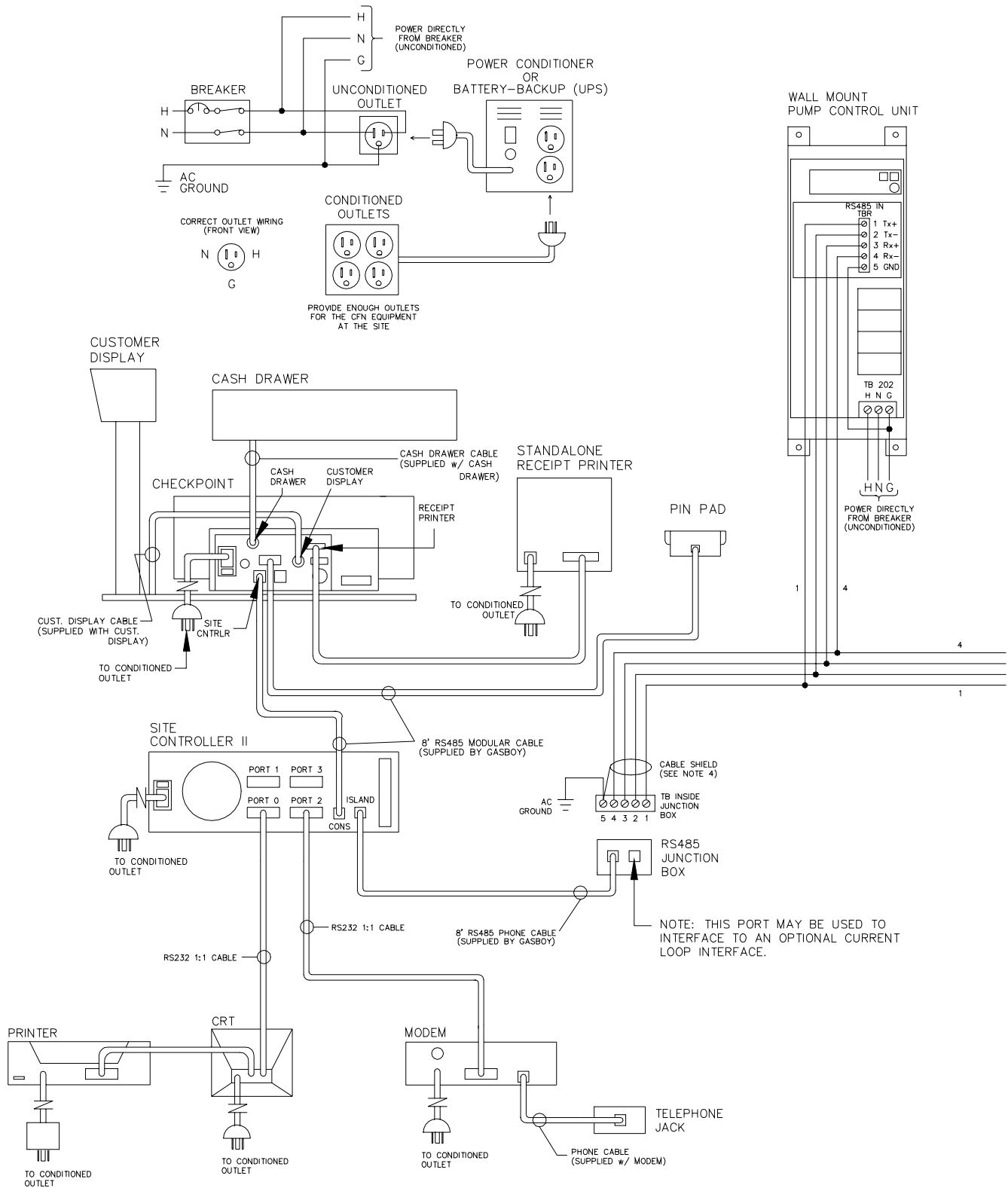
RS-232 DTE Cross Cable (P/N C05039: 8-foot M/M, P/N C05928: 8-foot M/F)

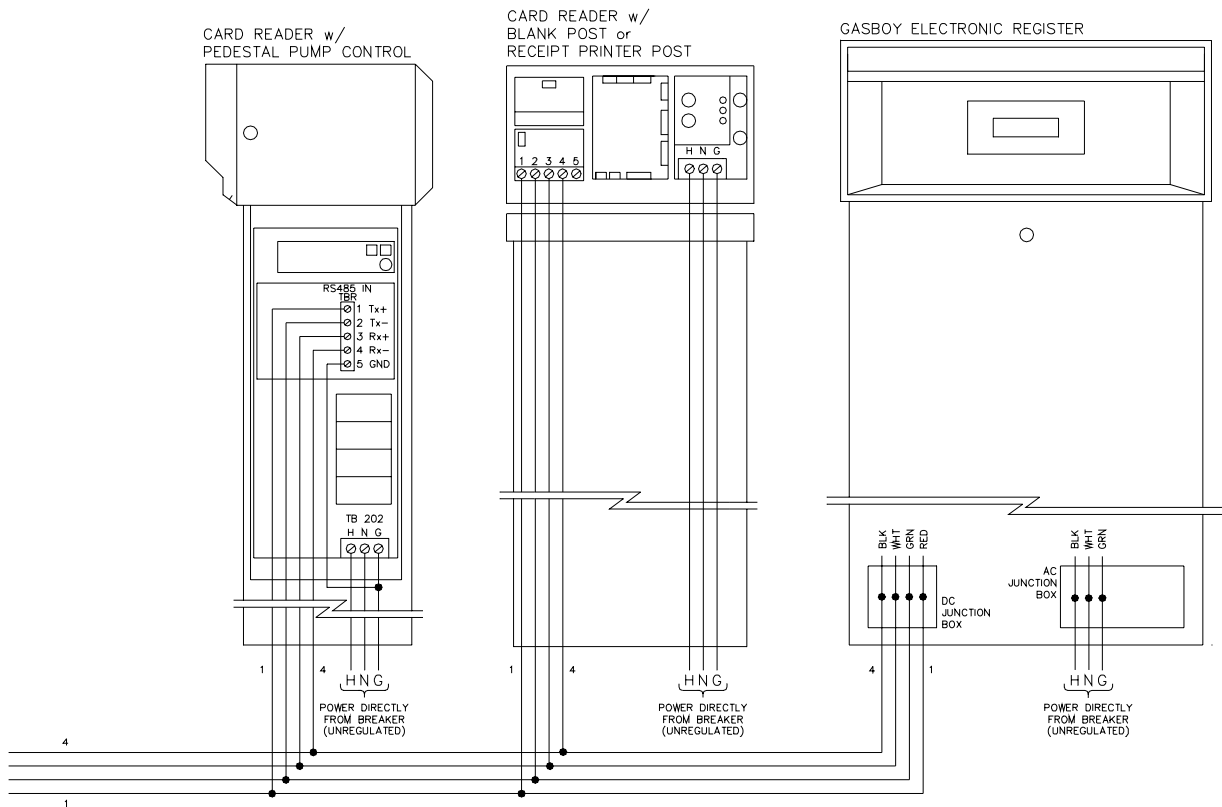


RS-232 1:1 Cable (P/N C05991: 6-foot F/F)



SYSTEM COMPONENTS WIRING DIAGRAM (WITH CHECKPOINT)

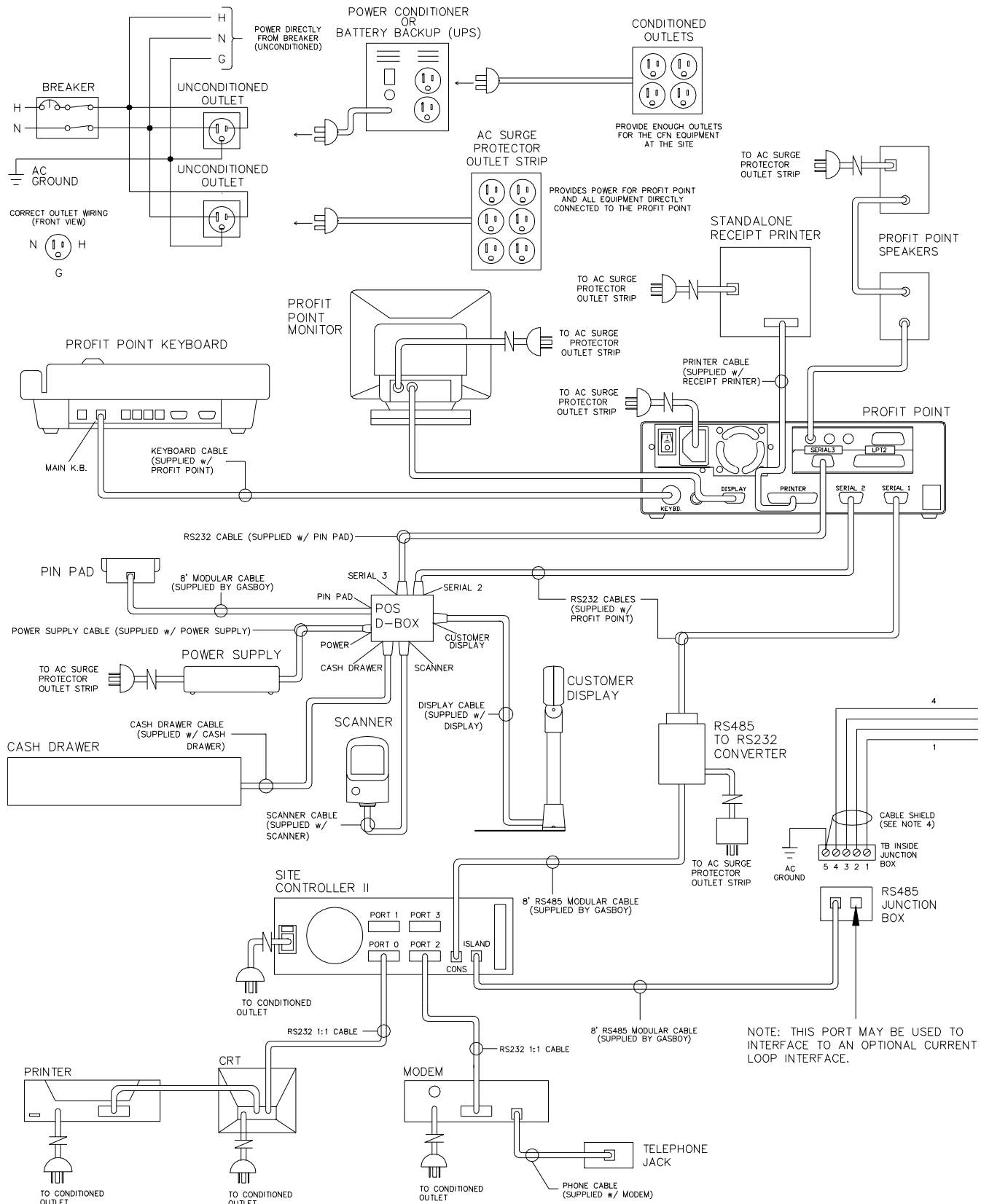


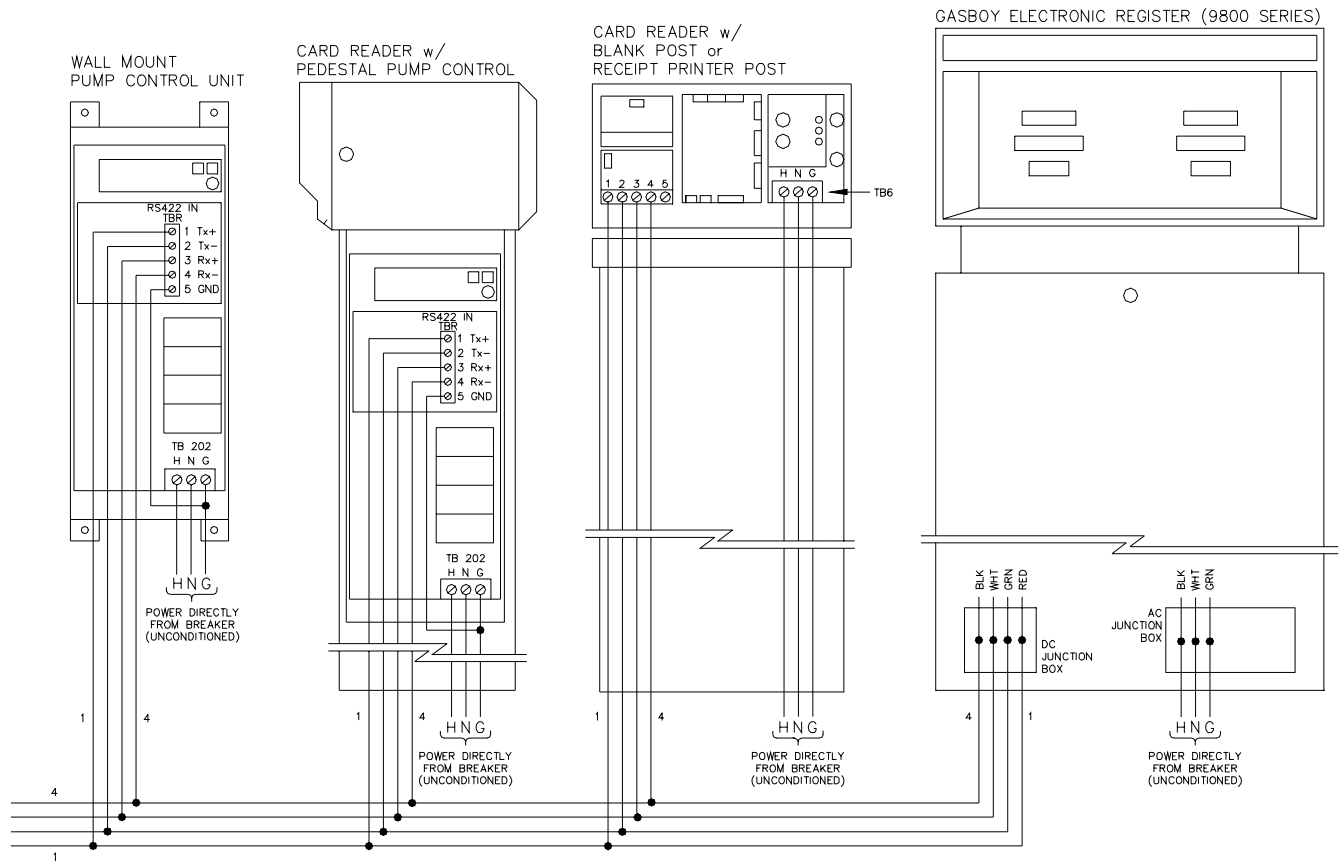


NOTES:

1. All wiring is to 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 Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code. 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 Listed, have an Electronics Industry Association (EIA) standard RS-232 communications protocol and not be installed over a hazardous location.
3. The above wiring diagram illustrates a CFN System with every component to indicate how they are interconnected. Components that are not a part of your system should be ignored.
4. When using 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. Satellite Islanders are interchangeable with CFN island card readers (ICR's) in your configuration.
6. Consult applicable section of this manual for specific system installation requirements.
7. If connecting to Tokheim DPT's, contact Gasboy Technical Service for special instructions.

SYSTEM COMPONENTS WIRING DIAGRAM (WITH PROFIT POINT)





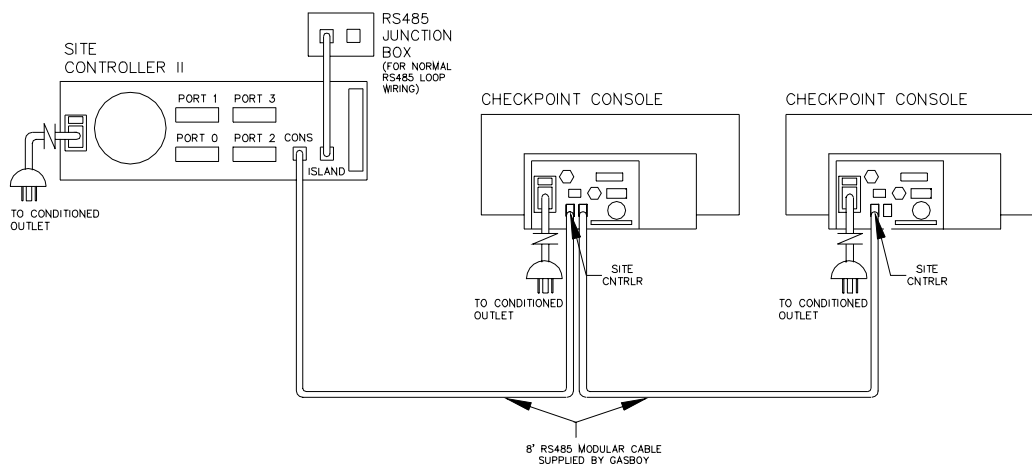
NOTES:

1. All wiring is to 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 Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code. 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 Listed, have an Electronics Industry Association (EIA) standard RS-232 communications protocol and not be installed over a hazardous location.
3. The above wiring diagram illustrates a CFN System with every component to indicate how they are interconnected. Components that are not a part of your system should be ignored.
4. When using shielded cable for the RS-485 communication wiring, ground the shield to the AC ground used for the system components (on one end only).
5. Satellite Islanders are interchangeable with CFN island card readers (ICR's) in your configuration.
6. Consult applicable section of this manual for specific system installation requirements.
7. If connecting to Tokheim DPT's, contact Gasboy Technical Service for special instructions.

