FOAMPRO®

A Safe Fleet Brand

Form 829
3/20

Systems 2001, 2002, 2002HP and 2024

INSTALLATION AND OPERATION MANUAL

Unit Serial Number	

All quality FoamPro products are ruggedly designed, accurately machined, carefully assembled, thoroughly inspected and tested. In order to maintain the high quality of your unit, and to keep it in a ready condition, it is important to follow the instructions on care and operation. Proper use and good preventive maintenance will lengthen the life of your unit. ALWAYS INCLUDE THE UNIT SERIAL NUMBER IN CORRESPONDENCE.

FoamPro • 26 Southern Blvd. • Nesconset, NY 11767 USA • 800-533-9511 • FAX 816-892-3178

TABLE OF CONTENTS

NOTE TO SYSTEM INSTALLERS

IMPORTANT: Please provide a copy of the FoamPro manual to the end user of the equipment. For additional FoamPro manuals, contact by FAX 816-892-3178, web site www.foampro.com, or call 800-533-9511. Request Form No. 829.

1 Safety

Before attempting to install a FoamPro System 2001/2002/2024, read all of the following safety precautions and follow carefully.

1. Do not pump at pressures higher than the maximum recommended pressure (400 psi [28 BAR]).
2. Do not permanently remove or alter any guarding devices or attempt to operate the system when these guards are temporarily removed.
3. **Always disconnect the power source** before attempting to service any part of the pump. Note this system contains a capacitor which will hold a charge for a time after power is disconnected. Take care to dissipate this charge by connecting a 12 or 24 volt test lamp from the pump base to the positive main power terminal.
4. **Release all pressure** within the system before servicing any of its components.
5. **Drain all concentrate and water** from the discharge system before servicing any of its component parts.
6. Check all hoses for weak or worn conditions after each use. Ensure that all connections and fittings are tight and secure.
7. From the foam pump outlet to the injector fitting, use only pipe, hose, and fittings that are rated at or above the maximum pressure (400 psi [28 BAR] minimum for 2001, 2002, 2024 and 600 psi [41 BAR] for 2002HP) rating that the water pump system operates.
8. Any electrical system has the potential to cause sparks during service. Be sure to eliminate explosive or hazardous environments during service/repair.
9. **CAUTION: Do not attempt to operate the system at or above a temperature of 160°F [71°C].**
10. **WARNING: Ensure that the electrical source of power for the unit is a 12 or 24 volt, negative ground, DC system. Power and ground lines must come directly from the battery without any connections to other high power devices, such as primer pumps, hose reels, light bars, scene lighting, etc. Refer to Section 7 for detailed information.**
11. **CAUTION: Be sure that the electrical source of power for the 2000 series systems is correct for the unit being installed. All systems are negative-ground DC systems. The systems require a minimum current rating of at least:**

System	Voltage	Min. Amps
2001	12 VDC	41
2001	24 VDC	22
2002	12 VDC	60
2002 HP	12 VDC	60
2002	24 VDC	30
2002 HP	24 VDC	30
2024	24 VDC	60

12. **CAUTION: Periodically inspect the pump and the system components. Perform routine preventive maintenance as required. Failure to perform routine maintenance may damage the pump. See the maintenance section of this manual for recommended maintenance procedures and intervals between maintenance work.**
13. **CAUTION: Read and understand the "Operating Instructions" section before attempting to operate the unit.**
14. **CAUTION: Always disconnect the ground straps and control cables from the Digital Display Control Module or other FoamPro equipment before electric arc welding at any point on the apparatus. Failure to do so will result in a power surge through the unit that could cause irreparable damage to the display or other system components.**
15. **CAUTION: The cables shipped with each FoamPro unit are tested at the factory. Improper handling and forcing connections can damage these cables which could result in other system damage.**

2 A Quick Look at How the System Works

The FoamPro 2000 series systems are electric motor-driven, flow-based proportioning systems that measure water flow and then inject the proportional amount of foam concentrate to maintain the preset percentage. The basic FoamPro 2000 series systems are shown in Figure 1. The systems will accurately deliver from 0.1% to 10.0% foam concentrate to the foam injector fitting. The flowmeter measures the water flow and sends a signal to the Digital Display Control Module. Another sensing device monitors the foam pump output. Constant comparison of these two information signals by the controller ensures maintenance of the desired proportion of foam concentrate at all times based on the water flow rate, independent of any variations in fire pump intake or discharge pressures. As water flow increases or decreases, the foam concentrate rate of injection is increased or decreased automatically to correspond to the water flow.

Foam concentrate is injected directly into the water stream on the discharge side of the water pump. It is then fed as foam solution by the main fire pump into a standard fog nozzle, an air aspirated nozzle, or CAFS equipment.

Since foam is injected on the discharge side of the fire pump and check valves are to be used at installation, contamination of the booster tank, fire pump and relief valve with foam concentrate is eliminated.

Order optional system components listed in Section 3 to accommodate system design and requirements.

FoamPro 2000 series systems will pump Class A and Class B Aqueous Film Forming Foam (AFFF) to capacity. Many brands of Alcohol-Resistant Aqueous Film Forming Foam (AR-AFFF) exhibit higher viscosity characteristics due to chemical composition and polymers. As viscosity increases, diminished flow may affect pump performance. Because of numerous variables; including pump design, foam cell configuration, inlet piping/components and system layout; please contact FoamPro at 800-533-9511 for application-specific recommendations when foam viscosities of 2000 cps (Brookfield #3 spindle @ 30 rpm) or higher are used.

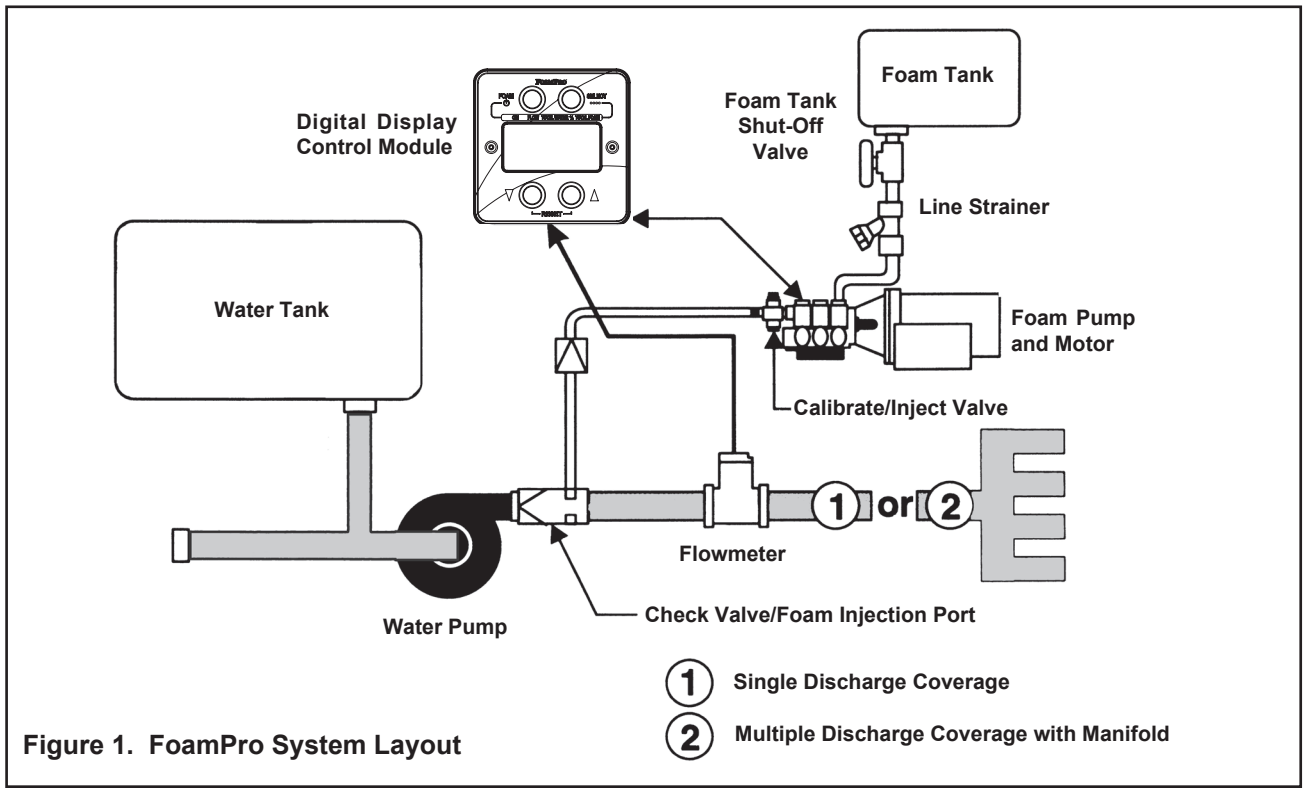


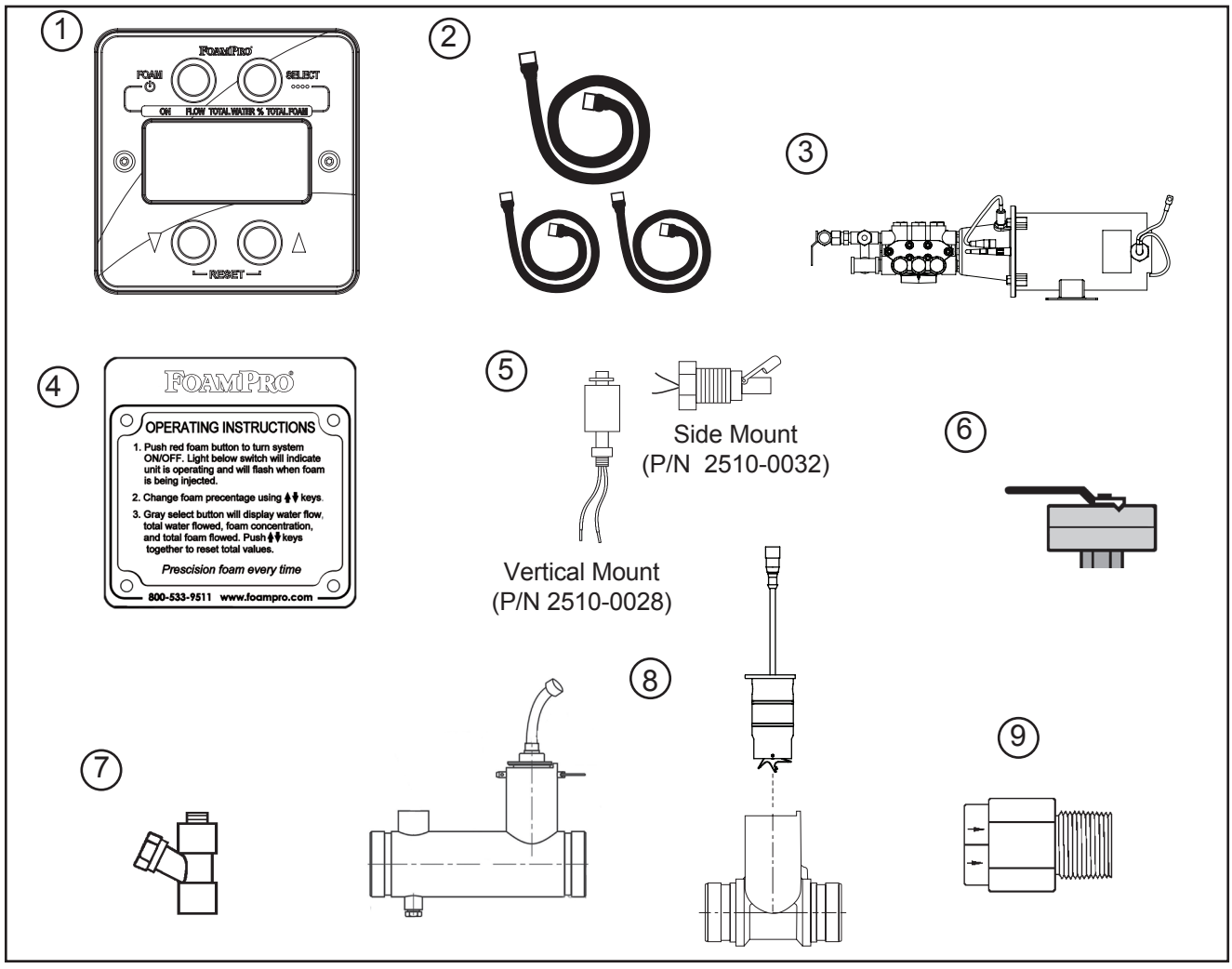
Figure 1. FoamPro System Layout

3 System Component Description

STANDARD FOAMPRO 2000 SYSTEM EQUIPMENT

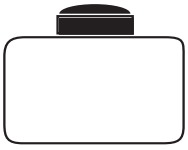
The following components are packaged with the FoamPro 2000 series:

1. Digital Display Control Module
2. Molded Cables
3. Foam Pump Assembly
4. Instruction Plate
5. Tank Low-Level Sensor (One required. Not packaged with the unit. Order separately.)
6. Calibrate/Inject Valve with Bushing (Attached to the pump outlet connection.)
7. Inlet Line Strainer with Nipple
8. FoamPro Paddlewheel Flowmeter or Manifold (The flowmeter is a required component and must be ordered separately. When ordering the 2000 series, specify the flowmeter size based on end use requirements. The flowmeters are available with 1-1/2 NPT x 1" Bore, 1-1/2, 2, 2-1/2, 3 and 4-inch NPT threads; or manifolds with Victaulic-grooved ends in 1-1/2, 2, 2-1/2, 3 and 4-inch pipe sizes. (Part numbers and flow ranges for the various flowmeters can be found on Page 39.)
9. 1/2 Inch NPT Foam Injection Check Valve. This NFPA required check valve prevents water back flowing into foam systems.

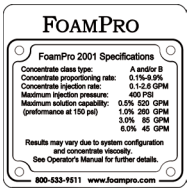


SYSTEM ACCESSORIES AVAILABLE

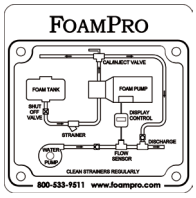
For more information on these accessories, please see publications 856 and PL-21.



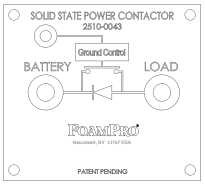
Polypropylene Foam Tank(s)
8, 12 or 20 gallon capacity



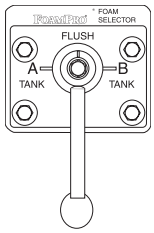
System Specification Placards



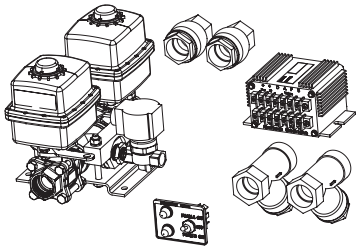
System Placard



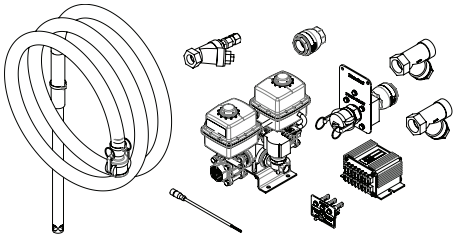
Solid State Contactor
P/N 2510-0043



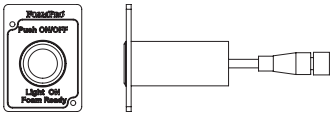
Manual Concentrate Management System
Manual control for Dual Tank Systems with interface to controller



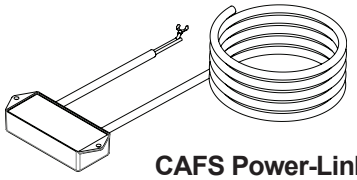
Electronic Concentrate Management System
Electronic control for Dual Tank Systems with interface to controller



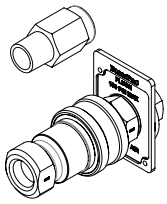
Electronic Concentrate Management System
Electronic control of single or dual tank onboard systems and an off-board pickup.
2002 Series and larger only



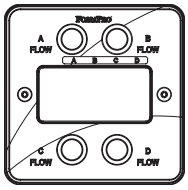
Remote Start/Stop



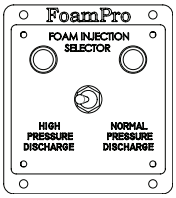
CAFS Power-Link
Interfaces FoamPro system with CAF system



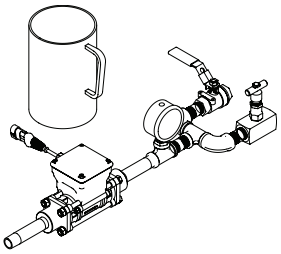
Single Tank Flush Kits
Both Internal and External flushing kits



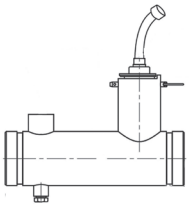
FoamPro MultiFlo Interface
Combines 2 to 4 flowmeters for single point systems



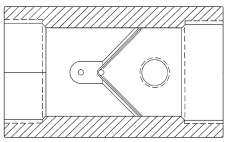
Dual Injection Management System
Provides capability for switching between two injection points



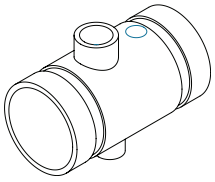
NFPA Calibration and Test Kit
For use with 1600 thru 3012 systems



Foam Manifold
All stainless steel with main waterway check valve, water flowmeter, injection port, and drain port. Victaulic grooved ends



Main Waterway Check Valve with Drain Port
Available in stainless steel.
NPT threaded ends with injection and drain ports



Main Waterway Check Valve
All stainless steel with Victaulic ends and injection and drain ports

4 Installer Supplied Parts

The FoamPro 2000 series systems are provided with the major components and accessories required for installation. Due to differences in chassis and apparatus configurations, the installer must provide pipe, hoses, tubing, wire and fittings to satisfy installation requirements. The following paragraphs list the specifications for selection of these components. Before beginning system installation, read this section thoroughly to make sure the proper components are selected. For detailed system installation instructions, refer to Sections 5, 6 and 7.

FOAM CONCENTRATE SUCTION LINE

Fittings and hoses from the foam tank to the inlet of the foam pump must be used. For 2001 & 2002 systems, use 3/4-inch (19mm) minimum inside diameter or larger hose, dependent on the viscosity of the foam concentrate. For the 2024 system, use 1-inch (25mm) minimum inside diameter or larger hose, dependent on the viscosity of the foam concentrate. Use components that are rated for 23 in [584.2 mm] Hg vacuum and 50 psi [3 BAR[pressure or greater. The components must be compatible with all foam concentrates to be used. Fittings used must be made of brass, 300 series stainless steel or other corrosion resistant material. Before selection of hose fittings, check for compatibility with foam concentrates to be used. The use of clear suction hose is required by NFPA to allow viewing foam priming operations. The foam pump must be positioned to allow gravity feed from the foam tank(s).

