



9820K Series AST Pumps

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# Installation and Operation Manual

## Computer Programs and Documentation

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## Approvals

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

### Underwriters Laboratories (UL):

UL File#	Products listed with UL
MH4314	All dispensers and self-contained pumping units
MH6418	Power operated Transfer Pump Models 25, 25C, 26, 27, 28, 72, 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

## Trademarks

### Non-registered trademarks

Atlas™  
Consola™  
Infinity™

### Registered trademarks

ASTRA®  
Fuel Point®  
Gasboy®  
Keytrol®  
Slimline®

Additional US and foreign trademarks pending.

All product names, logos, and brands are the property of their respective owners and are for identification purposes only. Use of these names, logos, and brands does not imply endorsement.

Additional US and foreign patents pending.

## Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

**Unique Identifier:** ASTRA 9820

### Responsible Party - U.S. Contact Information

7300 W. Friendly Ave.  
Greensboro, NC  
27410, USA



<https://www.gasboy.com/us/content/contact-us-gasboy>

### Federal Communications Commission (FCC) Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

### 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.

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# 1 – Introduction

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## Purpose

The purpose of this manual is to assist Gasboy® Authorized Service Contractors (ASCs) in installing and operating the 9820K Electronic Commercial pump unit used with Aboveground Storage Tanks (ASTs).

*Note: Whenever information in this document applies to the unit mentioned above, the 9820K model reference is used. 9120K Compact Mechanical Commercial pump is no longer available.*

## General Description

### Model 9820K

The Gasboy Series 9820K Aboveground Storage Tank Remote Access (ASTRA®) pump units are UL®-listed.

*Note: NFPA regulations do not allow tank-mounted pumps to be used for the resale of fuel.*

The 9820K Series units consist of two metal cabinet assemblies.

- One assembly is mounted on top of the tank and contains the pumping unit, meter, electronic pulser, and all hydraulics. The hose and nozzle are connected to this assembly.
- The second assembly is mounted at a height to permit easy access by a user. It contains the electronic register, controls, display and nozzle boot.

The standard features and specifications of the 9820K Series pumps are as follows:

- One-inch high, 6-digit, backlit LCD
- 1000:1 dual-phase, error-checking pulser (gallons); 250:1 dual-phase, error-checking pulser (liters)
- AC authorization line for control of the unit
- Reset complete (Switch Detect) output that allows monitoring of the unit's operation when it is connected to an automated fueling system
- Resettable electronic totalizer
- Discharge elbow
- This model uses a quiet and efficient pump which features an air eliminator built into the pump casting. The pump meter is a four-piston, positive displacement meter which is tested and calibrated for accuracy at any speed or pressure up to the maximum working pressure of 50 psi.
- The standard pumping cabinet finish is white. The electronic register cabinet is black with a blue graphics panel
- Dual Stage Solenoid Valve
- Filter
- Ability to display last transaction and capture of stored pulse count in the event of a power failure

The available options and accessories for the Gasboy Series 9820K pumps are as follows:

- Pulsar output drive line (open collector), capable of driving 1, 10, 100, 250 and 500 pulses per unit (gallons) or 1, 10, and 100 pulses per unit (liters)
- RS-485 communication for direct connect to Gasboy Fuel Controllers
- Mechanical totalizer
- A working voltage of 115 VAC (115/230 for motor) 60 Hz for domestic use, 230 VAC 50 Hz/60 Hz for international use.
- Other options include Listed automatic nozzles, special lengths of Listed hose assembly, Listed dual swivels, UL-recognized filters, Vapor Recovery, and Vapor Recovery Ready.

## Abbreviations and Acronyms

<b>Term</b>	<b>Description</b>
AC (or ac)	Alternating Current
ASC	Authorized Service Contractor
AST	Aboveground Storage Tank
ASTRA	Aboveground Storage Tank Remote Access
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
DC (or dc)	Direct Current
DIP	Dual In-line Package
ICR	Island Card Reader
J-Box	Junction-Box
LCD	Liquid Crystal Display
NEC	National Electrical Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Association
PCB	Printed Circuit Boards (preferred term: board)
PPG	Pulses Per Gallon
PPL	Pulses Per Liter
STP	Submerged Turbine Pump

## 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 the Gasboy Technical Support 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.

## Important Safety Information

### No Open Fire



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

### No Sparks - No Smoking



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

### Working Alone

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

### Working With Electricity Safely

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

### Hazardous Materials

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

#### **WARNING**

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

#### **WARNING**

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

#### **WARNING**

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



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

## In an Emergency

### Inform Emergency Personnel

Compile the following information and inform emergency personnel:

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

#### **WARNING**



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

#### **WARNING**

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

#### **WARNING**



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

#### **WARNING**



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

#### **WARNING**



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

#### **WARNING**




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

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

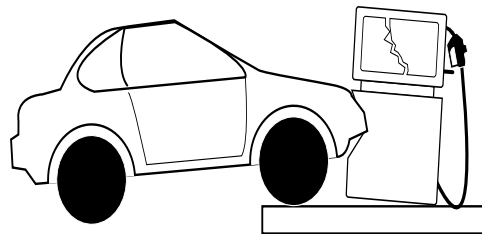
### Lockout/Tagout

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

## Hazards and Actions

 <b>WARNING</b>	
	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.

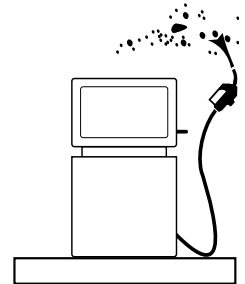
The following actions are recommended regarding these hazards:



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 – Wiring

Customers and installers having any questions pertaining to the installation should contact their Gasboy distributor.

### 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 pump. To assure a quality installation, follow these rules:

- All wiring must be installed to 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.
- Use only threaded, rigid, metal conduit.
- Use only UL-approved insulated gasoline and oil-resistant stranded copper wiring of the proper size.
- Wire connections should be properly trimmed and secured with a wire nut; close off the open end of the wire nut with electrical tape.
- The line to the motor should be on a separate circuit and installed on a 20 to 30 Amp breaker depending on the motor size and/or the voltage setting and the wiring run.
- Install an emergency power cutoff. In addition to circuit breaker requirements of NFPA 70 and NFPA 30A, a single control which simultaneously removes Alternating Current (AC) power from all site pumping equipment is recommended. This control must be readily accessible, clearly labeled, and in accordance with all local codes.



#### WARNING



The DISABLE PUMPS, and STOP buttons at the facility building and the optional DISABLE PUMPS button on the Island Card Reader (ICR) WILL NOT shut off electrical power to the pump.

This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in case of an emergency and not only these facility building and ICR station “stops”.

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

## Ground

To ensure proper operation of the equipment and provide the necessary safety factors, this unit must be grounded. Refer to “Ground” on [page 19](#).

## Circuit Breakers

A separate circuit breaker is required for the motor and another for the rest of the unit. A tag on the motor identifies the maximum current draw of the motor. If two (2) pumps are supplied from one breaker, the breaker must be capable of handling the load of both motors. Provisions must be made to break both legs of any AC circuit.

*Note: Canadian regulatory requirements may differ.*

## Pump Motor

Pumps are shipped from the factory with motors wired according to the specifications given on the order regarding current, frequency, and voltage.

Very often, on installation, it becomes necessary to change the original setting to suit the AC power source. To do this, locate the motor changeover plate (typically located on the shaft end of the motor) and remove the screw which secures it in place. Slide the plate so that the desired voltage, as marked on the plate, lines up with the screw hole. Reinsert the screw and secure the plate in place.

**Figure 3-1: Changeover Plate**



Many motor failures result from improper setting of the motor changeover plate. If set for 115 VAC and a 230 VAC feed is used, the motor will burn out after running only for a short time. If set for 230 VAC and a 115 VAC feed is used, the motor will run very slowly and the starting field will soon burn out.



## Pulse Output

The Pulse Output option provides the means for an external system to monitor the quantity that is dispensed by the 9820K pumping unit. Refer to “Pulse Output” on page 22. Refer to “Wiring Diagrams” on page 13, along with the installation manual of the system that will be connected to the 9820K pumping unit.

## RS-485

For information regarding the RS-485 option, refer to “RS-485” on page 22. Refer to “Wiring Diagrams” on page 13, along with the installation manual of the Gasboy Fuel Controller system for proper wiring.

## Wire Size

The AC wire size of the Pump Motor Feed (power supplied to unit for driving motor), Pump Motor (power from unit to motor), Neutral Feed (Neutral supplied to unit for driving motor) and Neutral (power from unit to the motor) is dependent upon the HP rating of the Pump Motor, the voltage at which the pump will be operated (115 VAC or 230 VAC International), and the distance from the circuit breaker panel to the pump.

In cases where multiple units are powered from the same breaker through the same wires, the gauge of the wires should be increased to handle the added load according to the distance from the breaker panel.

The chart below should be used as a guide in selecting the proper wire size according to the specific installation requirements.

## Wire Size Chart

115 Volt Wire Gauge Sizes per Feet of Run								
Motor HP	25'	50'	100'	150'	200'	250'	300'	Over 300', Use Relay at Motor Location
1	14	12	10	8	6	6	4	
230 Volt Wire Gauge Sizes per Feet of Run								
1	14	12	12	10	10	10	8	

## Model 9820K

The AC wire size for the Micro Feed and Neutral should be 14 AWG. This gauge of wire will be sufficient for runs up to 300 feet from the breaker panel to the pumping unit. Sites with distances over 300 feet should use 12 AWG wire.

The AC wire size for the Slow Flow and Fast Flow lines should be 14 AWG (when they are used).

The DC wire size for the Pulsar lines connecting the pumping unit to the AST register assembly must use 4-conductor, 18 AWG shielded cable (Belden 89418, Gasboy P/N C08864). This cable allows the pulsar wires to run in the same conduit as the AC wiring for the short distance between the pumping unit and the register assembly. Belden 89418 is rated as follows:

- Gas and oil-resistant insulation and jacket
- 18 AWG tinned, stranded, copper
- Four conductors
- 300 Volt maximum operating voltage
- Aluminum/Mylar shielded with drain wire

Twisted-pair shielded cable is highly recommended for the Pulse Output or RS-485 field wiring (when they are used). This type of cable provides superior noise immunity and must be used for distances over 100 feet or any time pulse output or RS-485 wiring is included in the same conduit as the AC wires. This cable must meet the following specifications:

- 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 600 V must be installed in a conduit separate from all AC wires.

See the Gasboy Fuel Management System Installation Manual for specific requirements.

# Conduit

## IMPORTANT INFORMATION

All wiring to the Gasboy Series 9820K pumping unit must be installed in threaded, rigid, metal conduit. PVC IS NOT ACCEPTABLE. The Gasboy Warranty will not apply to any pump in which the AC and DC wires are run in the same conduit, Junction Box (J-Box) or wireway, except as noted. The Gasboy Warranty will not apply to any pump using PVC as conduit.

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.

Metallic conduit is not considered an adequate equipment ground. Separate ground wiring must be used.

Use the charts in “[Conduit Size Charts](#)” on [page 12](#) as a guideline for determining the necessary conduit sizes for wiring of the Gasboy Series 9820K pumping unit. When actually determining the size of conduit, it may be necessary to increase the size of conduit because of a long run or large amount of bends. The installer should determine the orientation of the wire runs according to the layout of the components at the site and the applicable Gasboy wiring diagrams.

## Model 9820K

It is recommended that high voltage AC power wires to the register assembly (not between the register and pumping unit) be installed in a separate conduit from the DC pulser output wires (when used) and must not be run in any sort of common conduit or trough.

However, if AC and DC power wires share the conduit, the DC wiring must consist of UL-listed cable with the specifications described in “[Wire Size](#)” on [page 9](#). Only AC wires for the system and pumps can be installed in this conduit for this application.

When the Gasboy Series 9820K pumps are being installed with a fuel management system other than a Gasboy System, see the manufacturer installation manual for their specific conduit requirements.

