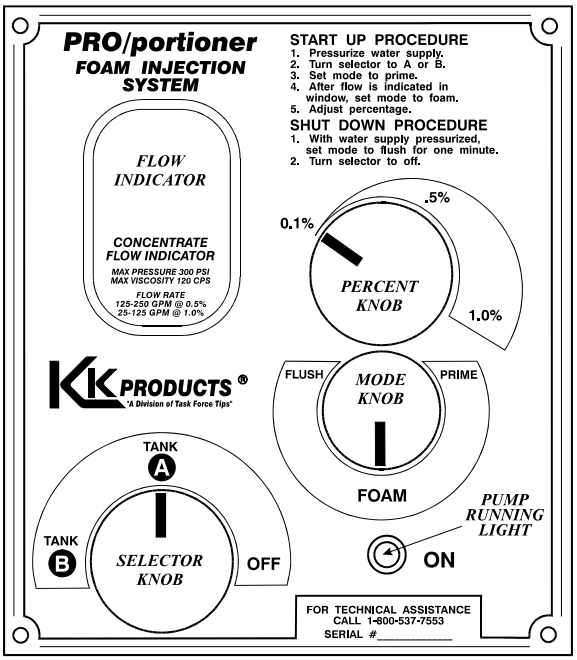
OPERATION and MAINTENANCE MANUAL



PANEL MOUNT

PRO/portioner

FOAM INJECTION SYSTEM

⚠WARNING ***Read manual before use. Operation of this system without understanding the manual and receiving proper training can be dangerous and is a misuse of this equipment.***

⚠WARNING ***This manual is intended to familiarize firefighters and maintenance personnel with the installation, operation and servicing procedures associated with Task Force Tips / KK Product's PRO/portioner foam injection system.***

⚠WARNING ***This manual should be kept available to all operating and maintenance personnel.***

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KK PRODUCTS PANEL MOUNT PRO/portioner OPERATIONS MANUAL

1.0 INTRODUCTION

Welcome to the growing number of users of the PRO/portioner injection system. KK Products has been designing and manufacturing quality fire fighting and suppression equipment since 1969. The KK Products line of single, dual, and selectable gallonage fog nozzles, and foam application and injection equipment is represented by over a hundred dealers worldwide. Please take a moment and fill out the enclosed WARRANTY card, and return it within ten days of placing the unit in service. This validates the unit's warranty and will keep you informed of new products and services.

1.1 DESCRIPTION

The PRO/portioner is a discharge side, concentrate injection system. Designed to inject liquid concentrates into a water flow at a user selectable concentrate ratio from 0.1% to 1%, this system offers dependability and ease of operation in rugged environments. The desired concentrate ratio is maintained at all flow rates up to the maximum flow capacity of the concentrate pump. Once selected, the concentrate ratio will automatically be injected into the water stream and will not be affected by variations in hose length, pressure, or elevation. With a maximum concentrate flow of 1.25 GPM, the PRO/portioner will operate easily at 1% ratios up to 125 GPM, and at 0.5% ratios up to 250 GPM. Designed especially for use with Class A foaming agents, 1% AFFF, and wetting agent concentrates, the PRO/portioner operates on a balanced pressure concept.

⚠WARNING ***Do not use 3 to 6% class B foams in the PRO/portioner. The use of 3 to 6% Class B foams will result in weak and ineffective foam. Maximum mix ratio, of this PRO/portioner is 1%.***

The PRO/portioner is designed for Class A and Class B AFFF concentrates only. Do not attempt to use any 3 or 6% concentrates in the PRO/portioner, or Class A foams not meeting USDA Forest Service "Interim Requirements for Foam for Wildland Fires, Aircraft or Ground Application" or NFPA 298 "Foam Chemicals for Wildland Fire Control".

1.2 BALANCED PRESSURE PROPORTIONING

The PRO/portioner is similar in concept to the carburetor on a gasoline engine. In a carburetor the air to fuel ratio remains constant as the amount of air through the carburetor changes. As the engine speeds up, the amount of air passing through the carburetor increases and more gasoline is injected into the air stream to maintain a constant percentage. A carburetor can make the mixture leaner or richer by adjusting the jets. The fuel pump maintains fuel pressure while the carburetor does the proportioning.

The pump on the PRO/portioner supplies the pressure to inject the concentrate into the water stream. The proportioning block, like the carburetor on an engine, maintains proper percentage. The pump is driven by a 12 VDC electric motor.

1.3 FLOW OPTIONS

The panel mount PRO/portioner is available in two flow ranges. The LOW FLOW model has a flow range of 10 to 125 GPM at any concentration between 0.1% and 1%. The LOW FLOW model gives greater accuracy for mop-up and booster line flows.

The HIGH FLOW model has a flow range of 25 to 125 GPM at any concentration between 0.1% and 1%, and may go to 250 GPM at lower percentages. At flows between 125 and 250 GPM, the maximum concentration is limited by the output of the concentrate pump which is 1.25 GPM. At any flow below 250 GPM, it is always possible to get at least 0.5% concentration. The concentrations possible at any flow is shown in Figure 1. In each case the venturi insert and concentrate adjustment knob are designed to work together. To avoid mix-up, the knob caps for the LOW FLOW range PRO/portioners are white and the HIGH FLOW versions are black.

⚠WARNING ***Maximum operating pressure is 300 psi. Over pressurizing system may result in loss of foam flow and can damage components.***

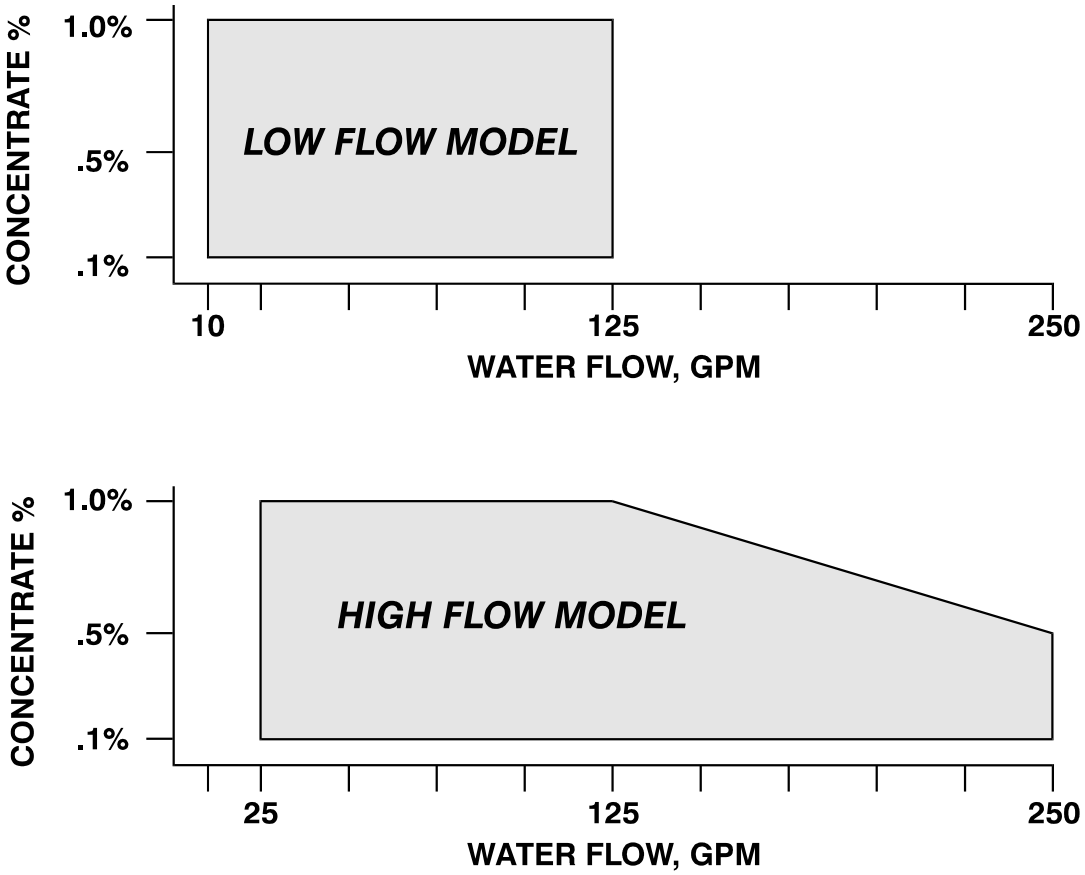


FIGURE 1 PANEL MOUNT PRO/PORTIONER OPERATING RANGE

2.0 SYSTEM COMPONENTS

Figure 2 shows the system components and their relation to each other. Each of the components is described in the following sections. A system diagram on a 4 by 6 inch aluminum plate (KK part #G561) is provided for mounting on the apparatus.

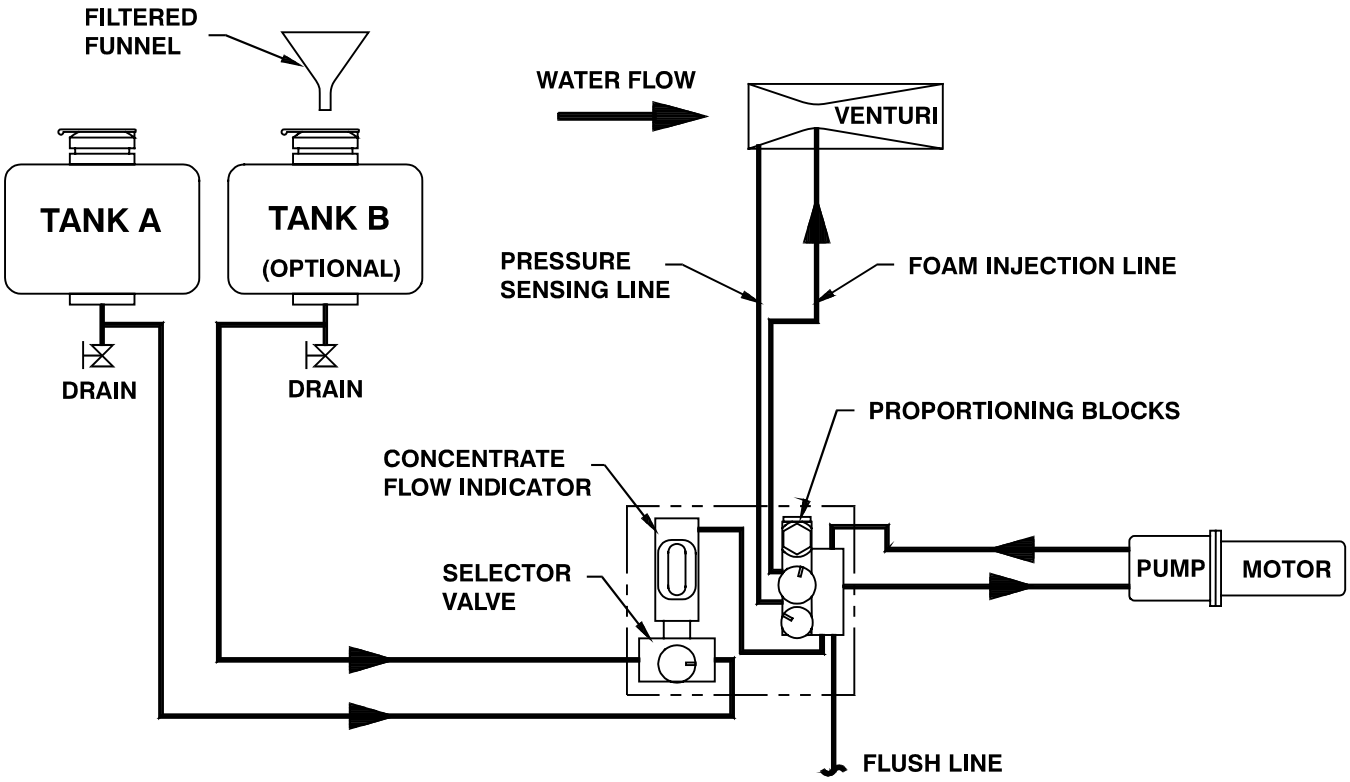


FIGURE 2 PANEL MOUNT PRO/PORTIONER SYSTEM DIAGRAM

2.1 PANEL ASSEMBLY

The panel assembly consists of the selector valve, flow indicator and the proportioning blocks.

2.1.1 SELECTOR VALVE

One or two supply tanks can be used with the system. The selector valve is rotated to select a tank as indicated on the engraved panel. There is a spring loaded detent at each of the three positions. Turning this knob to either tank A or B also activates an electrical switch that turns on the concentrate pump. In the off position each tank is completely shut off from the rest of the system.