NOTE: When using a Dual-Tank System, intake plumbing will be different. Refer to Concentrate Management System Manual (Ref. Form 828 or 887) for foam pump inlet plumbing installation.

FOAM CONCENTRATE DISCHARGE LINE

Fittings and hoses from the discharge of the foam pump to the injector fitting must be supplied by the installer. Hoses and fittings of 1/2-inch [13 mm] minimum INSIDE diameter rated at 400 psi [28 BAR] minimum working pressure for the 2001, 2002 & 2024; 600 psi [41 BAR] for the 2002HP or maximum discharge pressure of the fire pump, whichever is greater, must be supplied by the installer. Fittings and hoses must be compatible with all foam concentrates to be used. Use fittings of brass, 300 series stainless steel or other corrosion resistant material compatible with all foam concentrates to be used.

CHECK VALVES

NFPA requires installation of a check valve in the foam concentrate injection line. To prevent foam concentrate flow from the tank due to static head pressure, the foam concentrate check valve shall have a 11 to 13 psi [0.8 to 0.9 BAR] cracking pressure and shall be capable of withstanding the pressures that will be generated in the foam injection line.

A check valve is also required in all water piping locations where foam concentrate could drain back into pumps or other components of the fire apparatus. As a minimum, one check valve must be installed where the foam solution water piping connects to the fire pump discharge. (FoamPro main waterway check valve is recommended.)

Multiple drains that allow individual drain lines to communicate may allow foam to short circuit past the check valves; avoid this possibility. FoamPro recommends separate drain valve(s) for the discharge piping.

FOAM CONCENTRATE TANK(S)

Foam concentrate tank(s) must be supplied to suit the capacity required for the apparatus application. The tank(s) should meet NFPA minimum standards for the design capacity, including filler size, venting and drain facility. For example, to meet NFPA requirements using 1% AFFF foam concentrate, a 40 gallon foam tank is required.

ELECTRICAL REQUIREMENTS

Electrical wiring must be supplied from the main apparatus electrical system to the foam pump base system. Power must be supplied directly from the apparatus battery without any connections to other high power devices, such as primer pumps, hose reels, auxiliary starters, light bars, etc. with its own disconnect switch, or a switch or contactor actuated by the battery disconnect switch, PTO or other device. Use proper wire size to be able to supply the foam system with the proper voltage and amperage required. The minimum service is as follows:

2001 12VDC requires 41 amps
2002 or 2002HP 12VDC requires 60 amps
2001 24VDC requires 22 amps
2002 or 2002HP 24VDC requires 30 amps
2024 24VDC required 60 amps

Braided flat ground straps are required for ground connections. The flat straps limit the RFI/EMI interference encountered with radios, computers or other sensitive electronic equipment.

CAUTION: Always disconnect the ground straps and control cables from the Digital Display Control Module or other FoamPro equipment before electric arc welding at any point on the apparatus. Failure to do so will result in a power surge through the unit that could cause irreparable damage to the display.

5 Installation Planning

Because of the potential differences in apparatus plumbing and foam system configuration, it is not practical to depict exactly how each FoamPro unit can best be installed onto a particular apparatus. Figure 2 shows the relative location of the FoamPro system components. Most of the information contained in the following sections, however, will apply to any situation.

It is recommended that you read the following sections thoroughly before beginning installation of the FoamPro system. It is also recommended that you spend time planning and designing where and how you intend to install this unit in the apparatus *before beginning* the actual installation.

Determine the locations of the components to be installed such as; foam tank(s), foam pump and flowmeters. Try to place components in locations that require the least amount of hoses and fittings.

Locate the foam pump unit in an area that is protected from road debris and excessive heat buildup. Since the power switch and CAL/INJECT valve are located on this unit, the foam pump unit should be installed in an accessible area located in the vicinity of the operator's panel.

The foam pump unit should be located below the discharge of the foam tank(s) to provide for gravity feed to the foam pump. The 2002 and 2024 systems can be positioned with a suction lift not to exceed 6 ft (1.8 meters) and may be positioned accordingly. Locate the foam tank(s) where the refilling can be done with 5 gallon (19 liter) containers and other methods suitable to the end user. Most water tank manufacturers will build the foam tank(s) into the booster tank. When specifying integral foam tank(s), make provisions for installing the low-level sensor as well as foam suction connections and tank drainage.

Determine a location for the Digital Display Control Module on the operator panel of the apparatus. Consider the routing path for the control cables from the Digital Display Control Module to the foam pump unit and flowmeter(s). If necessary, order longer or shorter cable assemblies to suit the location demands.

CAUTION: Never attempt to cut or lengthen the molded cables.

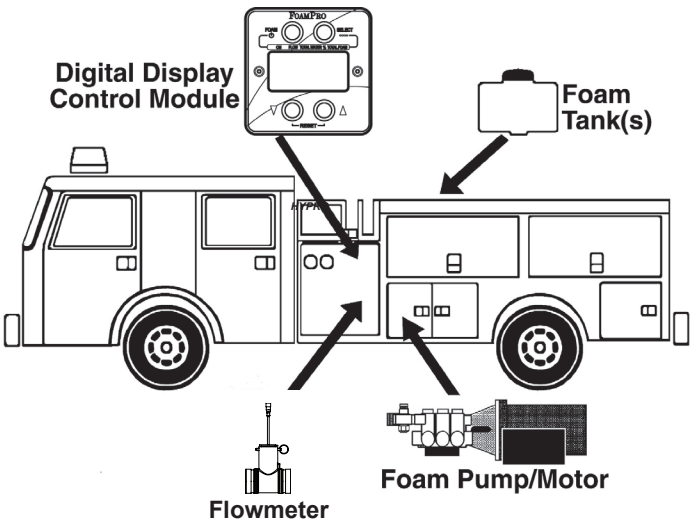


Figure 2. System Component Location

6 Plumbing Component Installation

The following diagram (Figure 3) provides recommended guidelines for the location of the system components that handle water, foam concentrate and foam solution. Note that additional options such as dual tank systems, multiple flowmeters, etc., are covered by individual manuals included with those systems; consider potential interferences.

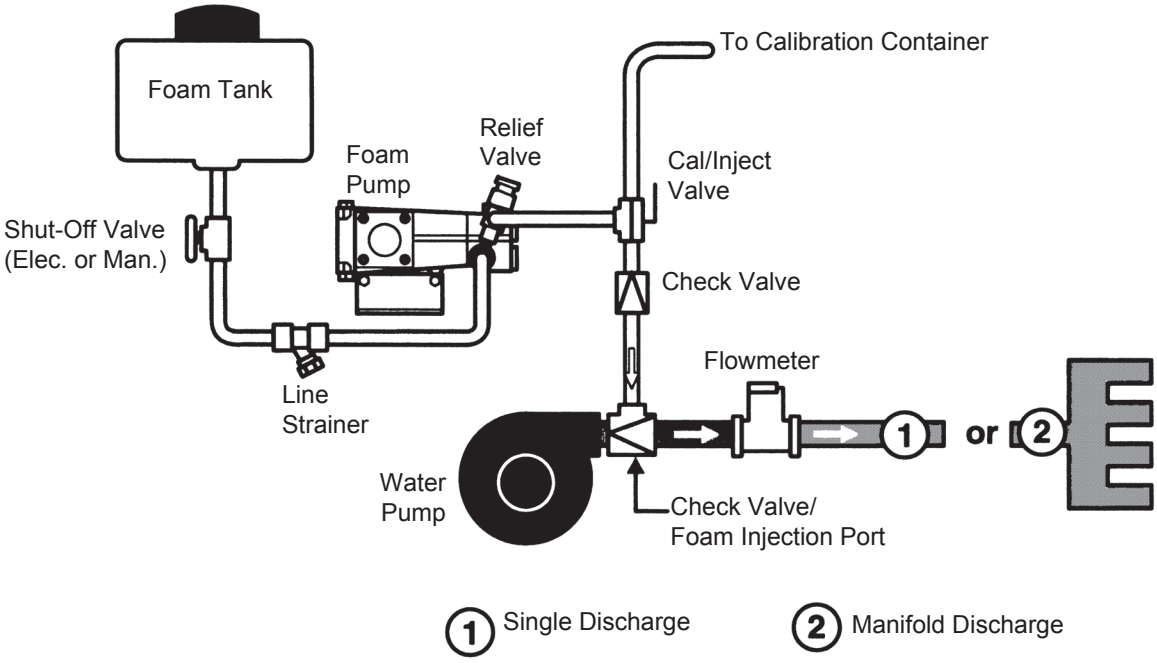


Figure 3. FoamPro 2000 Series System Piping

A. FOAM PUMP/MOTOR BASE ASSEMBLY

The foam pump/motor base assembly must be mounted in a horizontal position (See Figure 5). The base of the foam pump must be anchored to a surface or structure that is rigid and of adequate strength to withstand the vibration and stresses of apparatus operation. Figure 4 provides the mounting dimensions for the FoamPro 2000 series foam pump/motor base assembly. It is required to use flexible hose when making the hose connections to the FoamPro 2000 series. DO NOT hard pipe the system.

Position the foam pump so the circuit breaker/on-off switch is easily accessible. Also, consider access requirements for checking and changing the oil in the crankcase of the foam pump. Be sure the foam concentrate hoses can be properly routed to the inlets and outlets on the foam pump. Position the 2001 and 2002HP foam pump assembly so that the foam pump inlet is gravity fed from the foam tank(s). The 2002 and 2024 foam pump assemblies can be mounted in a position with a gravity fed inlet or with a maximum vertical lift of no more than 6 feet (1.8 meters). Ensure in all cases that the suction line size is appropriate and minimal in length. Keep the usage of elbows to a minimum and refrain from coiling or looping flexible lines. All connections must be air tight. The foam pump/motor base assembly must be mounted in an area to avoid excessive exhaust system heat buildup.

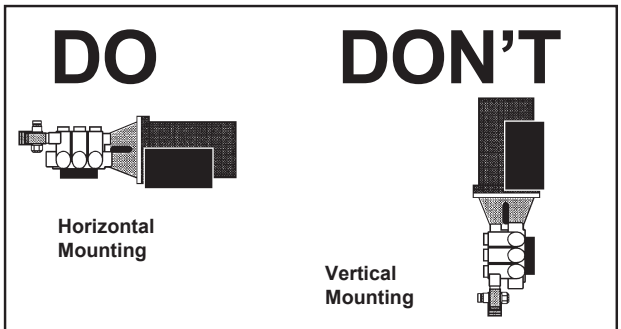


Figure 5. Foam Pump Mounting Position

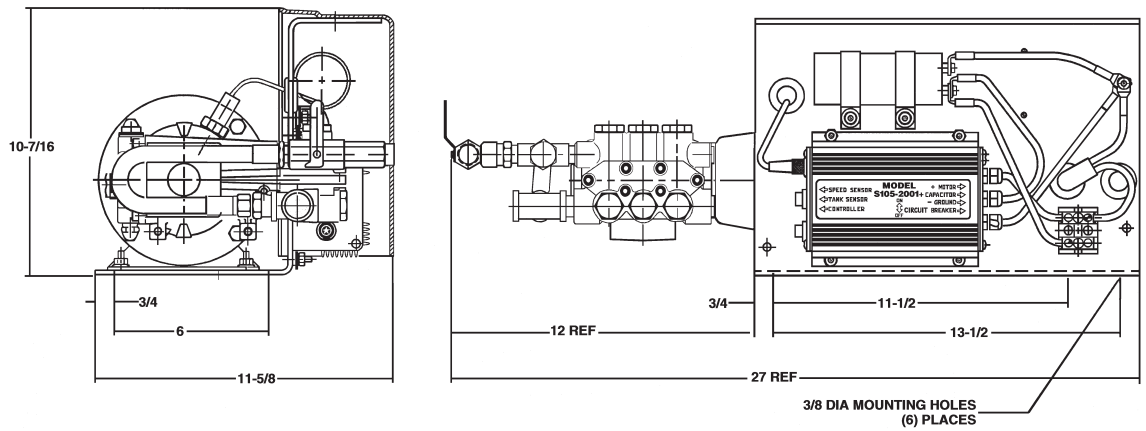


Figure 4. FoamPro 2001/2002 Mounting Dimensions

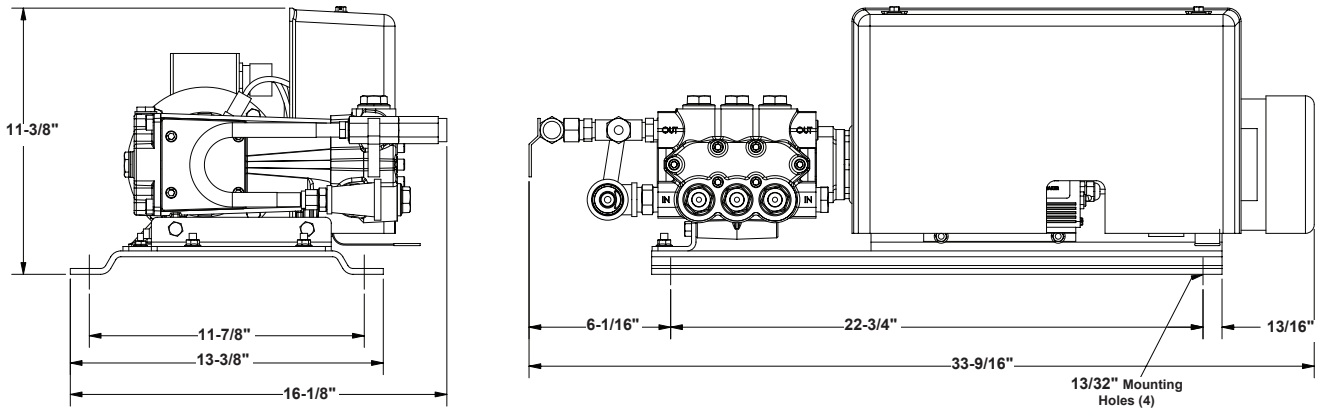


Figure 4a. FoamPro 2024 Mounting Dimensions

Protect the hoses and wiring from chafing and abrasion during operation of the foam system.

Protect the foam pump base unit from excessive road spray and debris. Although the system is sealed and designed to be resistant to the harsh environment of fire fighting apparatus, a protected location with easy operator access is the ideal installation location.

After the foam pump/motor base assembly is mounted, remove the shipping plug in the oil fill hole on the foam pump gear case and replace it with the vented oil dipstick (see Figure 6). Check the oil level by removing the vented dipstick; make sure the oil level is to the full mark on the dipstick. Proper oil level is also indicated when the oil is visible in 1/2 to 3/4 of the oil level sightglass. Add Dextron ATF oil if required. Replace the dipstick when the oil level is correct.

B. DISCHARGE RELIEF VALVE

The discharge relief valve is installed on the outlet port of the foam concentrate pump. It is provided to protect the foam pump from excessive pressures. The relief valve is factory set at 400 psi [28 BAR] (600 psi [41 BAR] for 2002HP model).

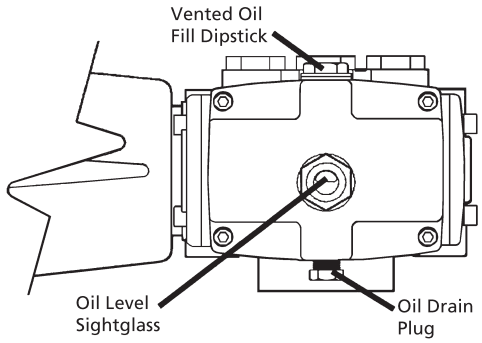


Figure 6. FoamPro 2000 Series Foam Pump Oil Level Check

C. CAL/INJECT VALVE

The CAL/INJECT valve is mounted on the discharge side of the foam proportioner. This valve shall be accessible by the pump operator during normal operations. The valve is a 3-way directional valve that selects where the output of the foam pump will go.

Check to make sure the valve is installed properly. Look at the ports as you move the handle, the flow should go from the center port to each of the other ports.

The hose and fittings from the INJECT port to the foam injector fitting should have 1/2-inch [13 mm] inside diameter and be rated at 400 psi [28 BAR] for 2001/2002/2024 models or 600 psi [41 BAR] for 2002HP models minimum working pressure or maximum discharge pressure of the fire pump.

The hose from the CAL/FLUSH port may have a lower pressure rating since it is plumbed to the atmosphere and will not receive high pressures. This hose is used for calibrating the foam pump, pumping the concentrate into a container to empty the tank or to assist in priming of the foam pump. The hose from the CAL/FLUSH port must be long enough to reach a container outside the truck. This hose must be coiled for storage when not in use.

D. LINE STRAINER

The line strainer that is provided with the FoamPro unit has 3/4-inch NPT female threaded ports for the 2001 & 2002 systems and 1-inch NPT female threaded ports for the 2024 system; and is to be installed on the inlet port side of the foam pump. The hose from the foam tank should have adequate wall stiffness to withstand the vacuum of the foam pump while it is operating (23 in. [584 mm] Hg and 50 psi [3 BAR]).

NOTE: If a pressurized water flush from one of the discharges is incorporated, the plumbing and line strainer exposed to this pressure must be rated at or above the operating pressure of all other discharge plumbing components. (400 psi [28 BAR] minimum) (600 psi [41 BAR] for 2002HP models).

E. FLOWMETER(S)

The FoamPro 2000 Series systems are designed to accept flow reading signals from the FoamPro paddlewheel style flowmeter.

Proper flowmeter sizing is critical to system accuracy. Select a flowmeter size based on actual flows required, not standard pipe sizes. Refer to the installation drawing at the end of this manual (Page 39) for proper flowmeter sizing.

The flowmeters require that the amount of turbulence in the pipe being monitored is as low as possible. Excessive turbulence produces unstable and inaccurate flow readings. The following installation guidelines will help attain the best readings and maintain accuracy of the FoamPro system when using the FoamPro paddlewheel flowmeter in a tee or in the FoamPro manifold.

a. A minimum **5 times the pipe diameter** of straight run pipe without any fittings is necessary upstream of the flowmeter.

   10 times is better — the longer the straight run, the lower the turbulence. Here are some examples of required straight run:

Pipe Size	Recommended Straight Run Pipe
1-1/2 in. [38 mm]	7-1/2 to 15 in. [191 to 381 mm]
2 in. [50 mm]	10 to 20 in. [254 to 508 mm]
2-1/2 in. [64 mm]	12-1/2 to 25 in. [317 to 635 mm]
3 in. [76 mm]	15 to 30 in. [381 to 762 mm]
4 in. [100 mm]	20 to 40 in. [511 to 1016 mm]

b. The downstream plumbing of the flowmeter is not as critical; but again, straight runs without fittings help maintain accurate flow readings.

c. Do not mount a flowmeter directly after an elbow or valve. Valves create severe turbulence when they are “gated-down”.

d. Try to mount the flowmeters in a position that is accessible for routine inspection and maintenance.