Wiring between the 9820K register and pumping unit is installed in a single conduit. This includes the wiring for the AC control of the pumping unit and the internal pulser. A special cable, as described in “[Wire Size](#)” on [page 9](#) must be used for the connection between the pulser inside the pumping unit to the register assembly.

## Conduit Size Charts

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

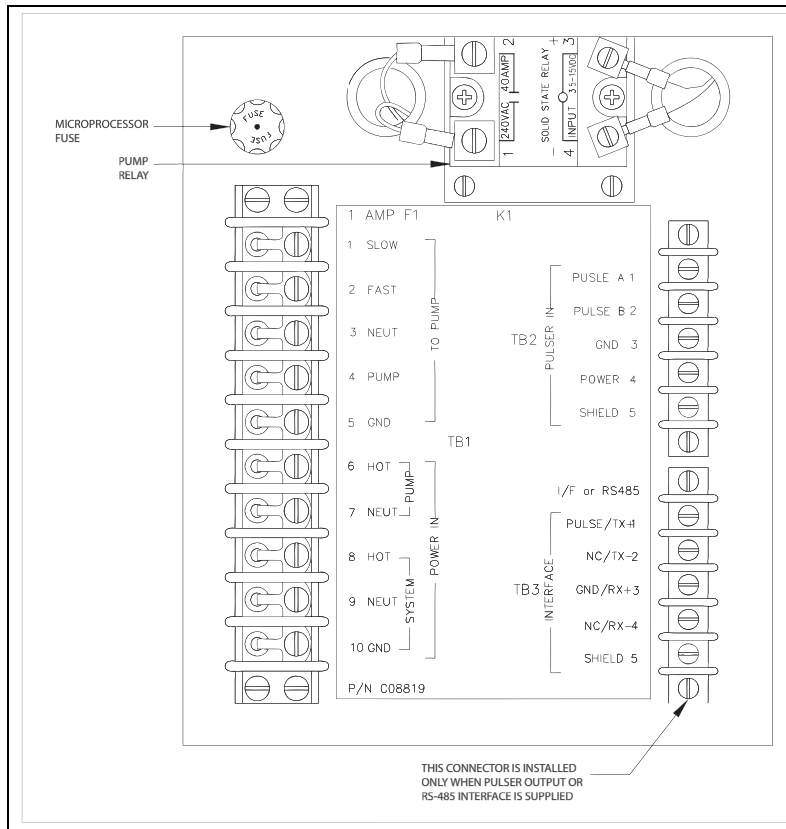
THHN/THWN Wire Areas				
Gauge	Diameter		Area (square units)	
	Inches	Millimeters	Inches	Millimeters
18	0.090	2.29	0.007	4.1
16	0.104	2.64	0.009	5.5
14	0.118	2.95	0.011	6.8
12	0.135	3.43	0.014	9.2
10	0.169	4.29	0.022	14.5
8	0.216	5.49	0.037	23.7
6	0.259	6.60	0.053	34.2
4	0.331	8.41	0.086	55.5
3	0.359	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	Internal Diameter		Area (square units)		Fill Area (square units) 25% Fill	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
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

# Terminal Block ID

The terminal blocks shown below are located in the 9820K register assembly.

**Figure 3-2: Register Assembly Terminal Block**



## Wiring Diagrams

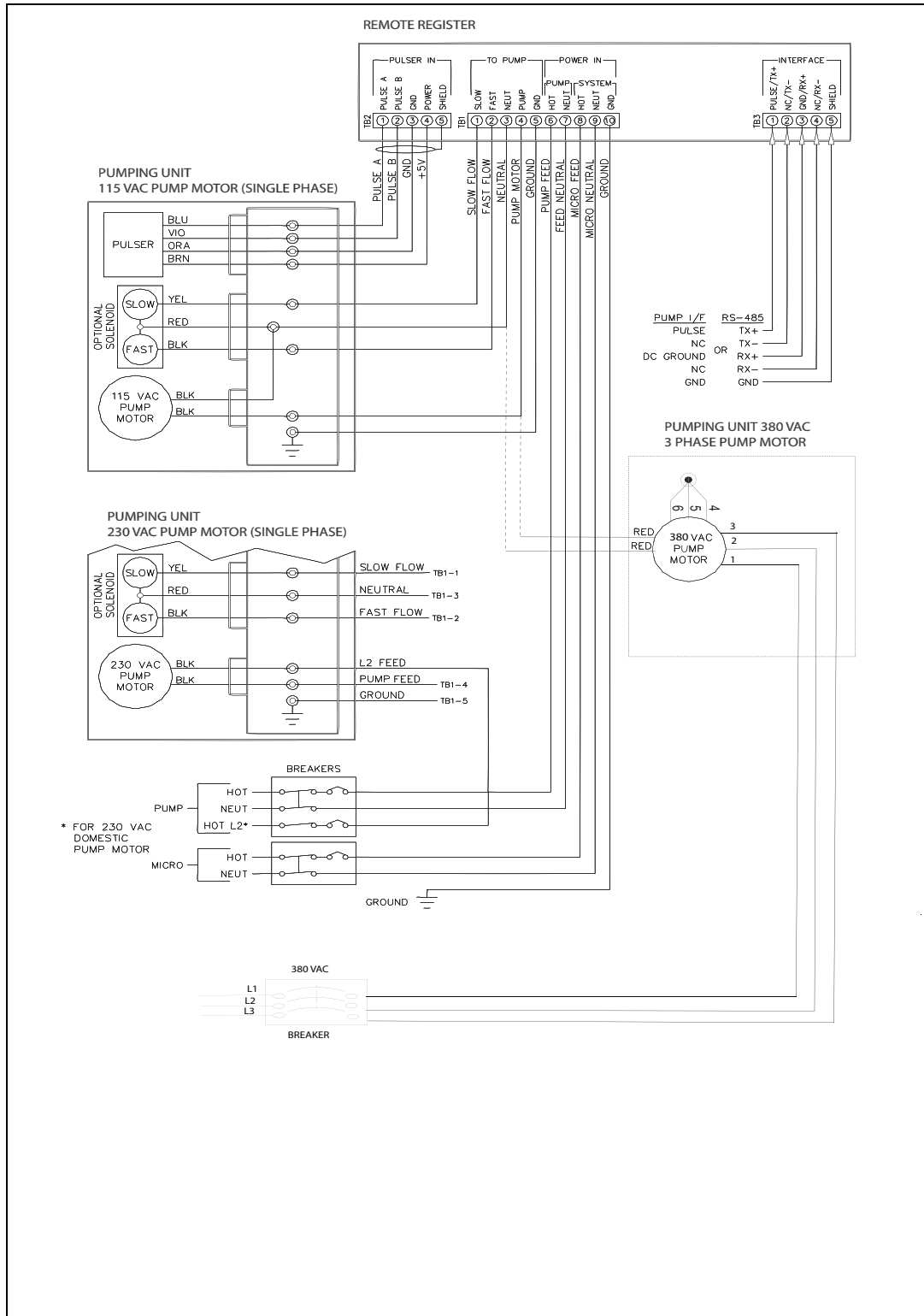
### CAUTION

Failure to follow the correct wiring diagram and all listed notes and precautions that follow each wiring diagram may result in damage to the Central Processing Unit (CPU) Printed Circuit Board (PCB).

The wiring diagrams provided are as follows:

- [Figure 3-3: Model 9820K Wiring Diagram – Domestic on page 14](#)
- [Figure 3-4: Model 9820K Wiring Diagram – International on page 16](#)

Figure 3-3: Model 9820K Wiring Diagram – Domestic



## Wiring Notes for Model 9820K – Domestic

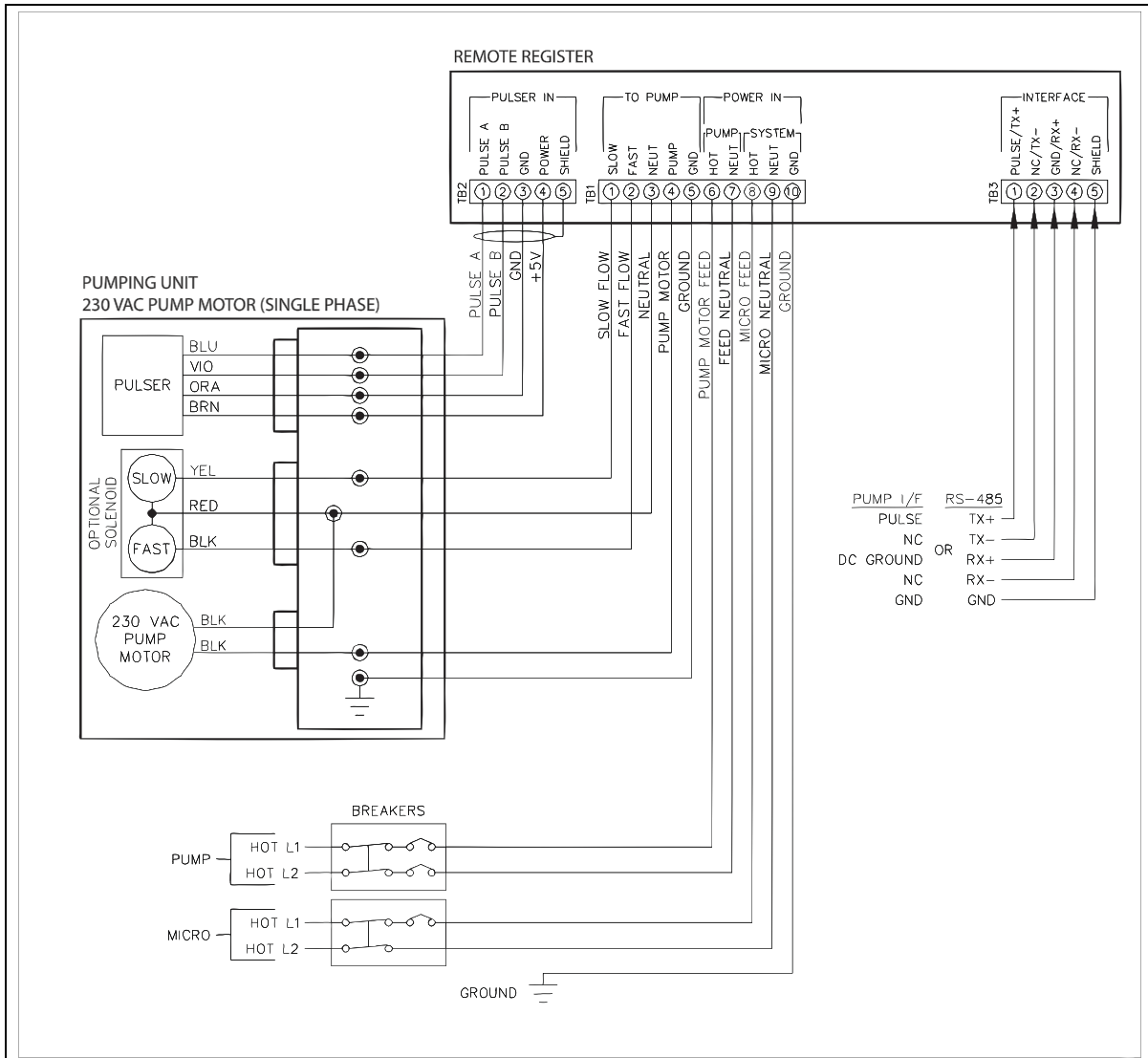
- Notes: 1) All wiring and conduit runs must conform with all building/fire codes, all Federal, State, and Local codes, National Electrical Code, (NFPA 70), NFPA 30, and Automotive and Marine Service Station Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.*
- 2) Pump Motor can be wired as 230 VAC to reduce current draw (see Breakaway View of 230 VAC Pump Motor). All other wiring should remain the same except for the addition of the L2 (requires 230 VAC breaker for control). If connected to equipment requiring control of the authorization input, the Phase 2 Feed should be switched through a separate relay to prevent false triggering of the authorization signal.*
- 3) If the Pump Motor line is controlled by a fuel management system using solid state relays, a resistor assembly must be installed between the Pump Motor Feed line and Neutral to prevent false triggering of the authorization input. The resistor assembly is 8.2K Ohm, 10 Watt (P/N C05818) for 115/230 VAC domestic and 30K Ohm, 10 Watt (P/N C06683) for 230 VAC international wiring.*
- 4) Slow Flow and Fast Flow lines are typically used when connecting to the valve. Each of these lines is capable of supplying 300 mA AC maximum (170 mA AC maximum if already connected to the valve).*

### CAUTION

These lines must not be shorted to any conduit or chassis metal, incorrectly wired, or connected to any equipment requiring more than stated maximum allowable current. If these restrictions are not followed, damage to the CPU PCB will occur.