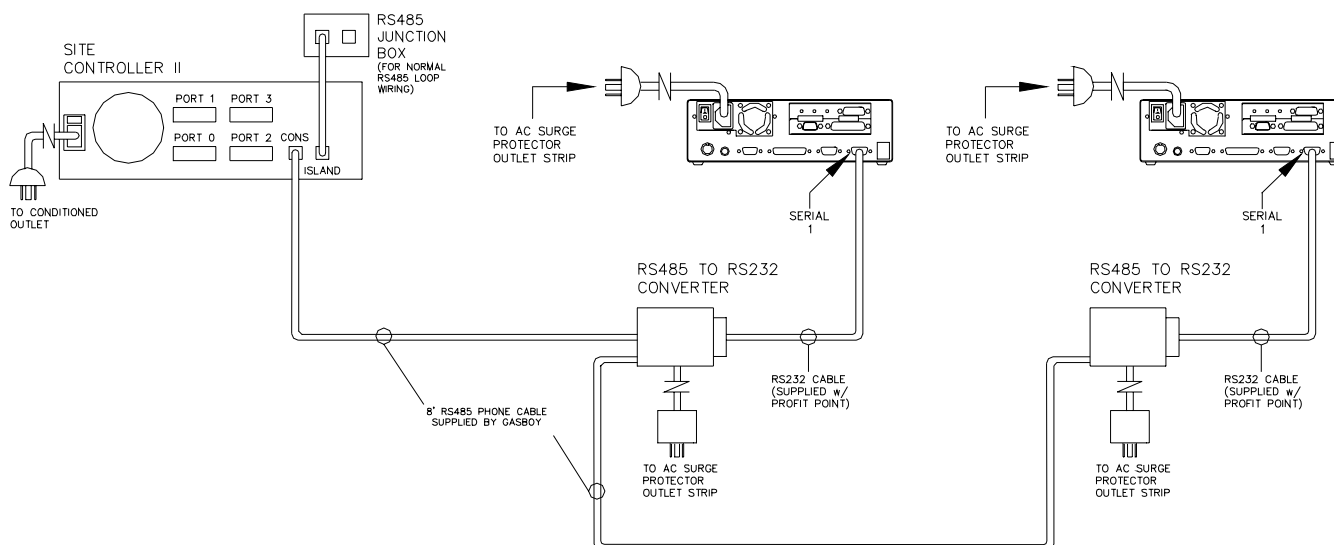
MULTIPLE CONSOLE WIRING - CHECKPOINT AND PROFIT POINT

The following diagrams illustrate how to connect multiple Checkpoint or Profit Point consoles. All wiring must be installed according to the RS-232 and RS-485 wiring specifications discussed previously.

Checkpoint



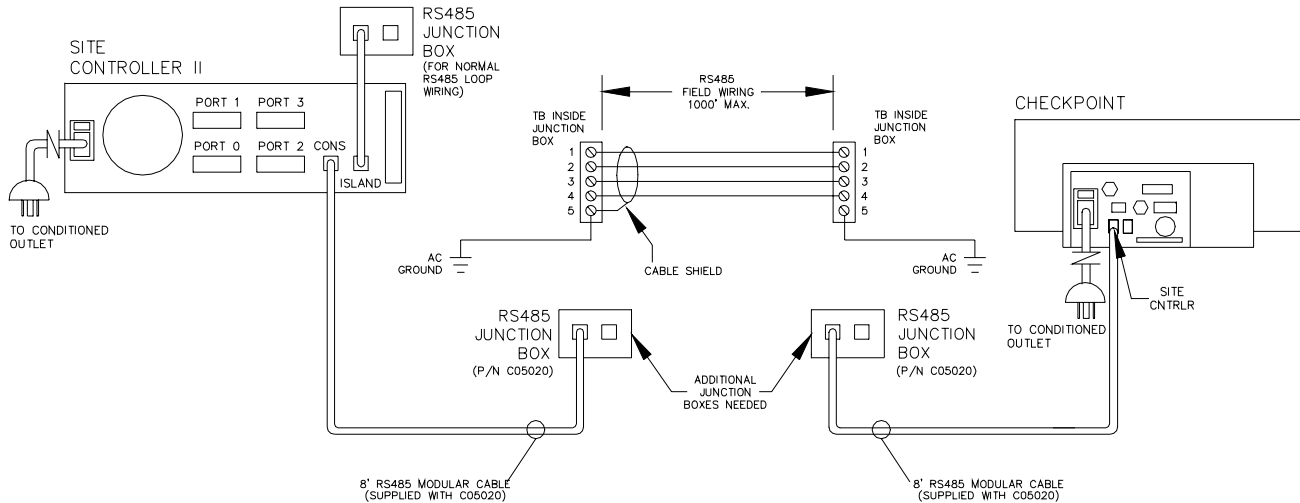
Profit Point



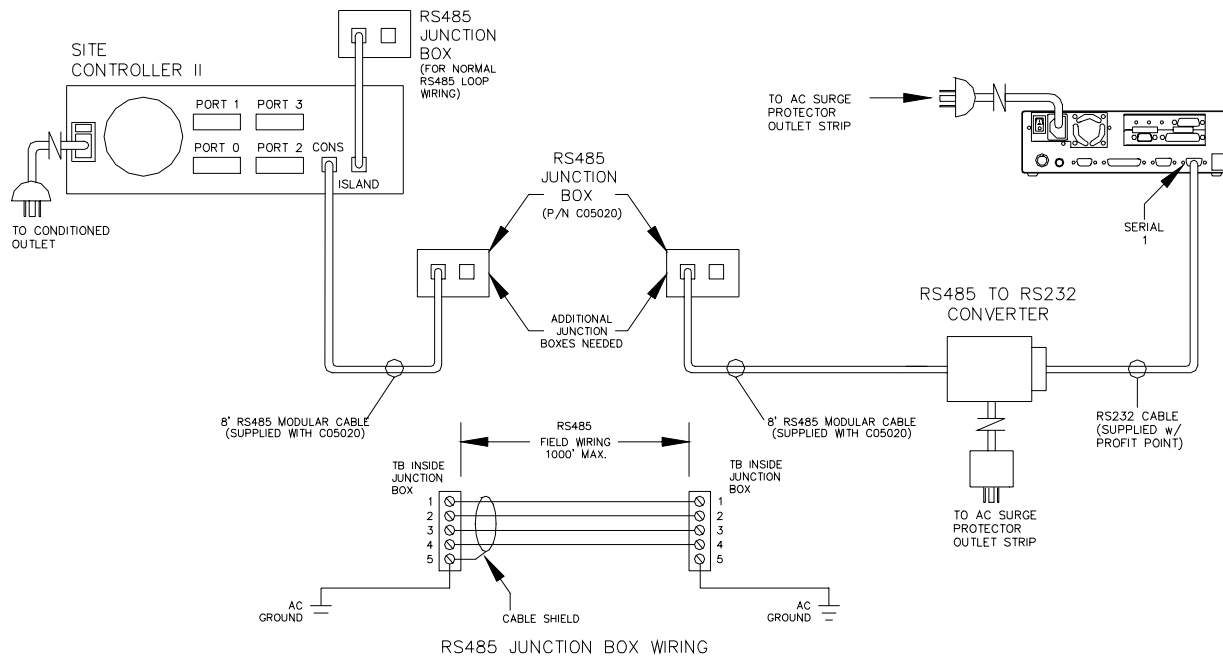
REMOTE CONSOLE WIRING - CHECKPOINT AND PROFIT POINT

Most consoles are located within eight feet of the site controller and are wired using the supplied cables. You can, however, locate your console up to 1000 feet from the site controller. 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 discussed previously.

Checkpoint Remote Wiring

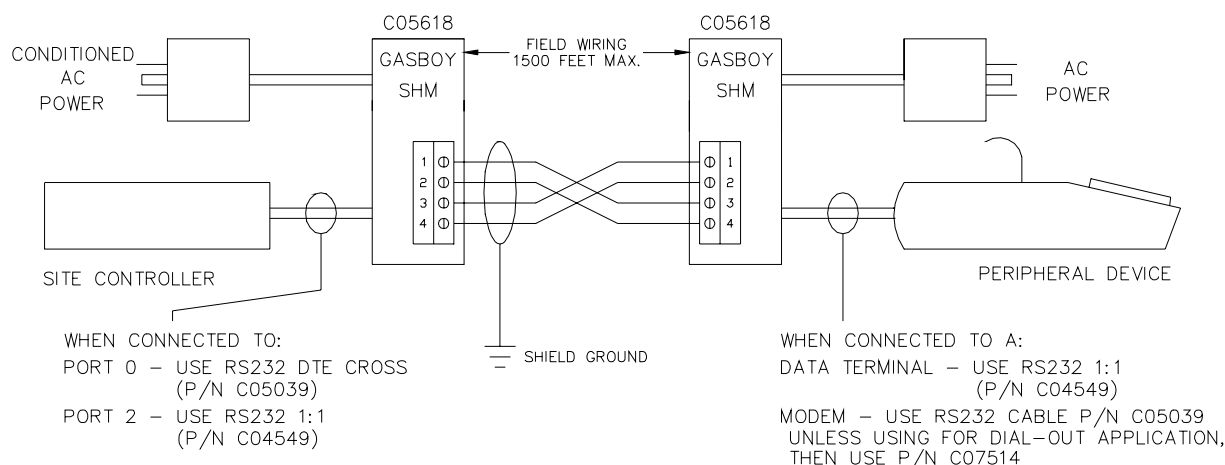


Profit Point Remote Wiring



SHORT HAUL MODEMS - RS-422

A GASBOY short haul modem 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.



1. All wiring is to 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 Code (NFPA 30A) codes and regulations. Wiring must also conform to the wiring diagram supplied with the pump/remote dispenser. Canadian users must also comply with the Canadian Electrical Code.
2. **Power:** The AC power for the short haul modem should come from the same breaker that supplies the peripheral device or the system.
3. **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 providing 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 600V
 Environmental: Gas- and oil-resistant; suitable for wet or dry locations.

GASBOY can supply Belden 1063A (P/N 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.*

Cable with a voltage rating of less than 600V must be installed in a conduit separate from all AC wires.

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

4. **Conduit:** When using the recommended shielded twisted-pair cable described previously, RS-422 wires can be run with AC wires in 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, outdoors.

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

If using cable other than the recommended Belden 88760 or equivalent, the RS-422 field wires must be installed in a metal conduit separate from any AC wires.

5. **Distance:** The maximum field wiring cable length is not to exceed 1500 feet.

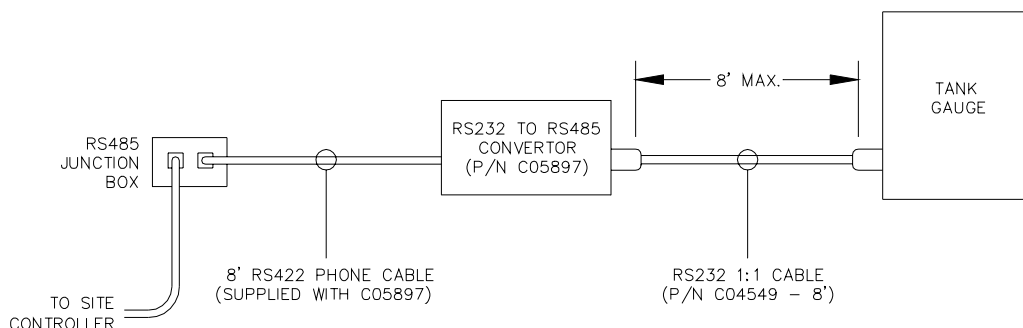
PHONE MODEMS

The type of phone line required for remote communication via a modem is contingent upon the type of modem used and the method of communication desired. Consult the manual that comes with the modem for specific requirements.

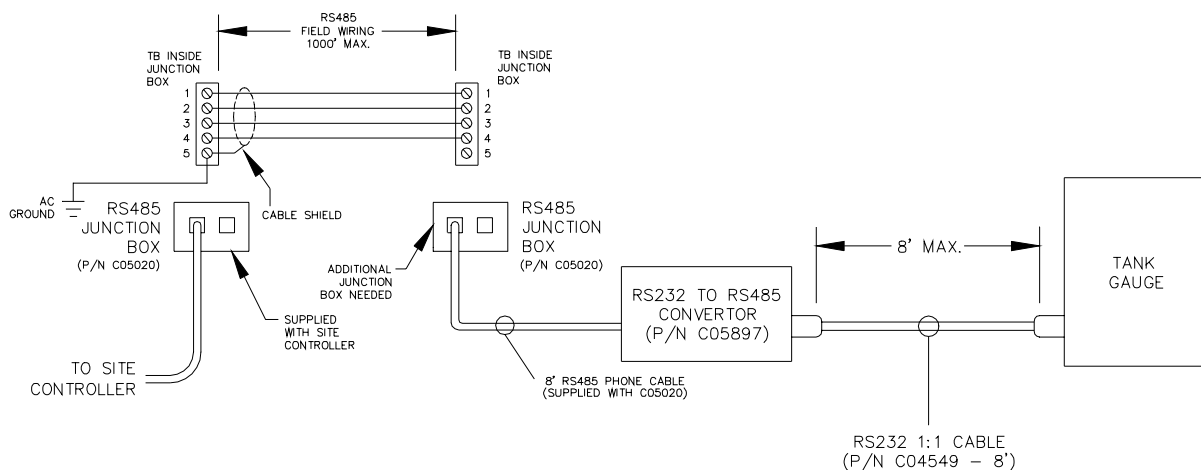
WIRING FOR A TANK MONITORING SYSTEM

The following diagrams show the wiring schemes when connecting the site controller to a tank monitoring system. All wiring must be installed according to the RS-232 and RS-485 wiring specifications discussed previously. Consult 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.

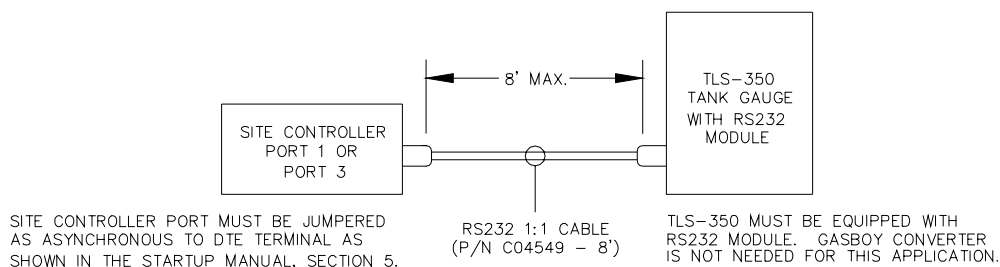
Wiring for a Tank Monitoring System (8 Feet or Less)



Wiring for Tank Monitoring System (Over 8 Feet)

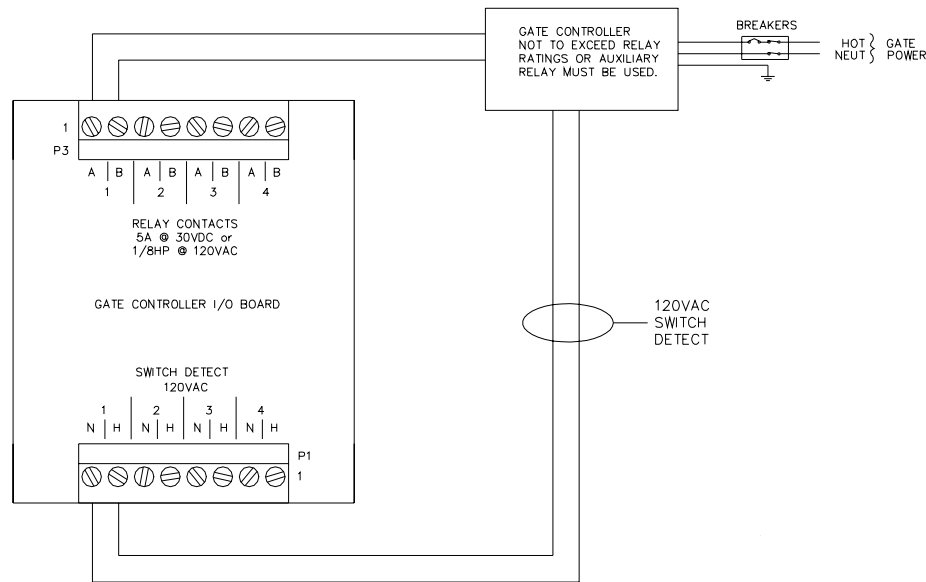


Serial Wiring for a TLS-350 Tank Monitoring System with RS-232 Module



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. Either of these Gate Readers allows activation by card, Fuel Point, or terminal command, but not via console or POS terminal.



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

Section 4

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 these rules:

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 Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code. Wiring must also conform to the wiring diagram supplied with the pump/remote dispenser.
2. Use approved conduit and insulated gasoline- and oil-resistant wiring of the proper size.
3. Wire connections must be tightly spliced and secured with a wire nut; close off the open end of the wire nut with electrical tape.
4. The line to the motor should be on a separate circuit and fused to carry 20 to 30 AMPS depending on the motor size and/or the voltage setting.
5. Install an emergency power cutoff. 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 Island Card Reader do not remove AC power from equipment and under certain conditions, will not stop product flow.

In order to provide the highest level of safety to you, your employees, and customers, we recommend that all employees be trained as to the location and 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 power to the submersible pump and any other remote dispensers which 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 manufacturer's instructions.

Suction Pumps

The CFN pump control unit 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 pump control unit 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 Pump Control Unit. They are wired as standalone units. Refer to the *9800 Pumps and Dispensers Installation/Operation Manual, 035235* for wiring diagrams and instructions.

WIRE SIZE

Table 4-1 shows 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 volt units. Use this table as a guide for selecting the proper size wire for your installation. All wire should be stranded.

The wire size for the switch detect from the pump should be 14 AWG. The wire size for the 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 must be 18 AWG and must meet the wiring requirements outlined in **Pulser Wiring and Configuration** later in this section.

Table 4-1. Wire Size

120 VOLT WIRE GAUGE SIZES PER FEET OF RUN								
MOTOR H.P.	25'	50'	100'	150'	200'	250'	300'	OVER 300' USE RELAY AT MOTOR LOCATION
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	6	6	4	
240 VOLT								
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	6	

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, nor can it handle auxiliary switch detects for console systems.