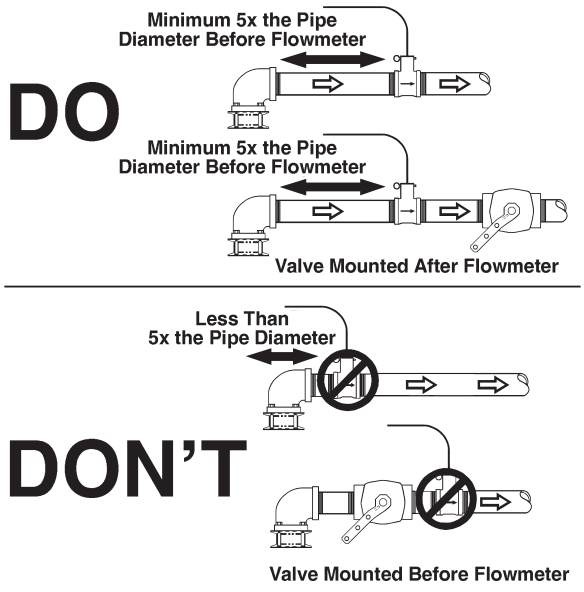


Figure 7. Flowmeter Placement

FOAMPRO PADDLEWHEEL FLOWMETERS

The FoamPro paddlewheel-style flowmeter fittings are specially designed tees and manifolds that make inspection and maintenance of the flow sensor easy. The threads of the tees are NPT. In horizontal runs, the tees should be mounted as close to upright as possible within the range shown in Figure 8.

With the use of a MultiFlo interface, two to four flowmeters may be monitored simultaneously. A single injection point that will supply foam agent to all foam discharge outlets is required.

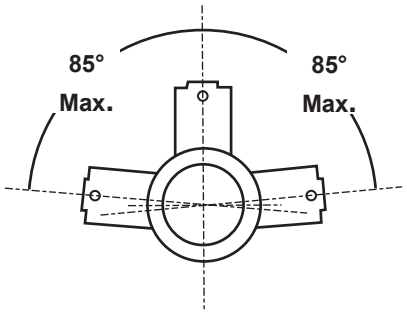


Figure 8. Flowmeter Position Range

F. INJECTOR FITTING (optional)

The brass injector fitting ensures foam concentrate is injected into the center of the water flow for better mixing. It is designed to fit into a 1 inch NPT threaded connection on a pipe tee that is installed in the discharge piping of the fire pump (See Figure 9). The inlet of the fitting is 1/2 inch NPT female thread and the outer threads are 1 inch NPT. The injector may also be inserted into a weld fitting with 1 inch NPT female threads. It MUST be mounted in a place that is common to all discharges which require foam capability. This fitting is not used if using a FoamPro Main Waterway Check Valve. A separate injection point is not possible for each discharge. If multiple flowmeters are used, the injector must be installed before the flowmeters at the inlet to their common manifold (See Figure 10).

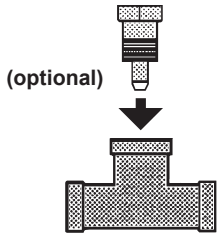


Figure 9. Injector Fitting Installation

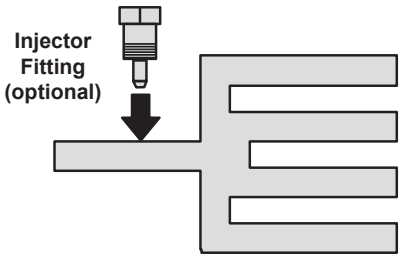


Figure 10. Injector Fitting Placement for Multiple Discharges

Most foam concentrates by nature mix with water very quickly, so each discharge from a manifold will receive equal concentrations if the manifold is properly designed and installed.

G. CHECK VALVES

A 1/2 inch NPT check valve meets NFPA requirements for a non-return device in the foam injection system. To prevent foam concentrate flow from the foam concentrate tank due to static head pressure, the foam concentrate check valve shall have a 12 psi [0.6 BAR] cracking pressure and shall be capable of withstanding the pressures that will be generated in the foam injection line. It is always a good idea to inject foam at a horizontal or higher angle to allow water to drain away from the check valve (See Figure 11). This will avoid sediment deposits or the formation of an ice plug.

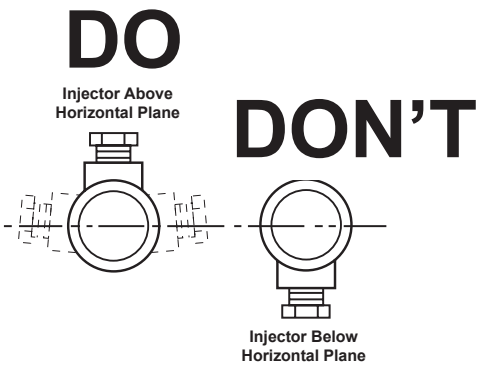


Figure 11. Foam Injector Position

The check valve in the water way is required to keep foam solution out of the main pump and allow pump priming without drawing foam into the piping. See Figure 12.

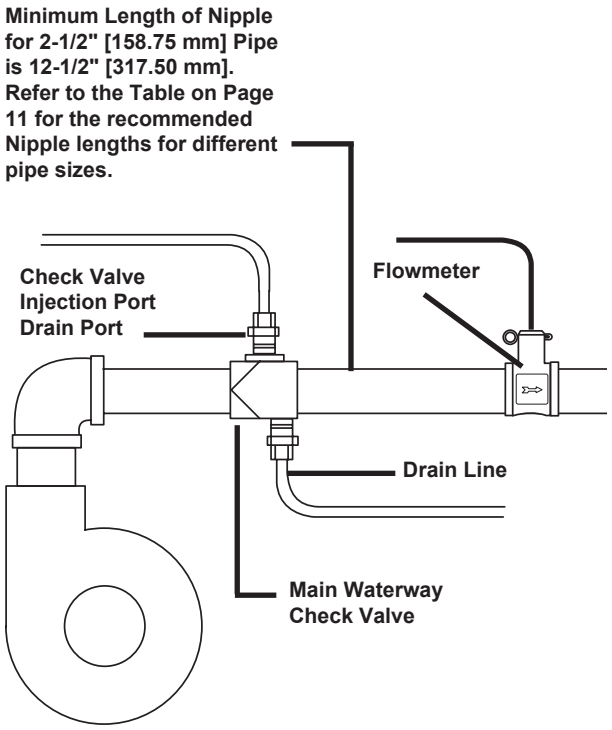


Figure 12. Recommended Pump Installation

H. DRAIN LINES

On apparatus with multiple drain lines, the drains from the foam solution discharge line should not be piped into a multi drain system before the check valves. The standard multi drain system from most manufacturers will allow cross talk between the drain lines and the apparatus water tank, resulting in contamination of the water tank with foam. A separate drain system should be provided for the foam solution piping to prevent contamination of the water tank and fire pump.

I. FLUSHING SYSTEM

Depending on the corrosiveness of the foam concentrates to be used, a flushing system may be required in the foam concentrate injection system. Generally, all Class B foam concentrates must be flushed from the system after use. Most Class A foam concentrates (per NFPA 1150) are less corrosive and therefore may not require flushing. Fig. 12-4 is a recommended diagram for a flush circuit. When a dual tank system is installed on the apparatus, provision for flushing the foam concentrate injection system is built into the dual tank selector system.

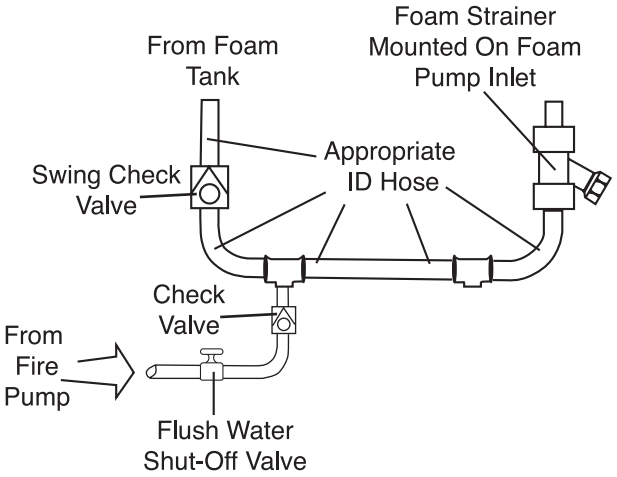


Figure 12-4. Foam Concentrate Flushing System Diagram

Flushing Foam Pumps

When returning the apparatus to ready condition after foam operations, the FoamPro foam pumps should be flushed. The following procedures can be used to flush the foam pumps. Refer to Figure 12-4 and do the following:

1. Energize apparatus and establish water flow through foam solution discharge.
2. Close foam concentrate tank shut-off valve and open flush water supply valve.
3. Energize FoamPro 2000 and allow electric motor driven foam pump to run until discharge is clear.
4. Shut off FoamPro 2000 system by depressing the FOAM button on the Digital Display Control Module. Close flushing water supply valve.
5. Close foam solution discharge and shut down apparatus.
6. Open foam concentrate tank shut-off valve.
7. Perform required maintenance checks on the FoamPro 2000.

7 Electrical Equipment Installation

ELECTRICAL CONNECTIONS

Follow the system electrical diagram (Figures 13,14 and 30) for proper hookup of each of the electrical components. Complete molded cable sets are provided with each FoamPro system to make all the necessary connections. The cables are color coded and "indexed" so they only go in the correct receptacle and they can only go in one way. DO NOT FORCE MISMATCHED CONNECTIONS. *The system can only perform when the electrical connections are sound, so make sure each one is right.*

SOME THINGS TO KEEP IN MIND

- **DO NOT** hook up the main power cables until all connections are made to each of the electrical components. The last connection should be the power cable to the foam pump/motor base assembly.
- **WARNING: This system contains a capacitor on the input power. Connect the leads with the battery off or disconnected. Current will flow even with the circuit breaker off.**
- **DO NOT** cut molded cables.
- Power must be supplied directly from the apparatus battery without any connections to other high power devices, such as primer pumps, hose reels, auxiliary starters, light bars, et. with its own disconnect switch, or a switch or contactor actuated by the battery disconnect switch, PTO or other device.
- Provide at least the following amounts of electrical power from the battery to the main power terminal:

  2001 12 VDC requires 41 amps;
  2002 or 2002HP 12 VDC requires 60 amps;
  2001 24 VDC requires 22 amps;
  2002 or 2002HP 24 VDC requires 30 amps;
  2024 24VDC requires 60 amps.

  Use proper wire size from the system terminal directly to the battery as described on page 17.
- The S1xx-xxxx systems are designed for 12-volt, negative-ground systems only. The S2xx-xxxx systems are designed for 24-volt, negative-ground systems only.
- Do not mount radio transmitter or transmitter cables in direct or close contact with the FoamPro unit.
- Connect ground strap with 3/8" mounting hole to chassis frame.
- Use care when installing molded cables. Count pins or check color codes before connecting.

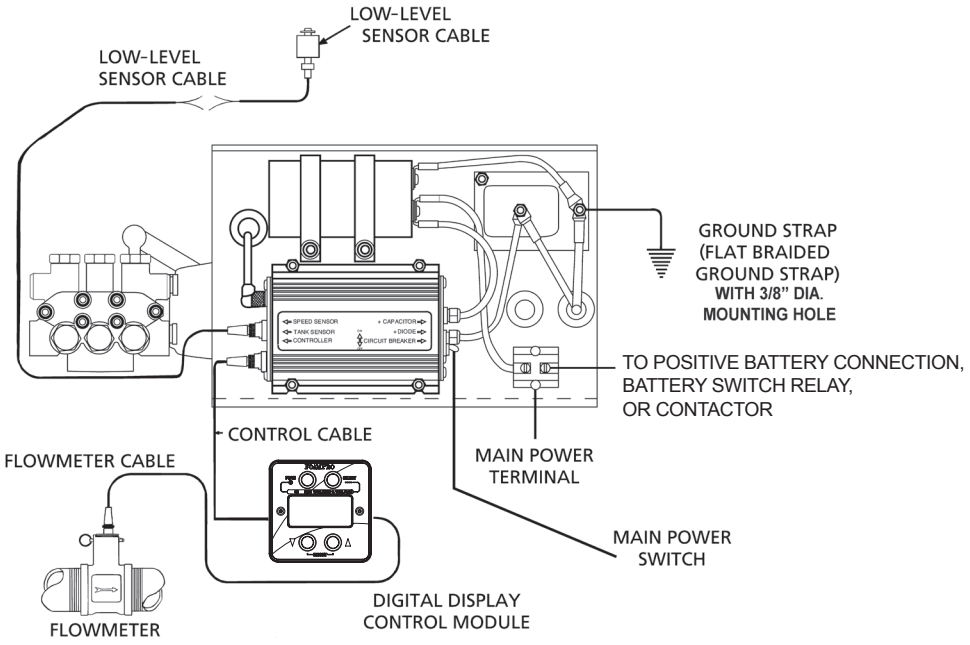


Figure 13. FoamPro 2002/2002HP/2024 Electrical Wiring Diagram

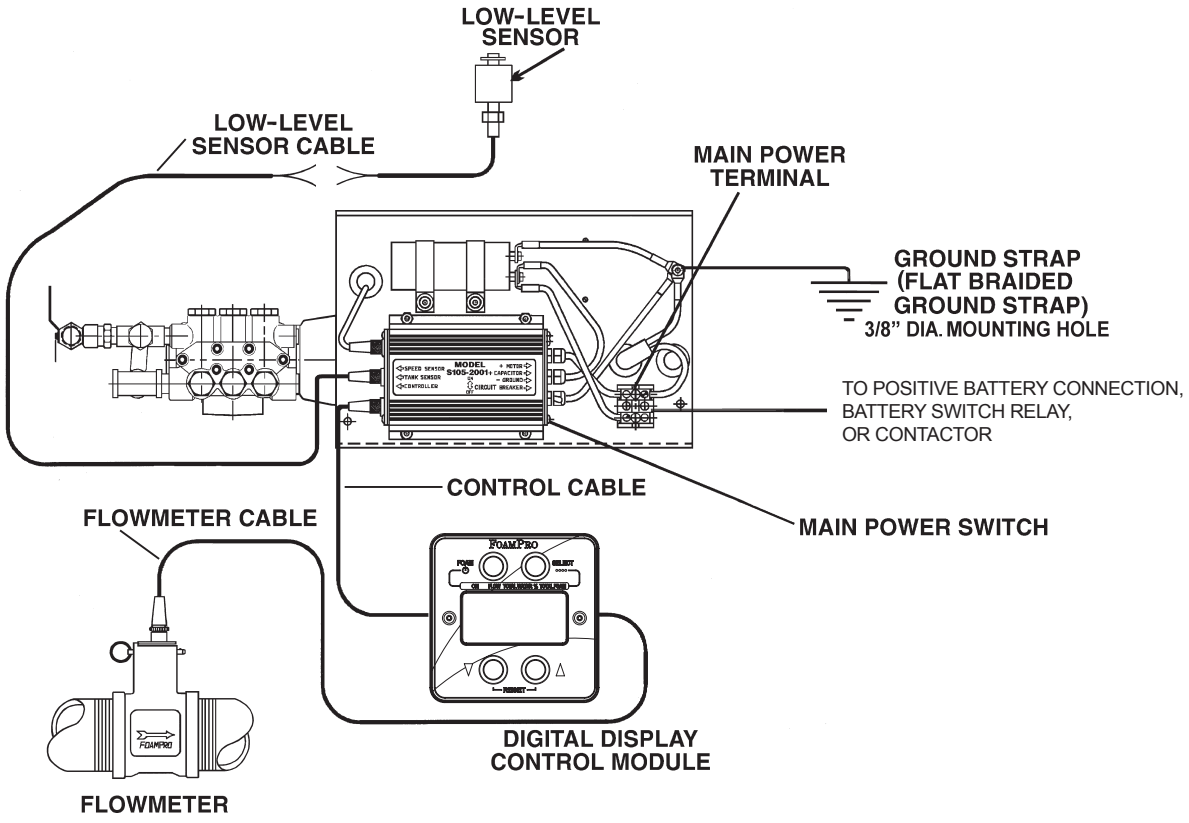


Figure 14. FoamPro 2001 Electrical Wiring Diagram

Bent pins caused by improper hookup can prevent proper operation even when cables are reattached properly.

- Before connecting the molded cables, inspect the yellow seal washer in the female connector. If the seal washer is missing or damaged, water can enter the connector and cause corrosion of the pins and terminals that will cause system failure.
- **CAUTION: The cables shipped with each FoamPro unit are tested at the factory with that unit. Improper handling and forcing connections can damage these cables, which could result in other system damage.**
- **CAUTION: Always disconnect the ground straps and control cables from the Digital Display Control Module or other FoamPro equipment before electric arc welding at any point on the apparatus. Failure to do so will result in a power surge through the unit that could cause irreparable damage to the display or other system components.**

A. DIGITAL DISPLAY/CONTROL MODULE

The Digital Display Control Module is designed to be mounted in the operator panel of the apparatus. The cutout that will be needed in the operator panel is a 3-7/8 inch [98 mm] diameter hole (the same as a 3-1/2 inch [89 mm] pressure gauge). The display is secured with four #10 socket head screws in the four holes in the face (See Page 38 for a mounting template). The display requires 5 inches [127 mm] minimum from the back of the operator panel to clear wires and connectors. Make sure there is enough clearance behind the operator's panel for the cables.

Once the Digital Display Control Module is mounted, connect the control cable (red coded cable end) from the motor driver box terminal to the 5 pin connector on the back of the Digital Display Control Module (See Figure 15). A color-coded decal on the motor driver box identifies each cable connection (See Figure 16).