2.1.2 FLOW INDICATOR

The flow indicator indicates concentrate flow from the selected tank to the water stream. The silver float raises as flow increases. It is also used to indicate when the pump has primed. Due to the nature of foam concentrates, the indicator will read higher in colder temperatures.

2.1.3 PROPORTIONING BLOCKS

The PRO/portioner blocks process all system inputs to produce the desired concentrate ratio. There are two control knobs on the blocks. The percent knob controls the amount of concentrate added to the water stream. It is infinitely variable between the extremes of .1% to 1%. The mode knob places the unit in one of three operational modes: prime, foam or flush. In the prime mode the outlet to the pump goes directly to the vent tube allowing air to be expelled from the system. In the foam position concentrate is metered into the water stream at the desired concentration. In the flush position water from the water stream circulates through the concentrate pump and proportioning blocks, flushing concentrate out of the system through the vent tube.

2.2 SUPPLY OPTIONS

2.2.1 SUPPLY TANKS

The supply tank(s) holds foam concentrate ready for use. An optional second tank can be used for more capacity or for a different type of foam concentrate. An 8-gallon (part# G9000T08), 12-gallon (part# G9000T12) or 20-gallon (part# G9000T20) tank kit is available through KK Products. Drain valve and fittings are provided. Also supplied with each tank is a filtered funnel for refilling. The tank lid contains a filter, has a 4" diameter opening and is pressure/vacuum vented.

2.2.2 REMOTE SUPPLY OPTION

The remote supply (G9000R) can be used in conjunction with any brand of tank compatible with foam concentrate. This supply option contains the hose, hose fittings, and filter necessary for connecting a supply tank to the panel mount. Tank must be both pressure and vacuum vented to help keep concentrate volatiles from evaporating and to not create vacuum as concentrate is used.

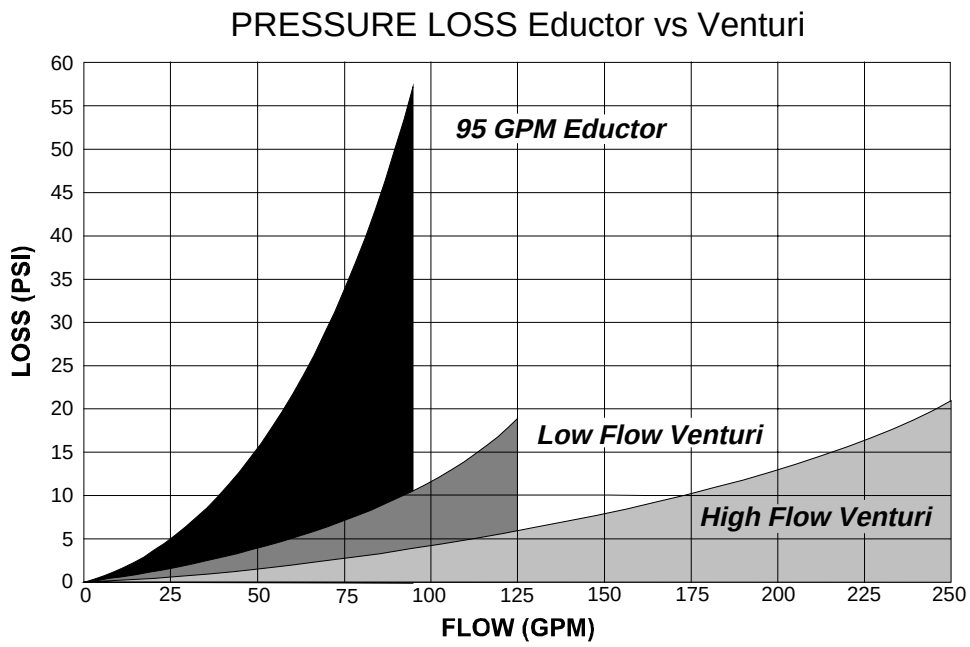
2.2.3 BULKHEAD COUPLING OPTION

The bulkhead supply (G9P00B) allows foam to be supplied from a bucket or alternate source not mounted on the vehicle. A bulkhead coupling with a quick connect nipple can be mounted onto the truck panel and attached to a hose which leads behind the panel, through a filter, to the tank selector valve on the panel mount. A stainless steel wand with a quick connect socket and valve is provided and can be quickly attached to the quick connect nipple to supply the unit with foam concentrate.

2.3 VENTURI

The venturi serves two functions. It senses the water flow passing through it and also provides a place for the concentrate to be injected into the water stream. The venturi has less pressure drop across it than an eductor as seen in the graph below. It is the pump and motor that do the actual work of injecting the concentrate into the water. The venturi is available with standard hose threads, grooves for Victaulic® couplings, pipe threads or flanged. See Figures 14 and 15 for the types and sizes available.

NOTE: A venturi is a restriction in the water flow area. Large increases in venturi inlet pressure are required to increase flow beyond the venturi's rated range.



2.4 PUMP/MOTOR

2.4.1 PUMP

The PRO/portioner uses a positive displacement three piston pump to minimize pressure pulsations. The pump has a capacity of 1.25 GPM. The pump is capable of pressures far greater than those encountered on the fire ground. No relief valve is necessary because the motor does not have enough power to damage the pump.

The pump is internally lubricated and may be run without concentrate or water for a prolonged period without damage.

2.4.2 MOTOR

The electric motor is a totally enclosed 12 VDC, 1/3 horsepower electric motor, and is designed for system pressures up to 300 PSI. At 300 PSI system pressure, the motor is at full load and will draw 27 AMPS of current. At lower pressures the electric current will be proportionately less. The motor is turned on whenever the selector knob is in the tank A or tank B position. A flashing green indicator light will be on whenever the motor is running.

TEMPLATE FOR PANEL OPENING

Minimum Required Clearance Behind Panel For Installation Is 8-1/2"