- 5) Use the wire size chart in “Wire Size” on page 9 to determine the wire size for the control wiring.*

Figure 3-4: Model 9820K Wiring Diagram – International





## Wiring Notes for Model 9820K – International

*Notes: 1) 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.*

*2) If the Pump Motor line is controlled by a fuel management system using solid state relays, a resistor assembly must be installed between the Pump Motor Feed line and Neutral to prevent false triggering of the authorization input. The resistor assembly is 30K Ohm, 10 Watt (P/N C06683) for 230 VAC international wiring.*

*3) Slow Flow and Fast Flow lines are typically used when connecting to an optional valve. Each of these lines is capable of supplying 300 mA AC maximum (170 mA AC maximum if already connected to the optional valve).*

### CAUTION

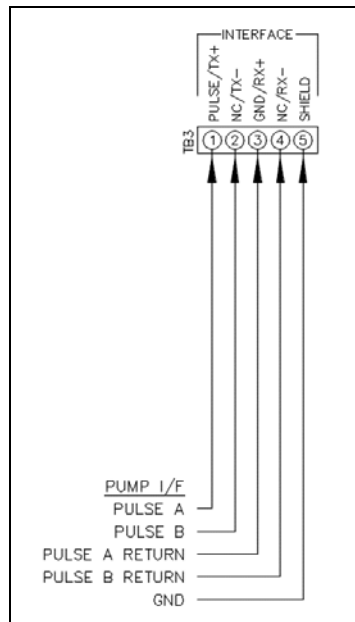
These lines must not be shorted to any conduit or chassis metal, incorrectly wired, or connected to any equipment requiring more than stated maximum allowable current. If these restrictions are not followed, damage to the CPU PCB will occur.

*4) Use the wire size chart in “Wire Size” on [page 9](#) to determine the wire size for the control wiring.*

## Dual Pulse Output

The following diagram illustrates the proper output for using a Pump I/F option configured to provide two isolated pulse outputs from a 9820K. This option is available on all 9800K Series pumps/dispensers. Use this wiring diagram instead of the pulser wiring diagram shown in [Figure 3-3](#) on [page 14](#).

**Figure 3-5: Dual Pulse Output**



*Note: All wiring and conduit runs must conform with all building/fire codes, all Federal, State, and Local codes, NEC®, 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.*

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## 4 – Control Lines

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### Purpose

The purpose of this section is to familiarize the installer with the control inputs and outputs that are available for the 9820K Series. It is recommended that installers read these instructions to obtain a better working knowledge of the unit in order to guide them in planning the site wiring. Refer to “[Wiring](#)” on [page 7](#) for a specific wiring diagram and installation notes.

### Ground

To ensure proper operation of the equipment and provide the necessary safety factors, a good ground line must be provided. A ground wire (preferably green or green with yellow stripe) must be connected between the unit’s AC J-Box ground lug and the main electrical service panel. One (1) earth ground connection is required per unit. The ground rod should be a solid corrosion-resistant conductor and must be installed at the main electrical panel in accordance with the National Electrical Code. 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).

*Note: Do not rely on conduit grounding in lieu of a ground wire.*

### Micro Feed

The Micro Feed (electronics AC hot line) is a 115 VAC (230 VAC International) input required to power the microprocessor of the register's electronics. This power must always remain on and must be on a separate breaker from the control lines (Pump Motor Feed). In a site configuration using multiple units, the power for the microprocessors of up to 6 units can be supplied by one breaker.

### Micro Neutral

The Micro Neutral is a return line for AC current from the microprocessor of the register’s electronics to the breaker panel.

# Pump Motor Feed

## Model 9820K

The Pump Motor Feed is a 115 VAC (230 VAC International) input which is required to power the pump and authorize the control line. This line is used to provide authorization for the unit (when enabled through the Dual In-line Package (DIP) switches). The Pump Motor Feed supplies power to the electric motor as well as the valves. 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 (115 VAC or 230 VAC), and the distance from the breaker panel to the pump. It however does not supply power to the motor for 3-Phase motors. Separate wiring is required for 3-Phase motors. Pump Motor Feed wires must not be used to supply the Micro Neutral/Feed.

If the line to the Model 9820K is controlled by a fuel management system using solid state relays, a resistor assembly must be installed between the Pump Motor Feed line and Neutral Feed to prevent false triggering of the authorization input. The resistor assembly is 8.2K Ohm, 10 Watt (P/N C05818) for 115/230 VAC domestic and 30K Ohm, 10 Watt (P/N C06683) for 230 VAC international wiring.

## Neutral Feed

The Neutral Feed is the AC current return line back to the breaker panel for all attached devices. The gauge of this wire should be equal to that of the Pump Motor Feed. Together with the pump feed, it supplies power to the motor and valves.

## Slow Flow (Reset Complete/Switch Detect)

The Slow Flow line is a 115 VAC (230 VAC International) output which is used to control the Slow Flow stage of the solenoid valve. This line also indicates when the reset process is complete and the unit is ready to dispense the product. This line can be used in conjunction with a fuel management system (for all Gasboy Controllers using Pulse-Output mode or any non-Gasboy Fuel Management systems).

This line is capable of supplying 300 mA AC maximum (170 mA maximum if already connected to the valve).

### CAUTION

This line must not be shorted to any conduit or chassis metal, incorrectly wired, or be connected to any equipment requiring more than stated maximum allowable current. If these restrictions are not followed, damage to the CPU PCB will occur.

## Fast Flow

The Fast Flow line is a 115 VAC (230 VAC International) output which is used to control the Fast Flow stage of the solenoid valve.

This line is capable of supplying 300 mA AC maximum (170 mA maximum if already connected to the valve).

### CAUTION

This line must not be shorted to any conduit or chassis metal, incorrectly wired, or be connected to any equipment requiring more than stated maximum allowable current. If these restrictions are not followed, damage to the CPU PCB will occur.

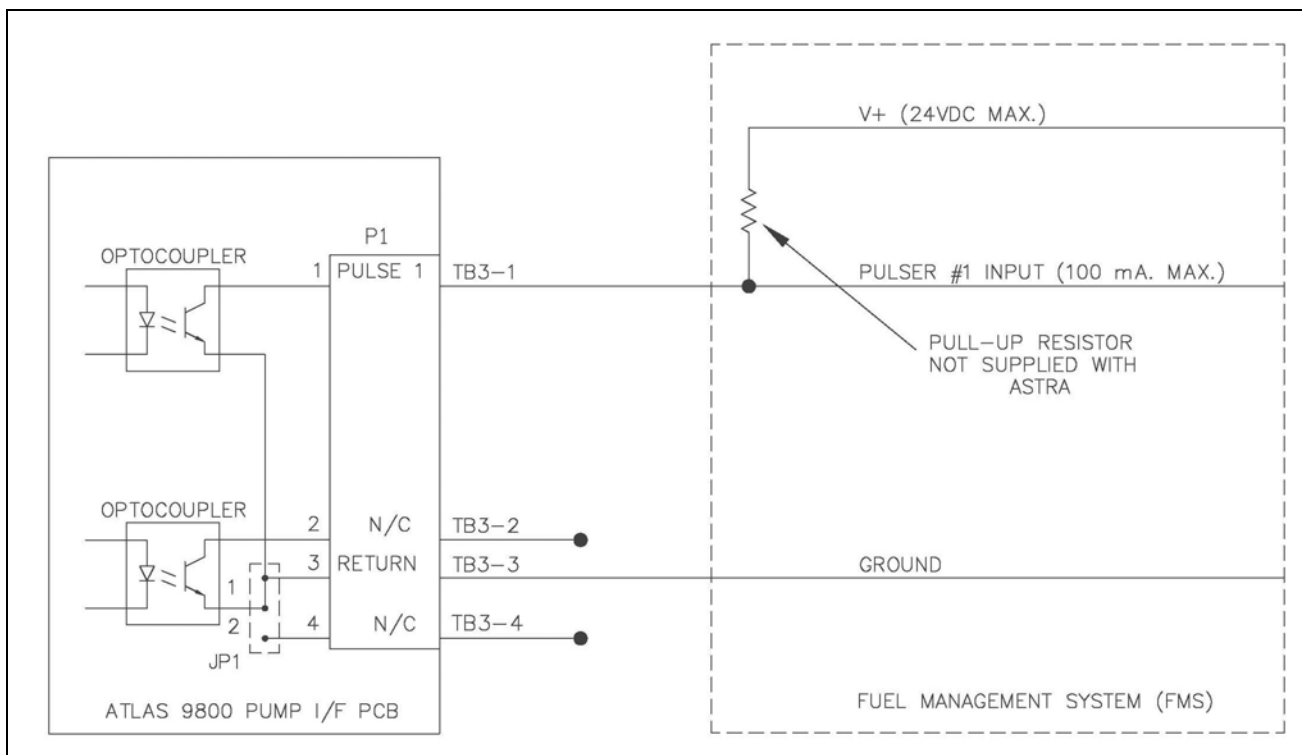
## Phase 2 Feed

The Phase 2 Feed is a hot feed, which is the opposite phase of the Pump Motor Feed. This line and the Pump Motor Feed are used for 230 VAC single phase motor applications. If connected to equipment requiring control of the authorization input, the Phase 2 Feed should be switched through a separate relay to prevent false triggering of the authorization signal.

## Pulse Output

The Pulse Output option provides a DC pulser output to indicate the quantity dispensed. The pulse rate can be configured by a sealable DIP switch for rates of 1, 10, 100, 250 and 500 pulses per gallon (PPG) or 1, 10 and 100 pulses per liter (PPL). This output should only be used when monitoring of the unit's operation is desired. The output is an open collector transistor capable of sinking up to 100 mA DC at voltages up to 24 VDC. The DC ground for the circuit comes from the FMS. Since the transistor switches between ground and high impedance, the installer must provide a voltage reference when the transistor is in the high impedance state. This reference voltage is provided by a pull-up resistor installed at the FMS between the pulser input and reference voltage. The value of this resistor is calculated based on the voltage and current requirements of the FMS pulser circuit.

**Figure 4-1: Pulse Output**



## RS-485

When the pumping unit includes the optional RS-485 interface, RS-485 lines are provided. This interface allows the user to connect a Gasboy Fuel Controllers using RS-485 Communications directly to the 9820K Series register's electronics.

# 5 – Installation

## Installation Precautions

All installations 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.

Plan your installation carefully. A pump cannot be expected to work satisfactorily unless the installation is correct. Pumping troubles, which seem to be pump-related, are frequently traced to faulty installation. Review the following list of installation DOs and DO NOTs to avoid potential problems.

### Installation DOs

- **DO** read the “[Important Safety Information](#)” on [page 3](#). It contains important information regarding the safe use of your pumping equipment.
- **DO** 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 pumping equipment is recommended. This control must be readily accessible, clearly labeled, and in accordance with all local codes.



### WARNING



The DISABLE PUMPS, and STOP buttons at the facility building and the optional DISABLE PUMPS button on the ICR WILL NOT shut off electrical power to the pump.

This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in case of an emergency and not only these facility building and ICR station “stops”.

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

- **DO** have the pump installed by a competent installer/electrician.
- **DO** install breakaway coupling on discharge hose. If using a high-hose retriever, install breakaway approximately 12 inches (30.5 cm) downstream of hose clamp on nozzle side of clamp.
- **DO** install emergency shut-off valve on supply pipe.
- **DO** install a model 52 valve for units not installed directly on top of the supply tank where tank fuel level can be 1 ft below or any amount above the inlet to the AST pumping unit.
- The installation of the components must be performed in the following order: nozzle, whip hose, breakaway, normal hose, hose clamp and AST.
- If you have an anti-siphon valve, set the spring to the lowest setting.