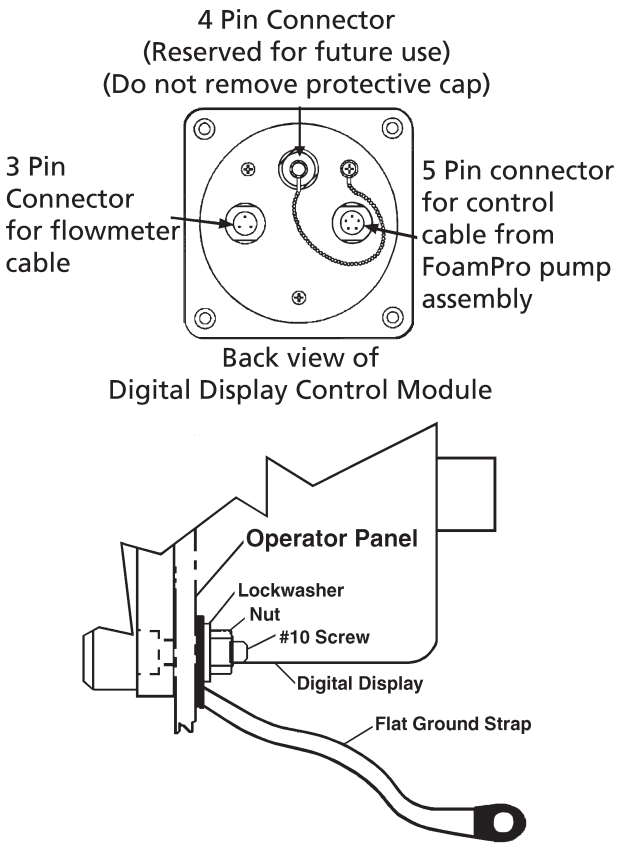
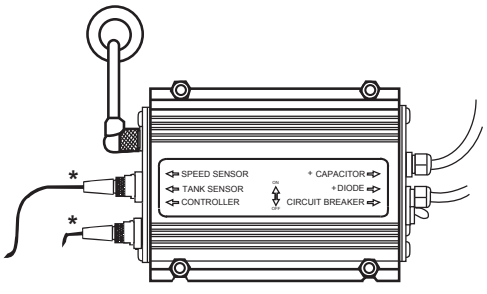


Figure 15. Digital Display Control Module Cable Connections and Grounding

NOTE: Make sure the panel where the Digital Display Control Module is mounted has an adequate ground. For stainless steel and vinyl-coated panels, a flat ground strap must be attached from one of the four screws holding the Digital Display Control Module in place, to the frame of the fire truck to ensure adequate grounding (See Figure 15).



*** Connections to be made during installation.**

Figure 16. Motor Driver Box Connections

B. FLOWMETER(s) CONNECTIONS

FOAMPRO FLOWMETER

If a single FoamPro paddlewheel-type flowmeter is to be used, a molded cable that connects from the flowmeter to the 3 pin connector on the Digital Display Control Module is supplied.

MULTIFLO FLOWMETER INTERFACE MODULES

See the instructions supplied with the MultiFlo interface for installations requiring multiple Foampro flowmeters. Figure 17 shows the interconnection of the flowmeters with the Digital Display Control Module.

C. FOAM TANK CONNECTIONS

The foam tank low-level sensor must be mounted into the bottom of the foam tank to monitor low foam concentrate level. The switch has 1/8 inch NPT threads. Mount the sensor in the bottom of the foam tank in an upright position. Use suitable sealant to prevent concentrate leakage. There must be space under the tank for the cable to be routed to the pump base assembly (See Figure 18). Be sure not to remove the float from the shaft on the sensor assembly. If installed in the reverse position, “LO CON” and “NO CON” will appear on the Digital Display Control Module, and the system will automatically shut down after two minutes, even if there is foam in the tank.

When the bottom of the foam tank is not accessible, the low-tank level sensor float switch can be hung from a long nipple attached to the top of the tank. The nipple should be rigid enough to withstand the force of sloshing foam when the vehicle is in motion. Make sure the low-tank level sensor does not contact the side of the foam tank when the vehicle is in motion (See Figure 18). Since wire connections must be made inside the nipple, a 3/8 inch NPT nipple with 3/8 by 1/8-inch NPT reducer at the lower end is the minimum size recommended.

CAUTION: The foam tank low-level sensor must be utilized to protect the foam pump from dry running. Failure to do so will void the warranty.

Connect the sensor wires to the low-tank level sensor cable (blue-coded cable ends). The low-tank level switch sensor cable may be shortened or lengthened (use 18-22 AWG). It has pigtails at one end and is not polarity sensitive. Connect the other cable end to the motor driver box on the foam pump/motor base assembly (see Figure 16).

Check low-tank level sensor operation after installation using a powered test light. With no foam in the tank, the

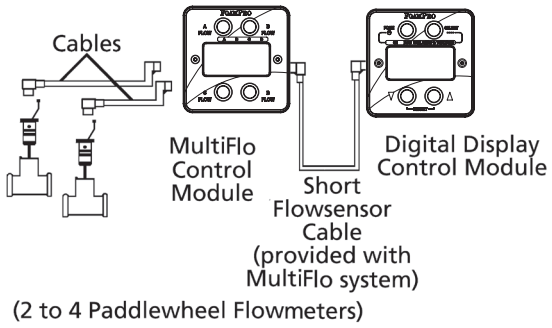


Figure 17. MultiFlo and Flowmeter Connections

light should be on. If this is not the case, remove the clip from the end of the sensor. Remove the float and reinstall 180° out of position. Reinstall clip.

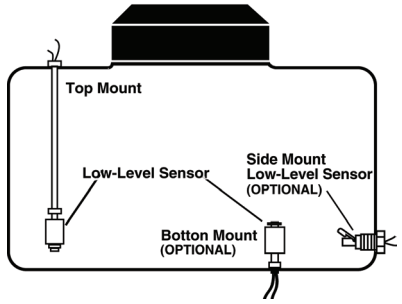


Figure 18. Foam Tank Low-Level Sensor Mounting Options

A side-mount tank level sensor is available to be used if both the top and bottom of the tank is not accessible (See Figure 18). The side-mount tank level sensor has 1/2-inch NPT threads and the center of the switch must be located approximately 2 inches [51 mm] from the bottom of the foam tank with the float positioned on top of the switch to move up and down.

NOTE: When the side-mount tank level sensor senses a low concentrate condition, the system will operate for two minutes unless the foam concentrate level is restored. If the foam concentrate level is not restored, the system will shut down after two minutes. When locating the side-mount low-tank level switch on the foam tank, sufficient foam volume must be present for two minutes of operation. This determination will be made using the most frequent foam concentrate injection rate and water flow.

The side-mount tank level sensor must be sealed with a suitable sealant to prevent concentrate leakage. After installation, check operation of the side-mount low-tank sensor with a powered test light. With no foam in the tank, the light should be on. If light does not come on, rotate the side- mount low-tank sensor until the test light is on. The float should be allowed to swing up and down freely.

D. DC MOTOR

Provide adequate electrical power (see the listing on Page 15) from the battery. Use 8 AWG minimum wire directly to the battery or battery switch. Long wire runs may require 6 AWG wire for proper operation.

See recommended wire size table on page 18.

E. ELECTRICAL POWER SUPPLY

Electrical devices can be damaged, or operate intermittently when powered by a weak or erratic power supply. The FoamPro 2000 Series systems are not any different – the better the power supply, the better the system will perform. Following the instructions that follow will ensure the FoamPro system will perform at its best.

Power and ground connections must come directly from the battery to the connections shown in figures 13 and 14. These connections must come directly from the battery without any connections to other high power devices such as primer pumps, hose reels, auxiliary starters, light bars, etc., with its own disconnect switch, solid state contactor or a switch or contactor actuated by the master disconnect switch, PTO switch, or other device. Ensure the switching device is rated for at least twice the maximum amperage of the system being installed.

See the Electrical Power Supply Schematic and Recommended System Fuze Size table on page 18.

CAUTION: Connecting other high power devices to the power or ground supply with the FoamPro system will cause component damage.

The system maximum amperage draw is listed as follows and must be protected with a fuse or breaker of minimum size listed in the main power line to the system and provides enough power and protection for the display, driver, motor, and associated components. If attaching other FoamPro products to the supply line, the fuse or breaker must be sized accordingly. It is also recommended to install a fuse or breaker of at least 50% of the main fuse or breaker value on the main ground line. All component power and ground connections must be common for all FoamPro components.

- **Always** connect the primary 12 or 24 VDC positive lead for the system directly to the battery or power switch using appropriate AWG wire that is chemical resistant and protected with a wire loom. Install the proper fuse or breaker size in the line that supplies the main power to the system.

- **It is recommended** to connect the ground lead for the main system directly back to the battery using the same AWG size as the main power line and it should also be chemical resistant wire protected in a wire loom. Installation of a fuse or breaker of at minimum of 50% of the main power breaker in line with the ground to the system.
- **Never** connect the main power or ground leads to other leads that are connected to high power components such as primer pumps, hose reels, auxiliary starters, etc.
- **Always** make the connection to the primary power supply the last step.
- **Always** ensure the connections are sound and tight to avoid erratic or poor power and ground connections to the components.
- **Always** make sure the Control Display and the Base System are grounded to the chassis using flat ground straps to reduce potential RFI and EMI issues.

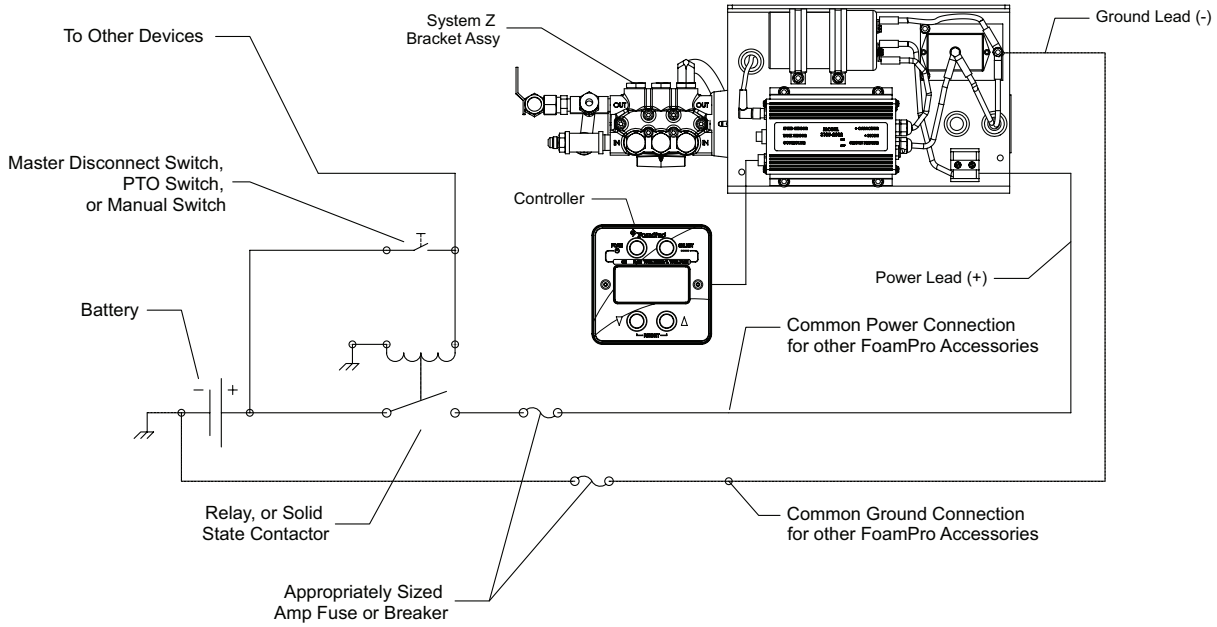
Recommended Wire AWG

System Model	System Voltage	Max Amps	10 ft.	15 ft.	20 ft.	25 ft.	30 ft.
2001	12 VDC 24 VDC	41 22	8 8	6 8	4 8	4 6	2 6
2002 & 2002HP	12 VDC 24 VDC	60 30	6 8	4 8	4 6	2 4	2 4
2024	24 VDC	60	6	4	4	2	2

Recommended System Fuse Sizes

System Model	Operating Voltage	Maximum System Amp Draw	Minimum Fuse or Breaker Size
2001	12 VDC 24 VDC	41 22	45 25
2002 & 2002HP	12 VDC 24 VDC	60 30	60 30
2024	24 VDC	60	60

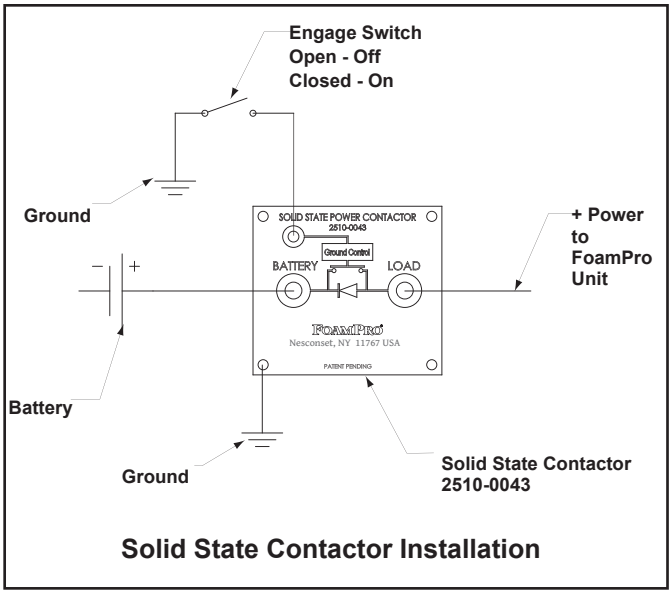
Electrical Power Supply Schematic



F. SOLID STATE CONTACTOR (SSC)

The usage of the optional solid state contactor (SSC) is recommended to help protect the FoamPro system from excessive voltage surges that can take place in fire apparatus systems. The SSC also has a higher life expectancy than mechanical relay options used for master switch applications.

The SSC allows the operator to easily power the system up and to shut it down with the use of a simple switch. The following diagram depicts the installation of this accessory.



Solid State Contactor Installation

G. EMI/RFI SUPPRESSION

An EMI/RFI (Radio Frequency Interference) suppression kit is included with each FoamPro system. The clamp-on beads included in the kit, when properly installed, along with proper grounding of components will reduce the potential for radio frequency interference. Additionally, make sure radio cables and hardware are not located in the immediate area where the FoamPro 2000 Series equipment is mounted.

Install clamp-on beads at the locations indicated in Figure 19. Slide the beads as close as possible to the connectors on the cable. Use a small amount GE SILICONE II, electrical tape, wire tie or heat shrink tubing to keep the beads from moving after installation.

FLOWMETER AND CABLES

Making round coils of extra control and flowmeter cables in the pump compartment can act as an antenna. While the flowmeter and control cables cannot be shortened, various lengths of cable are available to minimize the

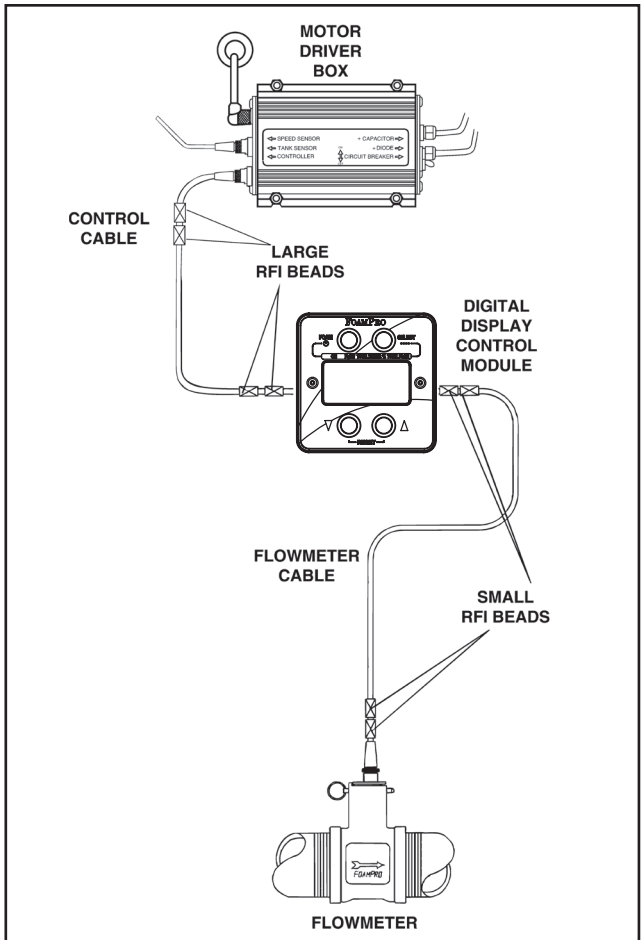


Figure 19. RFI/EMI Bead Installation

"extra" cable in the truck. (See the parts list in Section 13 for part numbers of different size control and flowmeter cables.) When routing control and flowmeter cables, avoid routing them next to antenna cables, radio power lines and radio components. When there is extra cable, double the cable back on itself and secure in a flat bundle with plastic wire ties instead of making a round coil (See Figure 20).

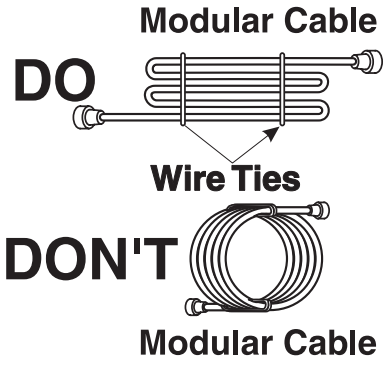


Figure 20. Extra Cable Storage

8 Making Sure Everything is Working Right

Electrical

- Tank level sensor is connected and the connections are sealed from moisture.
- Digital Display Control Module connectors are correct and tight.
- Cable connections at the motor driver box are correct and tight.
- Flowmeter cable(s) properly connected to the Digital Display Control Module or MultiFlo as required.
- All cables and wires are secured and protected by loom from damage during operation.
- RFI/EMI beads are installed; control and flowmeter cables are properly folded and secured; radio antennas, power lines and equipment are away from the control and flowmeter cables.
- All components, Digital Display Control Module, Flowmeter Tee, Pump Base, etc., are properly grounded with adequate size wire and bare metal connections.
- Adequate current capacity is available for the foam pump motor (see the listing on Page 14).
- Circuit breaker switch on the motor driver box is in the ON position.

Liquid

- Flowmeter is mounted with flow arrow in the correct direction for water flow.
- Check valves are properly mounted in water and foam concentrate lines.
- Strainer is properly mounted for the direction of concentrate flow in the foam tank to pump line.
- Foam tank to the foam pump valve is in place and open.
- Injector fitting lines are proper size and connections are tight.
- CAL/INJECT valve is properly mounted and oriented for direction of concentrate flow.
- The injector is in a common point to supply foam concentrate to all discharges specified to have foam capability.
- Fill foam tank(s) with a sufficient quantity of foam concentrate or water to allow system calibration. Minimum of 5 gallons required.
- Foam is properly primed.

FOAM PUMP

- Foam Pump gear case filled to proper level proper lubricant (see Maintenance section for information).