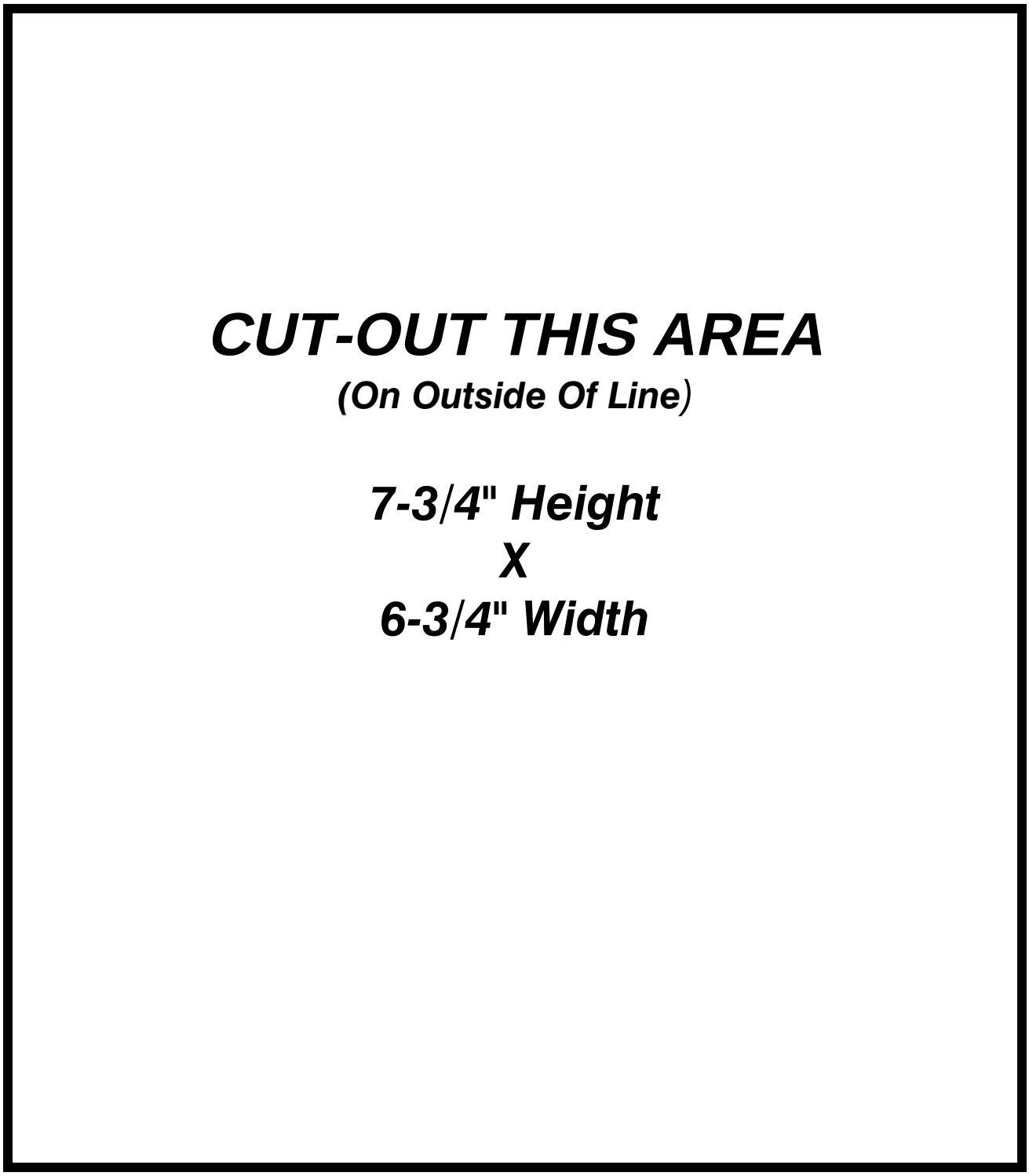


FIGURE 3A TEMPLATE FOR PANEL OPENING

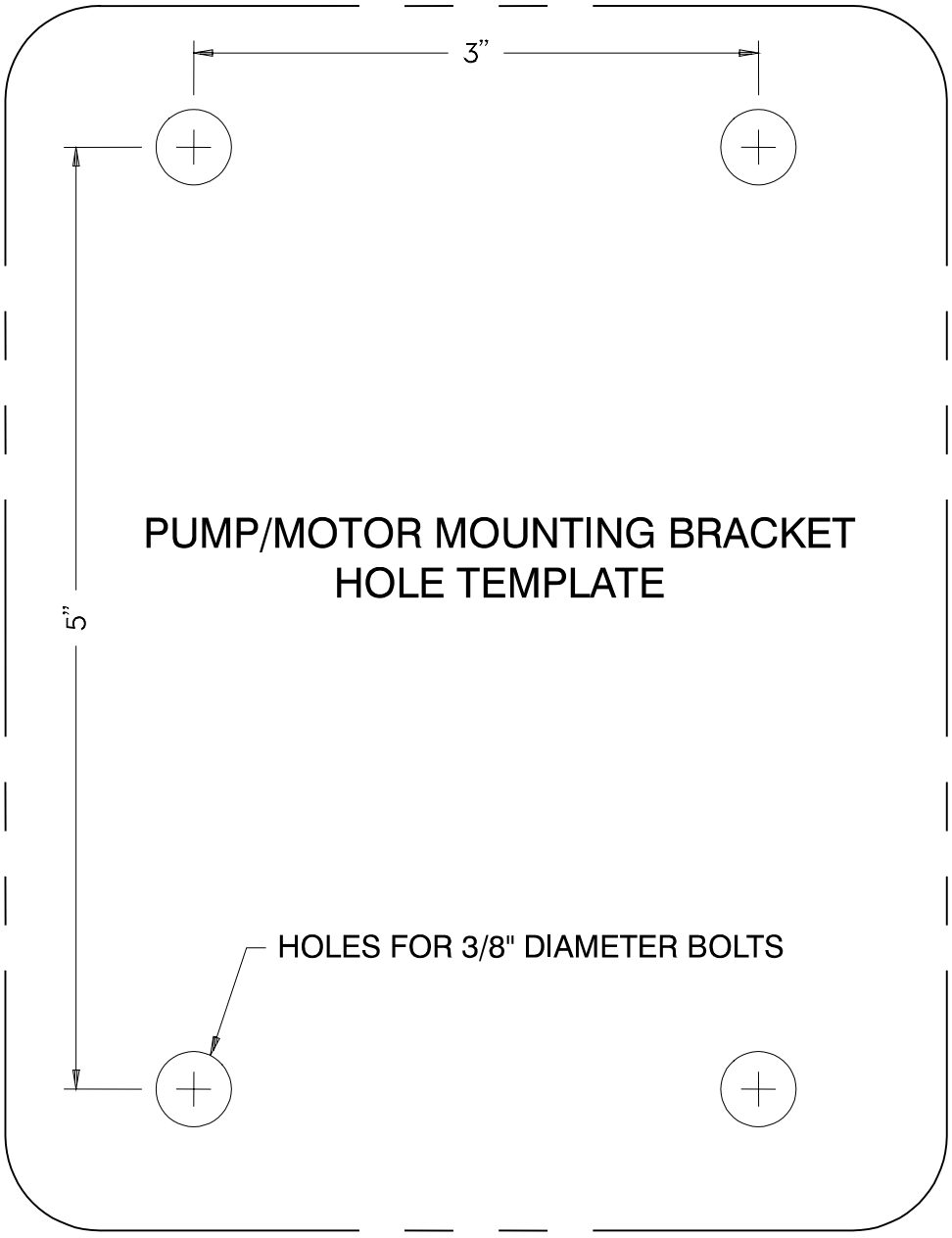
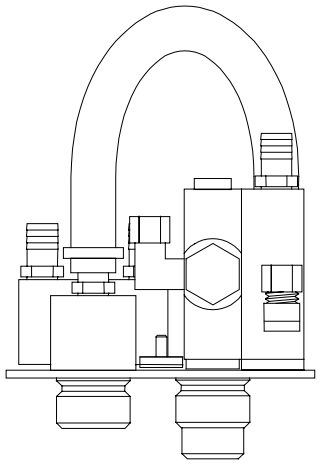
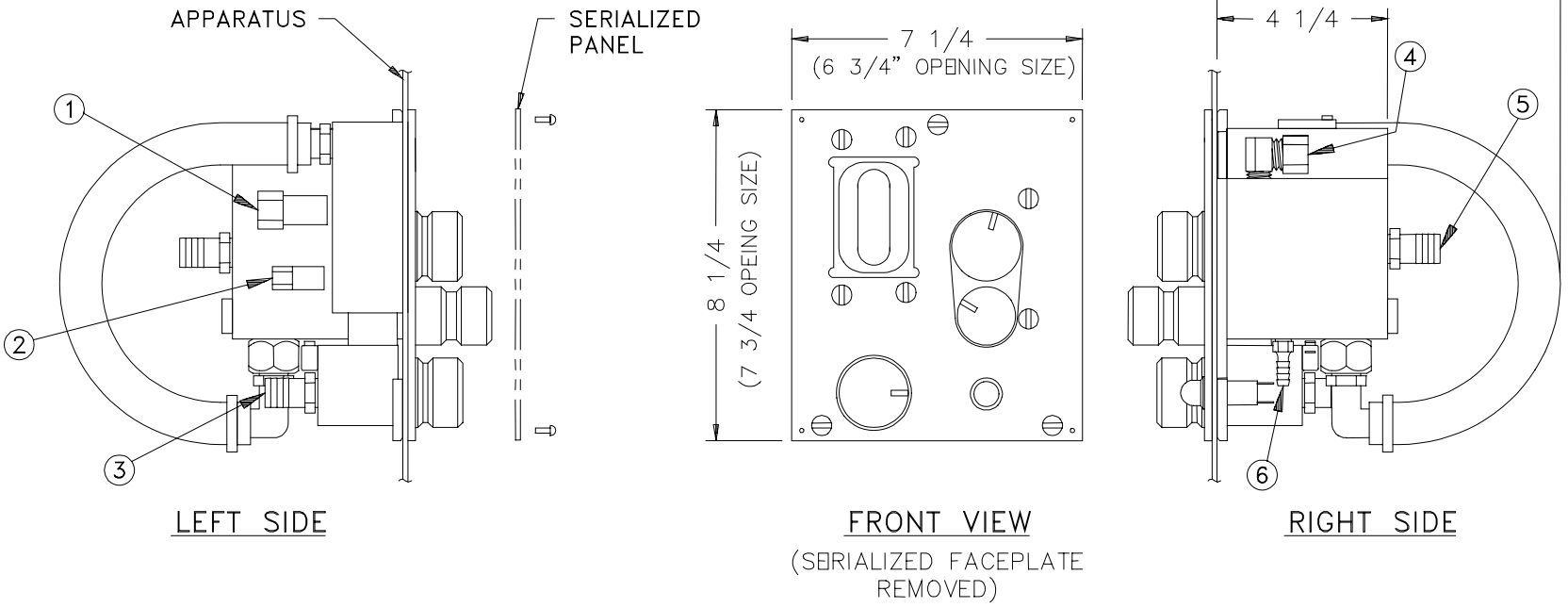

3”
5”
PUMP/MOTOR MOUNTING BRACKET
HOLE TEMPLATE
HOLES FOR 3/8" DIAMETER BOLTS

FIGURE 3B

PANEL HOSES (also see figure 2)			
FITTING	CONNECTS TO:	HOSE TYPE	MIN BEND RAD (IN)
1	VENTURI	1/2" OD NYLON	5
2	VENTURI	3/8" OD NYLON	4
3	SUPPLY TANK	3/4" ID CLEAR W/ WIRE	3
4	PUMP OUTLET	1/2" OD NYLON	5
5	PUMP INLET	3/4" ID BLACK HOSE	7
6	ATMOSPHERE	1/4" ID CLEAR VINYL	1



TOP VIEW



LEFT SIDE

FRONT VIEW
(SERIALIZED FACEPLATE REMOVED)

RIGHT SIDE

FIGURE 4 PANEL DIMENSIONS

3.0 SYSTEM INSTALLATION

3.1 PANEL INSTALLATION

Determine panel location for ease of operation and space constraints, allowing room for all hoses and fittings. Refer to Figure 4 for panel dimensions (also see template Figure 3A). Cut rectangular opening at desired location 6-3/4" wide by 7-3/4" high. Place panel assembly into opening and secure with the 3 clamps located at the two lower corners and top center. Press 1/4" vinyl tube (vent line) onto barb fitting on bottom of blocks and route to appropriate area to allow dumping of some fluid to the ground. ***Peel protective film from flow indicator label.*** Place flow indicator label behind window. Insert window in cutout at flow indicator. Fasten engraved face plate to front of unit with the four #6-32 screws provided. ***NOTE: The panel of the PRO/portioner needs to be mounted to a conductive grounded surface or a #16 AWG jumper wire must be used between the panel grounding lug (where light and switch ground wire attach) and a suitable ground.***

3.2 SUPPLY OPTION INSTALLATION

Foam concentrate supply plumbing should use only brass or plastic components that are compatible with foam concentrates.

⚠WARNING ***Debris in the foam can cause the system to become inoperative. The concentrate tank must have a filter (maximum opening size of .016 inch x 12 in² minimum filter area) affixed to the tank entrance or in the concentrate hose going to the proportioning unit. Clean the filter regularly to avoid blockage.***

3.2.1 SUPPLY TANK INSTALLATION

For best results mount the tank above the height of the panel and concentrate pump (the lower the tank, the longer system will take to prime). Use 3/4" I.D. hose with barb fittings and hose clamps to connect the tank to selector valve on panel. Secure hose as required to prevent damage from snags, excessive heat and abrasions. ***If only one tank is used, install a tee in the hose line to feed both supply inlets on the selector valve. This will assure that foam will be supplied if valve is inadvertently turned to an otherwise unused position.*** A suitable barbed tee fitting is available from KK Products as part number VFMT6BX6BX6B. Install drains in tank hoses as desired. The fittings and valves are included in the 8-gallon tank kit (part #G9000T08) the 12-gallon tank kit (part# G9000T12) or the 20-gallon tank kit (part# G9000T20) as loose parts to be assembled to suit your particular installation. Teflon tape must be used to ensure a proper seal. Mounting instructions from the tank manufacturer are shipped inside the tank. ***NOTE: Tank bulkhead fitting must not be tightened more than 1/2 turn past hand tight.***

3.2.2 BULKHEAD SUPPLY INSTALLATION

Determine location for ease of hook-up and space constraints, allowing room for hose and filter behind location. Cut a 1/2" diameter hole to mount bulkhead fitting. Mount the bulkhead coupling through the opening and secure with the lock washer and nut provided. The filter can be threaded directly into the bulkhead coupling. Make sure filter is installed bowl side down. Use 3/4" I.D. hose with barb fittings and hose clamps to connect filter to the selector valve on the panel. Secure hose as required to prevent damage from snags, excessive heat and abrasions. The quick connect wand can be stored in a compartment or attached and secured to the panel.

3.3 VENTURI INSTALLATION

The Victaulic® venturis are available in standard 2.0" and 2.5" sizes. Standard Victaulic® couplings, style 75 or 77, clamp into the grooves on the venturi. Victaulic® reducing couplings may be used for installation with other pipe sizes. The water MUST flow in the direction of the arrow on the venturis. The venturi should be installed between the outlet of the water pump and the discharge valve. A one-way check valve (wafer-type or equivalent) may be installed ahead of the venturi connection to prevent possible back flow of foam agents into tanks or water source. Turbulent water entering the venturi from partially gated valves can cause inaccurate proportioning. There are threaded holes for tapered pipe fittings in the venturi. Orient venturi so that the tube fittings are on its upper half (this helps keep dirt from entering system). The maximum allowable distance between the venturi and the proportioning block is 6 feet. Tubing may be cut shorter if desired. Install 1/2" O.D. nylon tubing and 3/8" O.D. nylon tubing between venturi and the proportioning blocks as shown in Figure 2. Use the brass compression fittings provided. ***NOTE: The brass compression fitting already has thread sealant applied to it, so pipe dope or Teflon tape is unnecessary.*** Secure hose as required to prevent damage from snags, excessive heat and abrasions. Figure 5 shows the proper use of these compression fittings.

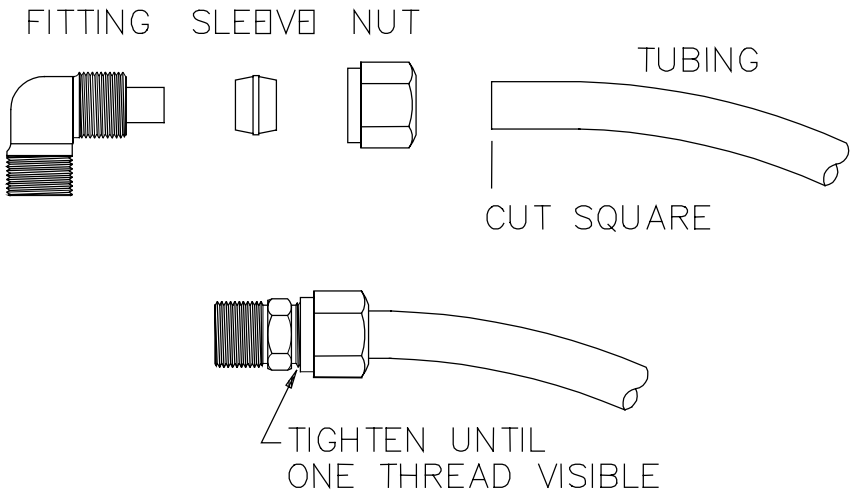


FIGURE 5 COMPRESSION FITTING USE

3.4 PUMP/MOTOR INSTALLATION

The pump/motor assembly is installed by means of a mounting bracket. It can be mounted up to six feet from the panel and needs a well ventilated environment. Maximum operating temperature of the pump and motor housing is 180 degrees F. The unit must be able to dissipate its heat to avoid overheating. Avoid locations that expose the unit to dirt and spray from truck wheels. Assure access to the oil drain plug and fill plug. The bracket has four holes for 3/8" bolts, on a 3 X 5" bolt hole pattern. See Figure 6 for mounting configuration and dimensions and Figure 3B for mounting hole template. The unit is shipped with the bracket on the left side of the unit. The bracket may be changed to the bottom position by removing the four bolts holding the pump and motor together, reorienting the bracket and reinstalling the bolts. Install 3/4" I.D. black hose and 1/2" O.D. nylon tubing between fittings on pump and PRO/portioner blocks as shown in Figures 2 and 4. Hose may be shortened if desired. Secure hose runs as required to prevent damage from snags and

abrasions. Drains may be installed in the pump lines as desired. **THE PUMP ITSELF MUST REMAIN UPRIGHT WITH THE MOTOR SHAFT HORIZONTAL FOR PROPER LUBRICATION (OIL FILLER CAP ON TOP). See figure 6 for proper pump orientation.**

The electric motor and other components are ignition sources. The PRO/portioner should be operated only in areas where there is adequate ventilation and no hazard of flammable vapor buildup.