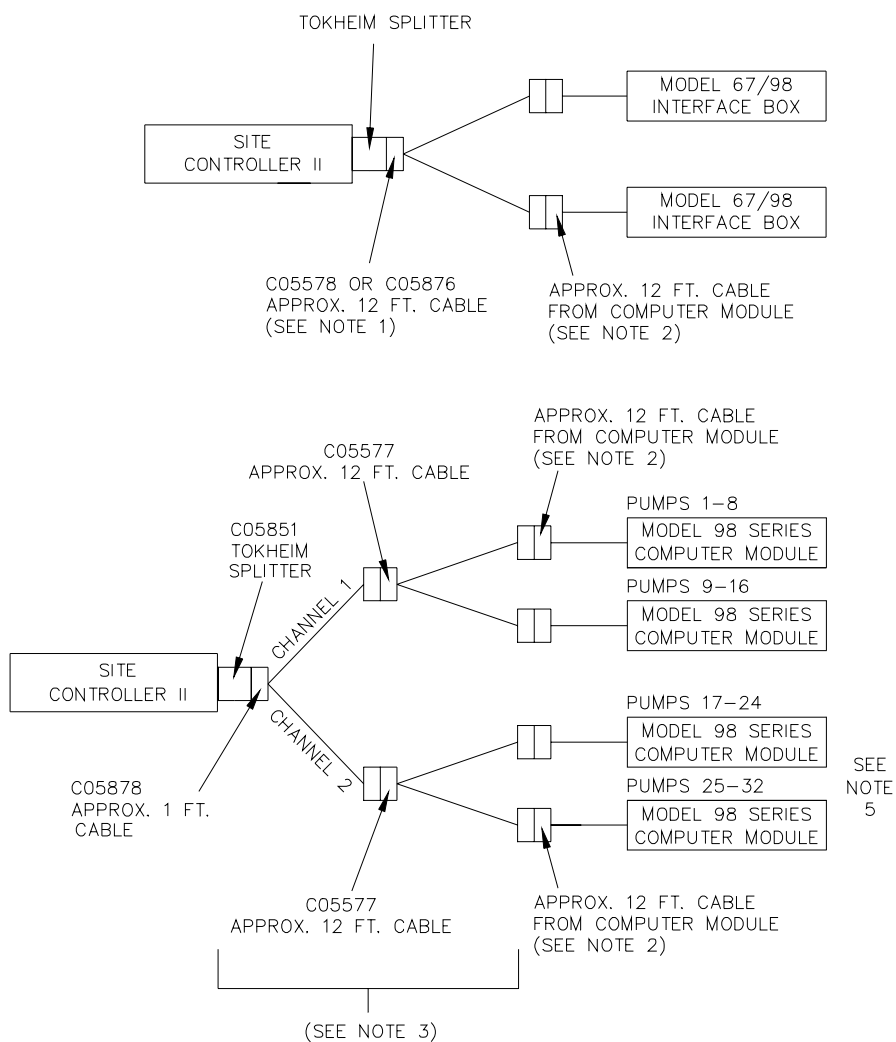
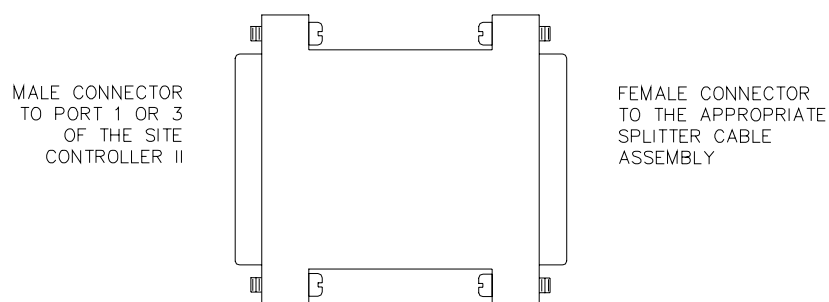
TOKHEIM SPLITTER

The Tokheim Splitter (shown on facing page) is required to establish an electronic interface between the Site Controller II and any Tokheim electronic pumps/remote dispensers. The Tokheim Splitter, along with proper cabling, also allows up to 32 pumps to be controlled through a single Site Controller II communication port (port 1 or port 3).

NOTES:

1. Use a C05578 cable for connection to a single 67 or 98 Interface box. Use a C05876 cable for connection to two 67 or 98 Interface boxes. Both cables include the Tokheim Splitter.
2. A Model 180 signal cable extension is available as an accessory from Tokheim. The maximum distance of the combined cables should not exceed 350 feet. The maximum distance for a 94 or 98 interface box is 250 feet.
3. Use part number C06694 for connection to three or four 98 series computer modules. C06694 is the combination of one C05878 cable, two C05577 cables and a Tokheim Splitter.
4. Communication for pumps 1-32 may be provided through port 1 or 3 of the Site Controller II.
5. The second two 98 boxes must be connected to channel 2 of the splitter. Address the third 98 box (first 98 box on channel 2) as pumps 1 to 8; address the fourth 98 box (second 98 box on channel 2) as pumps 9 to 16.

TOKHEIM SPLITTER C05851

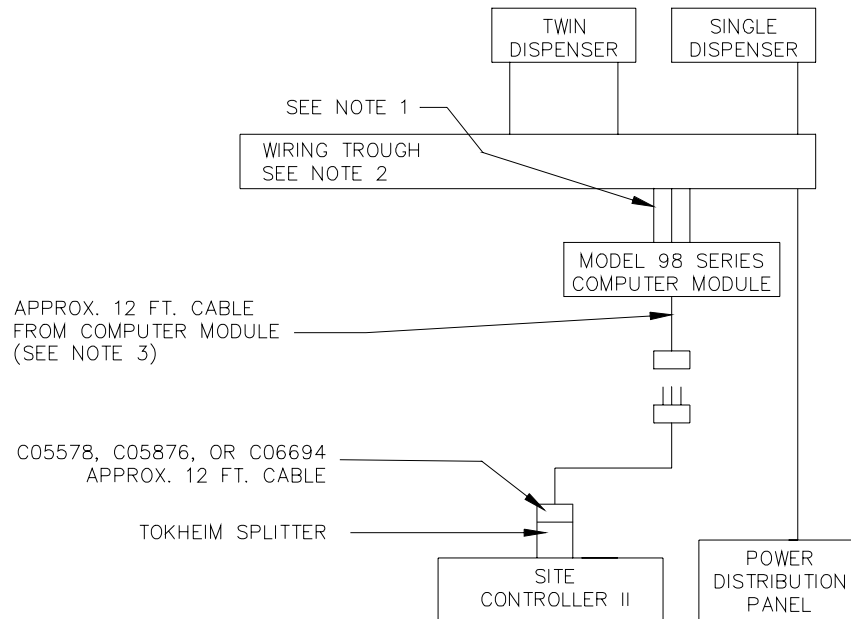


TOKHEIM 162 INTERFACE

Electronic Interface

Basic System

- 1 to 8 Hoses System consists of one Site Controller II, one computer module, and one C05578 cable and Tokheim Splitter combination.
- 9 to 16 Hoses System consists of one Site Controller II, two computer modules, and one C05876 cable and Tokheim Splitter combination.
- 17 to 24 Hoses System consists of one Site Controller II, three computer modules, and one C06694 cable and Tokheim Splitter combination.
- 25 to 32 Hoses System consists of one Site Controller II, four computer modules, and one C06694 cable and Tokheim Splitter combination.



NOTES:

1. All Tokheim equipment should be installed per Tokheim specifications.
2. Wiring trough, conduits, and wire are furnished by the installer.
3. A Model 180 signal cable extension is available as an accessory from Tokheim. The maximum distance of the combined cables should not exceed 350 feet. The maximum distance for a 94 or 98 interface box is 250 feet.
4. Communication for pumps 1-32 may be provided through port 1 or 3 of the Site Controller II.
5. The second two 98 boxes must be connected to channel 2 of the splitter. Address the third 98 box (first 98 box on channel 2) as pumps 1 to 8; address the fourth 98 box (second 98 box on channel 2) as pumps 9 to 16.

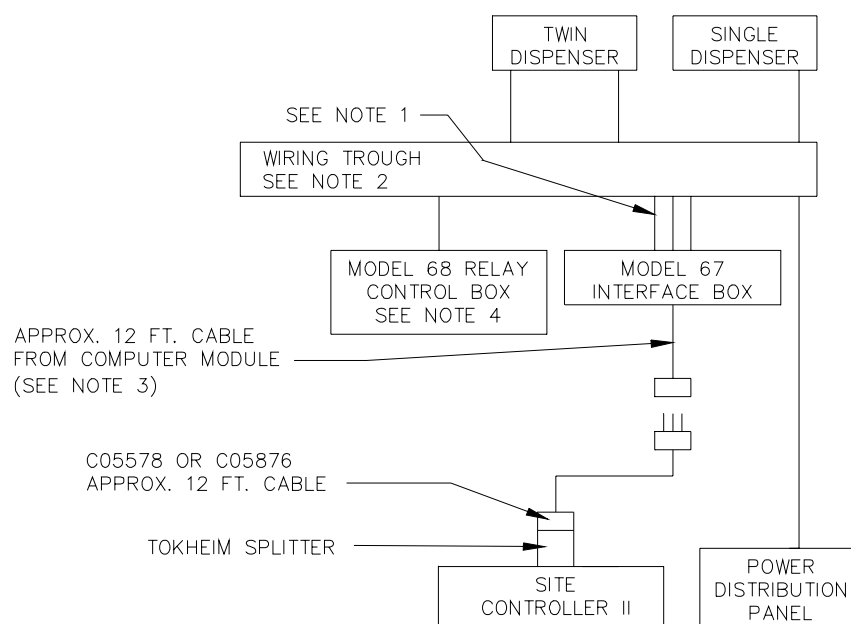
TOKHEIM 262 AND 262A INTERFACE

Electronic Interface

Basic System

1 to 16 Hoses System consists of one Site Controller II, one interface box, and one C05578 cable and Tokheim Splitter combination.

17 to 32 Hoses System consists of one Site Controller II, two interface boxes, and one C05876 cable and Tokheim Splitter combination.



NOTES:

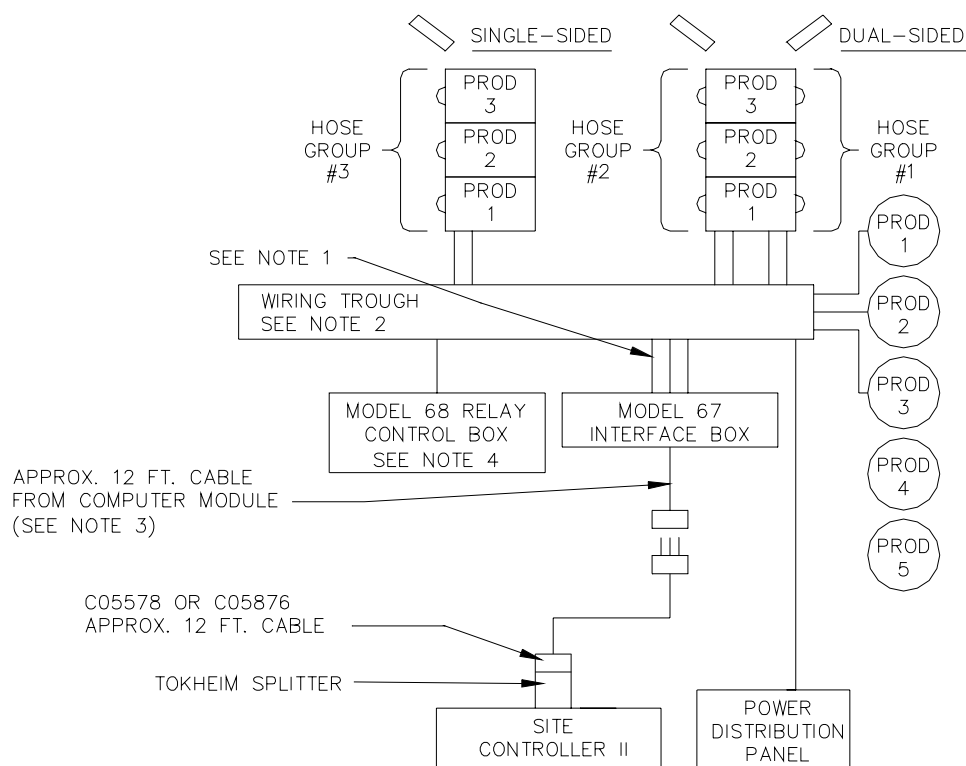
1. All Tokheim equipment should be installed per Tokheim specifications.
2. Wiring trough, conduits, and wire are furnished by the installer.
3. A Model 180 signal cable extension is available as an accessory from Tokheim. The maximum distance of the combined cables should not exceed 350 feet. The maximum distance for a 94 or 98 interface box is 250 feet.
4. A Model 68 Box is recommended for emergency shut-off applications.
5. Communication for pumps 1-32 may be provided through port 1 or 3 of the Site Controller II.

TOKHEIM 330B, 333B-SA, TCS, AND PREMIER INTERFACE

Electronic Interface

Basic System

- | | |
|----------------|--|
| 1 to 16 Hoses | System consists of one Site Controller II, one interface box, and one C05578 cable and Tokheim Splitter combination. |
| 17 to 32 Hoses | System consists of one Site Controller II, two interface boxes, and one C05876 cable and Tokheim Splitter combination. |

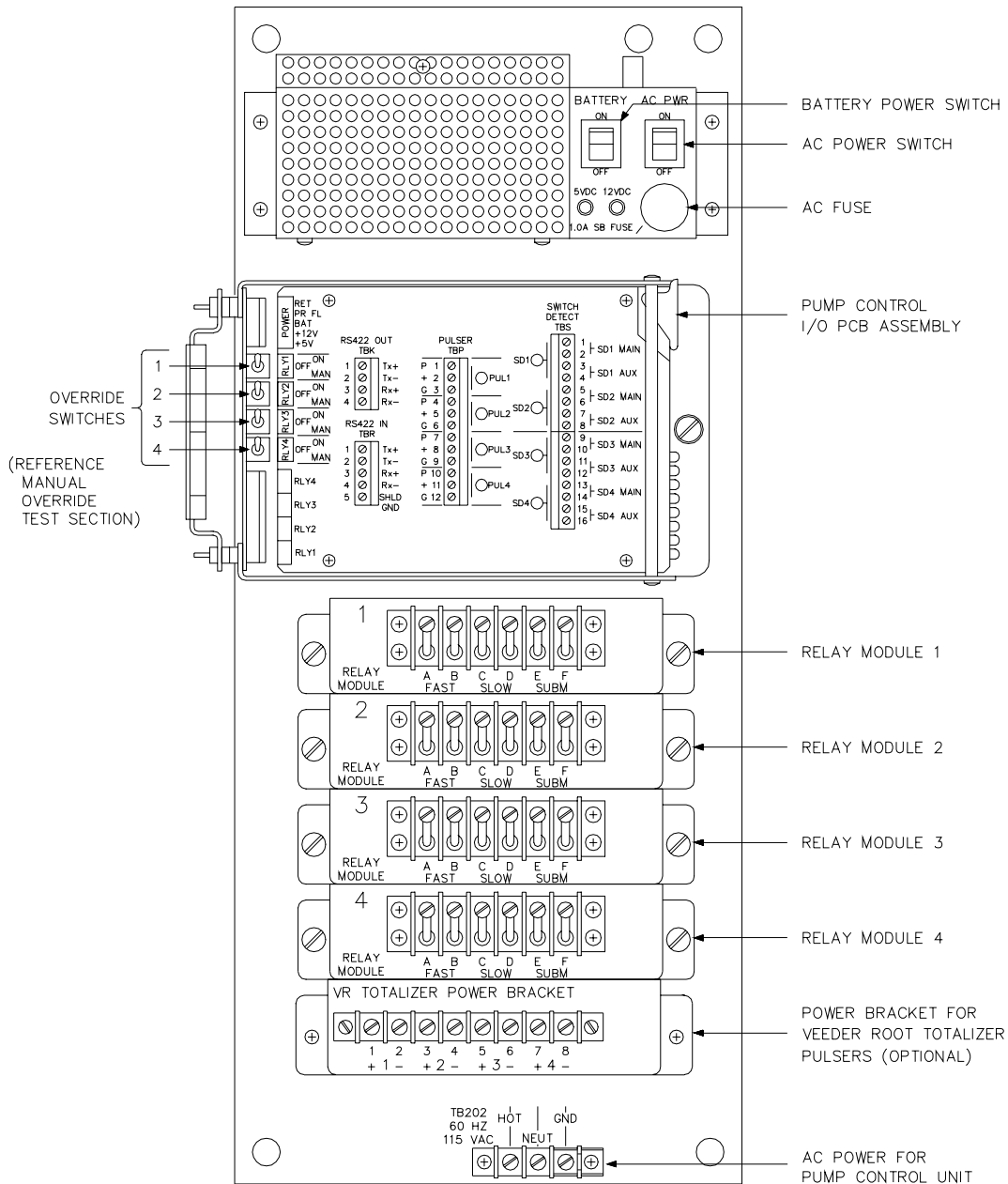


NOTES:

1. All Tokheim equipment should be installed per Tokheim specifications.
2. Wiring trough, conduits, and wire are furnished by the installer.
3. A Model 180 signal cable extension is available as an accessory from Tokheim. The maximum distance of the combined cables should not exceed 350 feet. The maximum distance for a 94 or 98 interface box is 250 feet.
4. A Model 68 Box is recommended for emergency shut-off applications.
5. Communication for pumps 1-32 may be provided through port 1 or 3 of the Site Controller II.

TERMINAL BLOCK ID

All mechanical pump/remote dispenser wiring for the CFN System is terminated in the pump control unit. Terminal connectors should be used on 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 PCB Assembly) do not require terminal connectors. The wire to these connectors must not be any larger than 14 AWG. The orientation of the chassis assembly is shown below.



CONTROL LINES

Descriptions of the control lines are provided to familiarize the installer with the 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 in order to guide him in planning 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 (1) 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 is to be a solid, corrosion-resistant conductor. It should be properly tied into the ground bus strip of the panel. We recommend the neutral and ground bus strips be bonded together (unless prohibited by local codes).

Reset Motor Feed

This is a 120VAC input which 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 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 120VAC input to the switch will be passed through as an output causing the solenoid valve (optional in some models) to open and the Reset Complete line to indicate 120VAC.

NOTE: This line is also used to sense the closing of the pump handle for console operation. A low current 120VAC 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

This is a 120VAC input which 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 manual mode. When the reset finishes its cycle, the 120VAC 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 would reset, but be unable 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 (120VAC or 240VAC), 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

This 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

This is a 120VAC input which 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 manual mode. When the reset finishes its cycle, the 120VAC 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

This is a 120VAC output which is used to indicate the reset is complete and the pump/remote dispenser is ready to dispense 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

This is a 120VAC input which 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 only be on when the pump/remote dispenser is authorized and the pump/remote dispenser should be in the fast flow mode. This line will also be switched on when the pump/remote dispenser is in the manual mode.