SYSTEM POWER CHECK

Turn the main power switch on the motor driver box to ON and check the digital display readout — “FRC or HYPRO” should appear for a few seconds while the controller checks itself (See Figure 21); then, a zero should appear on the digital readout. If no zero appears, refer to the “TROUBLESHOOTING” section for possible causes and solutions.

FOAM PUMP PRIMING CHECK

Turn the CAL/INJECT valve to the CALIBRATE or FLUSH position. Provide a container to collect the output that will be coming from the foam pump.

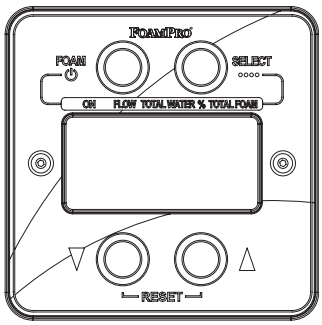


Figure 21.
Digital Display Control Module

- Put the system into “simulated flow mode” by selecting the “FLOW” display and depressing “RESET” (both up ⇧ and down ⇩ buttons simultaneously) (See Figure 22.) Increase simulated flow by pressing ⇧ button to permit easier priming (above 150). Display will show “≡” to indicate the simulated flow.

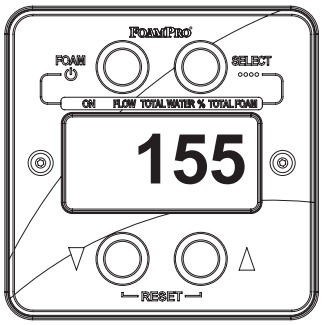


Figure 22. Simulated Flow Indication

- Engage the FoamPro system by pressing the red “FOAM” button.
- Foam concentrate should begin flowing into the container. If concentrate is not being pumped, check first to make sure the foam pump is running. If the pump is running, but no concentrate is being delivered, then the pump is most likely not primed completely. If the pump does not prime within 20-30 seconds, disengage the system by pressing the red “FOAM” button.
- If the system has been installed properly, foam concentrate should flow readily to the pump.
- Once foam flow is established, turn the system off and turn the CAL/INJECT valve back to the inject position.

If you are still having difficulty priming the foam pump in your FoamPro system, do the following:

- Make sure foam concentrate tank shut-off valve is open.
- Check to make sure there are no restrictions from the concentrate tank to the inlet of the foam pump.
- Check to make sure there are no leaks in the plumbing where air can enter the pump.

Wet the foam pump to speed priming operations using the following procedures.

- Remove one of the valve caps from the head of the pump and remove the check valve under it (See Figure 23).

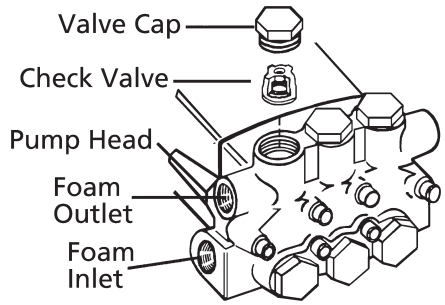


Figure 23. Foam Pump Manual Priming

- Pour a small amount of concentrate into the valve opening to fill up the pumping chamber in the pump head.
- Replace the check valve and cap and tighten securely. Run the pump again and the pump should prime right away.

Proceed to calibration section as the system must be calibrated.

9 Calibration and Setup

SYSTEM SETUP PROCEDURES

FoamPro systems permit easy calibration of the foam proportioning unit to assure accurate operation. The calibration process will make adjustments to the flowmeter(s) and foam pump display readings.

NOTE: FoamPro systems can be calibrated to any unit of measure, i.e. U.S., Metric, Imperial, etc. It is necessary to use the same unit of measure throughout the calibration process to ensure proper proportioning by the system.

IMPORTANT: Both the foam pump and flowmeter readings must be calibrated as a part of the initial setup after installation.

Recalibration should only need to be done after major repairs or changes to the foam system.

SETUP FOR DUAL-TANK OR REMOTE START/STOP OPERATION

The FoamPro controller is factory defaulted to the dual-tank option. If you are installing a remote start/stop system, you must change the default setting for proper system operation. The procedure for this new setting starting from the operational mode is as follows:

- Remove the screws to enter the setup and diagnostic modes.
- Enter the setup mode by pressing the internal button on the left side of the controller.
- Enter the diagnostics mode by pressing the internal button on the right side of the controller.

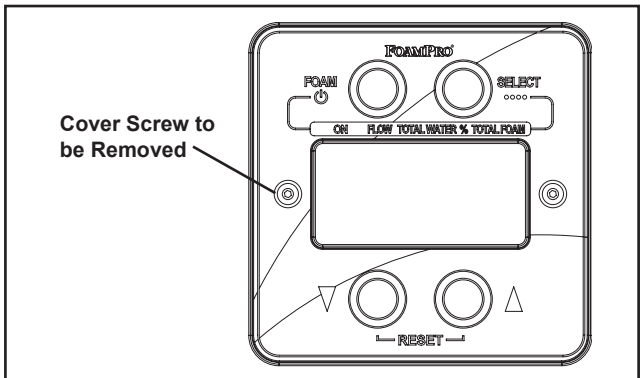


Figure 24. Calibration Switch Location

- The display will flash “CONF” and “DUAL.T” alternately.
- Press the DOWN button once. The display will now flash “CONF” and “RSTART”.
- Press the left internal button once. This puts you back into the operational mode.
- Replace internal button screws and o-rings.

CALIBRATION AND SETUP MODE

Calibration and Setup is done by using the Digital Display Control Module function buttons. To enter or exit the calibration and setup mode, remove the cover screw and o-ring to the left of the display readout panel on the Digital Display Control Module (See Figure 24). Use a 3/32 inch Allen wrench to remove the screw and also to operate the switch that is located beneath it.

To enter Calibration and Setup mode, use the Allen wrench to depress and release the switch inside the screw opening. The display will show “Elec Setup” until any function button is pressed.

Exit from Calibration and Setup mode is accomplished by pressing and releasing the switch again. “FRC or HYPRO” will appear followed by a zero after several seconds. REPLACE THE COVER SCREW AND O-RING WHEN DONE.

CAUTION: Always replace the cover screw and o-ring to keep water and dirt from entering the digital display control module or serious damage to the components may occur.

SYSTEM RESET

During calibration procedures, it may be necessary to return the system to the original factory default settings. To return to the factory default values, enter calibration and setup mode as previously described. Immediately after entry into calibration and setup mode, prior to pressing any other button, depress the ⇧ and ⇩ simultaneously. This action will return the system to the factory default settings. Proceed with calibration and setup after performing this reset.

NOTE: If using the Dual-Tank Option on the controller and Reset is used, the Dual-Tank default will need to be reconfigured.

FLOWMETER CALIBRATION

NOTE: It is critical that an accurate flow measuring device be used to measure the water flow to calibrate the flowmeter(s). Use a suitable size smooth bore nozzle and an accurate Pitot Gauge instrument. Hand-held pitot gauges are usually not very accurate. At the first available opportunity, make sure the system is calibrated with an accurate flow measuring device. Determine the water flow normally expected from that flowmeter discharge outlet. For example, actually establish a flow of 150 gpm [568 L/min.] of water through a nozzle and Pitot system.

Enter Calibration and Setup mode using the method previously described. Press the "Select" button and illuminate the light under "FLOW". The current water flow rate will be displayed. Press the ⇧ or ⇩ button to set the reading to match the actual flow calculated from the Pitot gauge reading. Decrease fire pump pressure by approximately 1/2 and recalculate water flow rate. Verify that reading on the Digital Display Control Module is the same as the calculated value. Stop the water flow when the reading adjustments are completed.

To lock the settings, exit Calibration and Setup mode by depressing and releasing the switch inside the cover screw opening. The display will show a zero until any function button is pressed.

SIMULATED FLOW

The default Simulated Flow value should be adjusted while operating in Calibration and Setup mode. Enter Calibration and Setup Mode using the method previously described. Press the SELECT button until the light under FLOW is illuminated. Pressing both the ⇧ and ⇩ buttons simultaneously will display the default simulated flow reading. Adjust the setting by pressing the ⇧ or ⇩ buttons to set the desired rate, i.e.. "≡ 100". After the rate has been set, press the ⇧ and ⇩ buttons simultaneously again to return to Calibration and Setup mode.

This setting will remain in the computer memory and be the default rate for all future Simulated Flow operations.

Exit Calibration and Setup mode as previously described.

FOAM CONCENTRATE INJECTION RATE

When power is supplied to the FoamPro system, the foam concentrate injection rate in memory will be the default injection rate setting. The default concentrate injection rate can be adjusted by entering Calibration and Setup mode as previously described.

Use the SELECT button to illuminate the lamp below "%". The display will show the current default concentrate injection rate stored in the controller memory as "PC x.x". The or buttons can be used to set the desired concentrate injection rate. Set this rate to the foam concentrate injection rate used most frequently in operation.

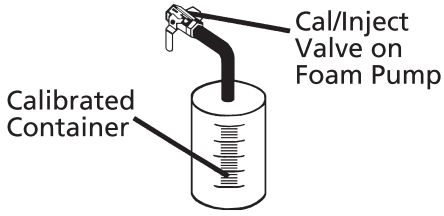


Figure 25. Foam Concentrate Collection

If using a dual-tank system, separate concentrate injection rates can be set by selecting either tank "A" or "B" on the electric selector switch or the manual valve. The display will show PAx.x (Tank A) or Pbx.x (Tank B) depending which tank is selected. Set the desired injection rate using the or buttons. Using the electric selector switch or the manual valve switch to the other tank and set the desired injection rate for that concentrate.

Exit the Calibration and Setup mode as previously described.

FOAM PUMP CALIBRATION

Note: The viscosity of different foam concentrates may have an effect on the amount of foam concentrate that is injected into the water stream. When calibrating the foam pump, use the foam concentrate that will be used most frequently during normal operations. When different viscosity foam concentrates are used, the actual concentrate injection may vary by as much as 10%. When using the dual-tank system, each foam concentrate should always be calibrated individually. Select tank "A" or "B" on the electric selector switch or the manual valve and calibrate the foam pump to each tank separately with the following procedure.

Enter the Calibration and Setup Mode using the method previously described. Press the SELECT button to illuminate the light below TOTAL FOAM on the Digital Display Control Module.

Turn the "CAL/INJECT" valve pointer to the Cal/Flush position. Place a graduated measure container beneath the outlet from the CAL/INJECT valve that can contain the expected volume of foam concentrate (minimum 5 gallons [19 liters]). If an accurate calibrated container is not available, a scale can be used to weigh the foam concentrate pumped. The total volume of foam concentrate can then be calculated from this weight.

Start the FoamPro foam pump by pressing the red "FOAM" button. The foam pump will operate and pump foam concentrate into the container. Stop the foam pump and measure precisely the amount of foam concentrate collected.

Adjust the reading on the Digital Display Control Module to the volume pumped by pressing the or button. Repeat the procedure two to three times to verify calibration.

If using a dual-tank system, switch to the other tank by using the electric selector switch or the manual valve. Repeat the calibrating procedure using the method previously described.

Turn the CAL/INJECT valve back to "INJECT" position.

Exit Calibration and Setup mode as previously described. REPLACE THE COVER SCREW. The system is now calibrated to the actual flow from the foam pump.

These Setup and Calibration procedures complete the adjustment of the system. The FoamPro system is now ready to be placed in service.

If this system is installed and calibrated by an apparatus manufacturer or dealer, the end user may wish to adjust the default Foam Concentrate Injection Rate and/or Simulated Flow to their special needs. These changes can be made without altering the calibration by using the procedures for those functions only.

Note: FoamPro 12V 2000 Series systems require 13.8 VDC (standard automotive voltage) to reach full capacity. 24V systems require 27 VDC.

PRESSURE RELIEF VALVE ADJUSTMENT

The pressure relief valve is factory tested and preset at 400 psi [28 BAR] (600 psi [41 BAR] for model 2000HP). During normal installation and operation, the relief valve will not require adjustment. The following procedures are provided if adjustment is necessary in field installation. DO NOT set the relief valve above 400 psi [28 BAR].

Perform this adjustment after the foam pump has been primed.

1. Determine the maximum pressure that will be needed to discharge foam solution. (For example: The maximum foam injection pressure should be approximately 50 psi [3.5 BAR] higher than the maximum operating pressure as set forth by department policy.)
2. Gather the items required for reading concentrate injection pressure: a 0-500 psi [0 to 34.5 BAR] test quality gauge, 500 psi [34.5 BAR] hoses and fittings to connect to the injector line from the foam pump.
3. Disconnect the injector from the foam line and connect the pressure gauge to it.
4. Screw the Pressure Adjustment Nut on top of the valve all of the way down until it stops.
5. Unscrew the Pressure Adjustment Nut counterclockwise 10 full turns. This will place it in a position to relieve at low pressure.

   CAUTION: DO NOT run the FoamPro system more than one minute deadheaded against the pressure gauge because the foam pump will overheat.
6. Operate the foam pump as described in the Foam Pump Priming Check Section.
7. While the foam pump is running, slowly screw the Pressure Adjustment Nut down clockwise until the desired pressure is reached. Apply tamper proof-type sealant to pressure relief valve adjustment nut so that it does not move accidentally.
8. Stop the foam pump.

   WARNING: Slowly loosen the foam pressure line fittings and allow the pressure to escape. Protect your face and eyes from any potential spray which may occur.
9. Reconnect the foam line to the injector fitting. The pressure relief valve is now set.

10 Operating Instructions

NORMAL SYSTEM OPERATION

Once the system has been set up and calibrated, operation is very simple and is controlled by the buttons on the Digital Display Control Module (See Figure 26). For setup and calibration instructions, see Section 9.

When the “FOAM” button is pressed, the “ON” status lamp will illuminate, indicating that the system is ready. The “ON” status lamp will flash when foam is being injected. The FoamPro system will monitor the water flows and control foam injection at the specified concentrate injection rate. The system responds to variations in water flow by increasing or decreasing the speed of the foam pump. When the “FOAM” button is again pressed, the “ON” status lamp will extinguish, indicating that the system is in Standby mode and the pump will stop but other system monitoring functions will continue. Without foam concentrate injection, the water flowmeter will display the current flow rate of the water.

If water flow requirements exceed the capacity of the pump to deliver foam concentrate, the pump will run at maximum rate and “HI FLO” will flash on the Digital Display Control Module so the operator realizes that the system capacity is being exceeded.

If the flow decreases such that the required injection rate is less than the lowest rating of the pump, the pump will run at its minimum rate and “Lo.Flo” will flash on the display so the operator will know the system is running rich on foam percentage.

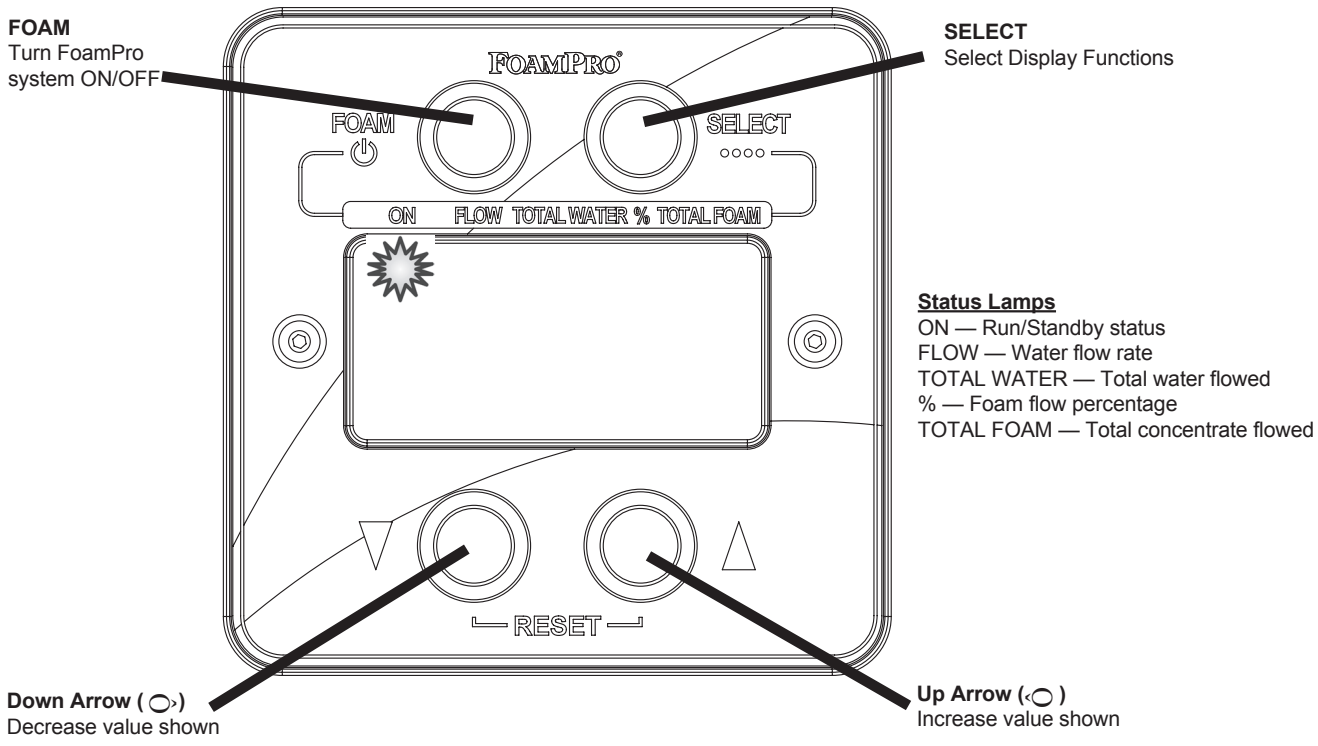


Figure 26. Digital Display Control Module Operation

DISPLAY INFORMATION

The five-digit display on the Digital Display Control Module shows the value of the selected display function or provides warnings to the operator when the system is operating. A function is selected by pressing the black "SELECT" button in the upper right-hand corner of the Digital Display Control Module. Each time the button is pressed, a new function mode is selected and displayed. A LED lamp above the digital display denotes which function is being displayed. Pressing the SELECT button changes the value displayed but does not alter system operation.

The Display Functions include:

Flow

The display shows the current flow rate of water or foam solution per minute.

Total Water

The display shows the total amounts of water or foam solution pumped. This totalized value may be reset. See "Reset Functions" paragraph.

% (Percent)

The display will show the foam concentrate injection rate setting in the % mode.

Total Foam

The display shows the total amount of foam concentrate pumped. The value will be in the same unit of measure as the water flow. This totalized value may be reset. See "Reset Functions" paragraph.