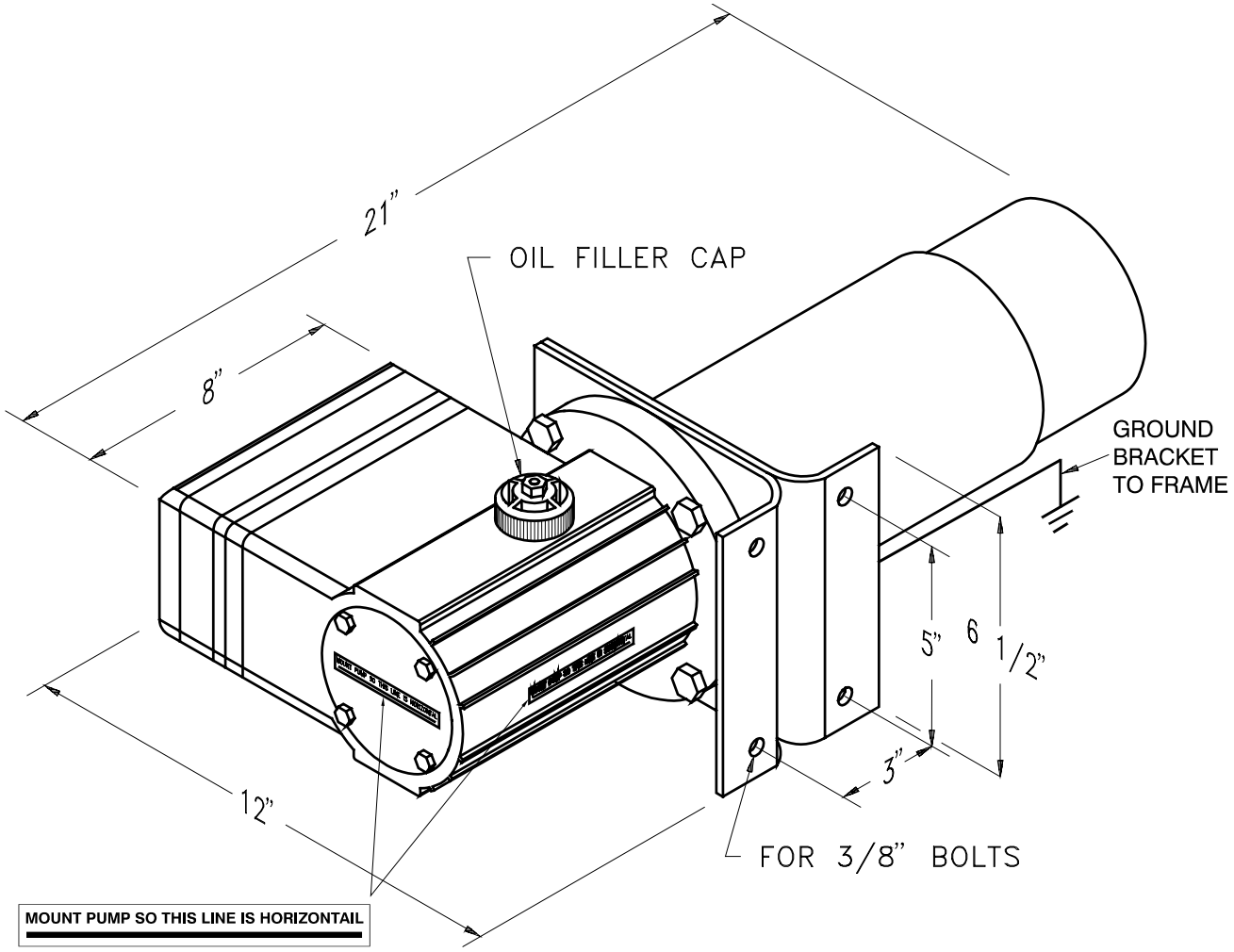


FIGURE 6 PUMP/MOTOR HOUSING

3.4.1 MOTOR WIRING

Refer to Figure 7 for motor wiring. Good mechanical connections on the wires are absolutely necessary and should be checked periodically. Poor electrical connections can cause power loss to the PRO/portioner and a fire hazard. Disconnect power before installing or servicing the electrical components. Most of the wiring has been factory installed. The remaining wires needing hookup are:

a) CORD BETWEEN PANEL AND MOTOR: The #16-2 cord provided connects the motor to the panel. All connectors are precrimped. Starting at the panel, the white wire goes to the switch and the black wire goes to the light. Use the cable clamp on the back of the flow indicator for cord mounting. Remove the motor cover (two acorn nuts) and pass the other end of the cord through the large wire fitting on the motor cover with the white wire attaching at terminal #85 of the relay and the black wire to terminal #87. Tighten the wire retainer. ***NOTE: Motor needs to be mounted to a conductive grounded surface or a #10 AWG jumper wire must be used between a mounting bracket bolt and a suitable ground. Ground connection must be capable of carrying 30 amps with minimal voltage drop.***

b) POWER TO RELAY: The red #10 AWG wire with 30 AMP circuit breaker supplies power to the motor's relay. Pass one end of this red wire through the small wire fitting on motor cover and attach to terminal #30 on the relay. Tighten wire firmly. Reinstall motor cover. For circuit protection a 30 AMP breaker is provided and must be installed as close as possible to the power source. The 30 AMP circuit breaker will trip if the motor is overloaded or overheated. When the circuit breaker trips, the green light will go out. The 30 AMP circuit breaker is internally sealed. It is a type I cycling breaker which continuously resets itself until the overload is corrected. The other end is connected to the positive side of a 12 volt power supply capable of safely maintaining a 30 AMP load. Use #10 wire. For runs over 30 feet, use #8 or heavier wire. ***NOTE: Relay voltage is 15 VDC max. / 9.5 VDC min.***

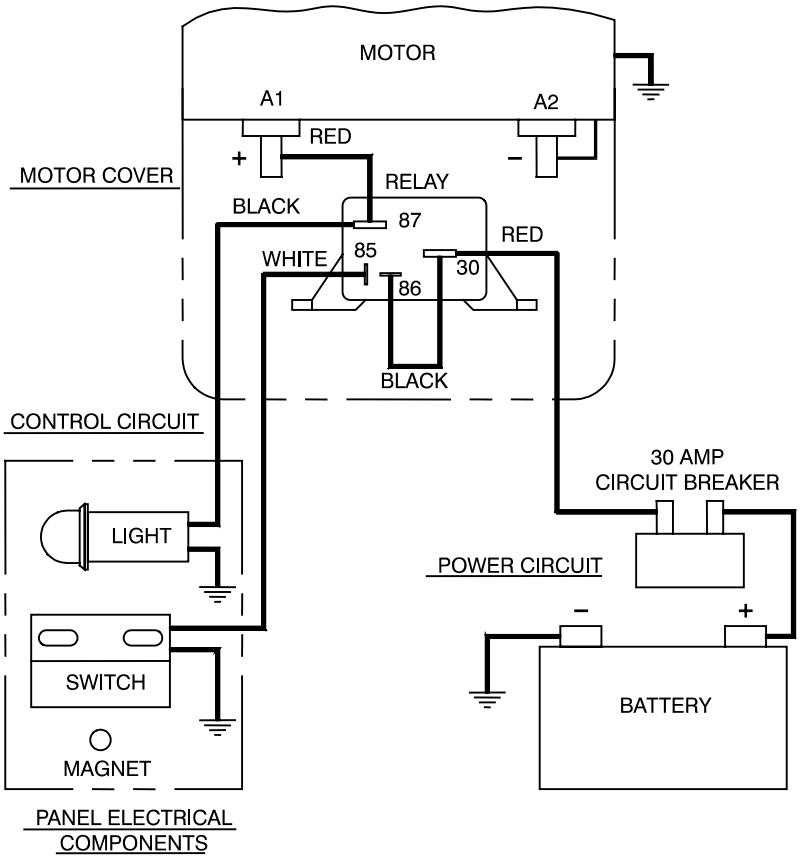


FIGURE 7 WIRING DIAGRAM

Use grommets whenever wire passes through holes and secure to prevent damage due to snags, abrasions, etc.

After all wiring has been installed, test system by turning selector knob on panel from OFF to A or B position. If system is working properly, the flashing green light and motor should come on. If not, refer to the trouble-shooting section below.

PROBLEM	**CHECK**
Motor does not run	- Reed panel switch and white control wire - Ground at panel and/or motor
Circuit breaker trips	- For shorts to ground - Wires between motor and panel for reversed lead
Clicking relay	- For low voltage at relay (if < 9.5 VDC, check power circuit) - For poor electrical contact on control panel
Motor runs in Off position	- Reed panel switch or white control wire for shorts to ground.

4.0 SYSTEM TEST

Every PRO/portioner is tested at the factory for function and accuracy. Units are factory tested with water instead of foam due to handling and disposal concerns. Because of the much lower viscosity of water the unit proportions at a greater percentage than if foam were used. The following table gives factory acceptance criteria for PRO/portioner accuracy testing.

FACTORY TESTING WITH WATER INSTEAD OF FOAM

PERCENT KNOB SETTING	NOZZLE FLOW (GPM)	INJECTION FLOW (GPM) HIGH FLOW MODEL	INJECTION FLOW (GPM) LOW FLOW MODEL
1%	60	.9 to 1.1	1.0 to 1.2
1%	95	At Least 1.3	At Least 1.3

Each PRO/portioner comes with a card affixed to the unit which gives the factory test results.

After installation of system, test for any plumbing leaks at maximun pressure rating of 300 PSI. Refer to section 11.0 for system operation.

NOTE: To meet maximum pressure rating of 300 PSI, the apparatus electrical system must be capable of supplying at least 27 amps to the motor. Minimum voltage at the motor must be 12 volts at full load.

5.0 TROUBLE SHOOTING

SYMPTOM	***CAUSE***	***REMEDY***
No foam flow indicated	Foam tank empty	Refill tank and reprime PRO/portioner
	Air in lines	Check for and correct any leaks leading to pump inlet
	Pump is off	Check electrical system
	Debris in concentrate pump	Clean pump check valves
	Air vent plugged on concentrate tank	Unplug or open vent
	Pump mounted sideways	Reorient pump (see figure 5) and reprime pump hydraulic cells (see pump manual service section)
Weak foam mix	Debris caught in percentage knob	Remove & clean percentage knob
	Thick concentrate, cold	Change to thinner brand
	Internal deposits of old dried concentrate	Fill concentrate tank with clean water and flush unit thoroughly
Motor cycles on/off	System pressure too high Circuit breaker tripping	Lower engine pressure, use larger hose or shorten lay
	Excessive heat, Circuit breaker tripping	Improve ventilation
Concentrate flows with nozzle shut off	Debris in concentrate pump	Clean pump check valves

6.0 MAINTENANCE

⚠CAUTION ***Any alteration to PRO/portioner or its markings constitutes a misuse of this product and could diminish safety.***

The oil level should be 3/4" from the top of the fill port - just below the small holes on the fill plug's dipstick. Use SAE 5W30 non detergent oil. Change the oil after every 100 hours or three months of operation, whichever comes first. Regular oil changes will help insure a long and trouble-free service life.

No maintenance is required on the motor, but for long life it should be run in a well ventilated area and be kept as dry as possible.

If the unit will not be used for more than 60 days, the following procedures are recommended. Drain the tank and rinse with clean water, leaving about 5 gallons of clean water in the tank. Set up the PRO/portioner as you would for fire-fighting and pressurize the water line. Run the unit for a few minutes drawing water, instead of concentrate, into the PRO/portioner. Rotate both control knobs back and forth a few times while the unit is running. Finally, turn the Mode Selection knob to FLUSH and run for one minute. After the unit is shut down, perform all other required maintenance listed above. Clean the PRO/portioner with a damp cloth. If the unit must be stored where the temperature will be below freezing, prime the unit with a 50/50 mixture of water and automotive antifreeze (glycol based).

The PRO/portioner can be serviced using common hand tools such as allen wrenches, sockets, adjustable or open-end wrenches, screw drivers, and pliers.

When ordering parts, always specify the serial number found on the PRO/portioner at the bottom of the engraved panel. Be sure to use the complete order number and description, as printed in the parts list.

Threaded joints have been secured using LOCTITE brand thread locking adhesive #271. Disassembly may require considerable torque to break the adhesive. If the fastener cannot be broken loose, heat the threads to 450 degrees F with a propane or oxyacetylene torch to break the bond. The application of excessive heat may damage adjacent seals and components. Threaded parts must be reassembled using LocTite #271 or equivalent. Small containers of LocTite are available from KK Products, part number V5010, LocTite Mini Dispenser.

7.0 CONCENTRATES

⚠DANGER ***Improper use of foam is dangerous to personnel and the environment. Follow foam concentrate manufacture's instructions and fire service training to avoid such things as:***

- ***Using wrong type of foam on a fire. i.e. Class A foam on a Class B fire.***
- ***Mishandling of concentrates, some of which are flammable.***
- ***Causing environmental damage.***

⚠WARNING ***Do not use 3 to 6% class B foams in the PRO/portioner. The use of 3 to 6% foams will result in weak and ineffective foam. Maximum mix ratio of this PRO/portioner is 1%.***

The PRO/portioner is designed for Class A and Class B AFFF concentrates only. Do not attempt to use any 3 or 6% concentrates in the PRO/portioner, or Class A foams not meeting USDA Forest Service "Interim Requirements for Foam for Wildland Fires, Aircraft or Ground Application" or NFPA 298 "Foam Chemicals for Wildland Fire Control".