## Installation DO NOTs

- **DO NOT** experiment with a pump if you are not sure that the installation is correct.
- **DO NOT** overload sub or main breaker panels.
- **DO NOT** use power line wiring of inadequate capacity (use gauge specified by the wiring diagram or the wire chart provided in [“Wiring”](#) on [page 7](#)).
- **DO NOT** use a circuit breaker of improper size (refer to [“Wiring”](#) on [page 7](#)).
- **DO NOT** use the Gasboy fuel pumping equipment to remove water ballast from the storage tank.
- **DO NOT** use gaskets on covers of explosion-proof type boxes. The sealing compound found around wires at various locations within the conduit is a requirement of the National Electrical Code and should not be disturbed. Ensure that the mating surfaces between the J-Box and cover are free of dirt, debris, nicks and scratches. Tighten J-Box covers before replacing panels.
- **DO NOT** use knock-out boxes or flexible conduit for installing this unit. All power and lighting wires should be run in threaded, rigid, metal conduit. All threaded connections must be drawn up tight. All but one opening in the power J-Box are provided with plugs at the factory. At completion of the installation, it is the installer's responsibility to ensure that any unused openings are plugged.

## AST Vent Line

The vent line for standard units is vented to the atmosphere. Whenever possible, it is recommended that the line be returned to the tank. A hole is provided above the normal vent opening to allow this line to exit the pumping unit and return to the tank.



## Vapor Recovery Option

This pump can be supplied with components necessary to provide vapor recovery. If the pump is equipped for vapor recovery, a splitter is located in the pump housing. A 3/4-inch discharge line will exit from the rear of the pump housing to return vapor/fluid to the tank. No changes are required to the nozzle hook or boot assembly when using vapor recovery nozzles.

*Note: The vapor recovery nozzles approved for use are the "short spout" type.*

The following nozzles and hose are approved for use with vapor recovery systems:

Component	Company	Model Approved for Use
Nozzles	Emco Wheaton Inc.	Model A4015
	Husky Corporation	Model 5010
	OPW Fuel Components	Model 211V
Hose	UL-listed Hose Assembly	

## Hose Length Estimator for 9820K

Use the following chart to estimate the length of hose required for your 9820K application. The correct length will prevent the hose from touching the ground when the nozzle is placed into the nozzle boot/hook arrangement of the register. This chart assumes that the 9820K register is mounted on the standard pedestal and that the bottom of the pedestal is mounted flush with the bottom of the tank.

*Note: Excessive hose lengths can create trip hazards and reduce unit flow rates.*

Height (in/cm)	Hose Length (ft/cm)	Register Minimum Radius (ft/cm)	Fueling Radius (ft/cm)	Height (in/cm)	Hose Length (ft/cm)	Register Minimum Radius (ft/cm)	Fueling Radius (ft/cm)
60" - 65" 152 - 165 cm	8' / 244 cm	6" / 15 cm	8' / 244 cm	96" - 101" 244 - 257 cm	11' / 335 cm	6" / 15 cm	11' / 335 cm
	9' / 274 cm	4' / 122 cm	9' / 274 cm		12' / 366 cm	3' 6" / 107 cm	11' 6" / 351 cm
	10' / 305 cm	6' / 183 cm	10' / 305 cm		13' / 396 cm	5' 6" / 168 cm	12' / 366 cm
	11' / 335 cm	7' / 213 cm	11' / 335 cm		14' / 427 cm	7' 6" / 203 cm	13' / 396 cm
	12' / 366 cm	8' / 244 cm	12' / 366 cm		15' / 457 cm	9' / 274 cm	14' / 427 cm
66" - 71" 168 - 180 cm	8' / 244 cm	6" / 15 cm	8' / 244 cm	102" - 107" 260 - 272 cm	11' / 335 cm	6" / 15 cm	10' 6" / 320 cm
	9' / 274 cm	3' / 91 cm	9' 6" / 290 cm		12' / 366 cm	2' 6" / 76 cm	11' / 335 cm
	10' / 305 cm	5' / 152 cm	11' / 335 cm		13' / 396 cm	5' / 152 cm	11' 6" / 351 cm
	11' / 335 cm	6' / 183 cm	12' / 366 cm		14' / 427 cm	7' / 213 cm	12' 6" / 381 cm
	12' / 366 cm	8' / 244 cm	13' / 396 cm		15' / 457 cm	8' 6" / 259 cm	13' 6" / 411 cm
72" - 77" 183 - 196 cm	9' / 274 cm	6" / 15 cm	9' 6" / 290 cm	108" - 113" 274 - 287 cm	12' / 366 cm	6" / 15 cm	11' / 335 cm
	10' / 305 cm	3' 6" / 107 cm	10' 6" / 320 cm		13' / 396 cm	3' 6" / 107 cm	12' / 366 cm
	11' / 335 cm	5' 6" / 168 cm	11' 6" / 351 cm		14' / 427 cm	6' / 183 cm	13' / 396 cm
	12' / 366 cm	7' / 213 cm	12' 6" / 381 cm		15' / 457 cm	8' / 244 cm	14' / 427 cm
	13' / 396 cm	8' 6" / 259 cm	13' 6" / 411 cm		16' / 488 cm	10' / 305 cm	15' / 457 cm

Height (in/cm)	Hose Length (ft/cm)	Register Minimum Radius (ft/cm)	Fueling Radius (ft/cm)	Height (in/cm)	Hose Length (ft/cm)	Register Minimum Radius (ft/cm)	Fueling Radius (ft/cm)
78" - 83" 198 - 211 cm	9' / 274 cm	6" / 15 cm	9' / 274 cm	114" - 119" 290 - 302 cm	12' / 366 cm	6" / 15 cm	11' / 335 cm
	10' / 305 cm	2' 6" / 76 cm	10' / 305 cm		13' / 396 cm	2' 6" / 76 cm	12' / 366 cm
	11' / 335 cm	4' 6" / 137 cm	11' / 335 cm		14' / 427 cm	4' 6" / 137 cm	13' / 396 cm
	12' / 366 cm	6' 6" / 198 cm	12' 6" / 381 cm		15' / 457 cm	7' / 213 cm	14' / 427 cm
	13' / 396 cm	8' / 244 cm	13' 6" / 411 cm		16' / 488 cm	9' / 274 cm	15' / 457 cm
84" - 89" 213 - 226 cm	10' / 305 cm	6" / 15 cm	9' 6" / 290 cm	120" - 125" 305 - 318 cm	13' / 396 cm	6" / 15 cm	11' 6" / 351 cm
	11' / 335 cm	3' 6" / 107 cm	10' 6" / 320 cm		14' / 427 cm	2' 6" / 76 cm	12' 6" / 381 cm
	12' / 366 cm	5' 6" / 168 cm	11' 6" / 351 cm		15' / 457 cm	4' 6" / 137 cm	13' 6" / 411 cm
	13' / 396 cm	7' / 213 cm	12' 6" / 381 cm		16' / 488 cm	7' / 213 cm	14' 6" / 442 cm
	14' / 427 cm	8' 6" / 259 cm	13' 6" / 411 cm		17' / 518 cm	9' / 274 cm	15' 6" / 472 cm
90" - 95" 229 - 241 cm	11' / 335 cm	6" / 15 cm	10' 6" / 320 cm				
	12' / 366 cm	4' 6" / 137 cm	11' 6" / 351 cm				
	13' / 396 cm	6' 6" / 198 cm	12' 6" / 381 cm				
	14' / 427 cm	8' / 244 cm	13' 6" / 411 cm				
	15' / 457 cm	9' 6" / 290 cm	14' 6" / 442 cm				

## Legend:

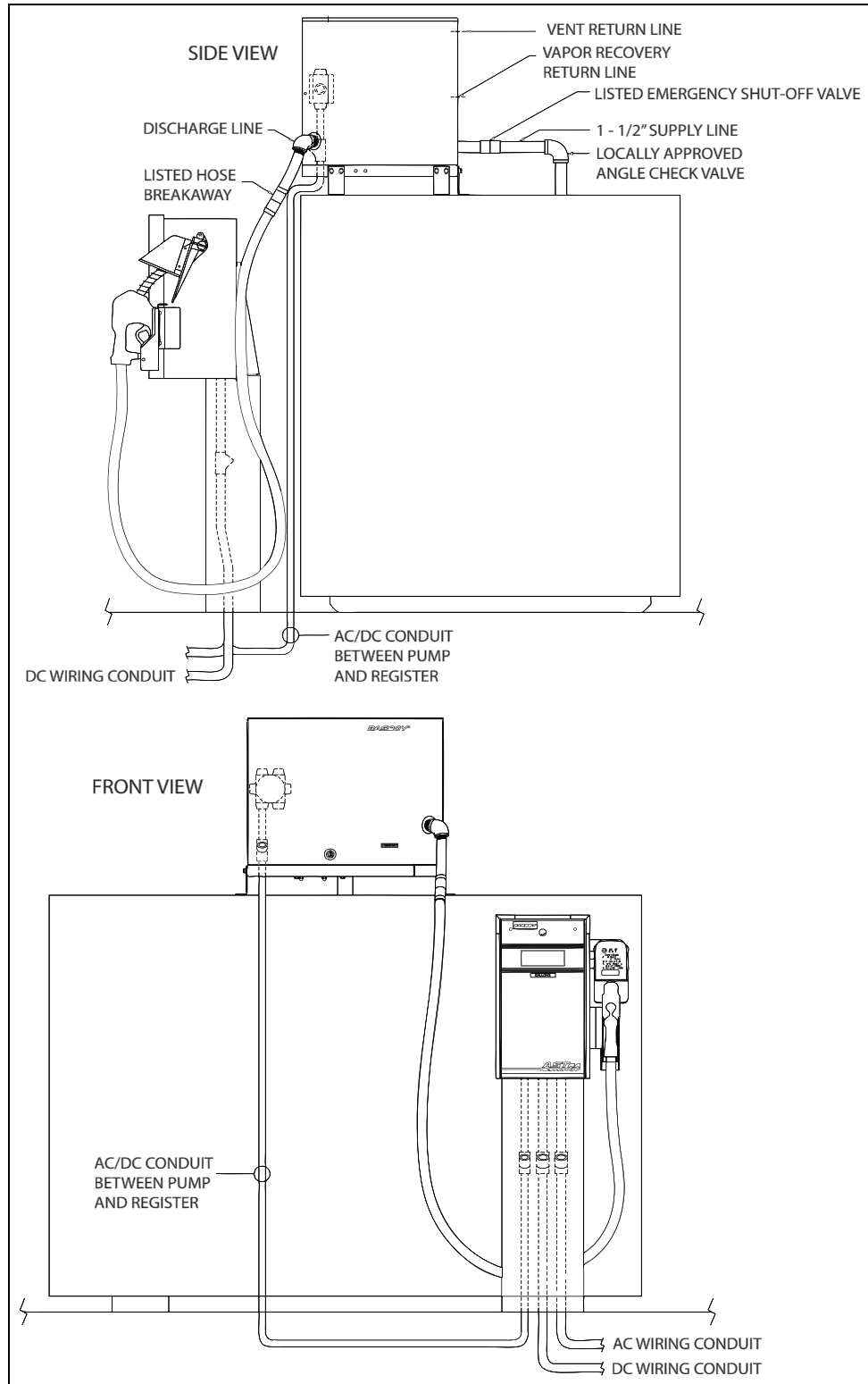
- Height: Measurement from the ground to the hose connection assuming the pumping unit is mounted on top of the tank with the feet provided.
- Hose Length: Length of hose less nozzles and fittings.
- Register Minimum Radius: Indicates the closest the register assembly can be to the specified starting point; any closer than this distance may allow hose to touch the ground when unit is not in use. This radius is measured starting from a point directly below pumping unit discharge to the center of the nozzle boot/hook of the register assembly.
- Fueling Radius: Indicates the approximate fueling radius. Measured from a point directly below pumping unit discharge to the nozzle.