Light Feed

This is a 120VAC 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 the lights of up to 8 units can be supplied by one breaker. The light feed is not controlled by the CFN System.

Light Neutral

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

Phase 2 Feed

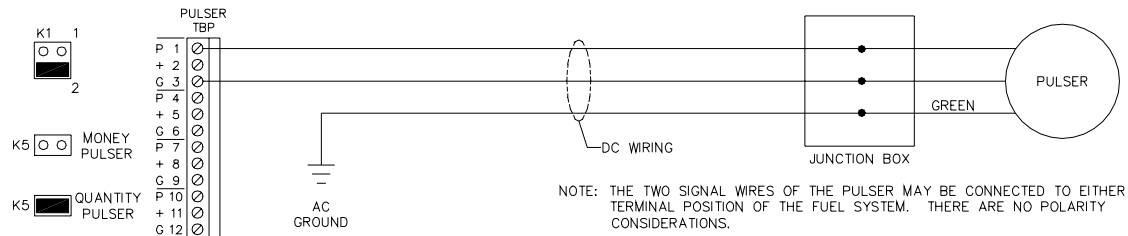
This is a hot feed which is the opposite phase of the pump motor feed. This line and the pump motor feed are used for 240VAC motor applications.

Pulser

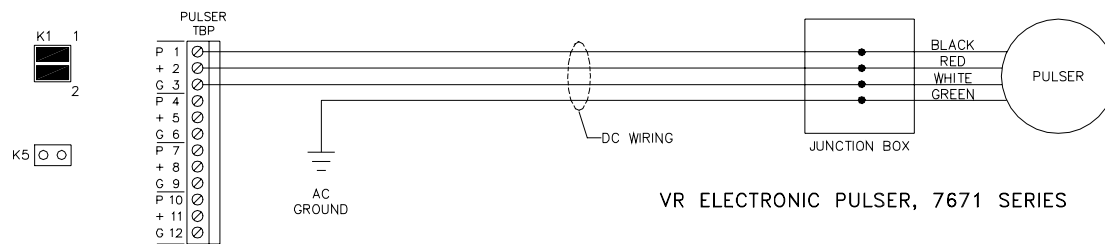
This supplies a DC output which is provided to indicate the quantity dispensed. This line must be capped when not in use. DC pulser and DC RS-422 and RS-485 communication wires can be combined in the same conduit. DC wires must be in separate metal conduit from AC wires unless shielded cable is used as specified in Section 3, **RS-485, Short Haul Modems (RS-422)**, and **Pulser Wiring and Configuration**.

PULSER WIRING AND CONFIGURATION

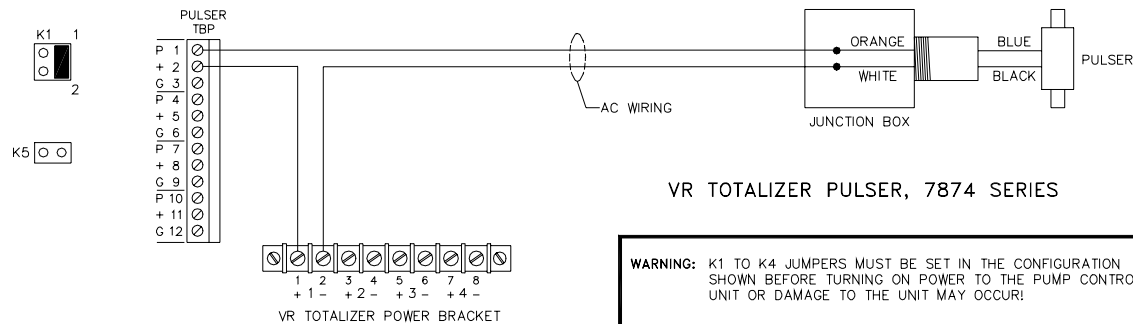
Pulser wiring diagrams appear below. Pulser wiring requirements are detailed on the following page.



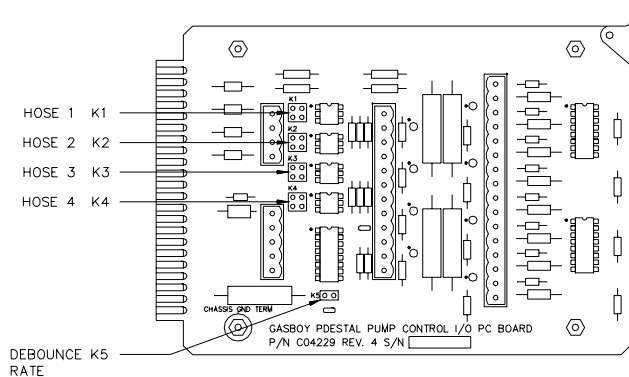
VR REED SWITCH PULSER, 1871 SERIES



VR ELECTRONIC PULSER, 7671 SERIES



VR TOTALIZER PULSER, 7874 SERIES



I/O PCB OF PUMP CONTROL UNIT SHOWN WITHOUT COVER PLATE AND TERMINAL BLOCK CONNECTORS (SEE TERMINAL BLOCK ID, PAGE 4-2 FOR LOCATION OF I/O PCB)

NOTE: ALL PULSERS SHOWN ABOVE ARE SHOWN CONNECTED TO THE HOSE #1 POSITION. THE K1 JUMPER PINS ARE USED TO CONFIGURE THE CIRCUITRY FOR HOSE #1. THE JUMPER PINS ASSOCIATED WITH THE OTHER HOSES ARE INDICATED ABOVE.

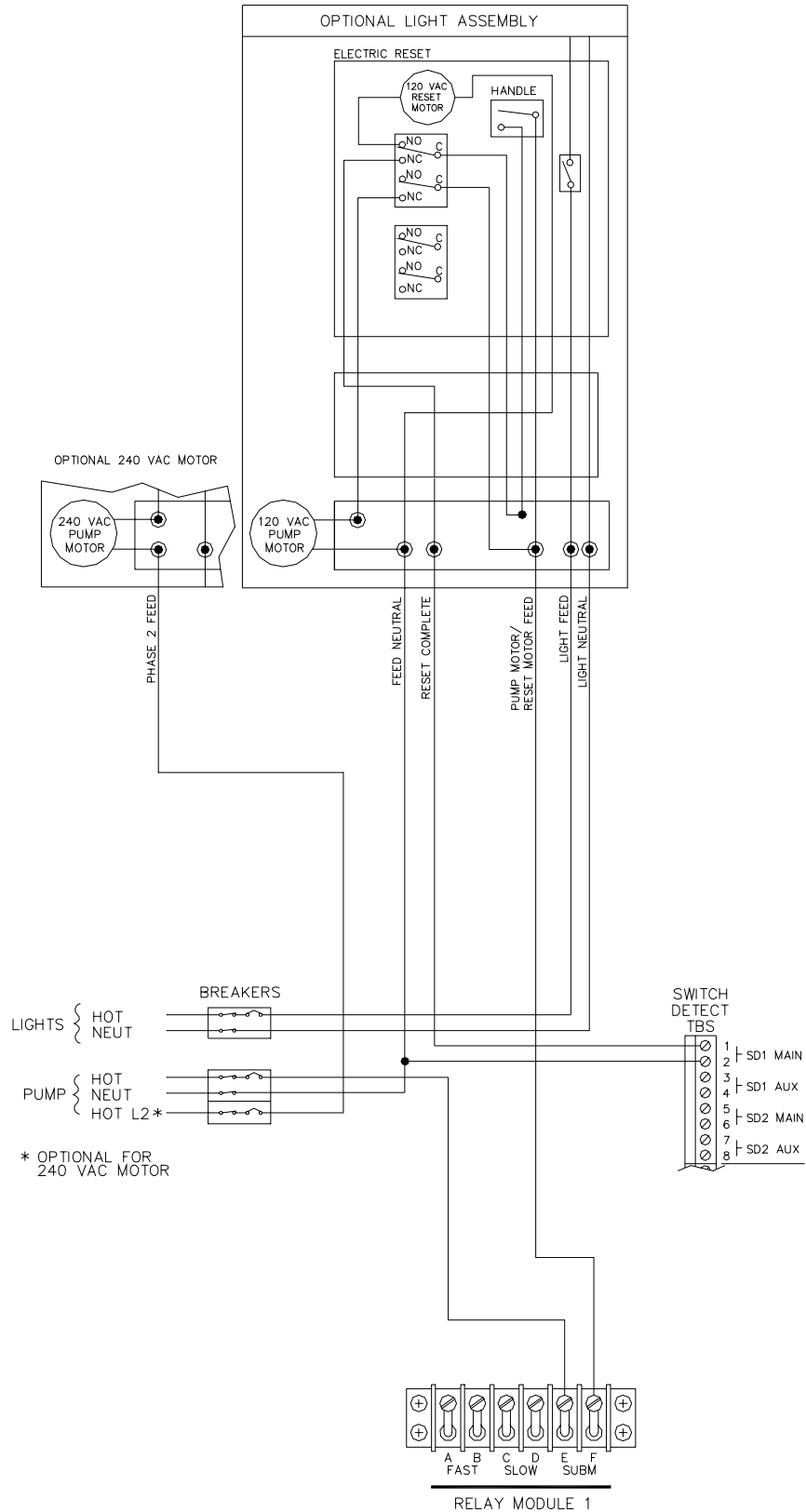
Pulser Wiring Requirements

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

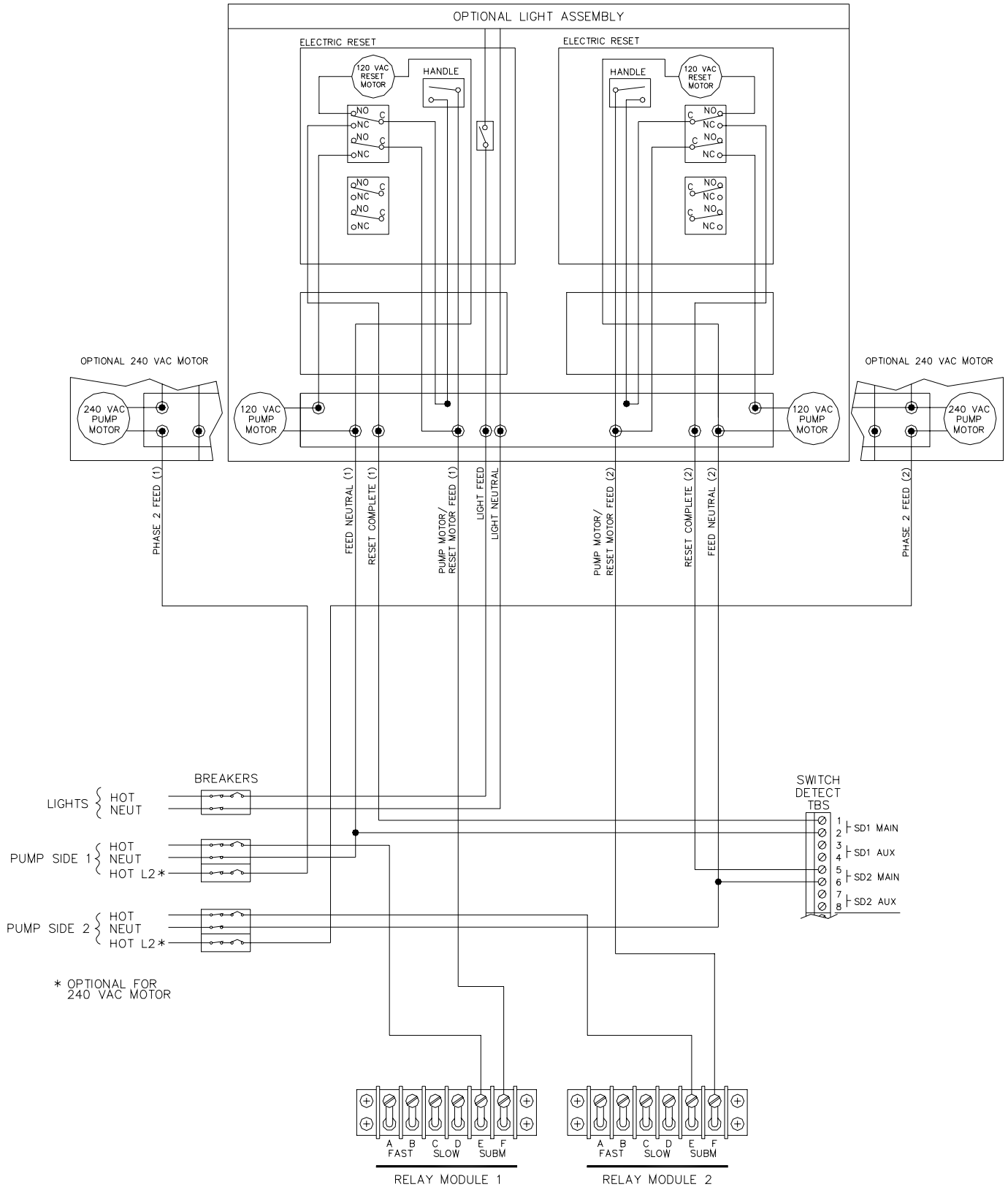
Conductor: 18 AWG stranded wire. Number of conductors to be determined by pulser
Shield: Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
Drain Wire: Stranded, tinned copper, 20 AWG or larger/or braided shield
Voltage Rating: Maximum operating voltage of 600V
Environmental: Gas- and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

GASBOY can supply Belden 1063A (P/N 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.*