Do not mix different types of concentrates. When Class A and Class B foams are mixed, the mixture can become very thick or solidify. We recommend that foam tanks be thoroughly rinsed when switching to a different **type** of foam. In systems with two or more foam tanks that contain different **types** of foam, we recommend that the PRO/portioner be flushed prior to switching to a different foam tank to prevent concentrate mixing in the PRO/portioner. For more information, contact your foam supplier.

The chemical makeup of most fire-fighting concentrates is a trade secret. The user should obtain complete literature and a MATERIAL SAFETY DATA SHEET for each concentrate used. The recommendations and cautions of each manufacturer should be closely followed.

Some concentrates can attack metals, rubber and plastic. KK Products has tried to use materials in the PRO/portioner that resist chemical attack, but cannot predict all the effects of concentrates on the PRO/portioner's components over time and in different environments. Therefore, it is not possible for KK Products to warrant the components of the PRO/portioner against chemical attack. The best way to prolong the life of your PRO/portioner is to limit its long term exposure to concentrates. While the water line is still pressurized, turn the mode selection knob to the **FLUSH** position and run the PRO/portioner for at least one minute to wash the concentrate from the system.

Viscosity is a fluid's resistance to flow. The higher the viscosity, the thicker the fluid. At room temperature most common concentrates have roughly the same viscosity. ***However***, at lower temperatures, some become extremely viscous and will resist flowing, and the PRO/portioner will not maintain the correct concentrate percentage. When operating in cold climates, choose a brand of concentrate with a low viscosity, or keep the concentrate in a warm place until it is used. ***Maximum concentrate viscosity is 120 CPS (centipoise).***

Figure 18 at the end of this manual gives foam concentrate usage for various water flows and percentages.

8.0 SHIPPING INSTRUCTIONS

The PRO/portioner may be shipped by United Parcel Service by following these easy steps:

1) Select a very strong box and pack around PRO/portioner securely to prevent motion.

2) Pack pump upright and mark box 'THIS SIDE UP' to prevent pump oil from leaking out.

3) If shipping to KK Products, please include your name, phone and address, and pertinent instructions.

4) Shipping insurance may be purchased from UPS for a modest fee.

9.0 WARRANTY

Task Force Tips, 2800 East Evans Avenue, Valparaiso, Indiana 46383-6940 warrants to the original purchaser of the Panel Mount ("equipment"), and to anyone to whom it is transferred, that the equipment shall be free from defects in material and workmanship during the two (2) year period from the date of purchase.

Task Force Tips obligation under this warranty is specifically limited to replacing or repairing the equipment (or its parts) which are shown by Task Force Tips examination to be in a defective condition attributable to Task Force Tips. To qualify for this limited warranty, the claimant must return the equipment to Task Force Tips, at 2800 East Evans Avenue, Valparaiso, Indiana 46383-6940, within a reasonable time after discovery of the defect. Task Force Tips will examine the equipment. If Task Force Tips determines that there is a defect attributable to it, it will correct the problem within a reasonable time. If the equipment is covered by this limited warranty, Task Force Tips will assume the expenses of repair.

If any defect attributable to Task Force Tips under this limited warranty cannot be reasonably cured by repair or replacement, Task Force Tips may elect to refund the purchase price of the equipment, less reasonable depreciation, in complete discharge of its obligations under this limited warranty. If Task Force Tips makes this election, claimant shall return the equipment to Task Force Tips free and clear of any liens and encumbrances.

This is a limited warranty. The original purchaser of the equipment, any person to whom it is transferred, and any person who is an intended or unintended beneficiary of the equipment, shall not be entitled to recover from Task Force Tips any consequential or incidental damages for injury to person and/or property resulting from any defective equipment manufactured or assembled by Task Force Tips. It is agreed and understood that the price stated for the equipment is in part consideration for limiting Task Force Tips liability. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above may not apply to you.

Task Force Tips shall have no obligation under this limited warranty if the equipment is, or has been, misused or neglected (including failure to provide reasonable maintenance) or if there have been accidents to the equipment or if it has been repaired or altered by someone else.

THIS IS A LIMITED EXPRESS WARRANTY ONLY. TASK FORCE TIPS EXPRESSLY DISCLAIMS WITH RESPECT TO THE EQUIPMENT ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. THERE IS NO WARRANTY OF ANY NATURE MADE BY TASK FORCE TIPS BEYOND THAT STATED IN THE DOCUMENT.

Excluded from this warranty are abuse, neglect, and chemical attack, as well as damage done by users performing maintenance. In addition, damage or malfunction caused by users adaptation to purposes not approved by Task Force Tips shall not be warranted. If service is necessary, please contact the factory before shipping the unit. Some problems can be solved over the phone. Make sure the PRO/portioner is working properly before attempting to extinguish a fire. ***If you have any problems or questions, please call Task Force Tips, toll free, at 1-800-348-2686.***

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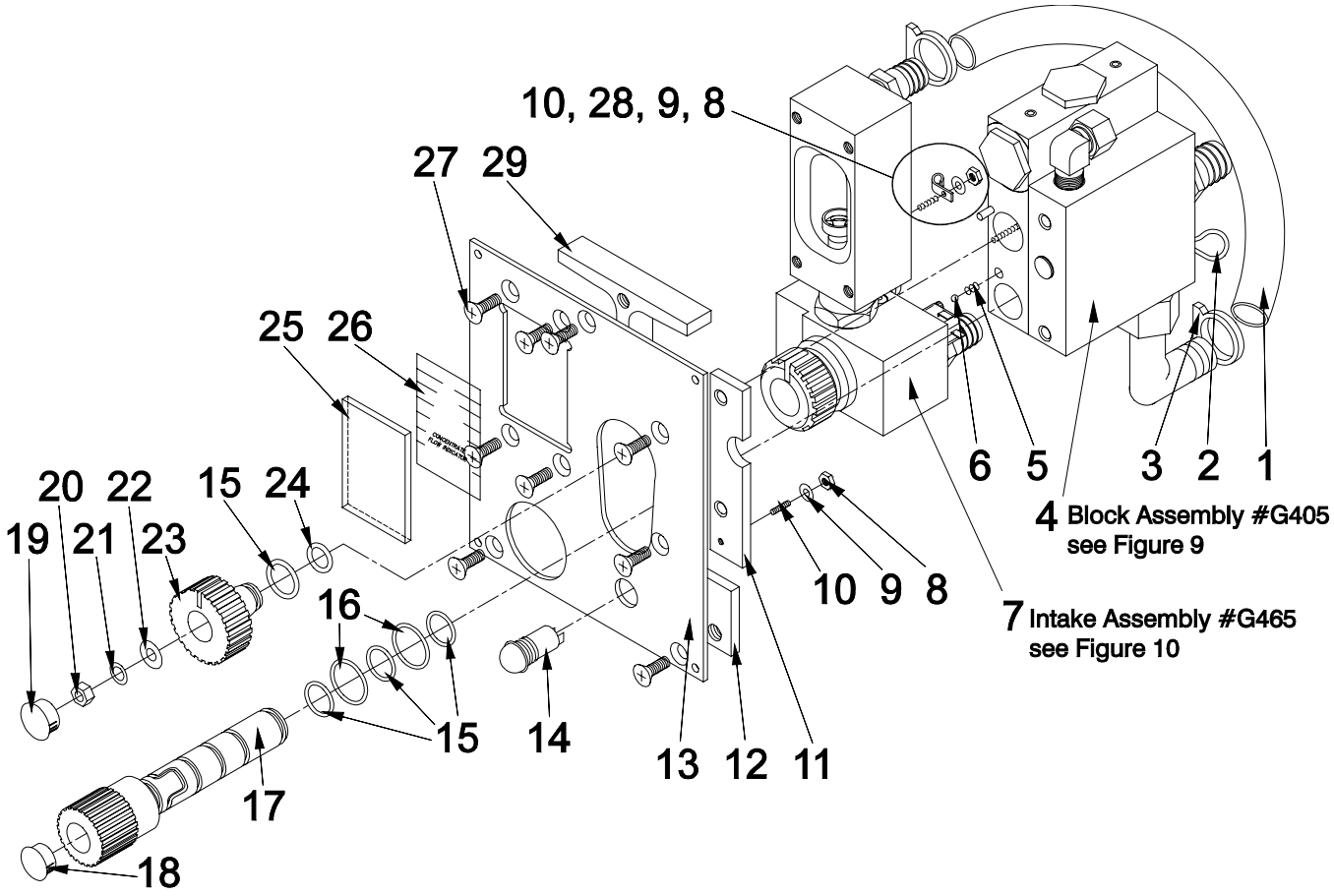
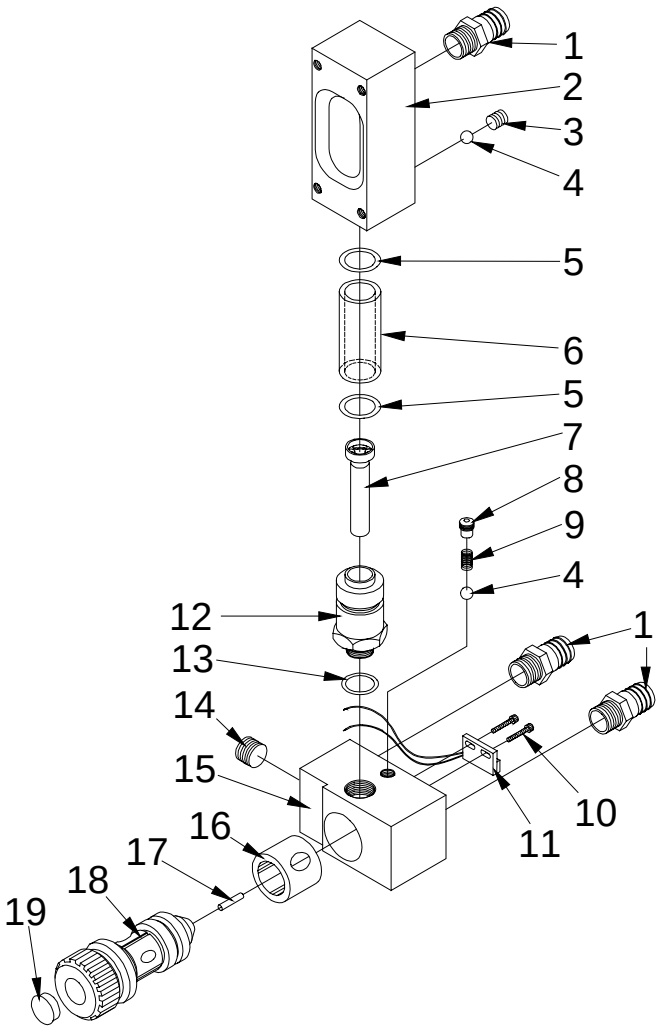


#	DESCRIPTION	QTY	PART #
	Engraved Panel (not shown)	1	G560
	Panel Screws (not shown)	4	VT06-32BH250
1	3/4 ID Tubing (inches)	15	G292
2	Bridge Pin	1	VM4255
3	Hose Clamp	2	G246
4	Block Assembly	1	G405
5	Spring	1	VM4195
6	3/16 Stainless Steel Ball	1	VB187SS
7	Intake Assembly	1	G465
8	10-24 Hex Brass Nut	2	VT10-24NTBR
9	#10 NickeL Plated Washer	2	VW213.513-40
10	10-24 x 5/8 Set Screw	2	VT10-24SS625
11	Spacer	1	G565
12	Clamp	2	G570
13	Subplate	1	G562
14	Light (uses #256 bulb)	1	G320
15	O-Ring-115	4	VO-115