RESET FUNCTIONS

The totalized values for water and foam concentrate pumped can be cleared from memory by performing a RESET function. Using the "SELECT" button, select either "TOTAL WATER" or "TOTAL FOAM". By pressing and holding both the ⇧ and ⇩ buttons at the same time, the value shown is cleared and displayed as zero.

FOAM PERCENTAGE (%)

When the concentrate percentage (%) is selected, the ⇧ and ⇩ buttons will respectively increase or decrease foam concentrate percentage. The percentage can be changed anytime during normal operation. Whenever the ⇧ or ⇩ buttons are momentarily pressed, the display will switch to the "%" display and show the current percentage that is set, in any display mode. If either button is held down for a period of 2 seconds, the value will increase or decrease accordingly. Once released, the display will return to the last selected display. When a reset is performed in the % display mode (pressing both the ⇧ and ⇩ buttons at the same time) the foam concentrate injection rate is returned to the default value. The default value is set during calibration.

DISPLAY MESSAGES

Several safety features are provided to protect the foam concentrate pump and the electric motor.

Low Foam Tank Level

The pump is interlocked with the foam concentrate tank level switch. If the tank is empty, the pump will not run for more than 2 minutes. A low foam concentrate tank level is denoted by "Lo Con" blinking on the display. This code will alternate with the normal display value shown. If two consecutive minutes of low concentrate level is detected, the display will show "No Con", the pump will stop, and the system will go to Stand By mode until the foam level is restored and the on button is depressed.

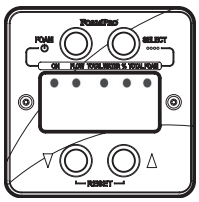
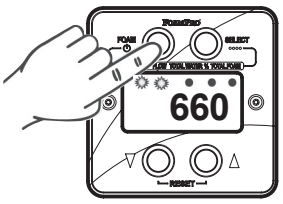
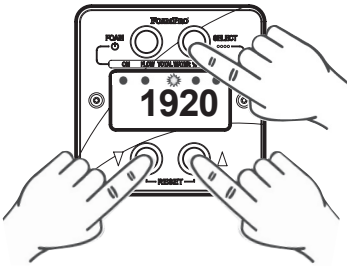
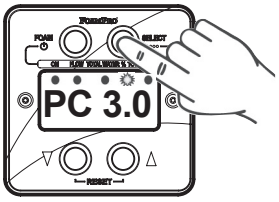
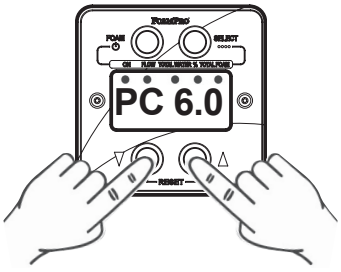
Pump Error

Motor stall protection is provided. In the event that the pump motor will not run or stalls for 10 seconds, the display will show "ERR.EL" to indicate that the pump is producing no feedback to the control signal. The system will return to off status to protect the electric motor and components. *Please refer to the Trouble-Shooting Guide on page 33 for further information*.

High/Low Flow Condition

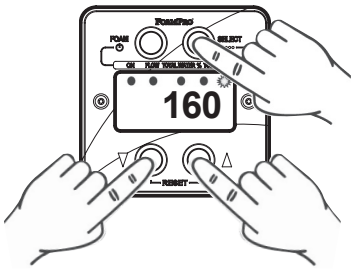
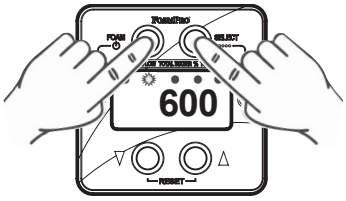
Whenever the foam pump cannot reach the selected level an indication of the status will blink in the background as:
"Lo.Flo" – Foam delivery rate is below pump capability.
"Hi.Flo" – The water delivery rate is too high for the foam pump's capacity.

Normal Operation Summary

How to	Display	Action
1. Turn FoamPro system on.		1. Operate the apparatus engine to develop hydraulic pressure. Turn the FoamPro Main Power circuit breaker switch on. **FRC** or **HYPRO** will appear on the display momentarily.
2. Make foam solution.		2. Establish water flow to the foam capable discharge. The Digital Display Control Module will indicate the water flow rate. Press the **FOAM** button (red upper-left button). The LED lamps below the **ON** and **FLOW** labels will illuminate and the lamp below the **ON** label will flash. The rate of water flow will be displayed in units per minute.
3. Read the total amount of water flowed during the operation.		3. Press the **SELECT** button (white upper-right button) until the LED lamp below the **TOTAL WATER** label is illuminated. The total amount of water will be displayed. Reset this value to zero by pressing the t and s buttons at the same time.
4. Read % of concentrate.		4. Press the **SELECT** button (white upper-right button) until the LED lamp below the **%** label is illuminated. The display will read percentage of foam concentration. Foam will continue to be injected.
5. Change the % of concentrate.		5. Press the ⇧ or ⇩ button. The display will show the new concentrate injection rate chosen. The proportion of concentrate injected will change immediately.

Normal Operation Summary Continued on Next Page

Normal Operation Summary

How to	Display	Action
6. Read the total amount of foam concentrate used.		6. Press the **SELECT** button (white upper-right button) until the LED lamp below the **TOTAL FOAM** label is illuminated. The total amount of foam concentrate used will be displayed. Reset this value to zero by pressing the ▲ and ▼ buttons at the same time.
7. Read water flow without foam injection.		7. If on, press the **FOAM** button, the foam injection will stop. Press the **SELECT** button (white upper-right button) until the LED lamp below **FLOW** is illuminated. The water flow rate through the foam discharge(s) will be displayed whether foam is being pumped or not.
8. Turn the FoamPro system off.		8. Turn the apparatus Master or Battery switch off. The system can also be turned off by using the circuit breaker switch on the valve driver box.

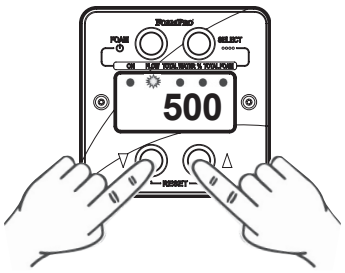
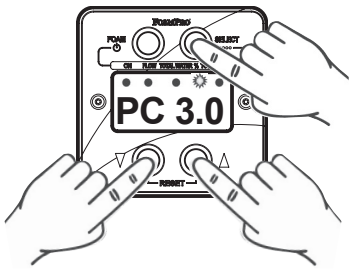
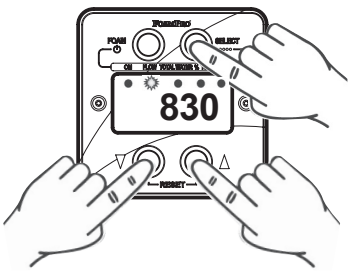
NOTE: Any of these changes can be made at anytime during, before, or after water is flowing.

Simulated Flow Operation

The Simulated Flow function of the system allows the operator to control the foam pump manually. The water flow rate and the concentrate injection percentage rate can be set by using the display readout and the rate adjustment buttons on the Digital Display Control Module. This function provides the manual control requirement of NFPA. This function also allows the operator to empty the foam concentrate tank for cleaning or changing foam types. It also provides a means of checking the operation of the foam pump at all normal rates of flow and injection without running the water pump.

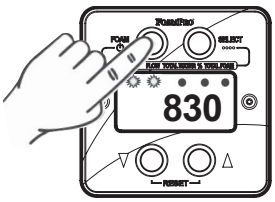
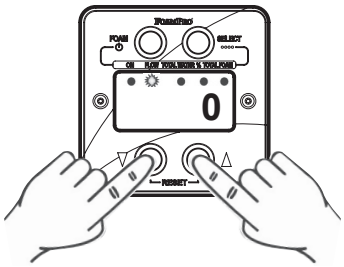
Warning: When operating the FoamPro in the Simulated Flow function, an outlet for the foam concentrate injection must be provided. Otherwise, dangerous excessive pressure may be built up in the apparatus water piping and or hoses. This outlet for the foam concentrate can be provided by turning the CAL/INJECT valve to the CAL position. A suitable container must be provided to collect the foam concentrate.

Simulated Flow Operation Summary

How to	Display	Action
1. Begin Simulated Flow Function.		1. Make sure the lamp below **FLOW** is illuminated. Press both the ⇧ and ⇩ buttons at the same time. The FoamPro Display will read ≡ to the left of the flow, meaning the system will "simulate" the displayed water flow rate. (The default value of flow may be set to any value, see Section 11). **CAUTION: Be certain that an outlet is provided for the foam concentrate when the foam pump is started.**
2. Change the injection rate while in Simulated Flow Function.		2. Press the **SELECT** button (white upper-right button) until the LED lamp below the **%** label is illuminated. The display will read the current percent setting. Press the ⇧ or ⇩ buttons to select the desired injection rate. The FoamPro will respond and immediately begin injecting concentrate at the new rate.
3. Change the Simulated Flow Rate while in the Simulated Flow Function.		3. Press the **SELECT** button (white upper-right button) until the LED lamp below the **FLOW** label is illuminated. The display will show ≡ and current flow rate. Press the ⇧ or ⇩ to select the desired simulated water flow rate. The FoamPro will respond and immediately begin operating at the new flow rate.

Simulated Flow Operation Summary Continued on Next Page

Simulated Flow Operation Summary

How to	Display	Action
4. Empty the Foam Tank.		4. Place a suitable container under the CAL/FLUSH outlet tube. Place the CAL/INJECT valve in the CAL/FLUSH position. Press the **FOAM** button. The foam pump will operate and foam concentrate will be discharged from the outlet tube. **NOTE: FoamPro must be in Simulated Flow Mode**.
5. Turn the Simulated Flow Function off and return to automatic operation.		5. Press both rate adjustment buttons at the same time. The ≡ symbol will leave the display and the FoamPro will operate automatically from the flow sensor signal. Turning the apparatus Master or Battery switch off will also turn off the Simulated Flow Function. The next time the power is turned on, the FoamPro will return to the original automatic default settings.

PRIMING THE FOAM PUMP WHEN FOAM TANK HAS RUN DRY

In some instances, the foam tank may run dry while operating the FoamPro system. The foam pump is designed to pump liquid. When the fire pump is running, the foam pump cannot pump air efficiently against 100 to 150 psi back pressure. To re-establish foam concentrate flow quickly, the following procedure can be used.

1. Turn the CAL/INJECT valve to the Calibrate position.
2. With the fire pump flowing water from foam discharge and the FoamPro on, observe the hose from the CAL/INJECT valve.
3. When foam concentrate flows from the unit, turn the CAL/INJECT valve back to the INJECT position. The pump is now primed and ready for normal operation.
4. If the fire pump is not running, place the FoamPro into the simulated flow mode and proceed with above steps.

11 Maintenance

1. **Monthly:** Inspect wiring, hoses, flowmeters and connections for tightness, corrosion, leaks and/or damage.

2. **Monthly:** Remove and clean the foam strainer screen(s). Flush as required.

3. **Monthly:** Check foam pump gear case oil level and refill as necessary with proper lubricant as described below.

4. **Annually:** Drain the pump oil and refill pump crankcase with proper lubricant as described below. Check for concentrate or water in the drain oil /ATF fluid.

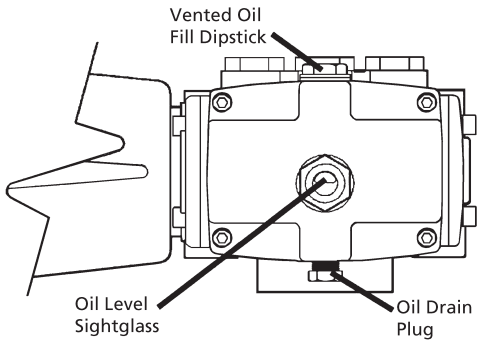


Figure 27. Foam Pump Oil Level Check

Foam pump crankcase lubricant:

If your foam pump has regular oil in the crankcase, replenish or change out with SAE 30 weight non-detergent oil.
If your foam pump has an ATF fluid in the crankcase, replenish or change out with a good quality Dextron II or III ATF.
Do not mix fluid types in the crankcase or seal damage may occur.

Note: Water quality, flushing and storage techniques, environment and usage may have an effect on your maintenance schedule. To ensure equipment longevity, it is recommended to adjust your schedule accordingly.

Caution: Release all pressure and drain all concentrate and water from the discharge system before servicing any of its component parts.

Winterizing

Flush out the pump with a RV & Marine antifreeze. Then purge with air while running the foam pump.

12 Troubleshooting

These FoamPro systems are designed to be easy to diagnose and service. There are several major components. Servicing the system involves isolation of the failed component and replacing it. There are no user serviceable internal components. Due to the reliable nature of modern electronics, most failures are traced to faulty cables or wiring problems. A diagnostic mode is built into the system to help isolate problems.

ENTERING DIAGNOSTIC MODE

Diagnostic mode is entered by removing the center screw and o-ring on the right-hand side of the Digital Display Control Module (See Figure 28) using a 3/32 inch Allen wrench. Once the screw is removed, press and release the switch located under the screw.

To exit the diagnostic mode, press and release the switch again. “FRC or HYPRO” will appear on the display followed by a zero after several seconds. REPLACE THE COVER SCREW AND O-RING WHEN DONE.

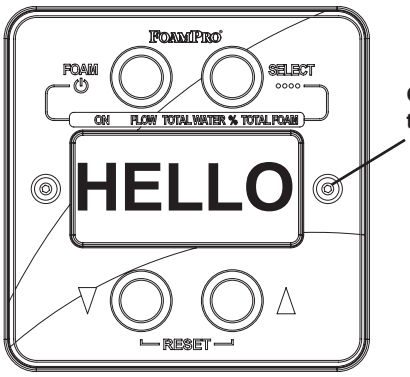


Figure 28. Diagnostic Switch Location

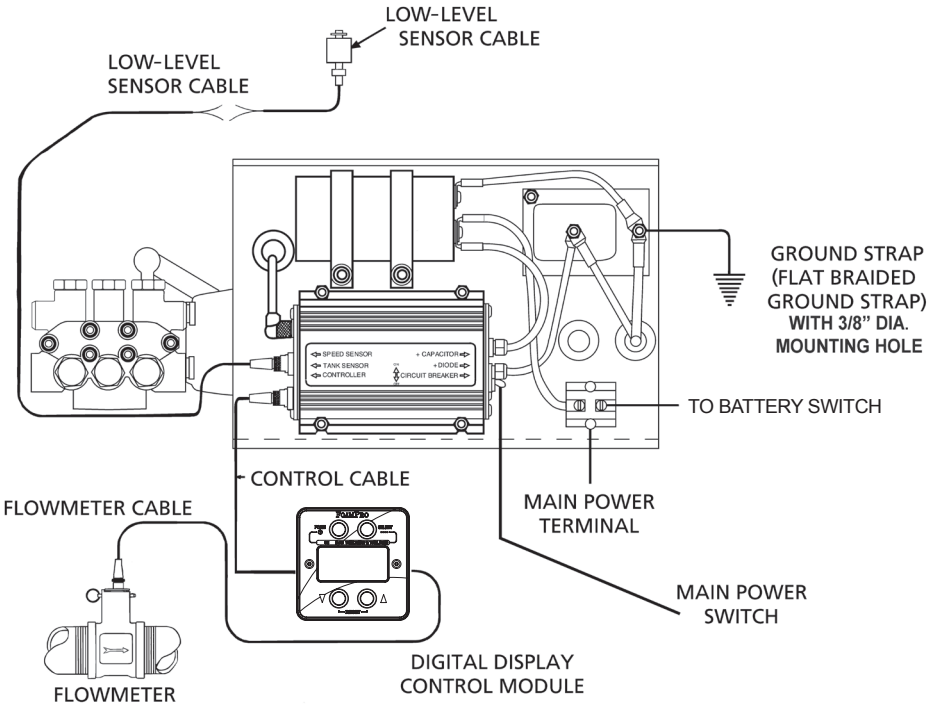


Figure 29. FoamPro 2002/2024 Electrical Wiring Diagram

NOTE: ALWAYS REPLACE THE COVER SCREW AND O-RING TO KEEP WATER AND DIRT FROM ENTERING THE DIGITAL DISPLAY CONTROL MODULE BECAUSE IT CAN CAUSE SERIOUS DAMAGE TO THE COMPONENTS.

The system will provide a full complement of diagnostic functions to enable verification of all system components.

DIAGNOSTIC MODE FUNCTIONS

On entry to diagnostic mode, the display will show "HELLO". No other status indicator lights will be illuminated. "SELECT" will select the various modes, each indicated by the status indicator light by the label. These diagnostic modes include:

"None"

Pressing will illuminate all display segments and status indicator lights.

"Flow"

The value shown is the current number of flow pulses being received each second. If no water is flowing, the value should be zero. This is a function test for the flowmeter. Removing the flowmeter sensor from its tee and spinning the paddlewheel should produce a reading other than zero on the display. If there is no reading on the display. Check the cable for continuity. If good, replace flowmeter. If not, replace cable.

"Total Water"

The value shown reflects the level of the liquid foam concentrate in the tank. "Lo.Con" indicates that the tank is empty. "Hi.Con" indicates a satisfactory level for operation. This is a test of the low-level sensor and wiring.

"%" (Percent)

The value shown reflects the duty cycle to run the foam pump. If "FOAM" is pressed, the pump will be run at the selected rate and the "ON" status indicator lamp will be illuminated. The value may be altered with or . This is a test of the motor control box and pump hook up. Depressing the will increase pump speed, which should be audible and visible on the "TOTAL FOAM" display.

"Total Foam"

The value shown is the current number of pump pulses being received each second. If the pump is not running, the value should be zero. Increasing motor speed in "%" mode should increase displayed value. This is a test of the pump feedback sensor and wiring.