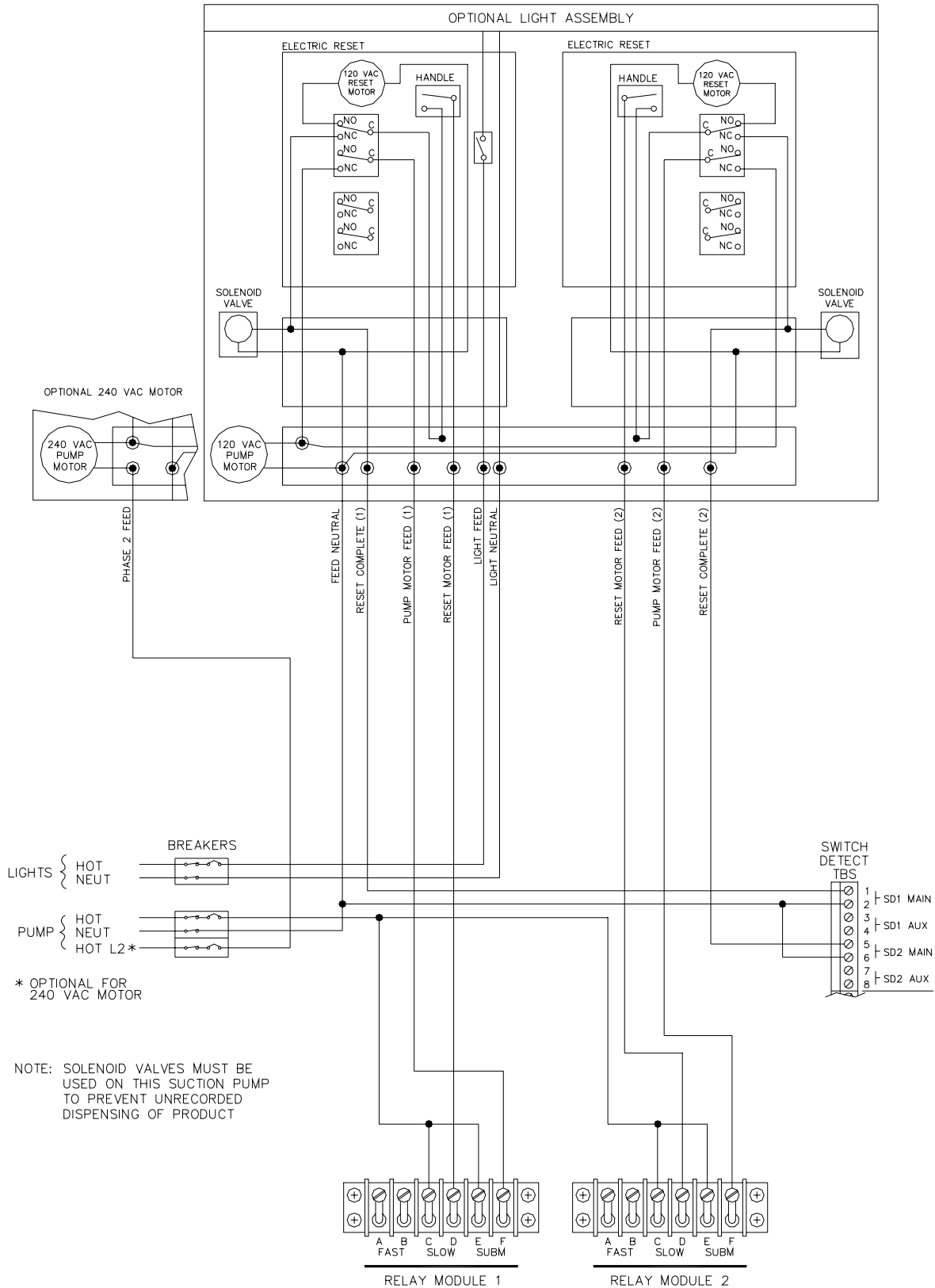
SINGLE SUCTION PUMP, VR RESET



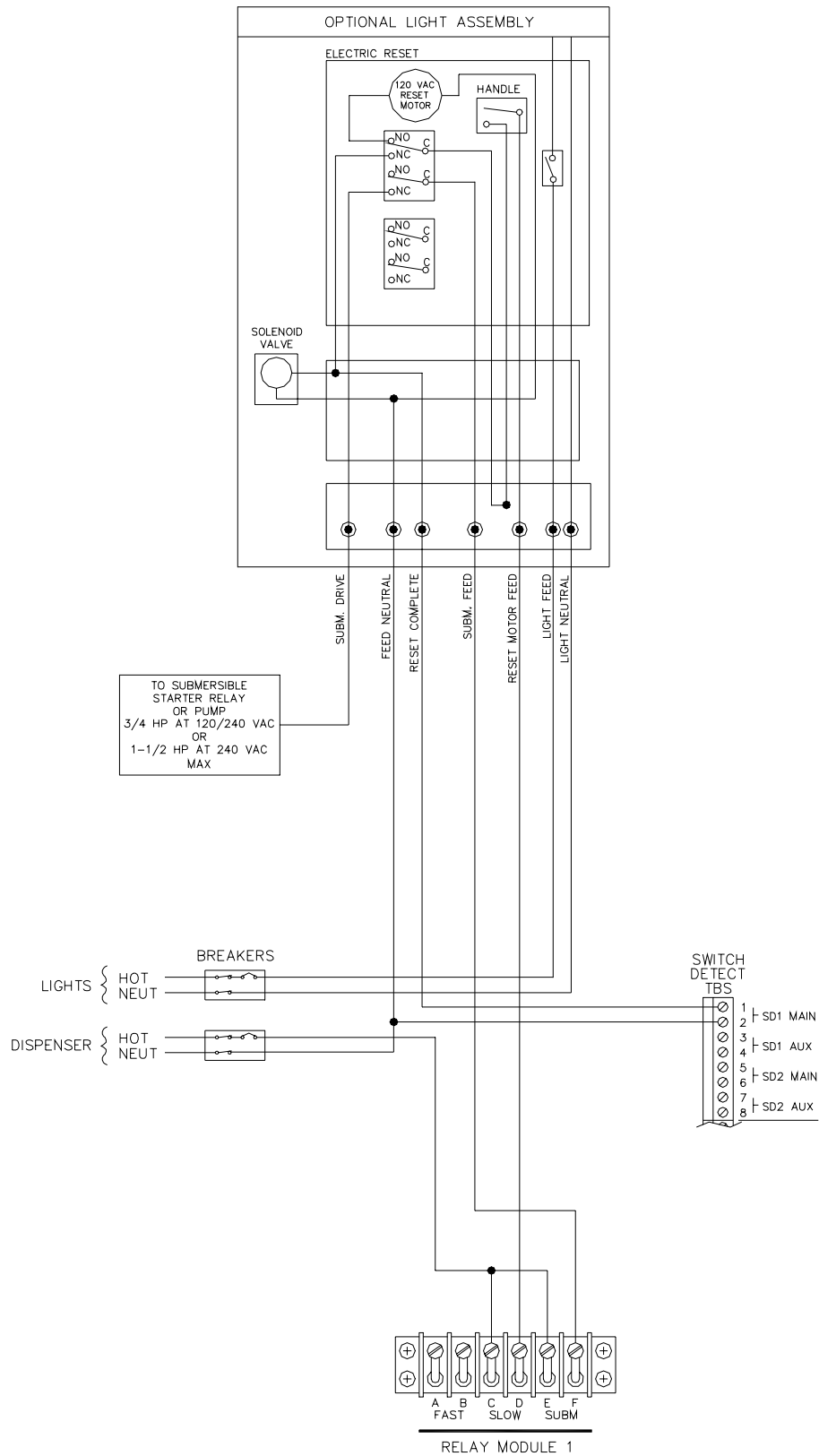
TWIN SUCTION PUMP, VR RESET



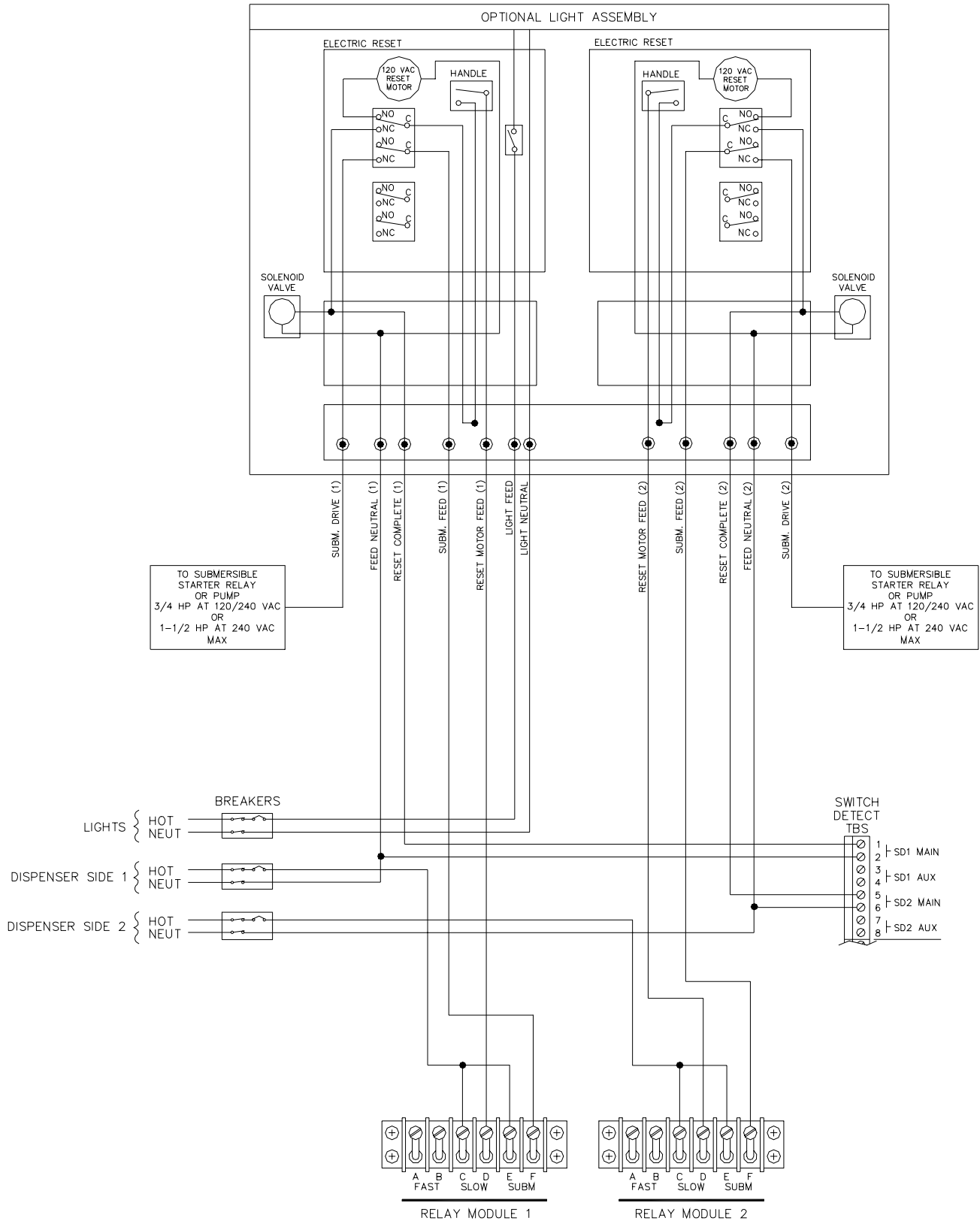
TWIN SUCTION PUMP, SINGLE MOTOR, VR RESET



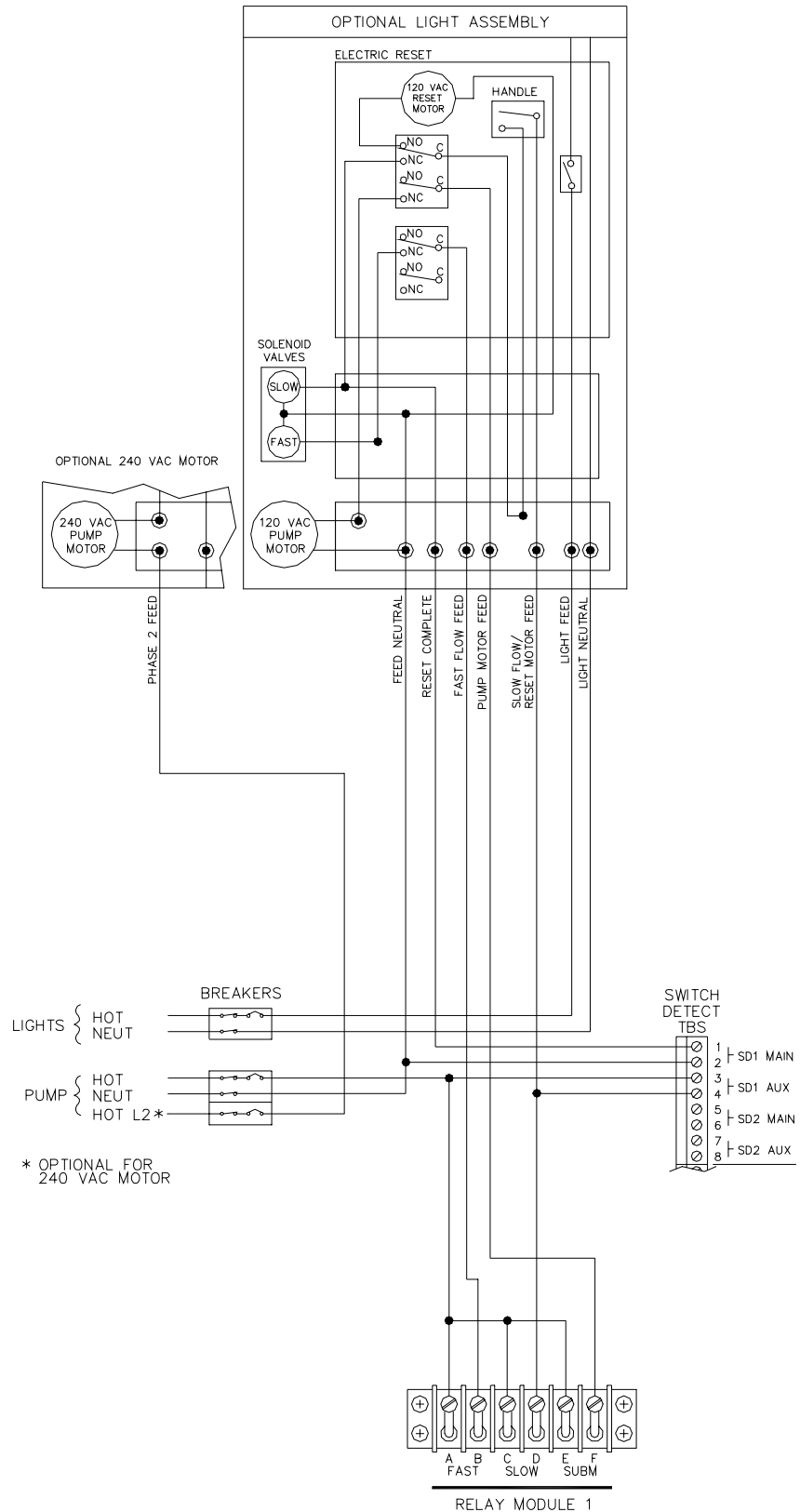
SINGLE REMOTE DISPENSER, VR RESET



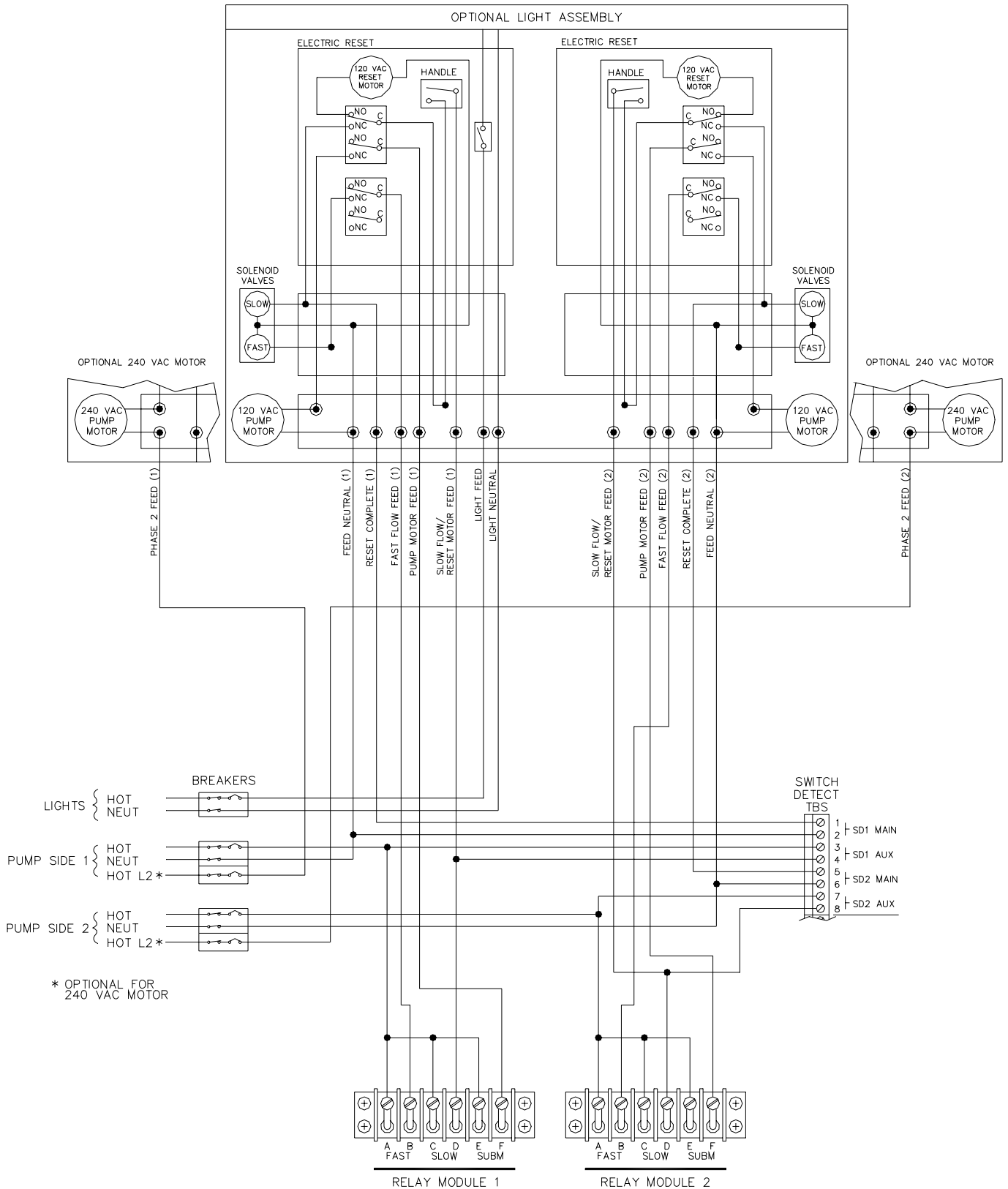
TWIN REMOTE DISPENSER, VR RESET



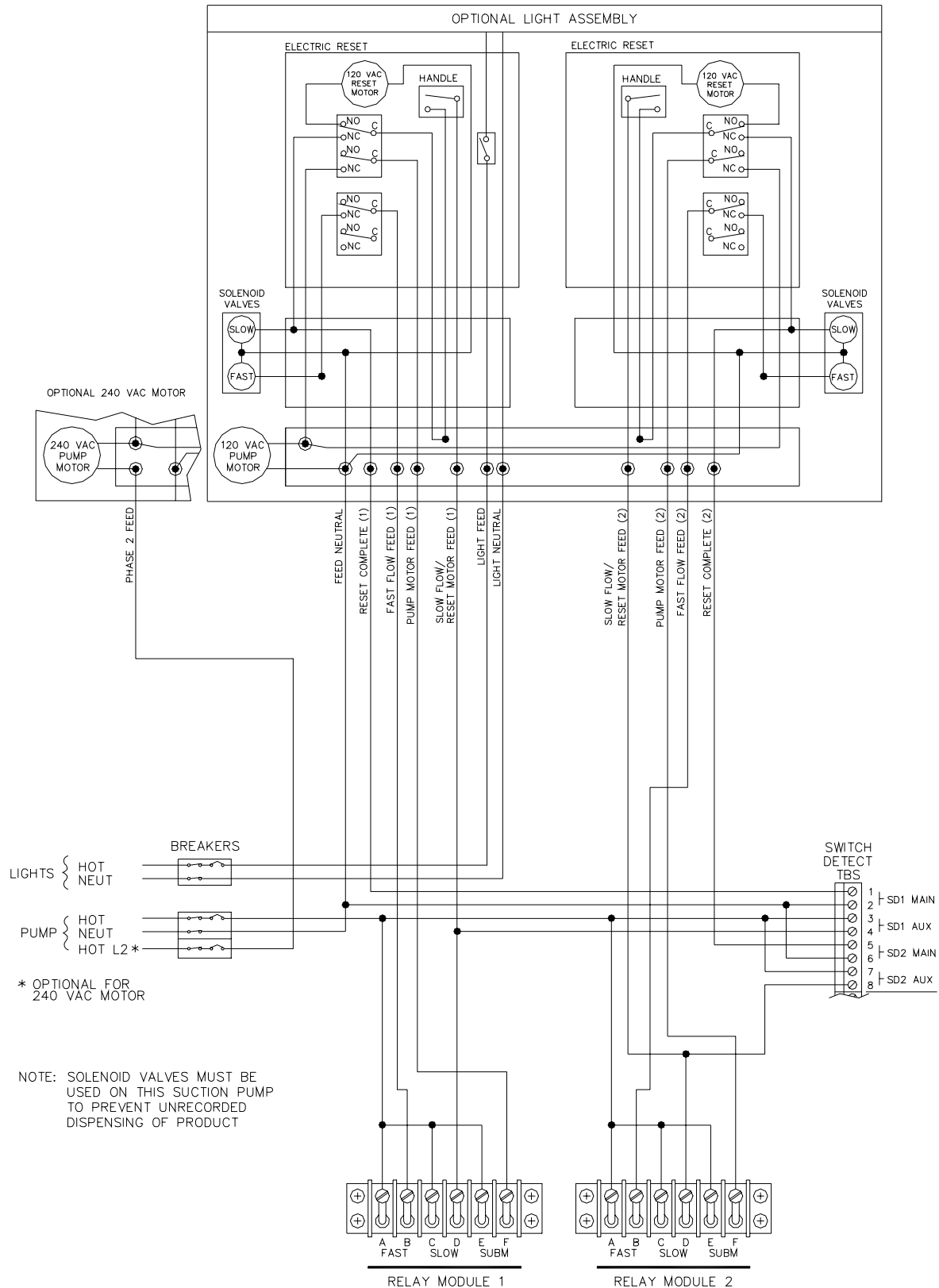
SINGLE SUCTION PUMP, CONSOLE, VR RESET



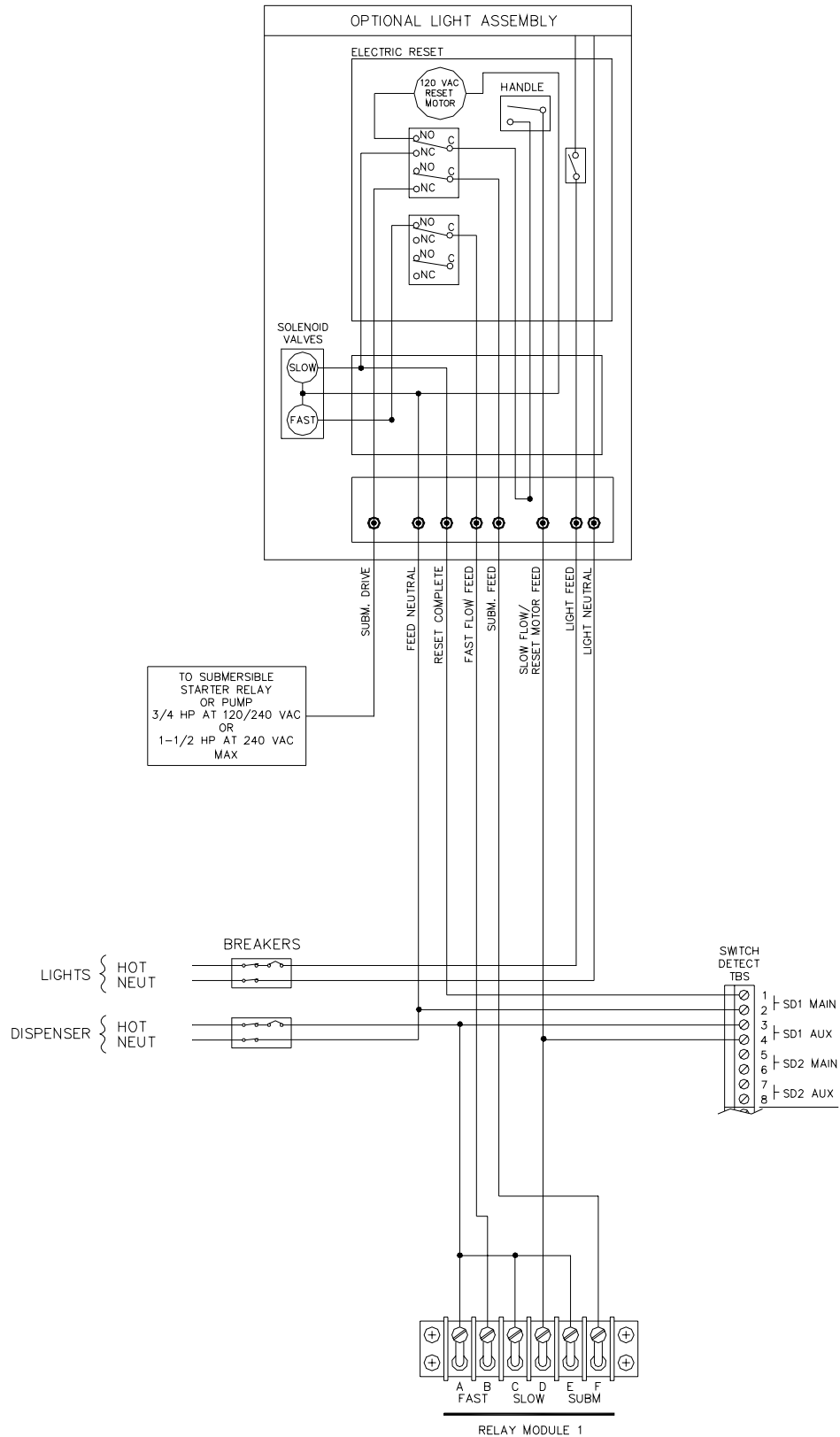
TWIN SUCTION PUMP, CONSOLE, VR RESET



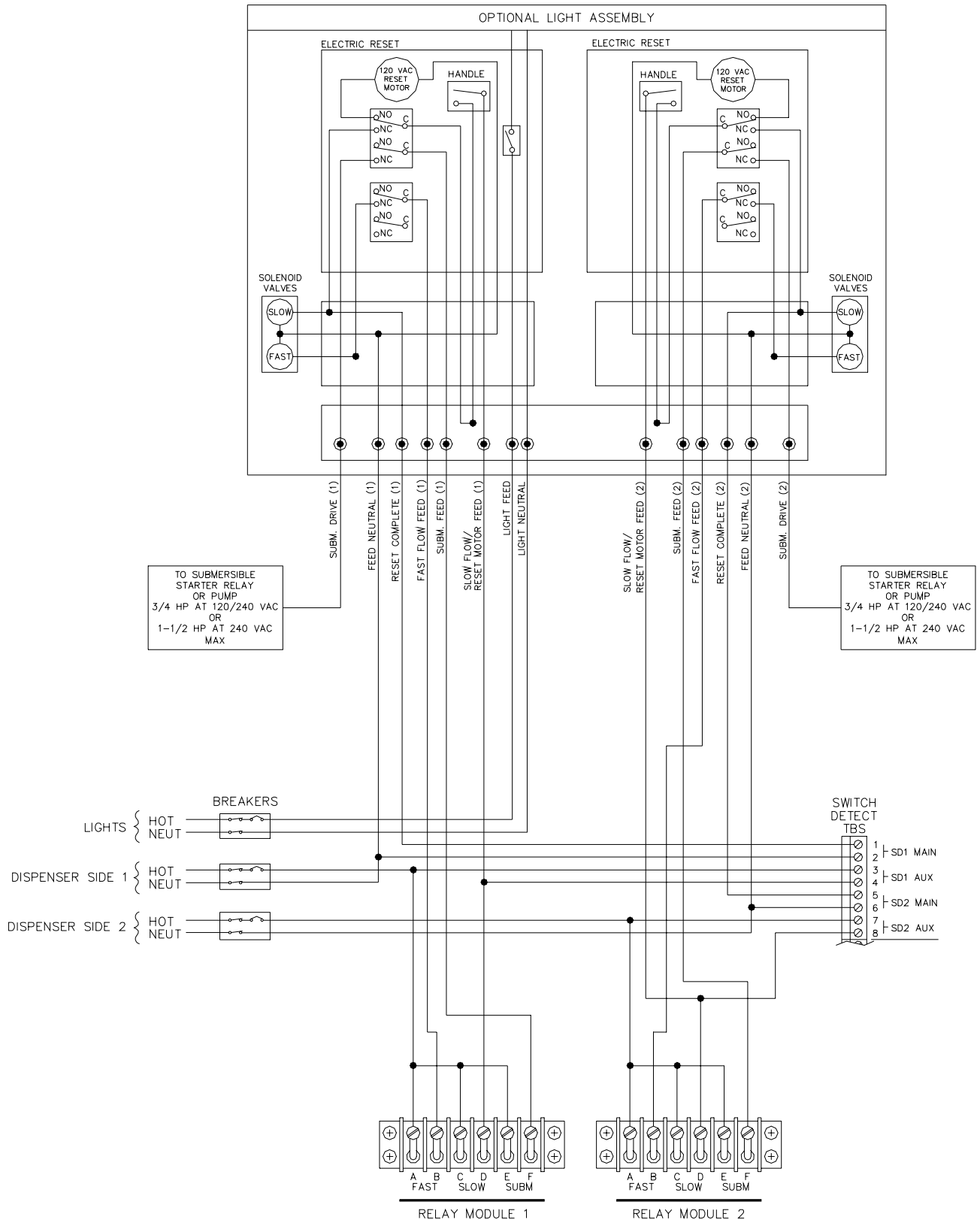
TWIN SUCTION PUMP, SINGLE MOTOR, CONSOLE, VR RESET



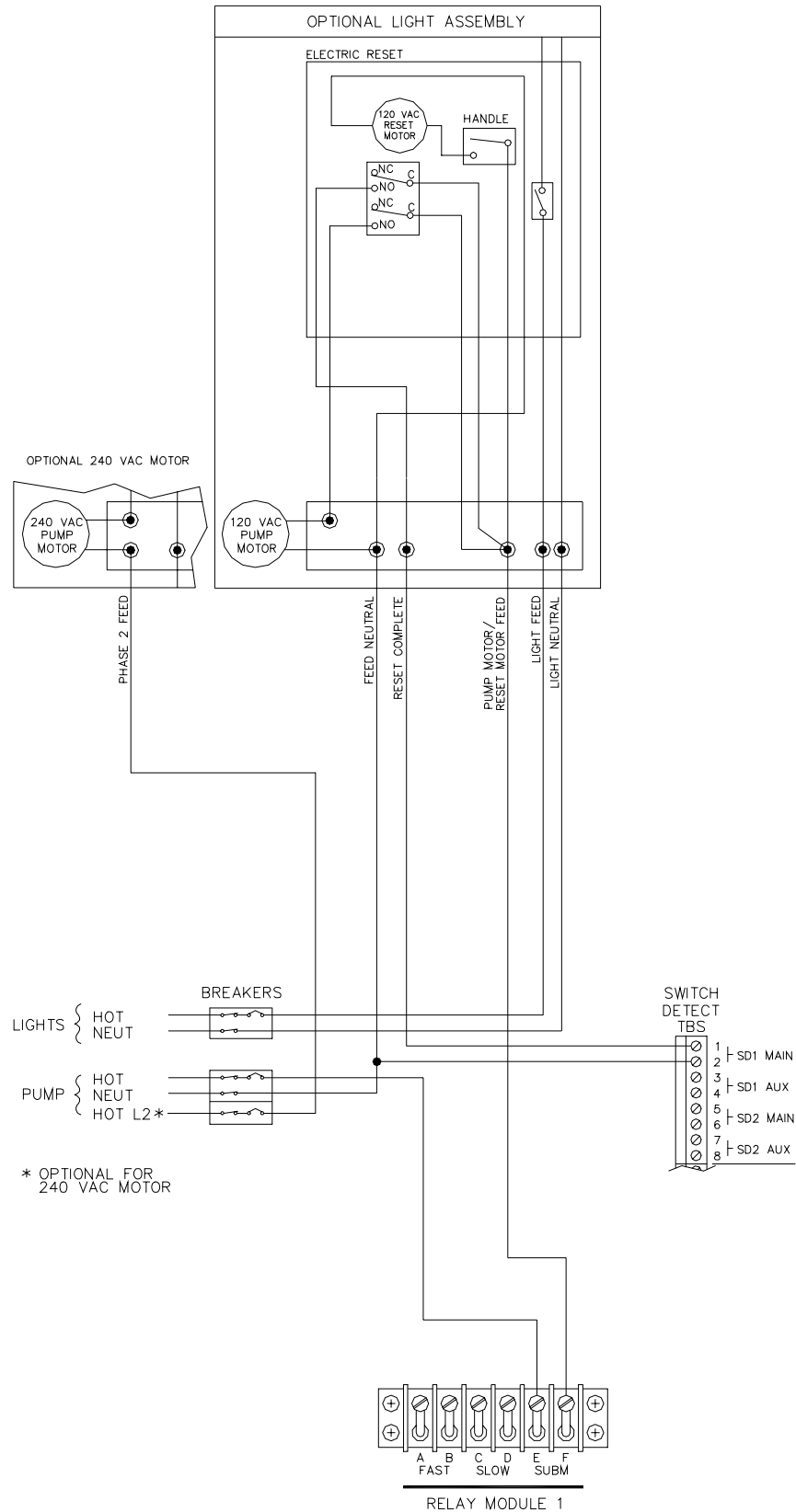
SINGLE REMOTE DISPENSER, CONSOLE, VR RESET



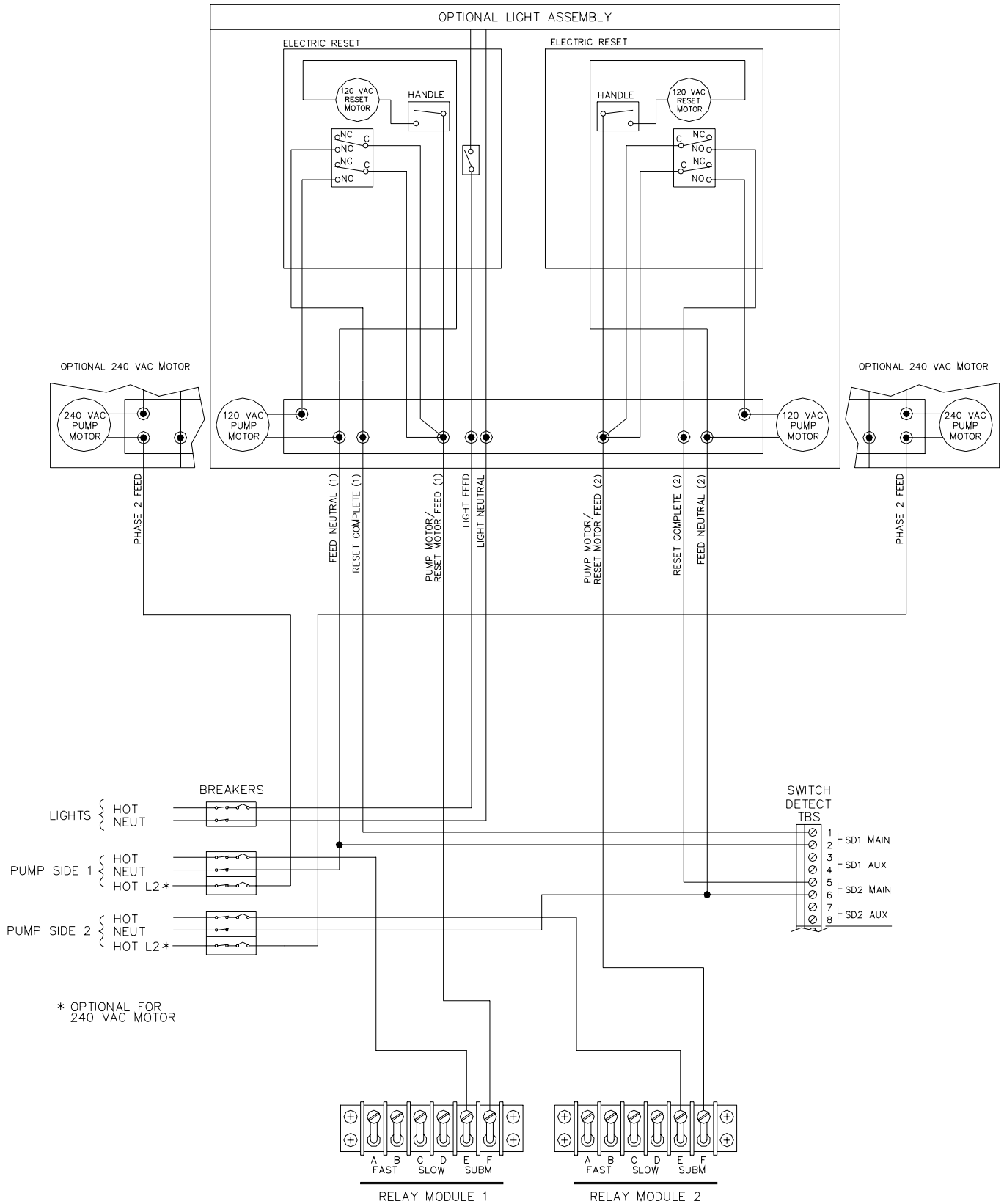
TWIN REMOTE DISPENSER, CONSOLE, VR RESET



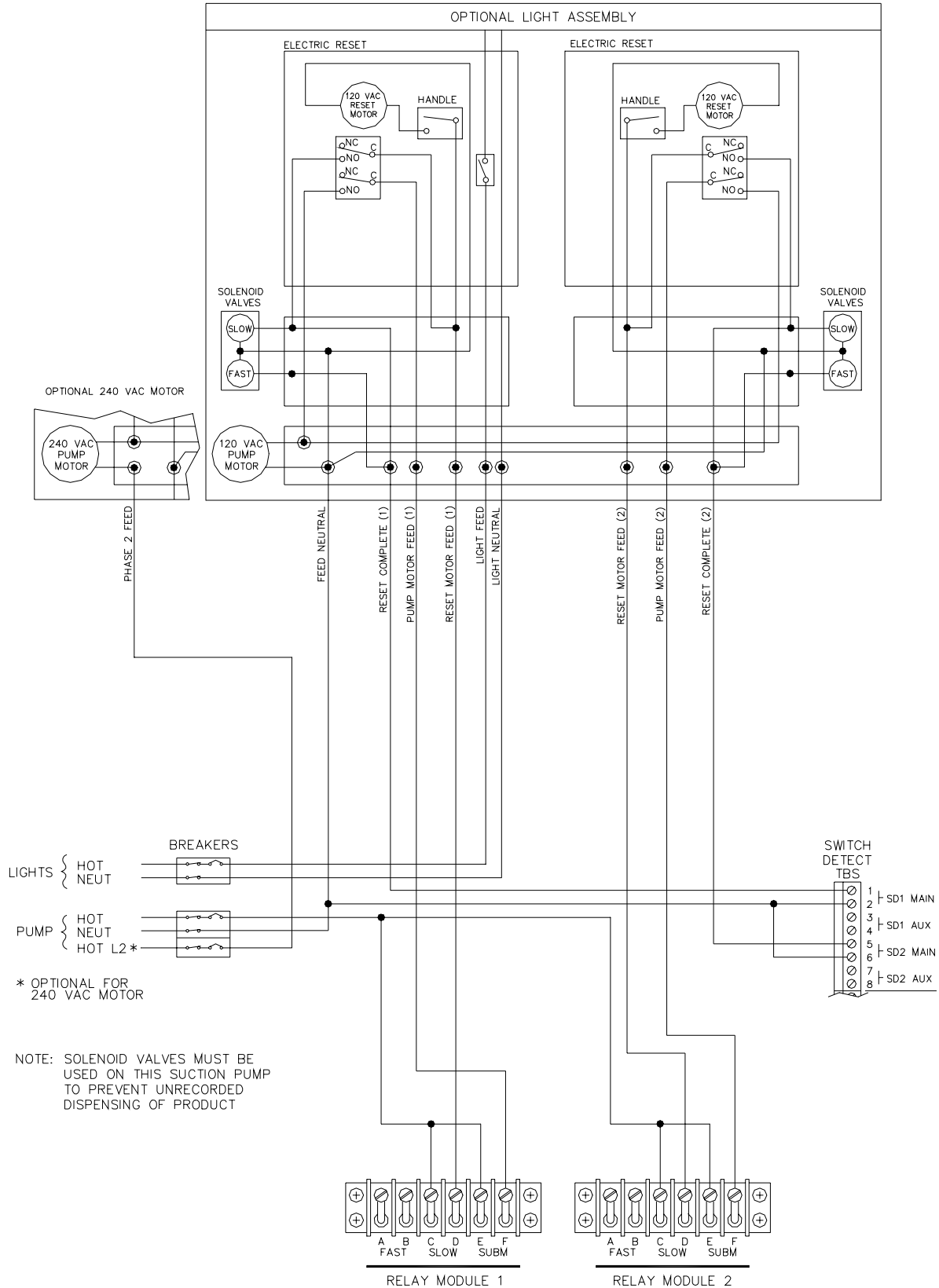
SINGLE SUCTION PUMP, TOKHEIM RESET



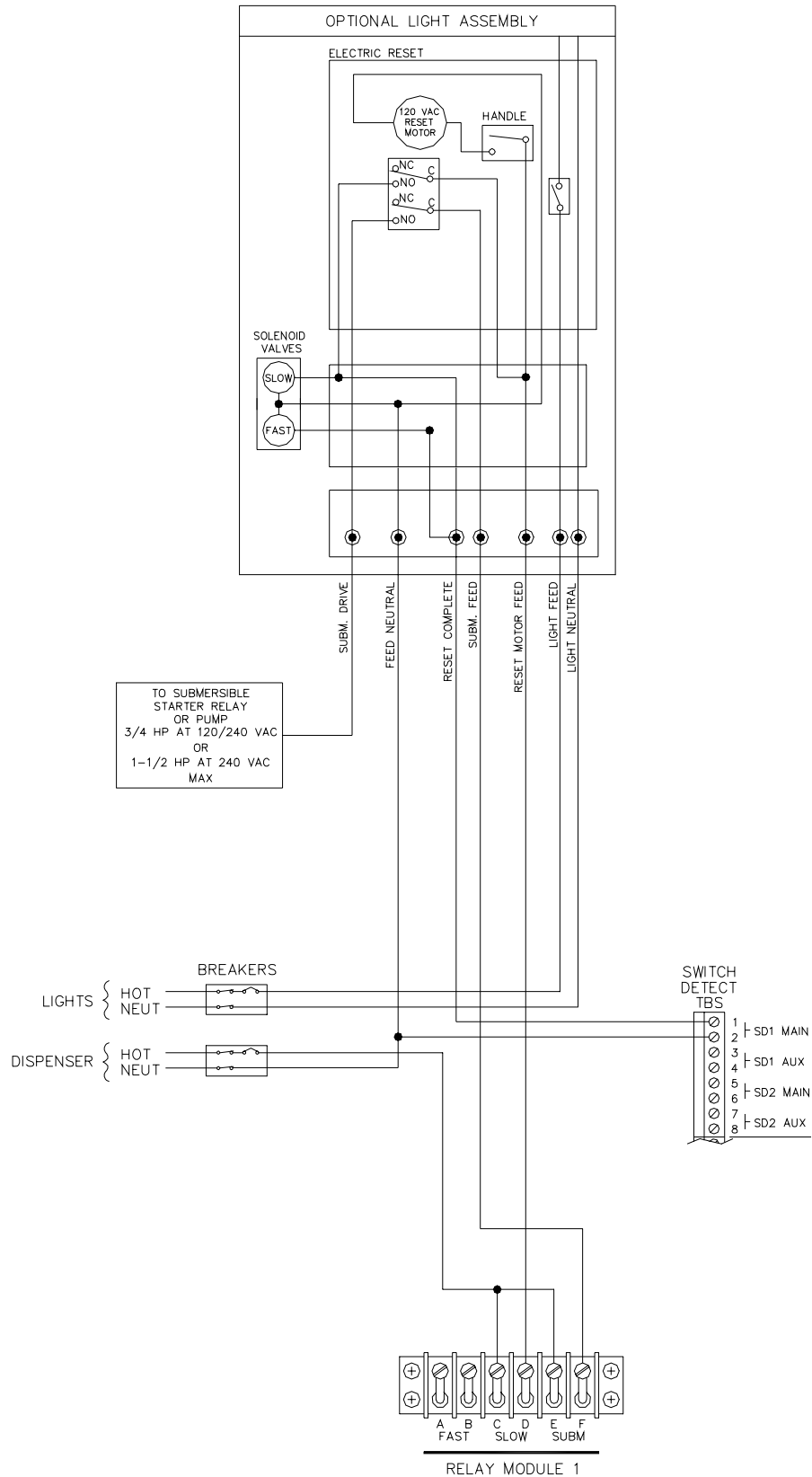
TWIN SUCTION PUMP, TOKHEIM RESET



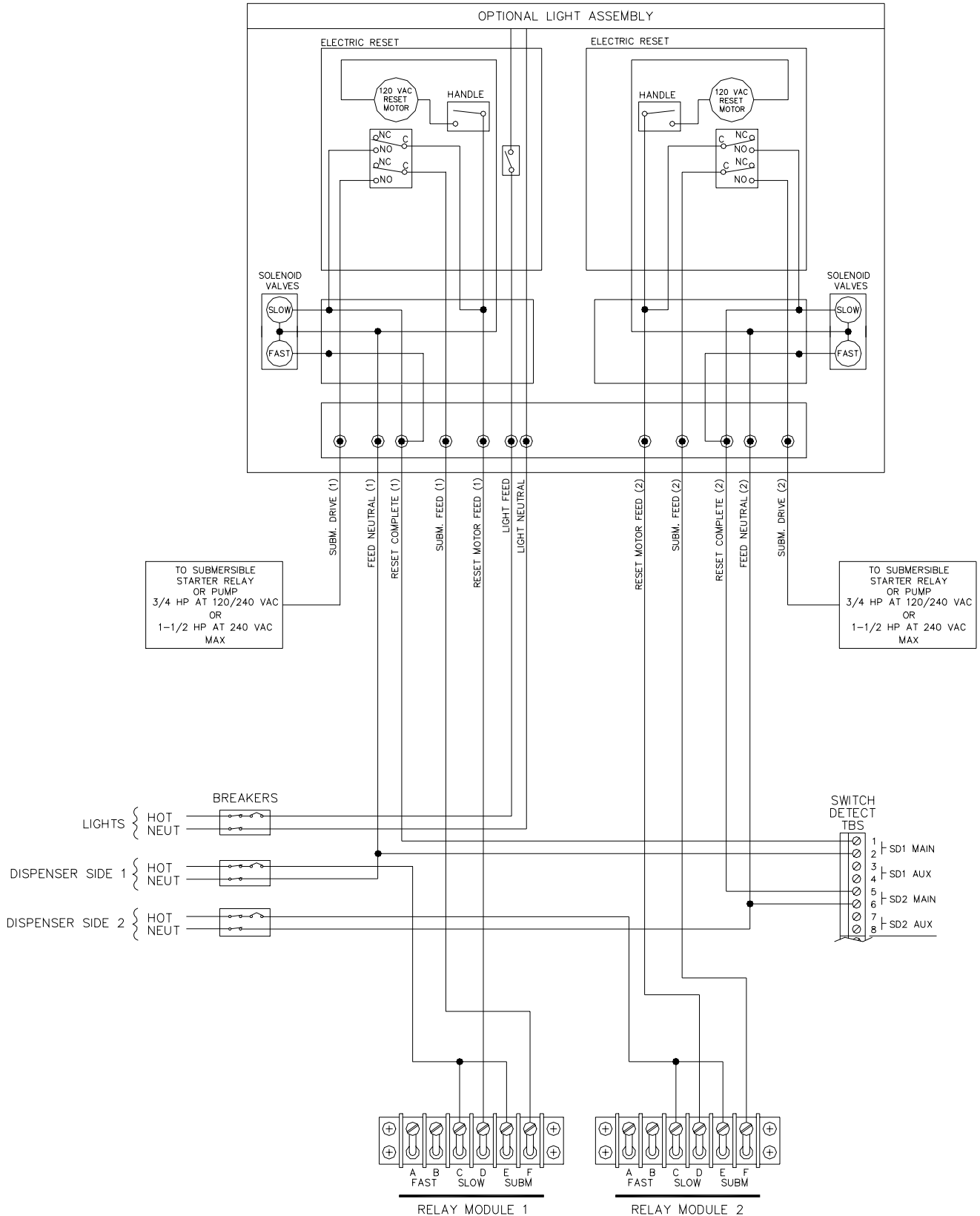
TWIN SUCTION PUMP, SINGLE MOTOR, TOKHEIM RESET



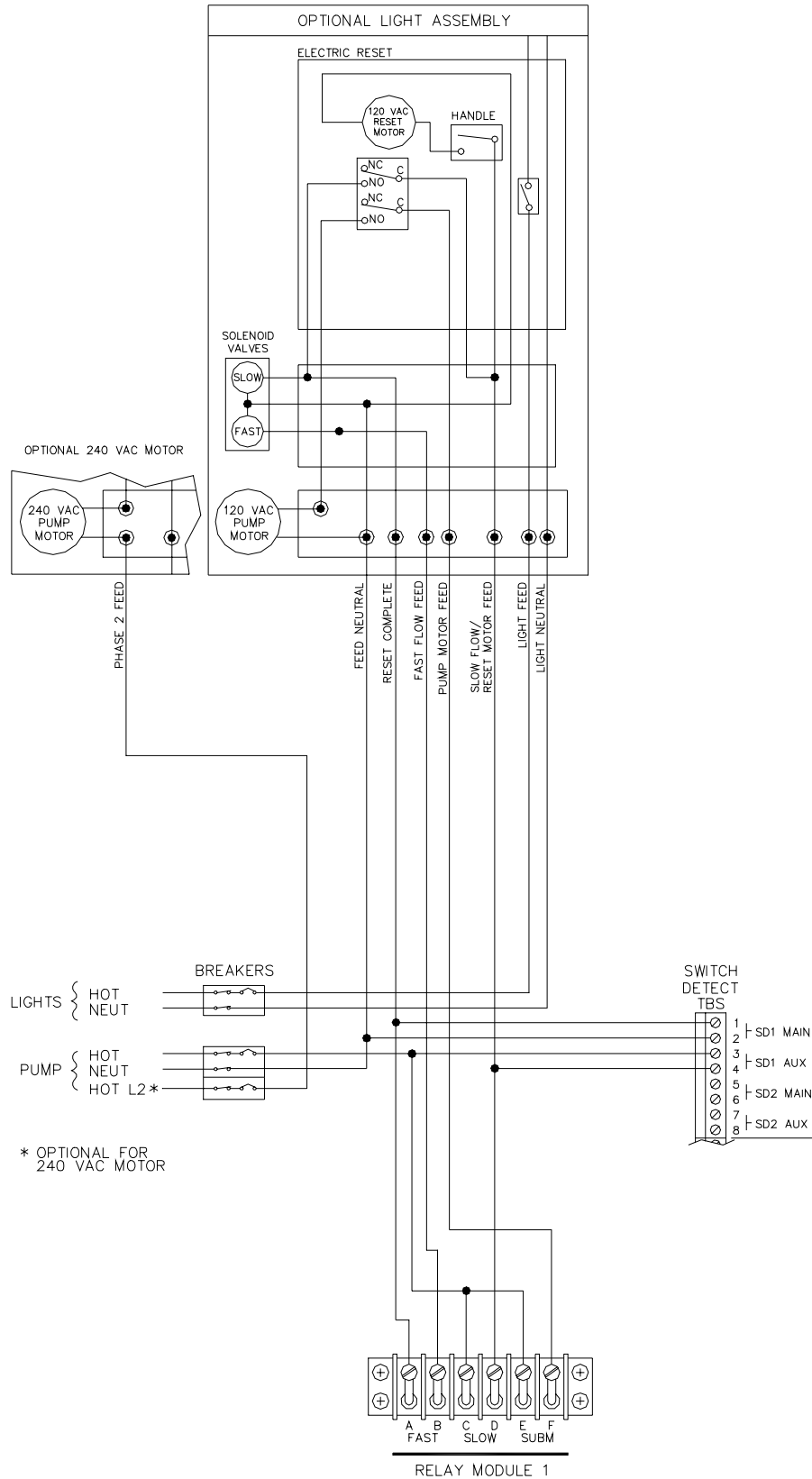
SINGLE REMOTE DISPENSER, TOKHEIM RESET



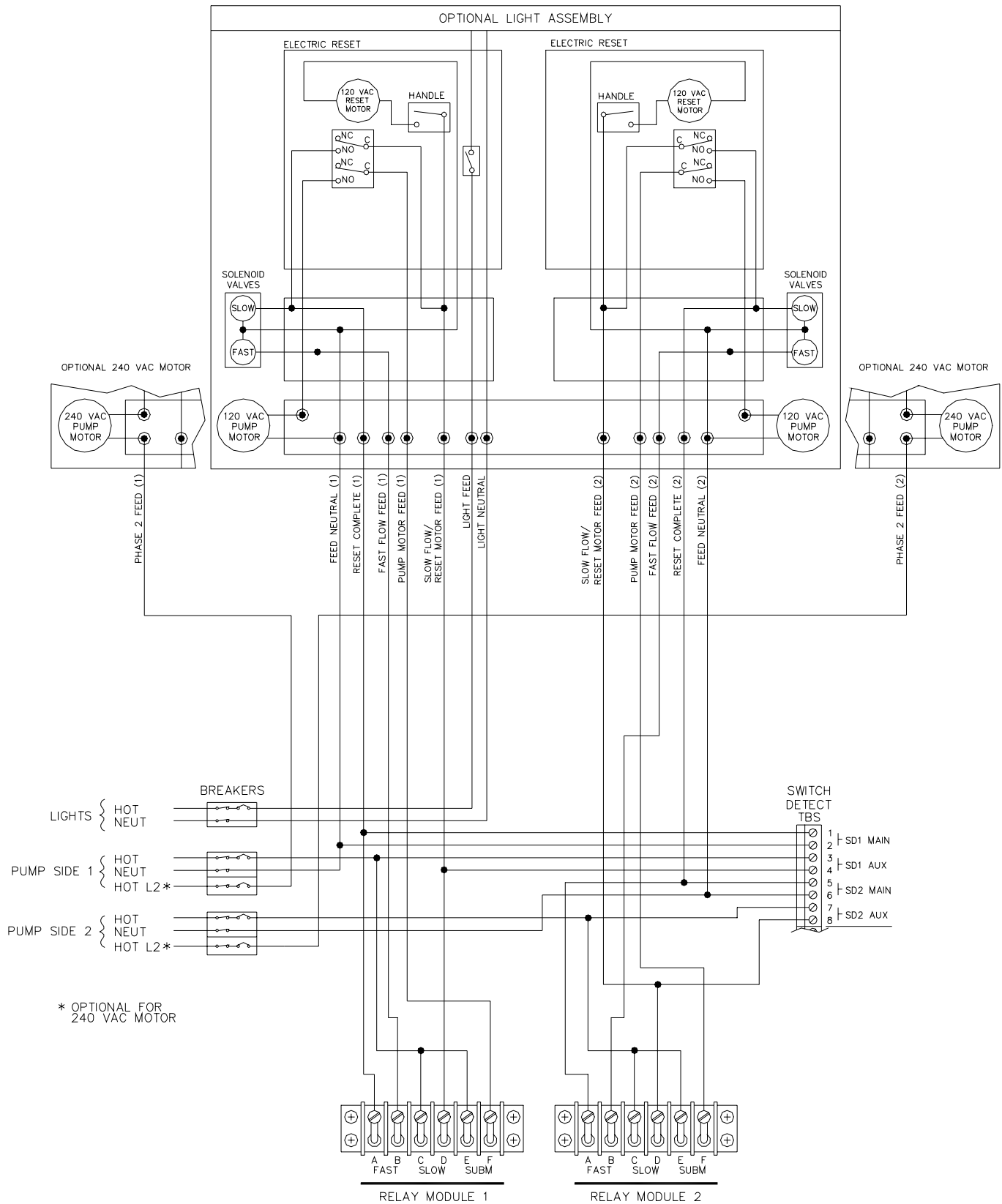
TWIN REMOTE DISPENSER, TOKHEIM RESET



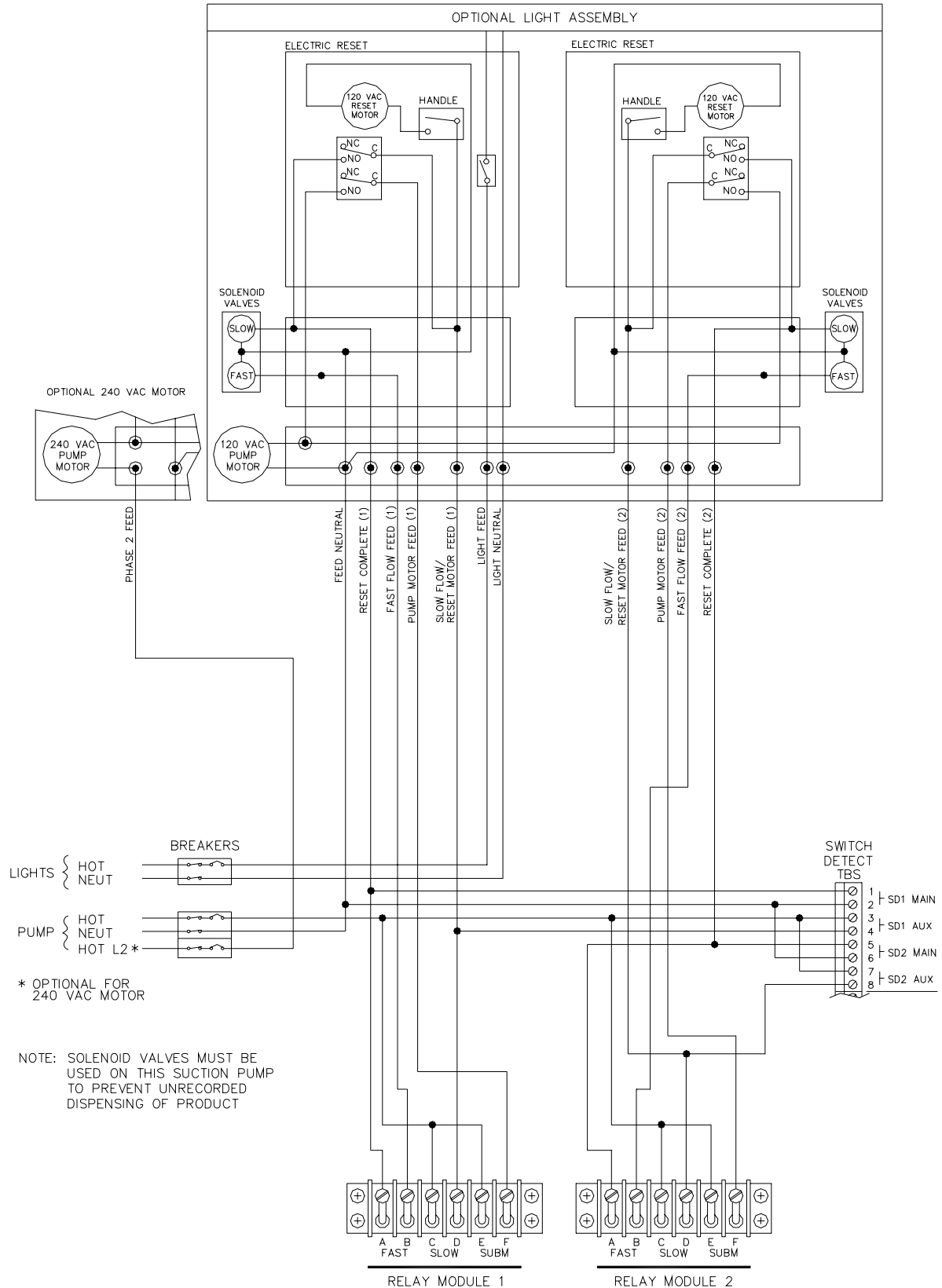
SINGLE SUCTION PUMP, CONSOLE, TOKHEIM RESET



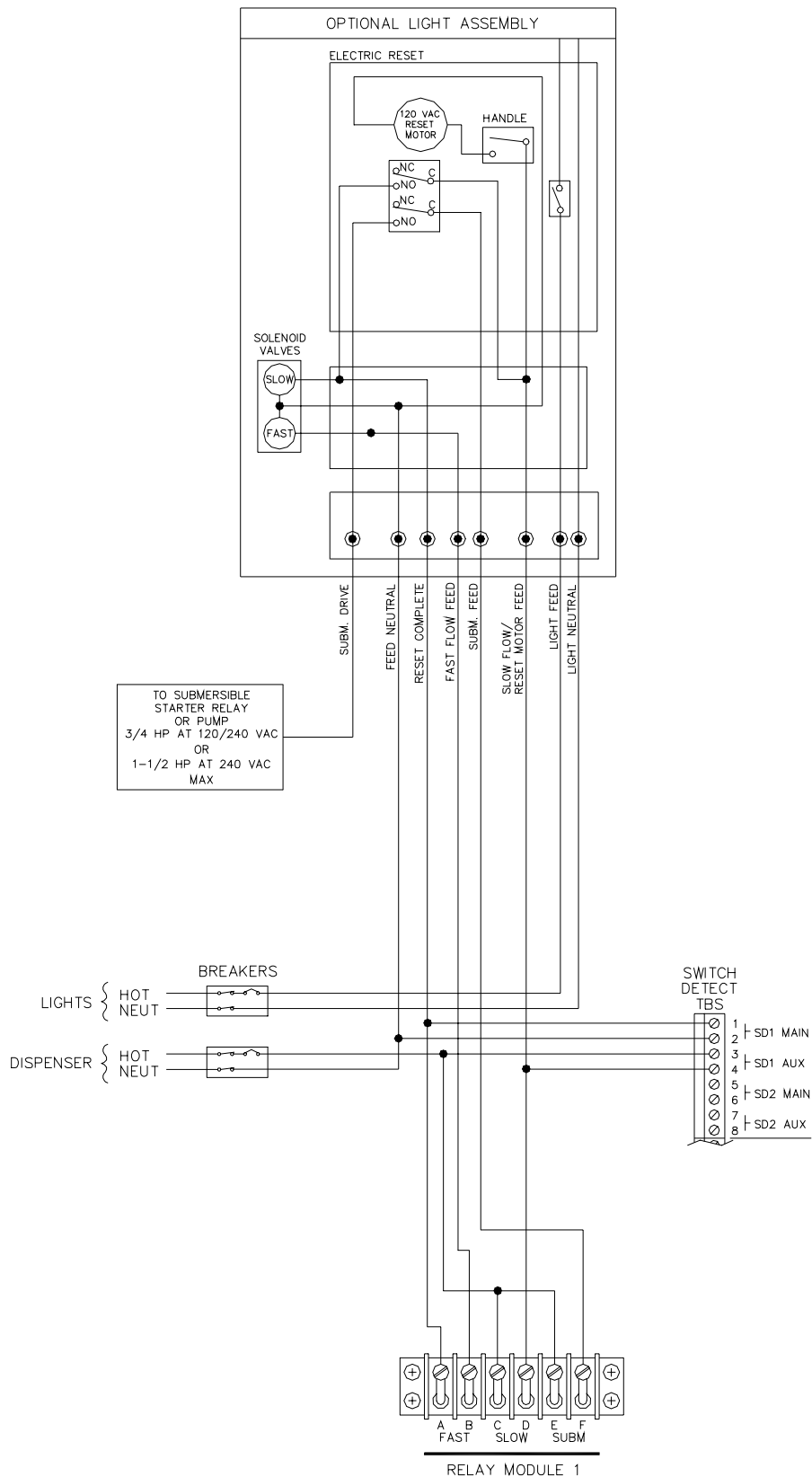
TWIN SUCTION PUMP, CONSOLE, TOKHEIM RESET



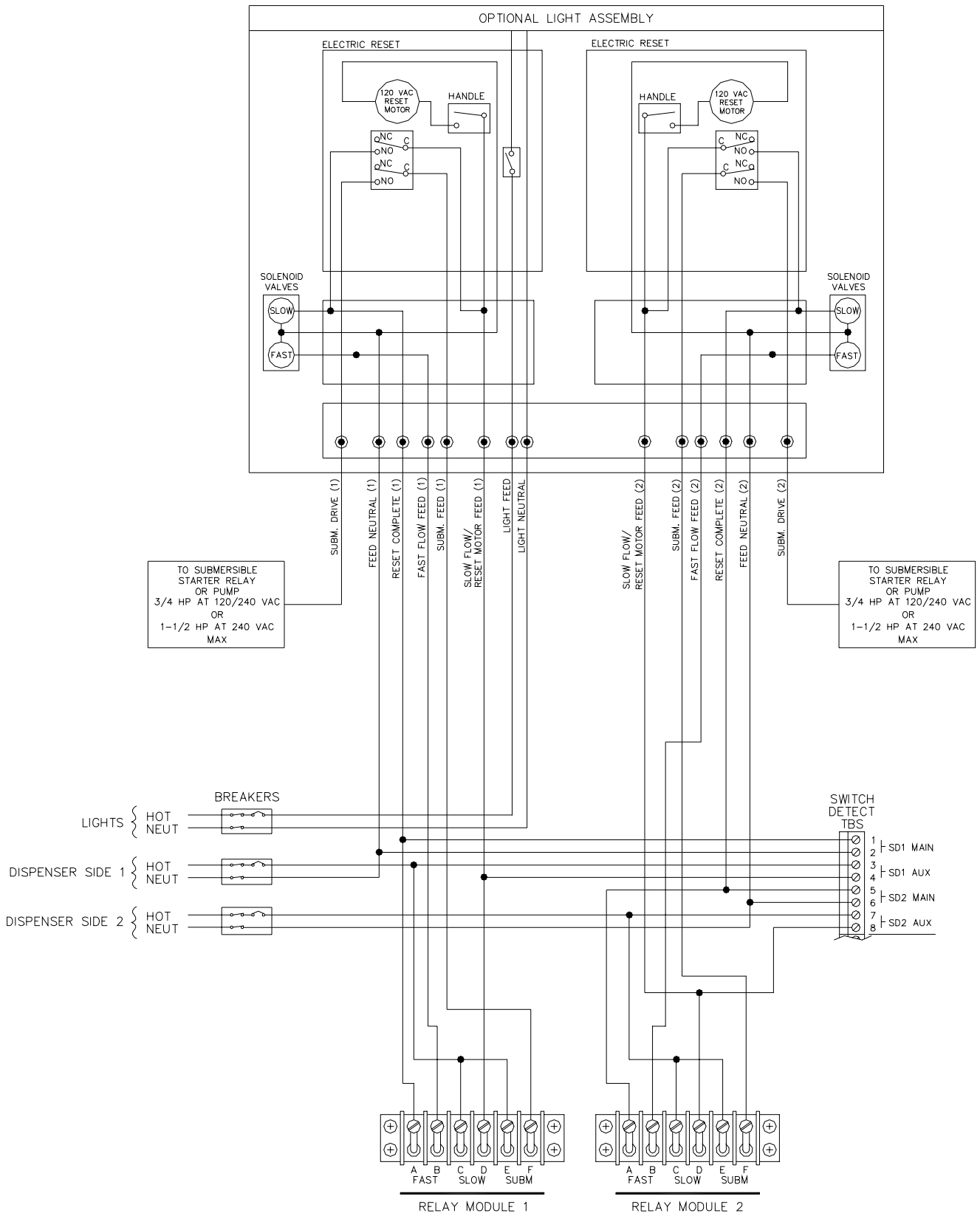
TWIN SUCTION PUMP, SINGLE MOTOR, CONSOLE, TOKHEIM RESET



SINGLE REMOTE DISPENSER, CONSOLE, TOKHEIM RESET

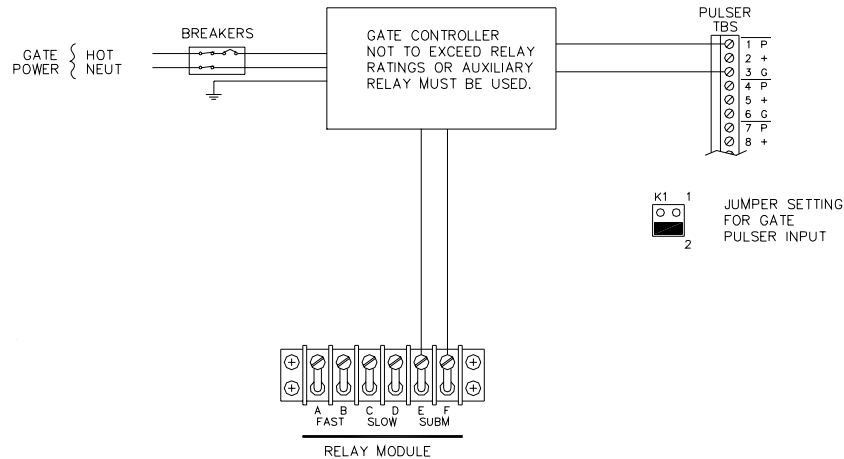


TWIN REMOTE DISPENSER, CONSOLE, TOKHEIM RESET



USING THE PCU TO ACTIVATE 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, not via card, console, POS terminal, or terminal command.



1. The CFN PCU can directly switch power to a gate controller. The maximum rating of the PCU relay is 3/4HP @ 120VAC. If your gate controller uses a different control voltage or exceeds the 3/4HP rating, use an auxiliary mechanical relay with a 120 VAC coil to handle the load.
2. Up to 4 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 but nothing is stored in memory.
4. The PULSER signal can come from a dry-contact switch with no other voltage or circuits connected, or it can be a 12VDC signal. Be sure to 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.