## Angle Check Valve

Angle check valves must be of a low restriction variety to allow maximum unit flow rate. Check valves with springs are not recommended.

# Typical Installations

Figure 5-1: Typical Installation for Model 9820K



# Base Layouts

**Figure 5-2: Model 9820K Base Layout – Pumping Unit Assembly (Dimensions in inches, unless otherwise noted)**

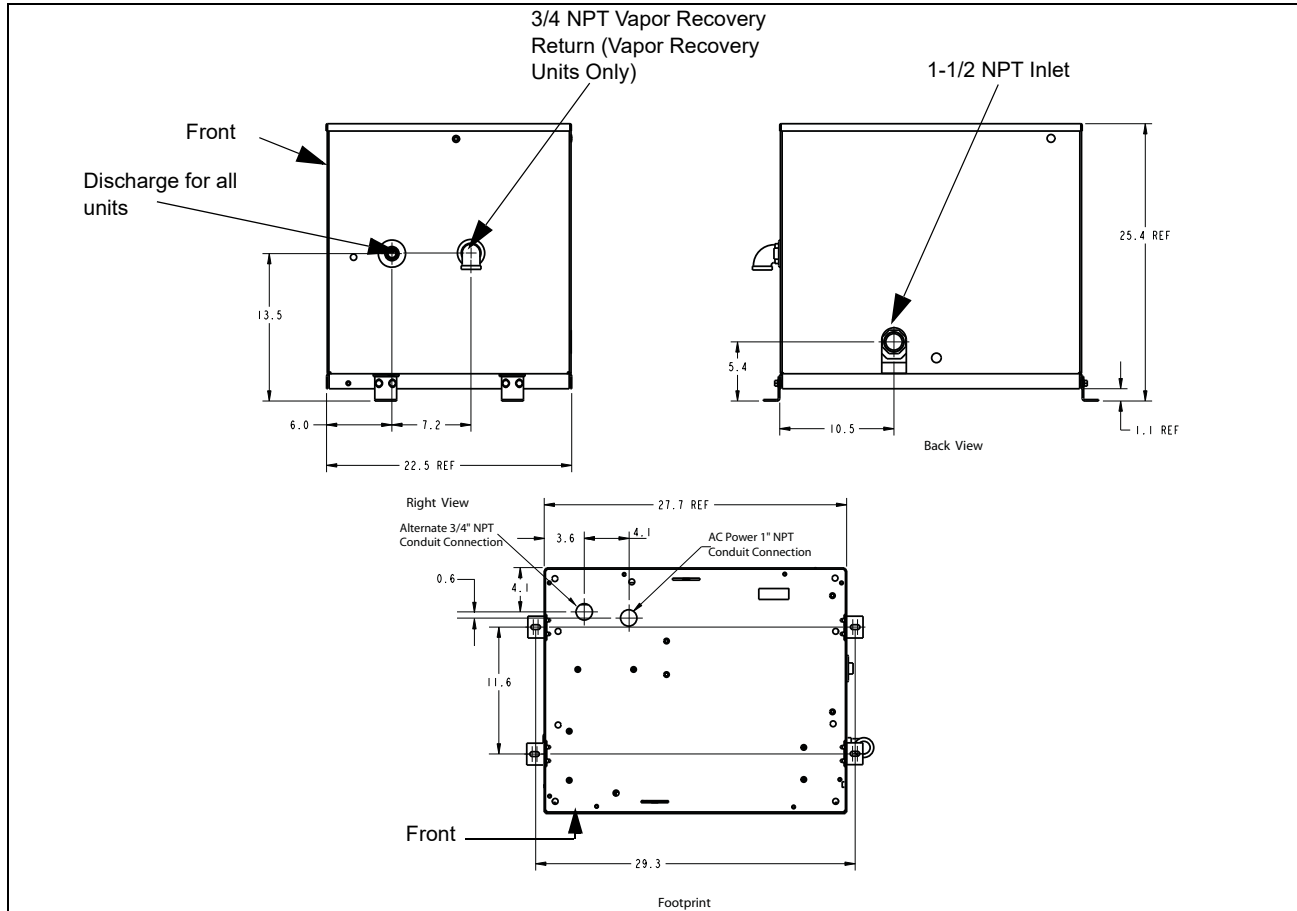


Figure 5-3: Model 9820K Base Layout – Register Assembly

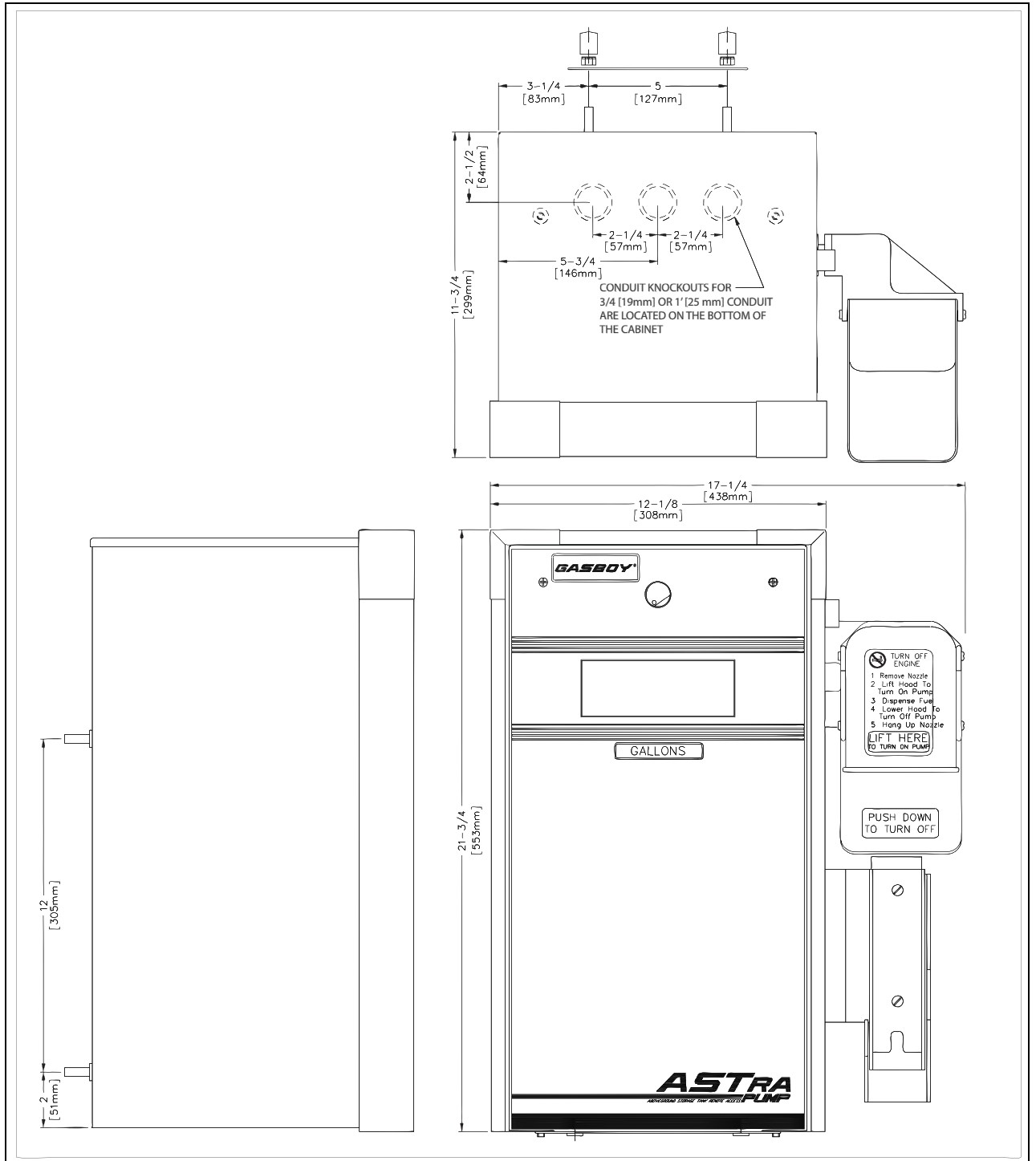


Figure 5-4: Model 9820K Base Layout – Optional Post

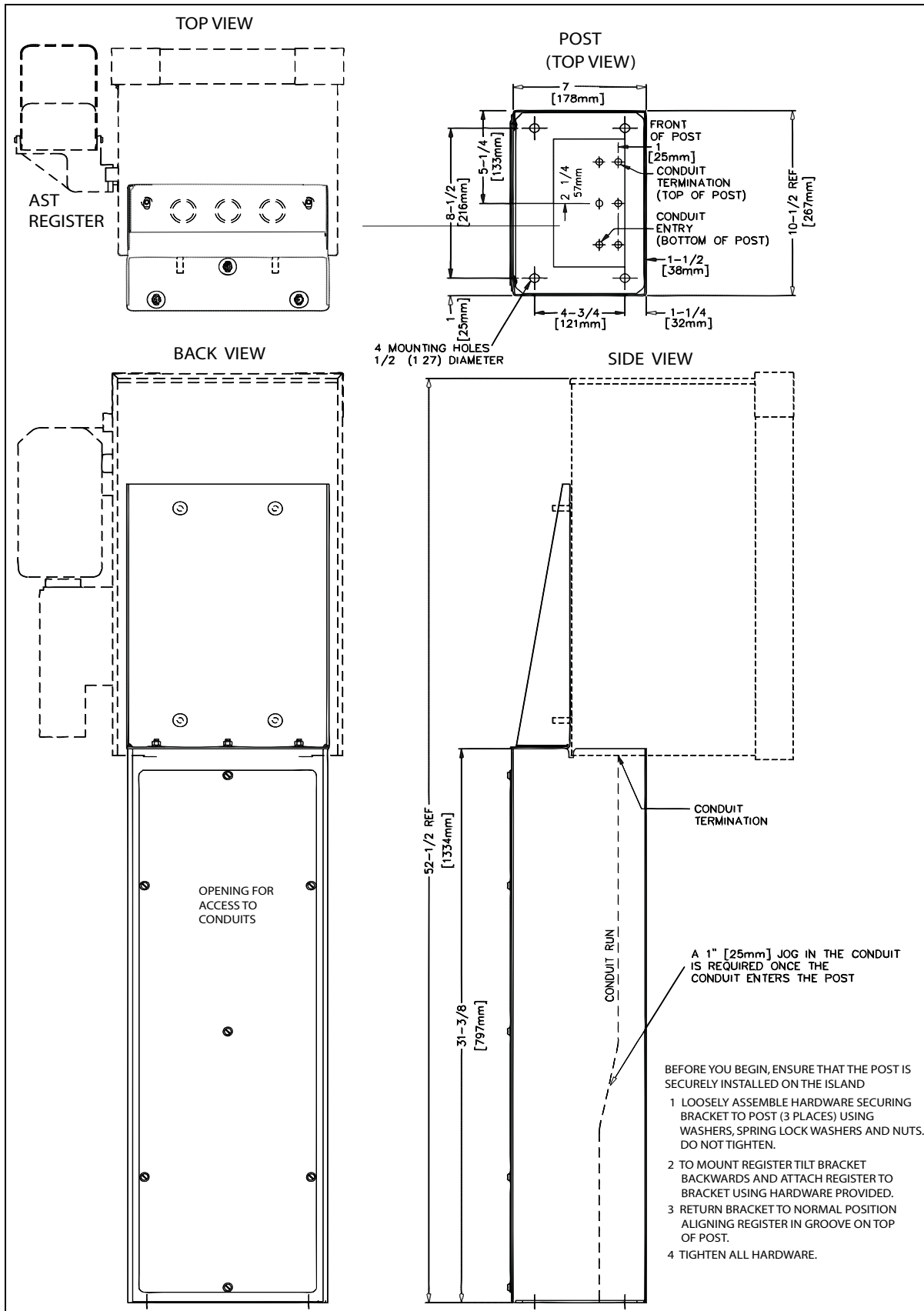


Figure 5-5: Model 9820K Base Layout – Side and Rear Brackets (View 1 of 2)