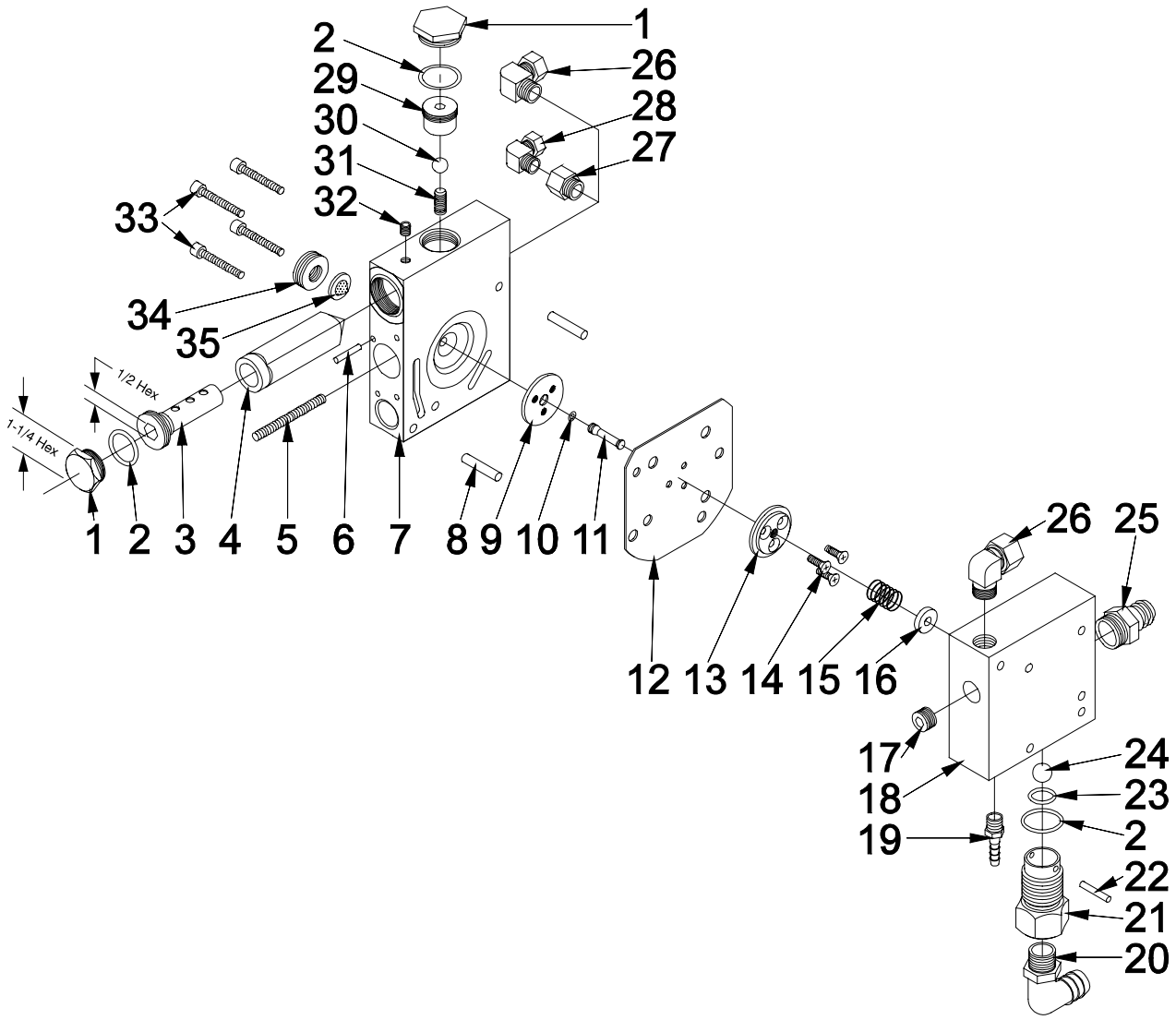
#	DESCRIPTION	QTY	PART #
16	O-Ring-119	2	VO-119
17	Flush Stem	1	G515
18	Plug	1	VM4123
19	Plug, Black (high flow)	1	VM4122
	Plug, White (low flow)	1	VM4121
20	1/4-28 Stainless Stop Nut	1	VT25-28NTAN
21	1/4 x .500 .022 SS Spring	1	VW250BELVIL
22	1/4 Flat Washer	1	V2045
23	Percent Knob (high flow)	1	G512
	Percent Knob (low flow)	1	G511
24	O-Ring-111	1	VO-111
25	Indicator Window	1	G558
26	Indicator Label (high flow)	1	GL542
	Indicator Label (low flow)	1	GL541
27	1/4 x 20 Flat Head Screws	9	VT25-20FS750
28	Cable Clamp	1	VM4105
29	Top Clamp	1	G571

FIGURE 8 G425 PANEL ASSEMBLY



#	DESCRIPTION	QTY	PART#
1	MALE BARBED FITTING	3	VFNN6BX4M
2	METER BODY	1	G540
3	1/4-20 X 3/8 SOCKET SET	1	VT25-20SS375
4	3/16 SS BALL 302 SS	2	VB187SS
5	O-RING-211	2	V0-211
6	METER GLASS	1	G555
7	FLOAT	1	G550
8	DETENT SCREW	1	D290
9	SPRING	1	VM4195
10	4-40 X 3/8 PAN HEAD	2	VT04-40PH375
11	PANEL SWITCH, REED	1	VM4143
12	METER TUBE	1	G545
13	O-RING-016	1	VO-016
14	3/8-24 PIPE PLUG	1	VFSP3M
15	SELECTOR BODY	1	G520
16	SELECTOR SLEEVE	1	G530
17	MAGNET	1	VM4152
18	SELECTOR VALVE	1	G414
19	PLUG	1	VM4122

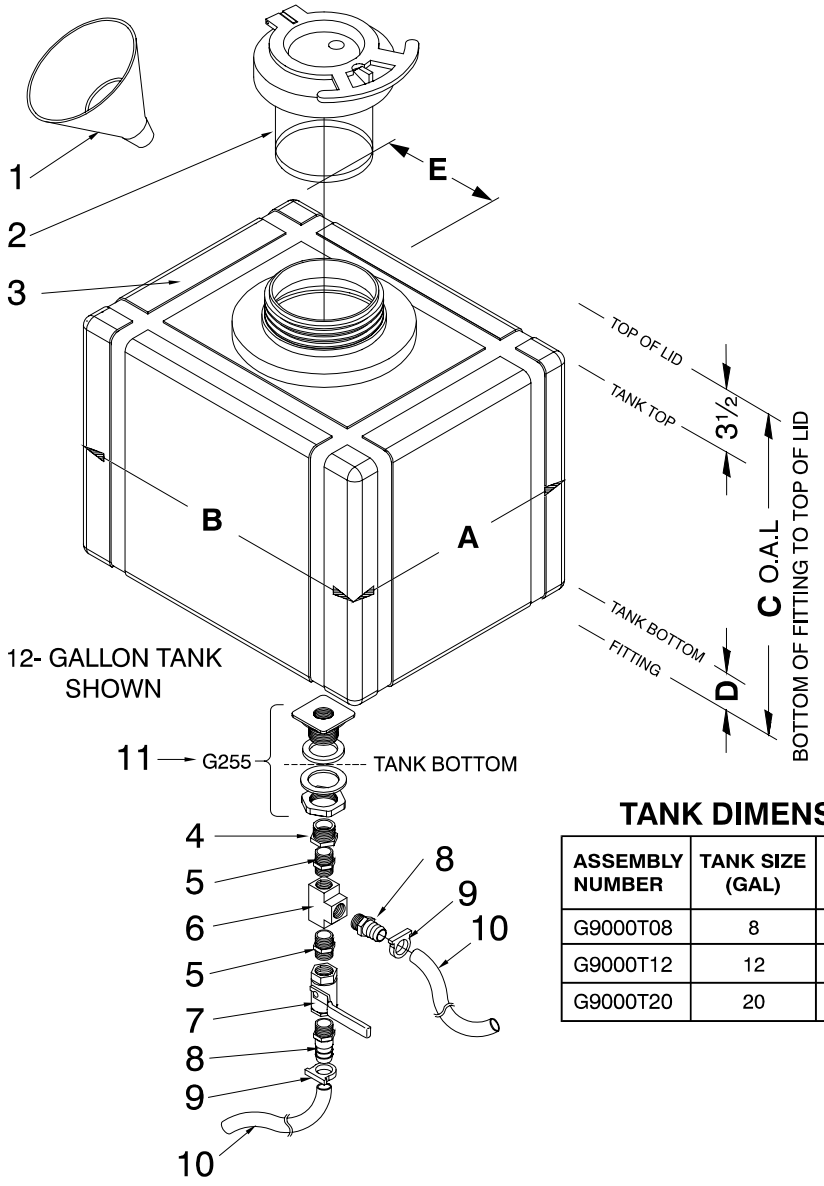
FIGURE 9 G465 INTAKE ASSEMBLY



#	DESCRIPTION	QTY	PART#
1	TOP CAP	2	G190
2	O-RING-119	3	VO-119
3	DISTRIBUTOR ROD	1	G194
4	PULSATION PRISM	1	G196
5	1/4-28 X 2.5 STUD	1	VT25-28SD2.5
6	5/32 X 7/8 HDP SPIROL SET	1	V1900
7	THICK BLOCK	1	G110
8	LOCATOR PIN	2	G177
9	DIAPHRAGM DISC	1	G162
10	O-RING-007	1	VO-007
11	KNUCKLE	1	G163
12	DIAPHRAGM	1	G125
13	CONTROL VALVE	1	G160
14	10-24 X 3/8 FLAT SOCKET	3	VT10-24FS375
15	DIAPHRAGM SPRING	1	VM5015
16	VALVE SEAT	1	G161
17	3/8-24 PIPE PLUG	1	VFSP3M
18	PANEL BLOCK	1	G510

#	DESCRIPTION	QTY	PART#
19	1/8 NPT X 1/4 ID CONN	1	VFNN2BX1M
20	1/2 NPT X 3/4 ID ELBOW	1	VFLL6BX4M
21	CHECK VALVE SEAT	1	G505
22	BALL RETAINER	1	G507
23	O-RING-016	1	VO-016
24	5/8 POLYPROPYLENE BALL	1	VB625PP
25	3/4 BARBED FITTING	1	VFNN6BX4M
26	VS269NTA-8-6 MALE ELBOW	2	VFLL4PX3M
27	1/4 PIPE EXTENSION	1	VFAA2FX2M
28	VS269NTA-6-4 MALE ELBOW	1	VFLL3PX2M
29	CHECK RING	1	G198
30	1/2 POLYPROPYLENE BALL	1	VB500PE
31	5/16-18 X .750 SOCKET SET	1	VT31-18SS750
32	5/16-18 X 1/4 SOCKET SET	1	VT31-18SS250
33	5/16-18 X 1-1/2 SHCS	4	VT31-18SH1.5
34	FILTER NUT	1	G192
35	FILTER WASHER	1	MS730

FIGURE 10 G405 BLOCK ASSEMBLY

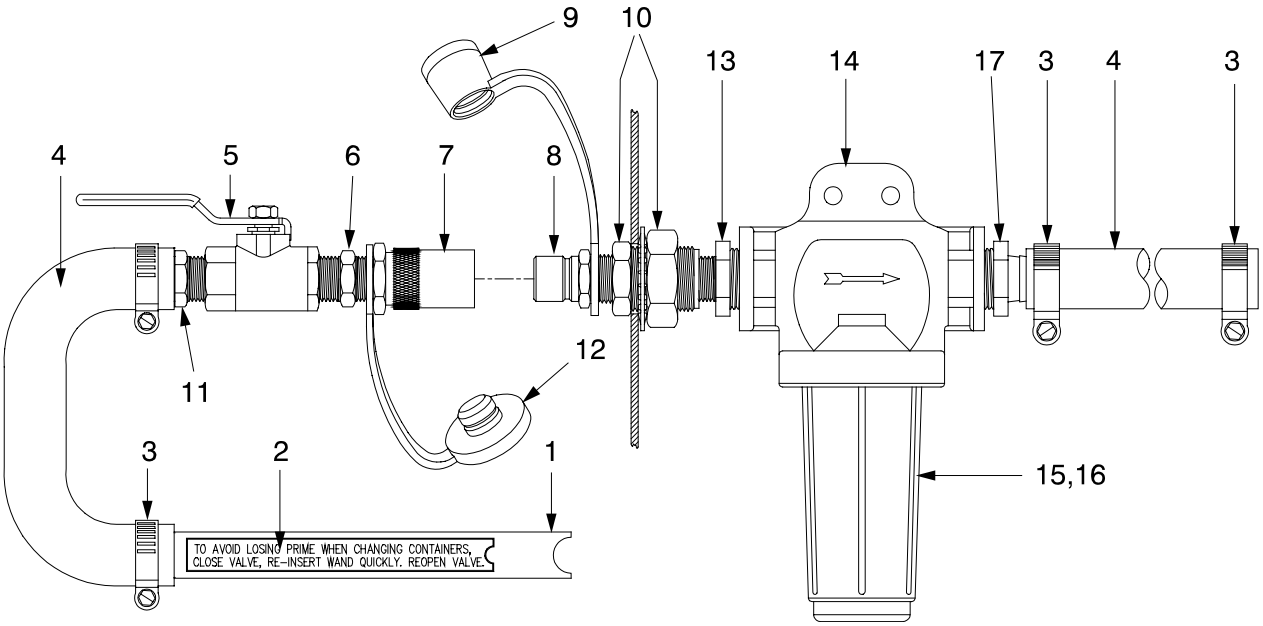


TANK DIMENSIONS (inches)