TROUBLESHOOTING GUIDE

Symptom	Probable Cause(s)	Corrective Action
Pump runs but produces no flow.	Pump is not primed.	See Foam Pump Priming Check section on Page 19.
Pump loses prime, chattering noise, pressure fluctuates.	Air leak in suction hose or inlet fittings.	Remove suction hose and test for leaks by pressurizing hose with water. Make sure thread sealant has been used on all fittings.
	Suction line is blocked, collapsed or too small.	Remove suction line and inspect it for a loose liner or debris lodged in hose. Avoid all unnecessary bends. Do not kink hose.
	Clogged suction strainer.	Clean strainer.
Pump runs for 8 to 10 seconds then shuts down. ERR.EL may be flashed on display. **(For additional information on troubleshooting this error, see page 35.)**	Inadequate voltage and/or ground	Check connections and voltage readings 12+ volts for a 12 VDC system 24+ volts for a 24 VDC system Check ground strap for clean connection to frame of the apparatus. Check for clean ground from apparatus frame to battery ground. Run diagnostics as described in Section 12 and recheck voltage readings while running.
	Speed Sensor circuit open	Inspect wiring and connections to speed sensor.
	Speed Sensor position incorrect	Run diagnostics on speed sensor for proper readings. If pulses are erratic, readjust sensor (from contact with gear, back off 1/4 turn and lock in place).
	Speed Sensor not functioning	Run diagnostics on speed sensor. If pulses are still at "0" replace sensor.
Pump runs full speed whenever the circuit breaker switch is in “ON”.	Poor ground to motor driver box on pump/motor bracket.	Make sure screws are tight and a good ground is maintained.
No characters are displayed on the digital display.	Note: The main switch is current limited to 41 amps for System 2001/12V DC; 60 amps for System 2002 & 2002HP/12V DC; 22 amps for System 2001/24V DC; 30 amps for System 2002/24V DC; 60 amps for System 2024/24V DC	
	The main power switch is not “ON”.	Turn on the main power switch on the computer control module.
	Cables not correctly connected.	Inspect and secure connections.
	Control cable(s) faulty.	Replace control cable(s).
	Digital display has been damaged.	Replace the digital display.
	Inadequate ground or voltage.	Inspect connections & check voltage.
System is powered up and the Foam ON/OFF switch has been pressed but the foam pump doesn’t run.	No water is flowing in any of the foam discharges.	Flow water.
	Flowmeter wiring not correct.	Inspect wiring and connection to flowmeter.
	Flowmeter obstructed.	Clear flow meter of debris.
	Flowmeter not functioning.	Replace flowmeter.
	Float is on plunger wrong – indicating tank is low.	Remove the snap ring at the top of the plunger and remove the float, turn it over and reinstall.
	Float stuck on plunger – indicating tank is low.	Inspect and clean float switch.
	Control cable(s) faulty.	Check connections and replace control cable(s).

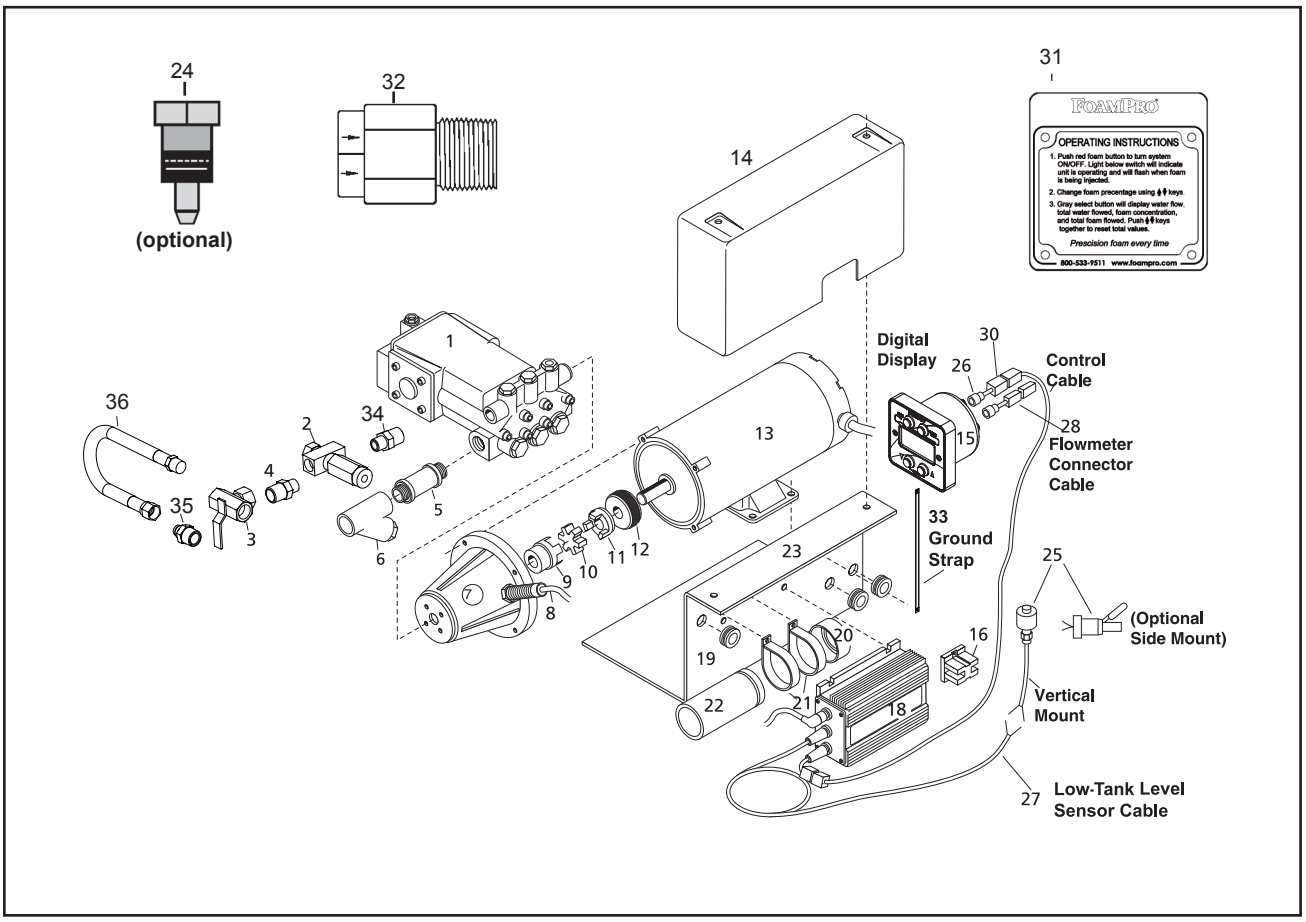
TROUBLESHOOTING GUIDE (Cont'd.)

Symptom	Probable Cause(s)	Corrective Action
System returns to standby mode while pumping—*FRC* or *HYPRO* appears momentarily while pumping.	Insufficient power supply.	Inspect and correct power and ground connections, and wiring.
	Current resistance in wiring circuits.	Make sure 8 AWG (minimum) wire is used for connection to battery terminal.
LO.CON appears on display.	Concentrate level in tank is low.	Fill concentrate tank.
	Low-level sensor or wiring is inoperative.	Repair or replace faulty components.
ERR.SU on power up.	Setup parameter memory is not functioning.	Contact FOAMPRO for replacement. (NOTE: This unit will continue to operate using factory setup values.)
Display shows "?" for flow.	Flowmeter is sensing water flow, but the flow rate is too low for precise proportioning.	Check flowmeter.
CAL/INJECT valve is leaking.	Valve seat is loose.	Remove hose and fitting from inject port of valve and tighten seat using 3/8 inch hex wrench. Reconnect fitting and hose.
System cannot be calibrated.	Calibration values selected are out of range of system, or setup memory is full.	Perform system reset as described in Calibration Section.

Additional ERR.EL troubleshooting instructions are as follows:

1. Check voltage coming into the the system using a multi-meter. If proper voltage is not seen, check the supply breaker.
2. Check the ground connections.
    a. Check the ground strap connections for a clean solid connection.
    b. Check the apparatus ground to ensure a solid connection from the battery to the apparatus frame.
3. Jumping the pump/motor assy.
    a. Turn the calibrate/inject valve to the calibrate/flush position (a container may be required for fluid collection)
    b. Connect a piece of 14 AWG wire or larger from the power input connection to the motor positive wire lead.
        1. Does the motor run wide open?
        2. Does the pump discharge foam or water?
        3. If the the results from above are 'no', recheck system ground or possible issue with pump and/or motor.
4. If step 3 checks out good, then run diagnostics on the system to check the speed sensor operation. Be sure to leave the calibrate/inject valve in the calibrate/flush position.
    a. Power the system and enter the diagnostics mode as described on page 32.
    b. Press the SELECT button until the indicator is in the TOTAL FOAM position.
    c. Press the red ON button.
        Result: The foam system should start running and pumping fluid. If not, the issue will be the Control Display, the pump/motor Driver, or the 5-pin cable between the display and the driver.
    d. With the system running and pumping fluid, look at the number on the display.
        a. Is the number zero, steady, or erratic?
        b. Push the UP button 5 or 6 times. Every time you push the UP button, you are increasing the duty cycle of the pump/motor assembly and the display readout will increase accordingly (pressing the DOWN button will decrease the duty cycle). You should also notice the increased flow from the foam pump and the speed increase from the motor.
        c. Once you stop increasing the duty cycle to around 18 - 20, are the numbers on the display zero, steady, or erratic?
            1. If the number is still zero, replace the speed sensor.
            2. If the number is erratic, try to readjust the speed sensor.
        d. After adjusting or replacing the speed sensor, run step 4 again to ensure proper installation/position.
5. When replacing or readjusting the speed sensor, remove old speed sensor, look straight down the hole the speed sensor was removed from. Make sure that the top of one of the teeth on the gear is below the hole. Put some Loctite® on the threads. Run the speed sensor down using your fingers until it touches the tooth of the gear. Back it off 1/4 turn. Lock the locking nut. This will give you the proper gap for the speed sensor.

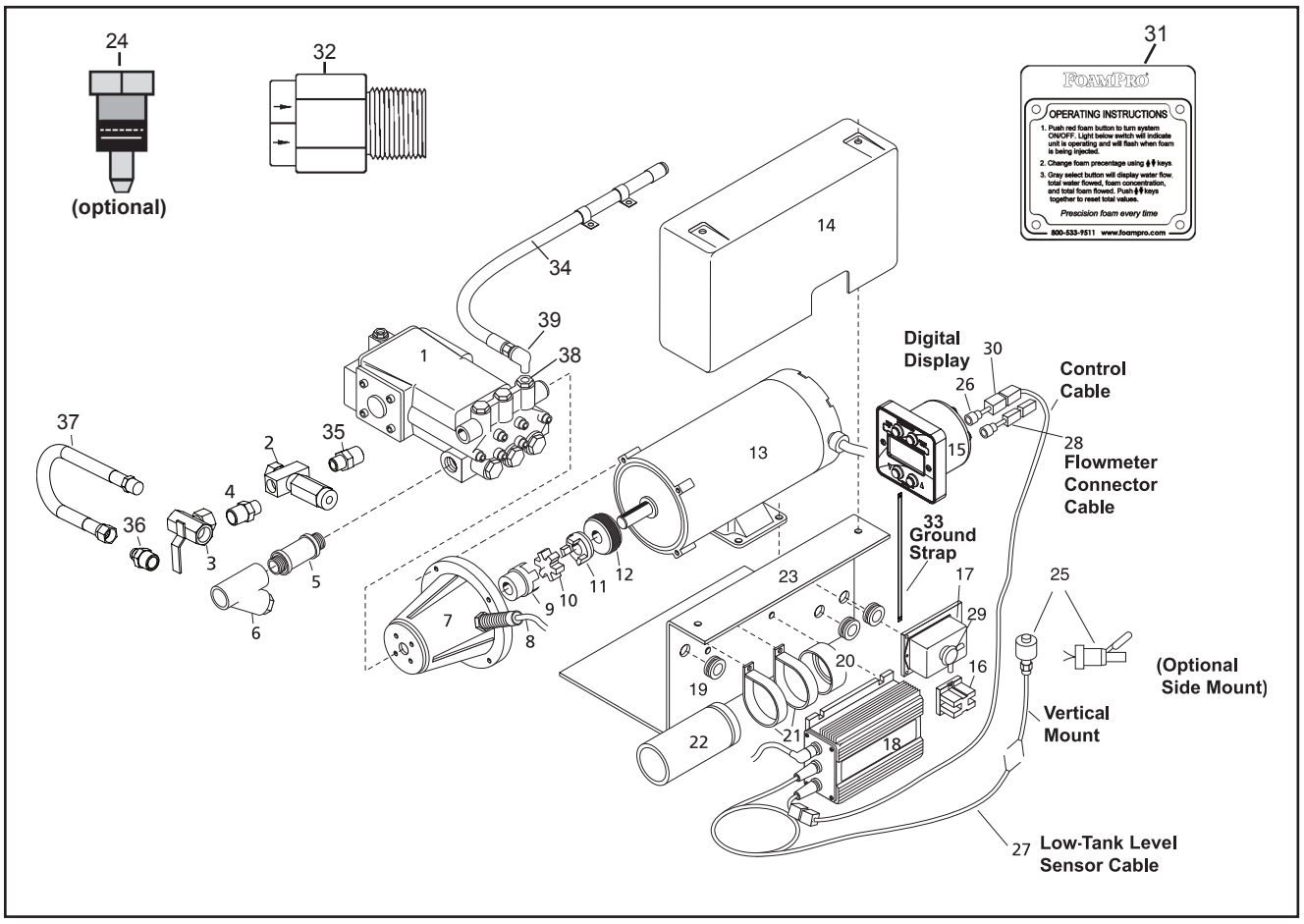
13 Parts Identification for System 2001



Ref.	Part No.	Description	Qty.
1	2341B-P-01	Foam Pump Assembly-2001	1
2	3300-0092	Relief Valve (Inc. brass tee fitting)	1
3	3304-0025	Cal/Inject Valve	1
4	2404-0271	Reducer	1
5	2401-0038	1/2 inch NPT Tee	1
6	3350-0143	Line Strainer (3/4 inch NPT)	1
7	0704-8600A1	Flange Adaptor	1
8	2530-0064	Speed Sensor	1
9	2738-2003	Coupling Body 3/4 inch [19 mm]	1
10	2728-1001	Rubber Disc	1
11	2738-2002	Coupling Body 5/8 inch [16 mm]	1
12	3115-0029	Gear	1
13	2570-0011	Electric Motor (1/2 hp; 12 V)	1
13	2570-0020	Electric Motor (1/2 hp; 24 V)	1
14	2840-0071	Shield	1
15	2527-0139	Digital Display Control	1
16	2530-0096	Terminal Block	1
18	2527-0071	Motor Driver Box (12 V)	1
18	2527-0152	Motor Driver Box (24 V)	1
19	1700-0120	Grommet	1
20	1450-0010	Plastic Cap	1

Ref.	Part No.	Description	Qty.
21	2910-0011	Clamp, Vinyl Coated	2
22	2530-0061	Capacitor (82,000uF)	1
23	1510-0086	Mounting Bracket	1
24	2404-0182	Injector Fitting (optional)	1
25	2510-0028	Tank Level Sensor (Vertical)	1
	2510-0032	Tank Level Sensor (Side)	1
26	2520-0048	Control Cable (6 ft. [2 m] Lg)	1
	2520-0049	Control Cable (12 ft. [3 m] Lg) (**Std**)	1
	2520-0050	Control Cable (20 ft. [5 m] Lg)	1
27	2520-0042	Low-Tank Level Sensor Cable	1
28	2520-0045	Flowmeter Cable (6 ft. [2 m] Lg)	1
	2520-0046	Flowmeter Cable (12 ft. [3 m] Lg) (**Std**)	1
	2520-0047	Flowmeter Cable (20 ft. [5 m] Lg)	1
30	3430-0351	RFI Kit for Controller (4 pcs)	1
	3430-0353	RFI Kit for Flowmeter (4 pcs)	1
31	6032-0012	Placard	
32	3320-0055	Check Valve, 1/2 inch	1
33	2520-0107	Ground Strap	1
34	2402-0017	Nipple	1
35	2404-0272	Adapter Fitting	1
36	2900-0049	Bypass Hose	1

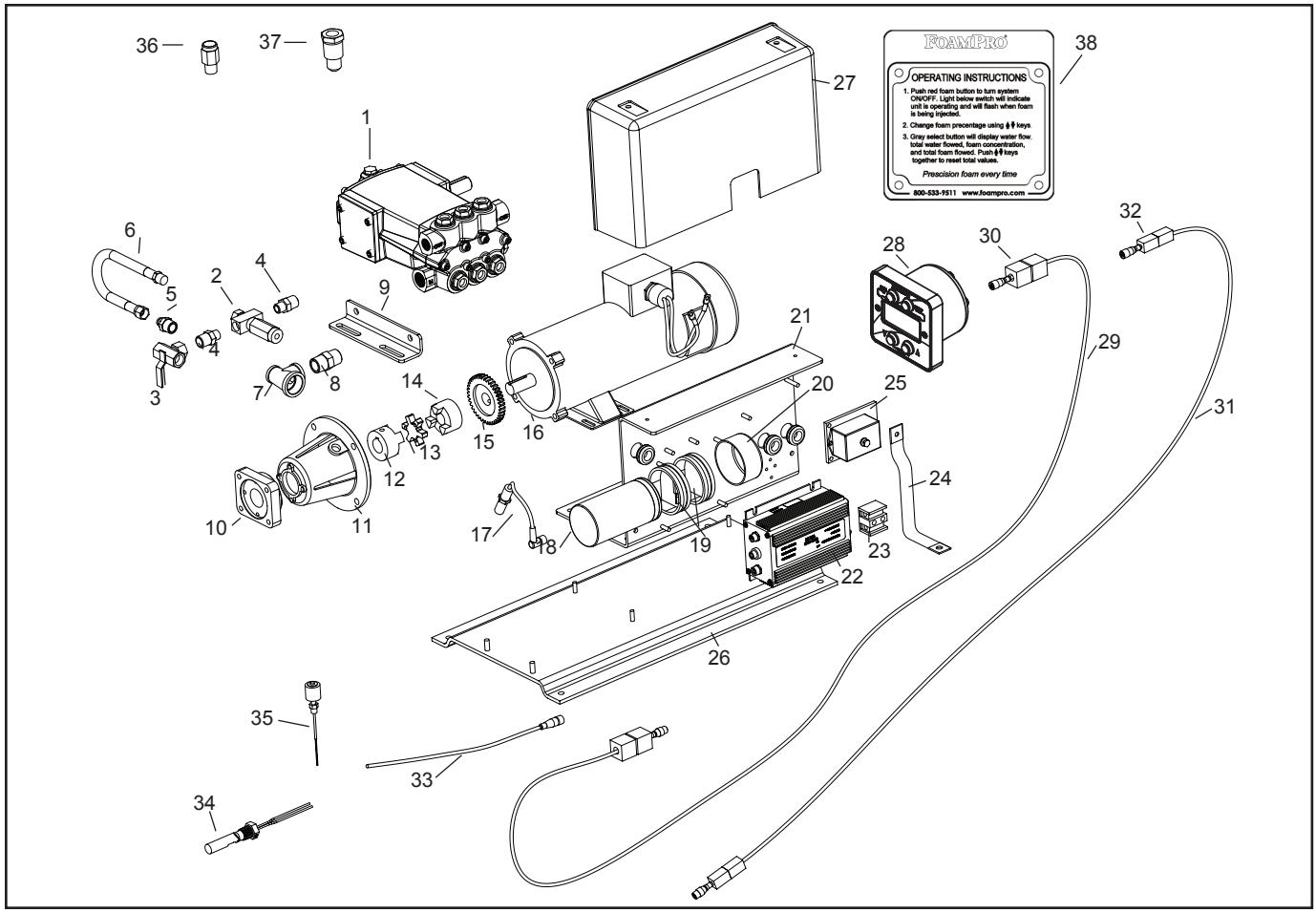
Parts Identification for System 2002



Ref.	Part No.	Description	Qty.
1	2345B-P-08	Foam Pump Assy-2002	1
1	2331B-P-01	Foam Pump Assy-2002HP	1
2	3300-0092	Relief Valve (Inc. brass tee fitting)	1
3	3304-0025	Cal/Inject Valve	1
4	2404-0271	Reducer	1
5	2401-0038	1/2 inch NPT Tee	1
6	3350-0143	Line Strainer (3/4 inch NPT)	1
7	0704-8600A1	Flange Adaptor	1
8	2530-0092	Speed Sensor	1
9	2738-2003	Coupling Body 3/4 inch [19 mm]	1
10	2728-1001	Rubber Disc	1
11	2738-2002	Coupling Body 5/8 inch [16 mm]	1
12	3900-0049	Gear	1
13	2570-0016	Electric Motor (.75 hp; 12 V)	1
13	2570-0017	Electric Motor (.75 hp; 24 V)	1
14	2840-0071	Shield	1
15	2527-0139	Digital Display Control	1
16	2530-0097	Terminal Block	1
17	2527-0031	Diode Block Assembly	1
18	2527-0069	Motor Driver Box (12 V)	1
18	2527-0153	Motor Driver Box (24 V)	1
19	1700-0120	Grommet	1
20	1450-0014	Plastic Cap	1
21	2910-0016	Clamp, Vinyl Coated	2
22	2530-0087	Capacitor (154000uF)	1