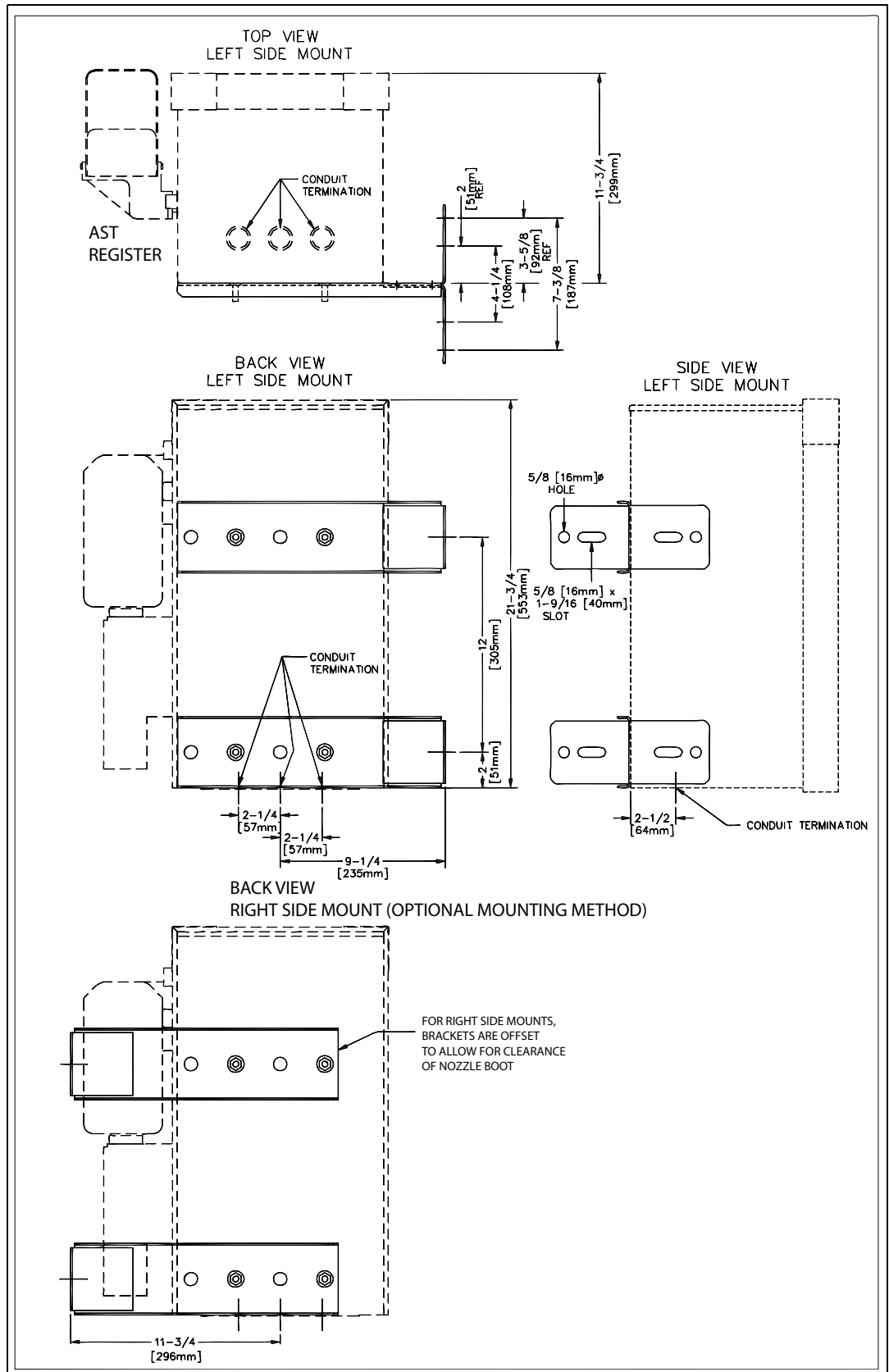
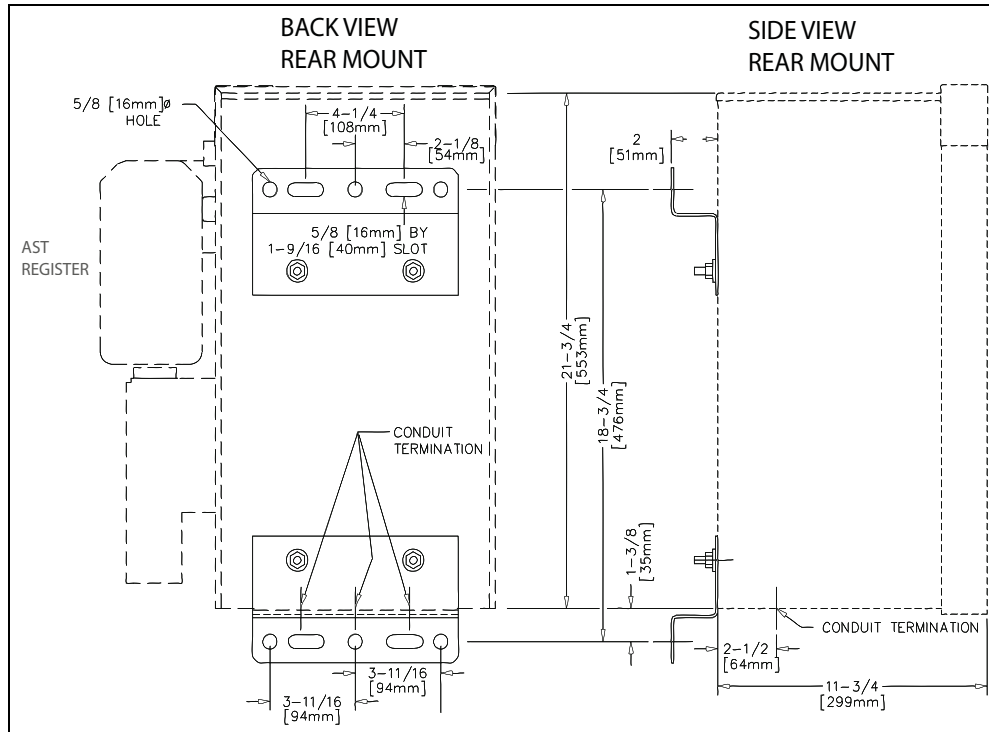


Figure 5-6: Model 9820K Base Layout – Side and Rear Brackets (View 2 of 2)





## 6 – 9820K Setup and Special Features

### Purpose

This section describes the setup and special features of the 9820K pump. The purpose of this section is to provide instructions for:

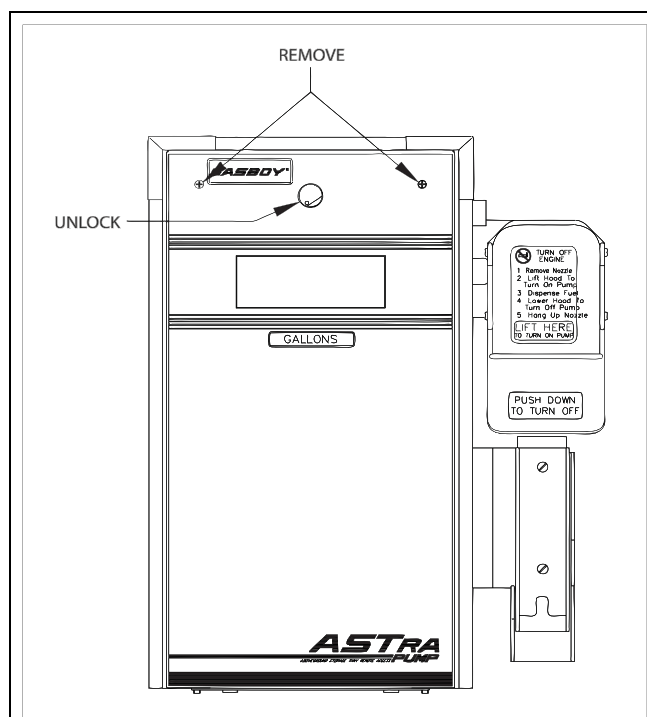
- Accessing electronic components
- Setting up internal switches
- Viewing and resetting electronic totalizers using the actuator
- Operating the pump
- Locking the nozzle

### Electronic Component Access

Before attempting to startup the 9820K, it is important to become familiar with the location of some key components as well as the various switch-selectable operating modes.

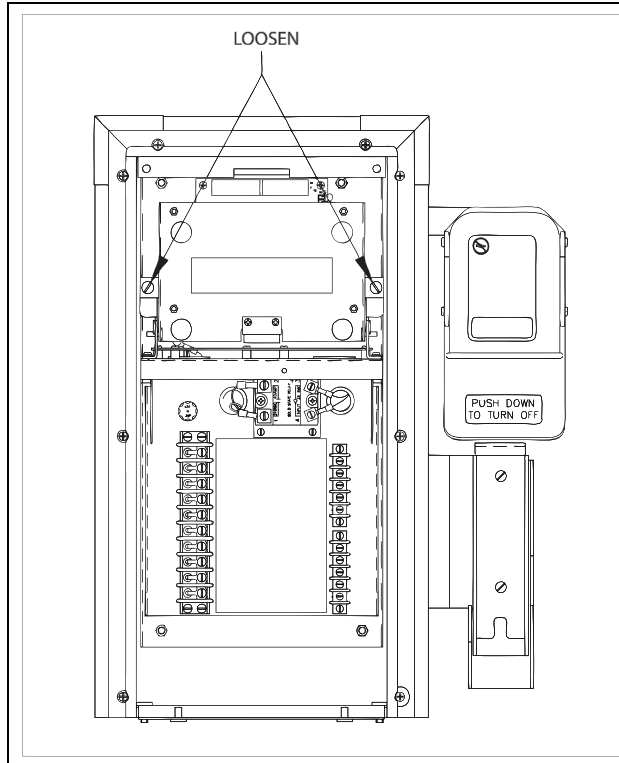
- 1 Unlock and remove the front panel (see [Figure 6-1](#)). Remove the two screws located at the top of the door assembly. Lift the door assembly to remove it.

**Figure 6-1: Front Panel – Model 9820K**



- 2 Loosen the two screws located on the left and right door support brackets and pivot the display panel down (see [Figure 6-2](#)).

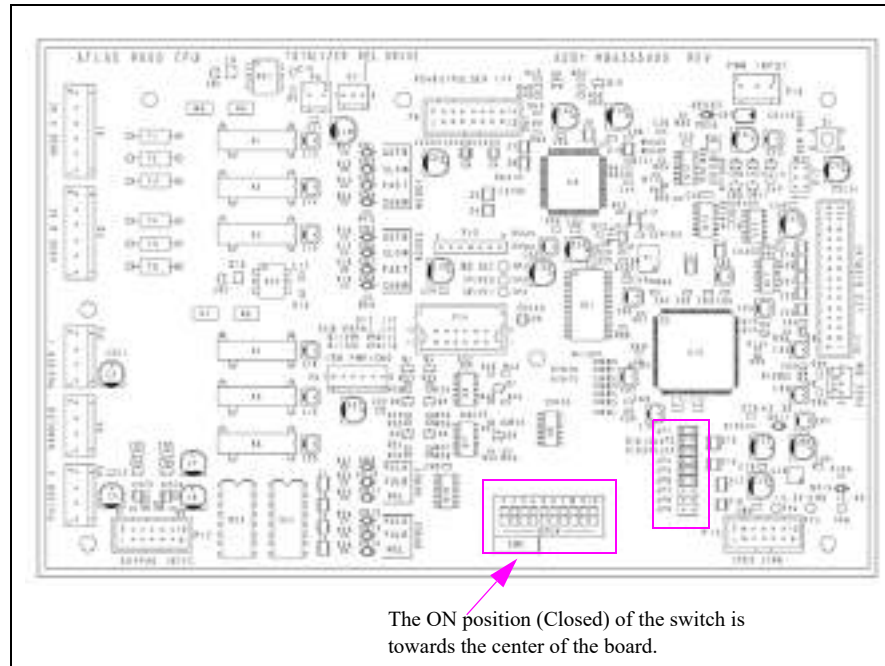
**Figure 6-2: Door Support Bracket Screw Locations – Model 9820K**



## CPU Switch Settings

The 9820K can be configured for various operating conditions using the switches and jumpers located on the CPU PCB (see [Figure 6-3](#)). Check these switches and jumpers and change their settings, if necessary. Switch and jumper settings should be changed with the power switch OFF. The new settings are read by the CPU PCB when the power is turned on again.