Section 5

TESTING

COMPLETION CHECK LIST

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

1. Are the CFN system components located in the proper environment as described throughout Section 2?
2. Is there adequate clearance around the island card reader(s) (See Section 2, **Island Card Reader**)?
3. Is all the wiring in metal conduit except as noted in Section 3, **Short Haul Modem - RS-422** section?
4. Is the AC and DC wiring in separate conduits, troughs, etc.? If not, and AC and DC wires share conduit, shielded cable must be used as specified in Section 3 **Communication Requirements, RS-485, Short Haul Modem - RS-422**, or Section 4, **Pulser Wiring and Configuration**.
5. Are the CFN system components on a separate dedicated breaker (see Section 3)?
6. Are the CFN system components grounded properly (see Section 3)?
7. Are pumps over 3/4 HP at 120/240 VAC or 1-1/2 HP at 240 VAC equipped with a starter relay (Section 4)?
8. Is the correct gauge wire installed for the:
 - system (Section 3)?
 - pumps (Section 4)?
 - remote dispensers (Section 4)?
 - pulsers (Section 4)?
 - short haul modems (Section 3)?
9. Are the communication lines under the maximum allowable distance:
 - RS-232 100 feet (Section 3)?
 - RS-485 1000/1500 feet (Section 3)?
 - RS-422 (short haul modems) 1500 feet (Section 3)?
10. If the system has an external modem, is the phone line installed (Section 3)?
11. Is there fuel in the tanks?

MANUAL OVERRIDE TEST

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

The pumps and/or remote dispensers should be tested to verify AC wiring. **Power up only the pump control unit(s) during these tests!** The steps below indicate the proper procedure for testing and the expected results. If any of these tests fail, correct the wiring and re-do the test. See the **Terminal Block ID** diagram in Section 4 for the location of the 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 any damage to the PCBs if the wiring is incorrect. Make sure the connectors are not touching any metal surfaces.
2. Turn on the breakers for all pumps and/or remote dispensers. If the site controller and other components are powered from the same breaker as the pump control unit (PCU), **be sure that they are switched off** before proceeding

CAUTION