Ref.	Part No.	Description	Qty.
23	1510-0086	Mounting Bracket	1
24	2404-0182	Injector Fitting (optional)	1
25	2510-0028	Tank Level Sensor (Vertical)	1
	2510-0032	Tank Level Sensor (Side)	1
26	2520-0048	Control Cable (6 ft. [2 m] Lg)	1
	2520-0049	Control Cable (12 ft. [3 m] Lg) (**Std**)	1
	2520-0050	Control Cable (20 ft. [5 m] Lg)	1
27	2520-0042	Low-Tank Level Sensor Cable	1
28	2520-0045	Flowmeter Cable (6 ft. [2 m] Lg)	1
	2520-0046	Flowmeter Cable (12 ft. [3 m] Lg) (**Std**)	1
	2520-0047	Flowmeter Cable (20 ft. [5 m] Lg)	1
29	1450-0012	Plastic Terminal Protector	1
30	3430-0351	RFI Kit for Controller (4 pcs)	1
	3430-0353	RFI Kit for Flowmeter (4 pcs)	1
31	6032-0012	Placard	
32	3320-0055	Check Valve, 1/2 inch	1
33	2520-0107	Ground Strap	1
34	3375-0012	Pulse Hose	1
35	2402-0017	Nipple	1
36	2404-0272	Adapter Fitting	1
37	2900-0049	By-Pass Hose	1
38	2404-0306	Valve Cap, Ported	1
39	2400-0035	Elbow	1

Parts Identification for System 2024

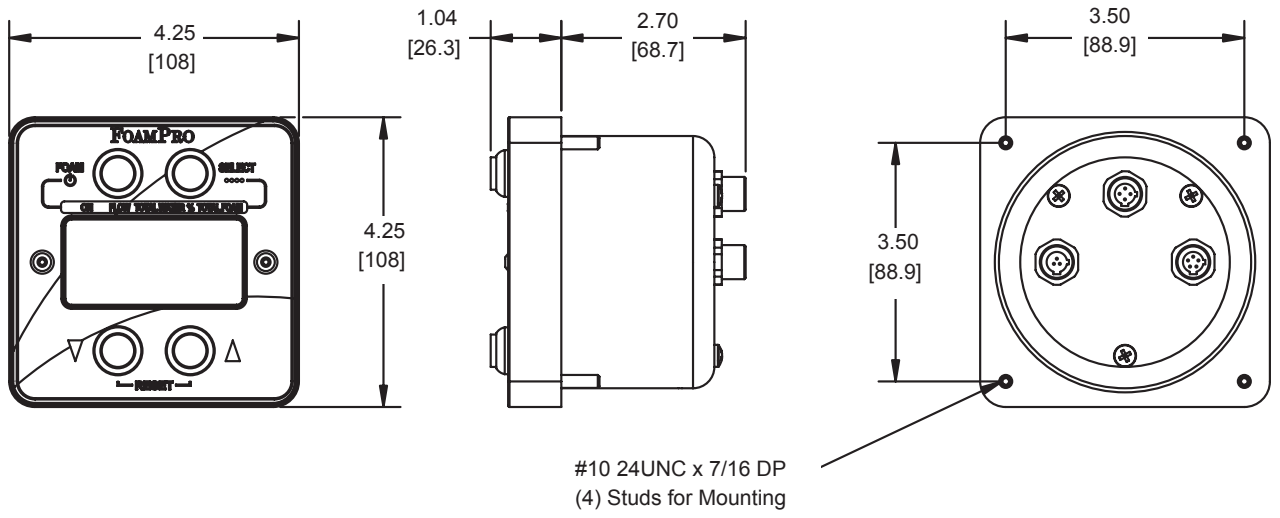


Ref.	Part No.	Description	Qty.
1	2413B-P-01	Foam Pump Assy-2024	1
2	3300-0092	Relief Valve	1
3	3304-0025	Cal/Inject Valve	1
4	2404-0271	Reducer	2
5	2404-0272	Reducer	1
6	2900-0049	Bypass Hose	1
7	2401-0033	Tee	1
8	2402-0034	Nipple	1
9	1520-0096	Pump Base	1
10	2404-0358	Pump Adaptor	1
11	0704-8600A1	Flange Adaptor	1
12	2739-1005	Coupler, 1”	1
13	2729-1001	Rubber Disc	1
14	2739-1003	Coupler, 7/8”	1
15	3900-0056	Timing Gear	1
16	2570-0028	Motor, 1-1/2 HP, 24 VDC	1
17	2530-0092	Speed Sensor	1
18	2530-0087	Capacitor	1
19	2910-0016	Clamp	2
20	1450-0014	Plastic Cap	1
21	1510-0086	Mounting Bracket	1

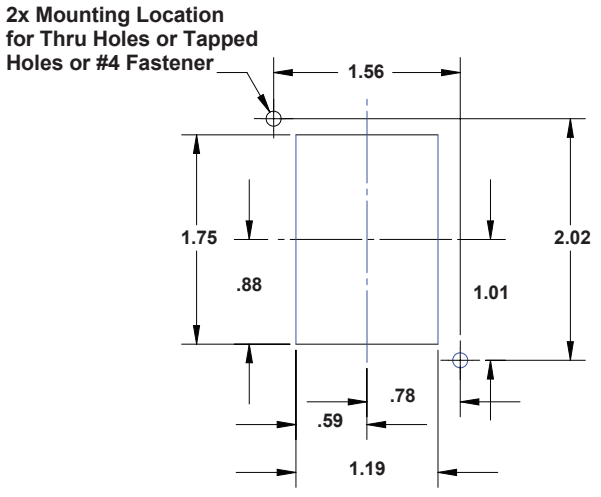
Ref.	Part No.	Description	Qty.
22	2527-0069	Driver Box	1
23	2530-0097	Terminal Block	1
24	2520-0107	Ground Strap	1
25	2527-0031	Diode Block	1
26	1510-0112	Base	1
27	2840-0071	Cover	1
28	2527-0139	Digital Display Control	1
29	2520-0048	Control Cable (6 ft.[2m])	1
	2520-0049	Control Cable (12 ft. [3 m]) STD	1
	2520-0050	Control Cable (20 ft. [5m])	1
30	3430-0351	RFI Kit for Controller	1
31	2520-0045	Flowmeter Cable (6 ft. [2 m])	1
	2520-0046	Flowmeter Cable (12 ft. [3m]) STD	1
	2520-0047	Flowmeter Cable (20 ft. [5m])	
32	3430-0353	RFI Kit for Flowmeter	1
33	2520-0042	Tank Sensor Cable	1
34	2510-0032	Tank Level Sensor (Side)	1
35	2520-0028	Tank Level Sensor (Vertical)	1
36	3320-0055	Injection Check Valve	1
37	2404-0182	Injector Fitting (Optional)	1
38	6032-0012	Instruction Placard	1

14 Installation Drawings

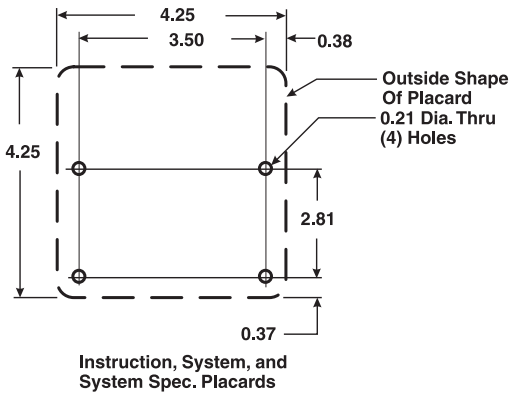
Display Requires 3-7/8'' [98 mm] Dia. Hole



Cutout Dimensions for Display Control Module



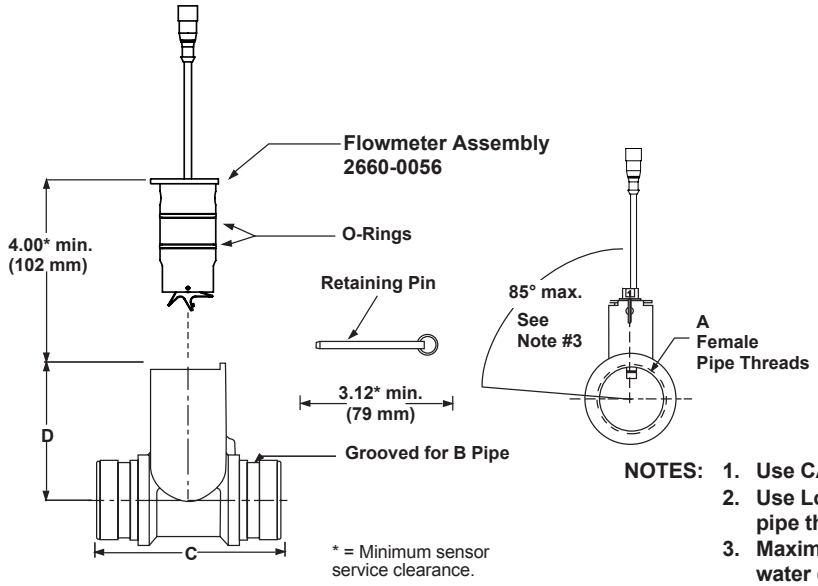
Remote Start/Stop



Cutout Dimensions for System Spec. Placard

(Please make a photocopy for your use.)

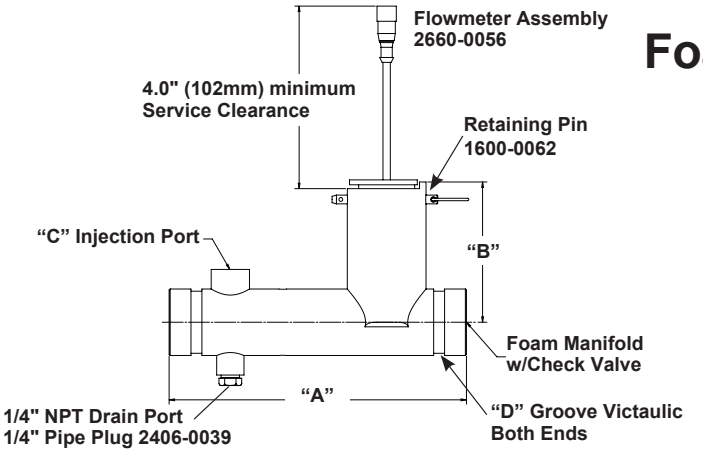
FoamPro Flowmeter



NOTES:
1. **Use CAUTION not to damage sensor during assembly.**
2. **Use Loctite® PST 565 or equivalent Teflon tape to seal pipe threads.**
3. **Maximum horizontal installation angle to allow proper water drainage. Unit may also be installed in vertical piping arrangement.**

Assy. Part Number	A	B	C	D	Maximum Accuracy Flow Range (gpm)	Maximum Operating Flow Range (gpm)
2660-0030	1-1/2''—11-1/2'' NPT NOTE 1'' I.D. Bore	2'' Pipe	7-3/8'' [188 mm]	3-7/8'' [99 mm]	5-110	3-145
2660-0031	1-1/2"—11-1/2" NPT	2" Pipe	5-3/8" [137 mm]	4-1/8" [105 mm]	10-320	3-380
2660-0031B	1-1/2"—11" BSP	2" Pipe	5-3/8" [137 mm]	4-1/8" [105 mm]	10-320	3-380
2660-0032	2"—11-1/2" NPT	2-1/2" Pipe	5-3/8" [137 mm]	4-3/8" [111 mm]	15-520	5-625
2660-0032B	2"—11" BSP	2-1/2" Pipe	5-3/8" [137 mm]	4-3/8" [111 mm]	15-520	5-625
2660-0033	2-1/2"—8" NPT	3" Pipe	5-3/8" [137 mm]	4-9/16" [116 mm]	20-750	8-900
2600-0033B	2-1/2"-11" BSP	3" Pipe	5-3/8" [137 mm]	4-9/16" [116 mm]	20-750	8-900
2660-0034	3"—8" NPT	4" Pipe	5-1/2" [140 mm]	4-7/8" [124 mm]	30-1150	12-1380
2600-0034B	3"—11" BSP	4" Pipe	5-1/2" [140 mm]	4-7/8" [124 mm]	30-1150	12-1380
2600-0035	4"—8" NPT	5" Pipe	5-1/2" [140 mm]	5-3/8" [137mm]	55-1980	20-2380
2660-0035B	4"—11" BSP	5" Pipe	5-1/2" [140 mm]	5-3/8" [137mm]	55-1980	20-2380

FoamPro Manifold



Assy. Part Number	A	B	C	D	Maximum Accuracy Flow Range	Maximum Operating Flow Range
2660-0051	8.5" (216mm)	4.0" (102mm)	1/2" NPT	1-1/2" Pipe	10-320 gpm (38-1211 Lpm)	3-380 gpm (11-1438 Lpm)
2660-0052	8.5" (216mm)	4.3" (109mm)	1/2" NPT	2" Pipe	15-520 gpm (57-1968 Lpm)	5-625 gpm (19-2365 Lpm)
2660-0053	9.5" (241mm)	4.5" (114mm)	3/4" NPT	2-1/2" Pipe	20-750 gpm (76-2840 Lpm)	8-900 gpm (30-3406 Lpm)
2660-0054	9.5" (241mm)	4.8" (122mm)	3/4" NPT	3" Pipe	30-1150 gpm (113-4350 Lpm)	12-1380 gpm (46-5220 Lpm)
2660-0055	11.5" (292mm)	5.2" (132mm	1" NPT	4" Pipe	55-1980 gpm (208-7495 Lpm)	20-2380 gpm (76-9009 Lpm)

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15 Limited Warranty

Fire Research Corp. (FRC), as supplier of FoamPro, warrants to the original purchaser, each new pump, system or other product of its own manufacture, for a period of two years from the date of shipment from the factory, to be free from defects in material and workmanship under normal use and service. “Normal use and service” means not in excess of recommended maximum speeds, pressures, and temperatures, or handling fluids not compatible with components materials, as noted in applicable FoamPro product catalogs, technical literature, and instructions. This warranty shall not apply to any pump, system or other product which shall have been repaired or altered to adversely affect the performance or reliability of the pump, system or other product.

Neither this warranty nor any implied warranty apply to damage or harm caused by any or all of the following: (1) Freight damage; (2) Freezing damage; (3) Damage caused by parts and/or accessories or components not obtained from or approved by FRC; (4) ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES, OTHER THAN INJURY TO THE PERSON, ARISING FROM THE USE OF ANY PUMP OR OTHER PRODUCT MANUFACTURED BY FRC EXCEPT in states that do not allow the exclusion or limitation of incidental or consequential damages; (5) Damage due to misapplication and/or misuse; (6) Normal wear of moving parts or components affected by moving parts.

The liability of FRC under the foregoing warranty is limited to the repair or replacement at FRC's option without charge for labor or materials of any parts upon return of the entire pump, system or other product or of the particular part to the FRC factory within the warranty period, at the sole expense of the purchaser, which part shall upon examination appear to FRC’s satisfaction to have been defective in material and workmanship. The liability of FRC under any theory of recovery (except any express warranty where the remedy is set forth in the above paragraph) for loss, harm or damage, shall be limited to the lesser of the actual loss, harm or damage or the purchase price of the involved pump, system or other product when sold by FRC to its customer.

FRC expressly warrants its pumps and other products as above stated. THERE ARE NO OTHER EXPRESS WARRANTIES. ANY IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO TWO YEARS FROM THE DATE OF PURCHASE BY THE ORIGINAL PURCHASER EXCEPT in states that do not allow time limitations on implied warranties. THERE IS NO IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY WHEN THIS PRODUCT IS PUT TO RENTAL USE.

No person including any dealer or representative of FoamPro is authorized to make any representation or warranty concerning FRC’s FoamPro products on behalf of FRC, or to assume for FRC the obligations contained in this warranty. FRC reserves the right to make changes in design and other changes and improvements upon its products without imposing any obligations upon itself to install the same, upon its existing products then in process or manufacture.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

IMPORTANT NOTICE

It is imperative to package all FoamPro components properly, before shipment (with Return Goods Authorization attached) back to FRC. The FoamPro contains electronic components that may receive damage from improper shipping procedures! All FoamPro components shipped back to FRC will pass through Quality Control Inspection, and will be photographed after the box is opened. Any shipping damage, such as superficial scratches, nicks, etc., to the unit makes it unusable (even after the internal warranty problem is repaired) and thus must be refinished to “like-new” condition during the warranty process. You are responsible for any physical damage occurring to FoamPro components at your facility and during shipment back to FRC.

Package the FoamPro, complete with all the recommended parts the Customer Service representative requires (i.e., Digital Display control with all premolded wire cables etc.) in its original carton with the Styrofoam and other packaging materials, as it was received at your facility. FRC appreciates your attention in this matter, as we feel it will help us to serve you in a better fashion, while keeping the cost of the FoamPro product competitive. Thank you.

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FRC
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