**Figure 6-3: CPU PCB – Location of Switches and Jumpers**



The ON position (Closed) of the switch is towards the center of the board.

### Jumper JP1 - JP9

#### JP1: Baud Rate

This jumper is set to reflect the communication rate of the Gasboy RS-485 pump loop: jumper installed for 1200 baud and jumper not installed for 9600 baud. All Gasboy Fuel Controllers communicate at 9600 baud.

Baud Rate	SW1-1
9600	Open
1200	Installed

**JP2: Mode**

If the 9820K is controlled by a Gasboy Fuel Controller using RS-485 Communications, the jumper should be open (online mode). If the 9820K is controlled by a Gasboy Fuel Controller using Pulse-Output mode, all non-Gasboy Fuel Controllers, or no fuel management system, the jumper should be installed (standalone mode).

*Note: The 9820K is shipped in standalone mode.*

Mode	SW1-2
Online	Open
Standalone	Installed

**JP3, JP4: Delay Time**

These two jumpers set the delay time used by leak detectors in submersible pump applications. The delay time is the period between activation of the submersible pump and activation of the Slow Flow valve. This time should be set according to the type of leak detector installed on the submersible pump to allow a normal leak test for each transaction. The delay time should be set to 0 seconds for suction pumps.

Delay Time	JP3	JP4
0 seconds	Installed	Installed
4 seconds	Installed	Open
5 seconds	Open	Installed
6 seconds	Open	Open

*Note: Settings that are too short will result in the leak detector tripping incorrectly and the ones that are too long will result in a longer wait for the fuel to be pumped.*

**JP5: Hose Pressurization**

For US Gallons (always in Hose Pressurization mode), this jumper is ignored. This jumper is used to determine if hose pressurization is used. If enabled, the slow flow valve is opened before reset is complete, to allow the hose to be pressurized before fuel dispensing begins.

Pressurization	JP5
Enabled	Installed
Disabled	Open

**JP6: Authorization**

This jumper allows activation of the 9820K from some types of fuel management systems. When the jumper is installed, a 115 VAC (230 VAC International) signal must be present on the Pump Motor Feed line for pump activation to occur (required setting for Gasboy Fuel Controllers using Pulse-Output mode, and all non-Gasboy systems). When open, the 9820K ignores the Pump Motor Feed line (required setting for Gasboy Fuel Controllers using RS-485 Communications, or no fuel system).

Authorization	JP6
Yes	Installed
No	Open

**JP7: Totalizers**

This jumper should be set to open for normal operation. When installed, this jumper enables the reset of the electronic totalizers. See View/Reset Totalizers later in this section for details.

Totalizers	JP7
Reset	Installed
Normal	Open

**JP8: Pump Disable Detection**

This jumper allows the pump/dispenser to detect or ignore a pump disable (RS-485 break character). When detection is enabled, the pump/dispenser will monitor the RS-485 communications for a pump disable signal. When received, any transaction in progress will be halted and then completed. This setting must be used only when the pump/dispenser is communicating to a Gasboy Fuel Controller using RS-485 Communications. This setting must be disabled (jumper installed) for all other configurations.

Detection	JP8
Disabled	Installed
Enabled	Open

**JP9**

This jumper is spare and not in use.

## Switch SW2

CPU Board (M06333KXXXX) can also be configured for various operating conditions using the switch positions SW2-1 through SW2-10. Verify these switches and change, if required. Switch settings must be changed with the power to the pump/dispenser set to “Off” position. CPU board reads new switch settings only during power up.

*Note: A switch in the closed position indicates that the switch is “On” (towards the center of the CPU board).*

### SW2-1 through SW2-4

These four switches serve a dual purpose: as an address setting when communicating on the Gasboy RS-485 loop or as a pulser output rate selector when pulser data is sent to all Gasboy Controllers using Pulse-Output mode or any non-Gasboy fuel management systems.

### Address Switches

A unique address identifier must be set when the 9820K is connected to the Gasboy RS-485 pump loop via the RS-485 I/F PCB. Since there are 16 possible address combinations, up to 16 units (single or twin) may be connected to the pump loop. Addressing should start at 1 and continue sequentially through 16. The physical wiring order does not have to correspond with the address order; that is the first unit on the RS-485 loop does not have to be address 1. Tabulated below are the switch settings and address selections.

Address	SW2-1	SW2-2	SW2-3	SW2-4
1	Closed	Closed	Closed	Closed
2	Open	Closed	Closed	Closed
3	Closed	Open	Closed	Closed
4	Open	Open	Closed	Closed
5	Closed	Closed	Open	Closed
6	Open	Closed	Open	Closed
7	Closed	Open	Open	Closed
8	Open	Open	Open	Closed
9	Closed	Closed	Closed	Open
10	Open	Closed	Closed	Open
11	Closed	Open	Closed	Open
12	Open	Open	Closed	Open
13	Closed	Closed	Open	Open
14	Open	Closed	Open	Open
15	Closed	Open	Open	Open
16	Open	Open	Open	Open

## Pulser Output Rate Switches

When the 9820K is connected to Gasboy Controllers using Pulse-Output mode or any non-Gasboy fuel management system (standalone), the pulser signals are sent out via the Pump I/F PCB. The pulse rate required by the monitoring equipment can be configured by setting the switches as shown in the chart below. Pulse-out rate represents the pulses per unit (gallon, liter, or imperial gallon). For domestic units, the pulse rate can be up to 500 PPG. For international units, the pulse rate can be up to 100 PPL. This switch may need to be sealed by a Weights and Measures paper seal if the 9820K is used for the resale of product.

*Note: If a valid pulse-out rate is not selected, the CPU will not output pulses.*

Pulse Rate	SW2-1	SW2-2	SW2-3
1	Closed	Closed	Closed
10	Open	Closed	Closed
100	Closed	Open	Closed
250	Open	Open	Closed
500	Closed	Closed	Open
None	Closed	Open	Open
None	Open	Open	Open

Leading zeros are always suppressed in the hundreds and tens positions to the left of the decimal point. When in standalone mode, positions to the right of the decimal point are displayed based on the pulse rate selected as shown in the chart below.

Pulse Rate	Display
1:1	XXX.
10:1	XXX.X
100:1	XXX.XX
250:1	XXX.XXX
500:1	XXX.XXX

## Timeout Switch (if JP2 is Installed)

When the 9820K is in standalone mode, it will turn off an active hose if it does not detect pulses for 4 minutes, 15 seconds. This timeout feature can be disabled by setting switch SW2-4 to Open.

Timeout	SW2-4
Enabled	Closed
Disabled	Open

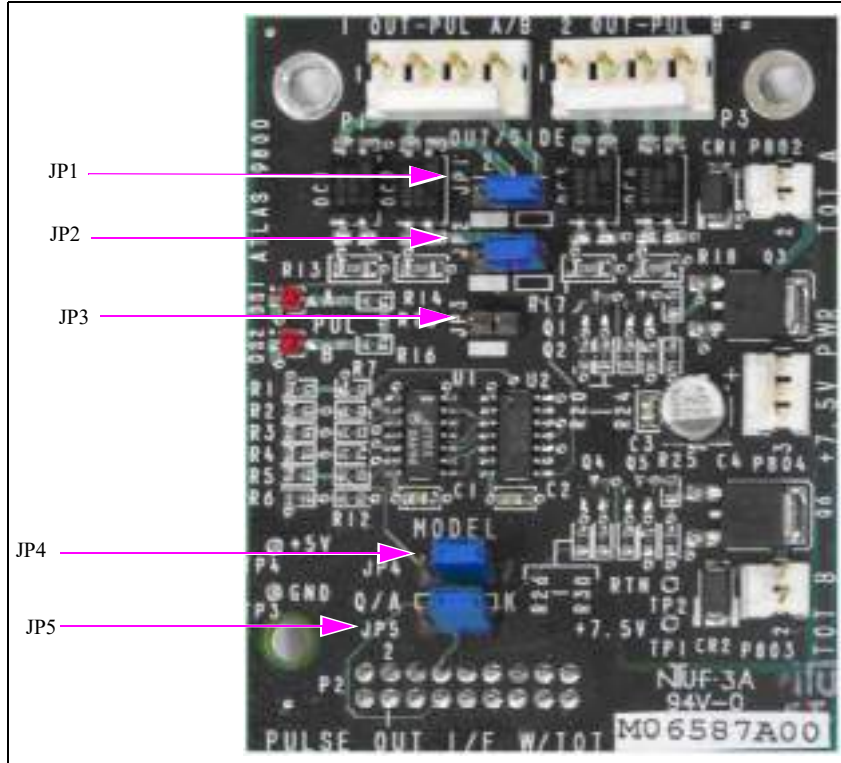
## 9820K Dual Pulse Output Option

When the 9820K is using the Pump I/F PCB (M06587A001) to create output pulses to monitoring equipment, it can be configured for one or two isolated pulse outputs. For example, use two isolated outputs to send pulses to a fuel management system and tank monitoring equipment. To set the pulse output for a single output, set jumpers JP1 and JP2 on the Pump I/F PCB to position 1 and use the standard wiring shown in [Figure 3-3](#) on [page 14](#) or [Figure 3-4](#) on [page 16](#). To set the pulse output for two isolated pulse outputs, set JP1 and JP2 to position 2 and use the wiring diagram shown in [Figure 3-5](#) on [page 18](#). JP3 should remain open in both cases.

### JP4 and JP5

When using the Pump I/F PCB (M06587A001) on the 9820K, jumpers JP4 and JP5 should always be set to the Q/A position.

Figure 6-4: JP4 and JP5 Positions



### JP1, JP2, & JP3

Jumper Settings		
	Single Channel, Dual/Single Hose Pulse-out I/F (Default Setting)	Dual Channel, Single Hose Pulse-out I/F
Terminal Block Position	JP1 Position 1 JP2 Position 1 JP3 Open	JP1 Position 2 JP2 Position 2 JP3 Open
TB3 - 1	Pulse	Pulse A
TB3 - 2	No Connection	Pulse B
TB3 - 3	DC Ground	Pulse A Return
TB3 - 4	No Connection	Pulse B Return

Note: Refer to the wiring diagrams on [page 14](#), [page 16](#), and [page 18](#).



# Battery Backup Power Supply

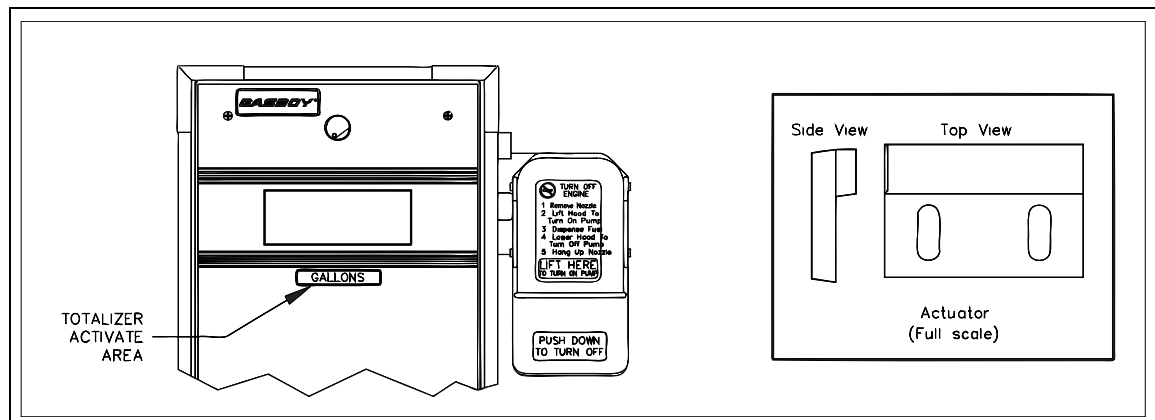
Until summer of 2012, a battery-backed power supply was an option for all the 9800 models including the 9820K. This option was required for units used in a retail application. If power was lost to the unit, the battery allowed the last transaction amount to remain on the display to meet W&M requirements. The current 9800 series displays are backed up by a super cap that performs this function at the display.