ASSEMBLY NUMBER	TANK SIZE (GAL)	A	B	C	D	E
G9000T08	8	12	16	16	1½	8
G9000T12	12	14	18	17	1½	9
G9000T20	20	14	28¼	19½	4½	8¾

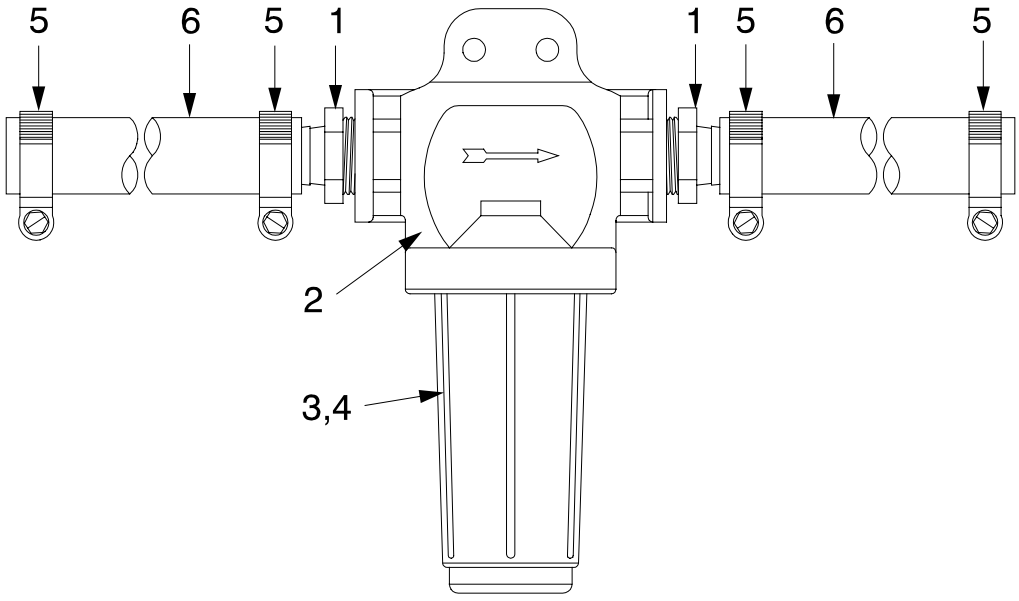
#	DESCRIPTION	QTY	PART#
1	FILTER FUNNEL	1	G214
2	TANK LID SUB-ASSEMBLY	1	G455
3	TANK, 12 GALLON (shown)	1	G212
	TANK, 8 GALLON	1	G200
	TANK, 20 GALLON	1	G220
4	3/4 - 1/2 BUSHING	1	VFHB6MX4F
5	1/2 X 1/2 HEX NIPPLE	2	VFHN4MX4M
6	1/2" NPT PIPE T	1	VFFT4FX4FX4F
7	1/2 x 1/2 FNPT VALVE	1	G253
8	3/4 BARB X 1/2 MNPT	2	VFNN6BX4M
9	SS HOSE CLAMP	4	G246
10	3/4 ID VARDEX TUBING (inches)	108	G292
11	BULKHEAD FITTING	1	G255

FIGURE 11 SUPPLY TANK ASSEMBLIES



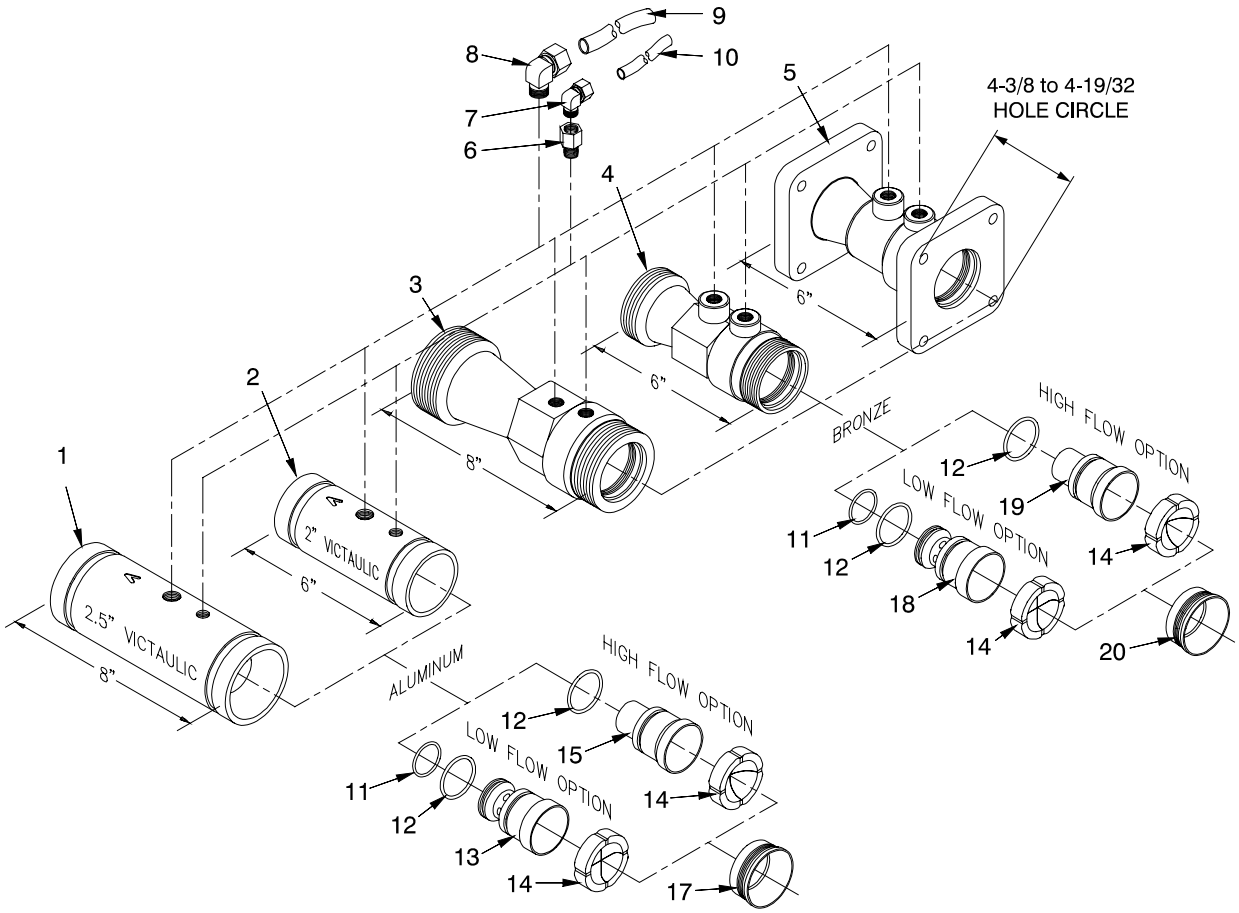
#	DESCRIPTION	QTY	PART#
1	PROPORTIONER WAND	1	G205
2	WAND LABEL	1	GL070
3	SS HOSE CLAMP 1.0 DIA	4	G246
4	3/4" ID VARDEX HOSE	(2) 84"	G292
5	1/2" X 1/2" FNPT VALVE	1	G253
6	1/2" X 1/2" HEX NIPPLE	2	VFHN4MX4M
7	1/2" QC SOCKET X 1/2" FNPT	1	VFAA4QX4F
8	1/2" X 1/2" QC NIPPLE	1	VFNN4QX4M
9	QC CAP	1	G264
10	1/2 NPY BULKHEAD COUPLING	1	VFBC4FX4F
11	3/4" BARB X 1/2" MNPT	1	VFHN6BX4M
12	QC PLUG	1	G263
13	3/4” X 1/2” HEX NIPPLE	1	VFHN6MX4M
14	FILTER HEAD	1	G275
15	FILTER BOWL	1	G276
16	FILTER SCREEN	1	G277
17	3/4” BARB X 3/4” MNPT	1	VFHN6MX6B

FIGURE 12
G9P00B BULKHEAD SUPPLY SYSTEM



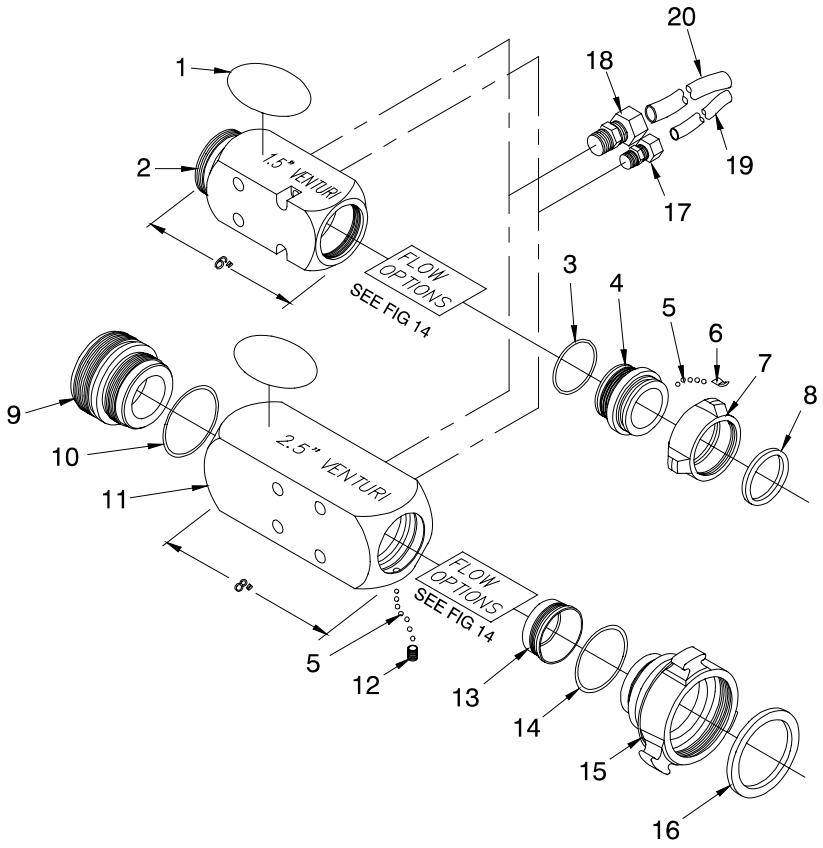
#	DESCRIPTION	QTY	PART#
1	3/4" BARB X 3/4" MNPT	2	VFHN6MX6B
2	FILTER HEAD	1	G275
3	FILTER BOWL	1	G276
4	FILTER SCREEN	1	G277
5	SS HOSE CLAMP	4	G246
6	3/4" ID VARDEX HOSE	84"	G292