AC power is present on the terminal blocks of the 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 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 through 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 site controller 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 start-up will complete the verification of correct AC wiring to the pump/remote dispensers. The automatic test should only be performed at the start-up.

WARRANTY

General Statements:

Gasboy International LLC. warrants all new equipment manufactured by Gasboy against defective material and/or workmanship, for the warranty period specified below, when the equipment is installed in accordance with specifications prepared by Gasboy.

This warranty does not cover damage caused by accident, abuse, Acts of God, lack of surveillance of automatic recording systems, negligence, mis-application, faulty installation, improper or unauthorized maintenance, installation or use in violation of product manuals, instructions, or warnings. Under no circumstance shall Gasboy be liable for any indirect, special, or consequential damages, losses, or expenses to include, but not limited to, loss of product, loss of profits, litigation fees, or the use, or inability to use, our product for any for any purpose whatsoever.

Parts Only - During the warranty period, Gasboy will, at its option, repair or replace defective parts returned transportation prepaid to its factory.

On-Site Labor Included - Gasboy will also provide, within the Continental United States and during the warranty period, the services of an Authorized Service Representative (ASR) for on-site repair or replacement of defective parts.

Replacement Parts - Any system components that are not part of the original system order, including Island Card Readers, Pump Control Units, etc., are considered replacement parts.

Equipment	Term	Coverage
Commercial Pumps and Dispensers Full-Cabinet Consumer Pumps	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts and Labor.
Small Transfer Pumps, Meters, Pressure Regulators	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.- Excepting the Model 2020 Hand Pump, which has a 90-day warranty from date of GASBOY International's invoice.	Parts Only.
Keytrol	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts and Labor.