## View/Reset Totalizer

### Electronic Totalizer

The 9820K stores a running quantity total. This electronic totalizer works independent of the optional mechanical totalizer that may be installed at the pump module, and is shown as whole gallons (liters) on the displays (decimal point is shown, although it is disregarded). The totalizer data is stored in battery-backed memory. The 9820K is supplied with an actuator (see [Figure 6-5](#)), which allows you to view and reset the electronic totalizer. When the 9820K is shipped, the actuator is attached with a tie wrap to the electronic chassis behind the register door. At installation or startup, cut the tie wrap and remove the actuator. Retain for future use.

**Figure 6-5: Electronic Totalizer**



To view the pump totalizer, ensure that the pump handle is off and no transaction is in progress. Locate the unit of measure indication (for example, gallons) below the display window. Touch this area with the actuator as shown. The totalizer data will be displayed for 10 seconds. If more time is needed, touch the actuator to the same area for an additional 10-second period.

To reset the electronic totalizer, follow the disassembly procedure outlined under “[Electronic Component Access](#)” on [page 33](#) earlier in this section.

- 1 Turn off the breaker supplying the 9820K AC power.
- 2 Jumper JP7 on the CPU PCB.
- 3 Hold the actuator against the totalizer bracket and have someone turn the breaker on. The display should change to all zeroes.
- 4 Remove the actuator and remove jumper on JP7.

*Note: Remove jumper from JP7 to prevent the totalizer from being reset the next time the actuator is used to read it.*

## Mechanical Totalizer

Some 9820K models contain an optional mechanical totalizer. The totalizer has 8 digits; 7 whole gallons and 1 tenth-gallon column, 8 whole digits for liters. The mechanical totalizer is located on the front right side of the pumping module.

# 7 – Operating Sequence and Locking the Nozzle

---

## Operating Sequence

The exact sequence of events that occurs during the operation of the pump is determined by various switch/jumper settings, inputs, and the user. A typical transaction is explained below.

- 1 Turn on the pump handle.  
If AC is present on the Pump Motor Feed line, the reset cycle begins.  
The display does the following:
  - Goes blank for one second
  - Shows all 8s for one second
  - Goes to 0.000 (gallons) or 0.00 (liters) and remains this way for one second

The Pump Motor turns on. The Slow Flow valve turns on.

- 2 The user begins to dispense fuel.  
Quantity will not be recorded on the display until 0.010 gallons (0.04 liters) is reached. However, all pulses will be sent out on the Pulse Output line, if equipped. At 0.010 gallons (0.04 liters), the Fast Flow valve turns on.

The pump continues to run until one of the following conditions occurs:

*Note: These conditions turn off all relays.*

- The handle is turned off.
- The Pump Motor Feed line is turned off.
- A pulser error is detected.
- A timeout of 255 seconds is reached. If connected to a fuel management system, the timeout loaded into the system will be used.
- A quantity of 990.000 gallons (9900.00 liters) is reached. If connected to a fuel management system, the limit set in the system will be used.
- The pump is halted by an operator of a fuel management system.
- An AC power failure occurs.

The 9820K continues to monitor for pulses until a 2-second period with no pulses occurs. At that, time the transaction is considered completed.

## 9820K Nozzle Locking

A locking mechanism is supplied as part of the hook arrangement on each 9820K (see [Figure 7-1](#) on [page 47](#)). This allows the unit to be locked, thus preventing the use of the pumps.

A lock with a shackle clearance of at least 2-1/2 inches is required to lock the pump (for example, Master No. 1LJ-D). To lock the nozzle in place, proceed as follows:

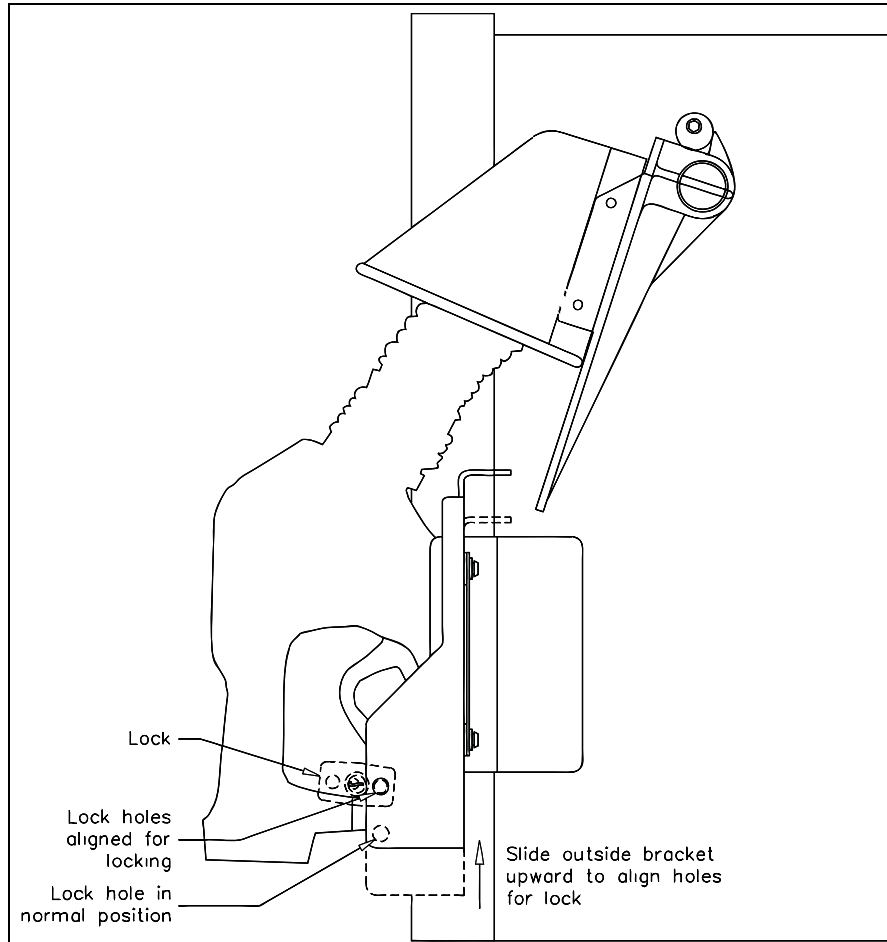
- 1 Insert the nozzle onto the hook assembly with the nozzle tip inside the boot.
- 2 Slide the rear bracket of the nozzle hook assembly upward until the holes near the bottom of the nozzle are aligned.
- 3 Slide the open padlock through holes in the moveable and stationary portions of the hook arrangement, thus capturing the nozzle in place.

*Note: The four holes will not align until the moveable bracket has been slid upward.*

- 4 Close the lock.

While the nozzle is locked in place, the nozzle cannot be removed from the nozzle hook and the pump cannot be turned on.

Figure 7-1: Locking Mechanism – Model 9820K



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## 8 – 9820K Startup and Test

### Installation Completion Checklist

The information below should be reviewed to help verify the proper installation of the Series 9820K AST Pump Unit. If the installation does not meet the criteria listed, correct the problem before the startup is performed.

#### CAUTION

To avoid damage to the CPU PC board, verify if the Slow Flow and Fast Flow wires are not shorted to any conduit or chassis metal, incorrectly wired, or connected to any equipment requiring more than stated maximum allowable current.

- The unit must be properly secured to the tank.
- All plumbing must be complete and tight.
- When DC pulsers are used in the pump for connecting to Gasboy fuel management systems, AC and DC wires should not share any conduits, J-Boxes, or troughs.
- All conduit work must be complete. All J-Box covers must be secured. Conduits should not be sealed until the wiring is verified through proper operation.
- The unit must be properly grounded.

### Startup

After successfully verifying the installation against the completion check list above, the unit is ready for startup. Follow the procedures listed below to perform an orderly startup of the Series 9820K AST Pump Unit.

#### Preliminary Steps

- 1 All liquid-carrying lines must be checked for leaks.
- 2 Before any testing begins, remove any water in the tank through a fill opening, using a suitable pump.

#### CAUTION

Do not use the Gasboy pump module to remove water. Serious damage may occur.

*Note: A sufficient volume of fuel must be present in the tank to ensure that the liquid level is above the bottom of the suction pipe.*

## Startup – Model 9820K

- 1 Verify if all switches and jumpers on the CPU PCB are set properly for the various operating conditions as explained in “[Wiring](#)” on [page 7](#).
- 2 Turn on the circuit breakers for the microprocessor.
- 3 Authorize the unit through the fuel management system, if available.
- 4 Remove the nozzle from its holder and turn on the pump handle. Verify if the display goes through the proper reset sequence as explained in “[View/Reset Totalizer](#)” on [page 41](#).
- 5 Dispense fuel and verify if the high flow valve opens. Check all plumbing for leaks at this time.
- 6 Turn off the pump handle and open the nozzle. No fuel should be dispensed at this time.
- 7 Verify if the correct quantity was recorded by the fuel management system, if available.
- 8 Run the unit through all standard calibration procedures. See “[Calibration](#)” on [page 50](#).
- 9 Reset the electronic totalizer as described in “[View/Reset Totalizer](#)” on [page 41](#).

## Post Startup Tests

### Voltage

The incoming voltage to the pump should be checked and any reading not within 10% of the rated voltage should be corrected before testing is continued. Take voltage readings while the pump is operating on bypass and also while making a delivery. Any voltage drop in excess of 10% during either of these operating states should be considered a low voltage condition that could affect the long term reliability of the unit. Corrective action should be taken to ensure an adequate power supply to the pump.

### Tightness

After determining that the pump is operating satisfactorily and the system is fully primed, check the pump and piping to ensure that all connections are tight.

### Calibration

All Gasboy pumps are adjusted for accurate measure at the factory. However, since the conditions of the installation and fuel types can affect pump accuracy, it is the responsibility of the installer to check the pump for accuracy and make any required adjustments. It is the owner's responsibility to report this device to the local Weights and Measures officials for their inspection before the unit is put into service.



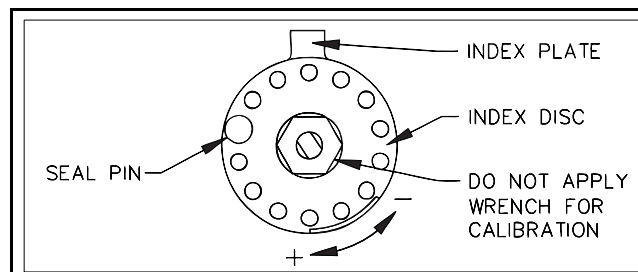
Each meter is equipped with a mechanism for calibration, located on the side of the meter. To adjust the volume dispensed, proceed as follows:

- 1 Check the meter registration by delivering the product to a reliable, accurate, 50 or 100-gallon prover can or a smaller can size approved by local Weights and Measures for the flow rate of the unit.
- 2 Remove the seal wire from the seal pin (see [Figure 8-1](#)).
- 3 Remove the seal pin and turn the wheel to adjust measurement (see [Figure 8-1](#)).
  - Turn clockwise to decrease the amount in the prover to match the display.
  - Turn counter-clockwise to increase the amount in the prover to match the display.

*Note: Moving the wheel one hole position changes the calibration by 2/3 cubic inch per 5 gallons (18.9 liters). To change by half of this amount, you may use the alternate seal pin hole on the opposing side of the calibration wheel.*

- 4 Repeat the process until the volume in prover can and the amount recorded are within tolerance.
- 5 After calibration is complete, reinstall the seal pin and secure in place using a seal wire.

**Figure 8-1: Index Disc**



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