FIGURE 13
G9000R REMOTE SUPPLY SYSTEM



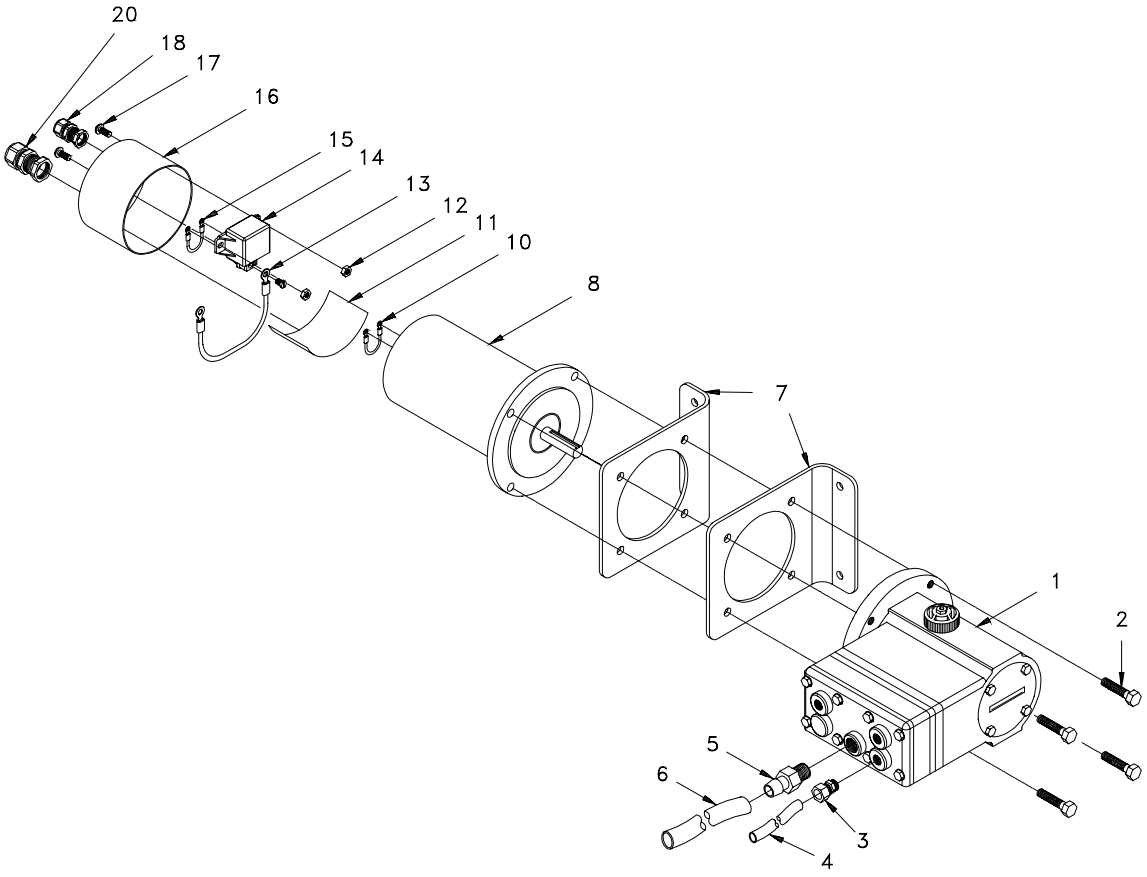
#	DESCRIPTION	QTY	PART#
1	2.5 VICTAULIC® VENTURI (ALUM)	1	G128
2	2.0 VICTAULIC® VENTURI (ALUM)	1	G129
3	2.5 NPT VENTURI (BRONZE)	1	G585
4	2" NPT VENTURI	1	G580
5	FLANGED VENTURI (BRONZE)	1	G588
6	1/4 PIPE EXTENSION	1	VFAA2FX2M
7	1/4 ELBOW FITTING	1	VFLL3PX2M
	1/4 STRAIGHT FITTING	1	VFAA3PX2M
8	3/8 ELBOW FITTING	1	VFLL4PX3M
	3/8 STRAIGHT FITTING	1	VFAA4PX3M
9	1/2 OD NYLON TUBING (inches)	72	VM4325
10	3/8 OD NYLON TUBING (inches)	72	VM4330
11	O-RING-124	1	VO-124
12	O-RING-126	1	VO-126
13	LOW FLOW VENTURI INSERT (ALUM)	1	G531
14	HEART VALVE	1	G141
15	HIGH FLOW VENTURI INSERT (ALUM)	1	G132
17	BACK RING	1	G123
18	LOW FLOW VENTURI INSERT (BRONZE)	1	G531-642
19	HIGH FLOW VENTURI INSERT (BRONZE)	1	G132-642
20	BACK RING (BRONZE)	1	G123-642

FIG 14 PIPE FITTING VENTURIS



#	DESCRIPTION	QTY	PART#
1	PRO/portioner LABEL	1	GL050
2	1.5 VENTURI *	1	G130 *
3	O-RING-132	1	VO-132
4	TAIL PIECE	1	G133
5	3/16 SS BALLS (1.5 VENTURI)	34	VB187SS
	3/16 SS BALLS (2.5 VENTURI)	36	VB187SS
6	PORT PLUG	1	B770
7	1.5 ROCKER COUPLING *	1	F10097 *
8	1.5 HOSE GASKET	1	V3130
9	2.5 FRONT RING *	1	G127 *
10	O-RING-143	1	V0-143
11	2.5 VENTURI	1	G126
12	1/4-28 X 1/4 SOCKET SET	1	VT25-28SS250
13	BACK RING	1	G123
14	O-RING-140	1	VO-140
15	2.5 ROCKER COUPLING *	1	J14097 *
16	2.5 COUPLING GASKET	1	V3190
17	1/4 STRAIGHT FITTING	1	VFAA3PX2M
	1/4 ELBOW FITTING	1	VFLL3PX2M
18	3/8 STRAIGHT FITTING	1	VFAA4PX3M
	3/8 ELBOW FITTING	1	VFLL4PX3M
19	3/8 OD NYLON TUBING (inches)	72	VM4330
20	1/2 OD NYLON TUBING (inches)	72	VM4325
*	SPECIFY THREAD DESIRED WHEN ORDERING		

FIG 15 HOSE THREAD VENTURIS



#	DESCRIPTION	QTY	PART #
1	PUMP	1	G108
2	3/8-16 x 1.75 HEX BOLT	4	VT37-16HX1.7
3	3/8” STRAIGHT FITTING	1	VFAA4PX3M
4	1/2” OD NYLON TUBING	72”	VM4325
5	3/4” HOSE FITTING	1	VFNN6BX4M
6	3/4” ID HOSE	72”	VM4345
7	MOUNTING BRACKET	2	G280
8	ELECTRIC MOTOR	1	G361
10	MOTOR -GROUND WIRING ASS’Y	1	G421
11	REMOTE WIRING LABEL	1	GL095
12	1/4-20 STAINLESS STEEL NUT	3	VT25-20NT
13	RELAY-MOTOR WIRE ASS’Y	1	G420
14	12 V POWER RELAY	1	G317
15	RELAY WIRE ASS’Y	1	G419
16	MOTOR COVER	1	(part of G361)
17	1/4-20 x 5/8 SLOTTED PAN HEAD	2	VT25-20PH625
18	HEYCO CORD FITTING #344	1	VM4095
20	HEYCO CORD FITTING #34	1	VM4100

FIGURE 16 G4PMOTORASSY PUMP/MOTOR ASSEMBLY

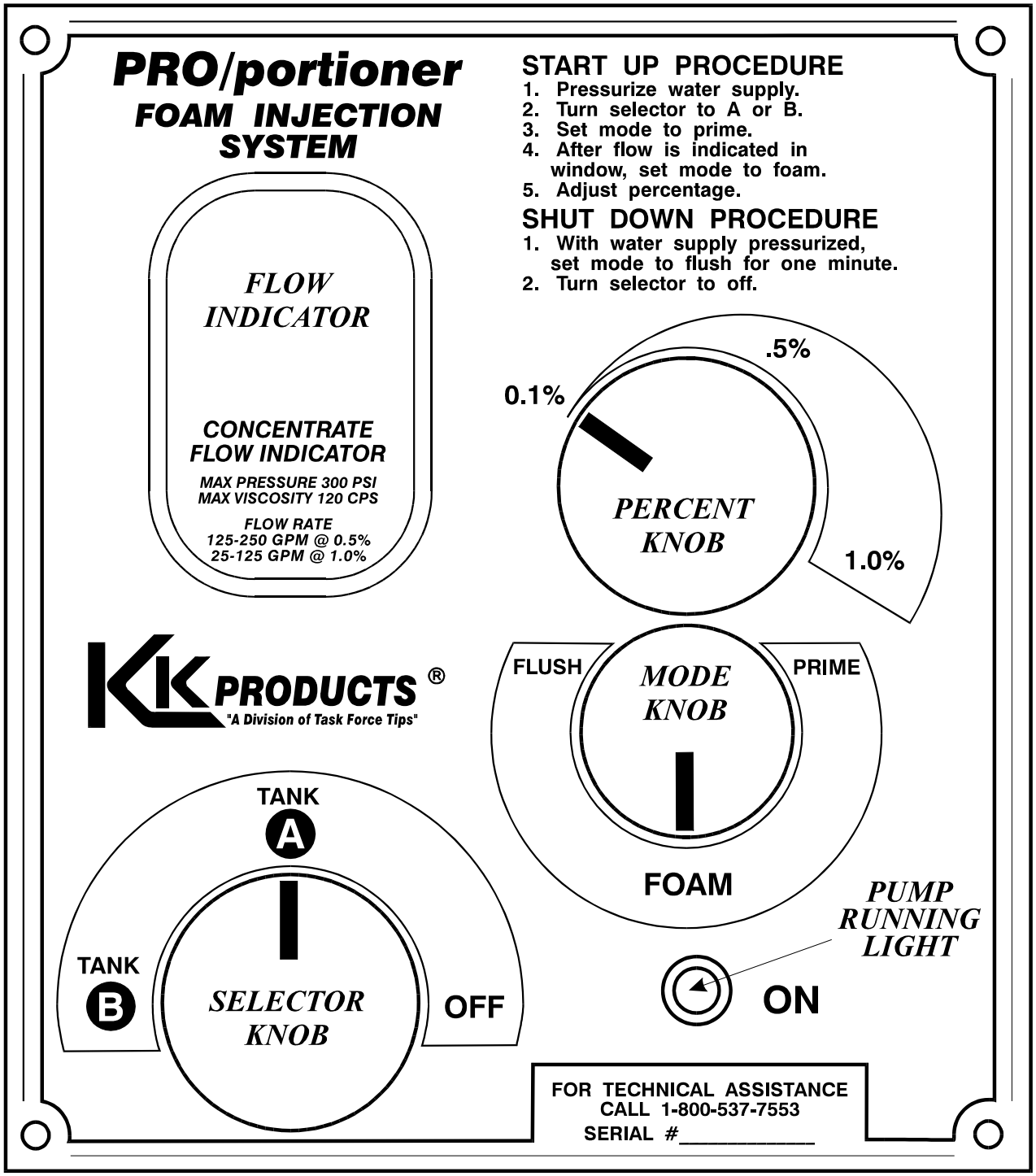


FIGURE 17 PRO/portioner PANEL

⚠WARNING ***Improper use of foam can be harmful to personnel and the environment. Follow foam concentrate manufacture's instructions and fire service training to avoid such things as:***

- ***Using wrong type of foam on a fire. i.e. Class A foam on a Class B fire.***
- ***Mishandling of concentrates, some of which are flammable.***
- ***Causing environmental damage.***

11.0 OPERATION

Operate the foam system by following the steps below. Refer to Figure 17 for panel orientation.

a) Check concentrate level in tank(s) and fill as required.

b) Attach hose and nozzle to foam discharge on truck.

c) Pressurize water line by opening its valve and/or turning on water pump**. Maximum operating pressure for the PRO/portioner is 300 PSI.**

d) Turn selector knob on panel to A or B position. This opens the valve from selected concentrate tank to rest of system and also turns on concentrate pump. **GREEN LIGHT SHOULD BE FLASHING.**

e) Set mode knob to ***PRIME***. This allows air to be expelled from the system. ***NOTE: Switching to flush mode momentarily can act as a "power prime" and help the system prime quicker.*** Pump has primed when steady flow is indicated on flow indicator. ***NOTE: Stay in prime mode no longer than necessary as concentrate is wasted through the vent tube once pump has primed.***

f) Set mode knob to ***FOAM***. System will now inject concentrate into the water stream whenever water is flowing. Check for concentrate flow in "Concentrate Flow Indicator". Adjust percent knob as required. With nozzle shut down no concentrate is added to hose line. Stay in this mode as long as foam is desired.

g) With water line still pressurized, set mode knob to ***FLUSH*** position for at least one minute. This allows water from the water stream to circulate through the concentrate pump and block, flushing concentrate out of the system through the vent tube. ***DO NOT FLUSH IF UNIT WILL BE SUBJECT TO FREEZING TEMPERATURES.***

h) Turn selector knob to ***OFF*** position.

i) After the unit is shutoff, return the mode selector knob to FOAM. Failure to do so will result in pressurized water from the venturi being forced through the pump and out the drain tube next time they use the truck.

⚠DANGER ***Lack of foam can place the nozzle operator at risk of injury or death. Establish foam flow before advancing into dangerous situations. Assure against running out of foam. Check concentrate level periodically and keep an adequate supply on hand.***

⚠WARNING ***In compressed air foam systems (CAFS) loss of foam concentrate flow will cause slug flow and high impulsive nozzle reactions. Unit must be closely monitored to avoid this.***

WATER FLOW (GPM)

DESIRED RATIO

	10	25	50	75	100	125	150	175	200	225	250
.1%	1200	480	240	160	120	96	80	69	60	53	48
.2%	600	240	120	80	60	48	40	34	30	27	24
.3%	400	160	80	53	40	32	27	23	20	18	16
.4%	300	120	60	40	30	24	20	17	15	13	12
.5%	240	96	48	32	24	19	16	14	12	11	10
.6%	200	80	40	27	20	16	13	11	10		
.7%	171	69	34	23	17	14	11	10			
.8%	150	60	30	20	15	12	10				
.9%	133	53	27	18	13	11					
1.0%	120	48	24	16	12	10					

TIME TO EMPTY 12 GALLON SUPPLY (MINUTES)

FOAM CONCENTRATE USAGE CHART - Figure 18

TASK FORCE TIPS

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LKG-101 June 11, 1999 Rev 11