Fuel Management Systems: - CFN/ Profit Point - Series 1000/Fleetkey - TopKAT - Fuel Point Readers (sold with new systems)	One year from date of start-up or 15 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.- The basic warranty only applies to systems which have been started up by a Gasboy Authorized Service Representative (ASR).	Parts and Labor.
Additional Fuel Point Items: - Fuel Point Readers sold for retrofitting existing systems. - Fuel Point vehicle and dispenser components.	One year from date of start-up or 15 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts Only.
Encoders, Embossers, Modems, CRTs, and Logger Printers	Purchased with Fuel Management System (Encoders, Embossers only): 90 days from the date of start-up by a Gasboy ASR, or 180 days from date of Gasboy International's invoice, whichever occurs first. Purchased with Fuel Management System (Modems, CRTs, and Logger Printers only): Matches system warranty. Purchased Separately: 90 days from date of Gasboy International's invoice to the purchaser.	Purchased with System (Encoders, Embossers only): Parts only. Purchased with System (Modems, CRTs, Logger Printers only): Matches system warranty. Purchased Separately: Parts Only.
Air Diaphragm Pumps	Three years from date of purchase (for full warranty description, see Price List).	Parts Only.
Items not manufactured by Gasboy (ex. automatic nozzles, hoses, swivels, etc.)	Not warranted by Gasboy International (consult original manufacturer's warranty).	Not Applicable.
Replacement Parts	One year from date of Gasboy International's invoice to the purchaser.	Parts Only.

To the extent permitted by law, this warranty is made in lieu of all other warranties, expressed or implied, including warranties of freedom from patent infringement, or merchantability, or fitness for a particular purpose, or arising from a course of dealing or usage of trade. No one is authorized to vary the terms of the warranty nor may anyone make any warranty of representation, or assume any liability other than that herein stated, in connection with the sale described herein. The acceptance of any order by Gasboy International is expressly made subject to the purchaser's agreement to these conditions.



GASBOY INTERNATIONAL LLC

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