



A Safe Fleet Brand

Form 865
05/15

Dual Injection Management System

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.

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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. 865.

1 Safety

1. **Always** disconnect the power source before attempting to service any part of the FoamPro system.
2. **Any electrical system** has the potential to cause sparks during service or repair. Take care to eliminate explosives or hazardous environments during service or repair of the system.
3. **Release** all pressure and drain the liquid from the piping before servicing or removing the paddlewheel flowmeter sensors.
4. **Read and understand** the operation section of this manual before attempting to operate the FoamPro unit. Serious injury could occur if the wrong discharge is selected by the operator.
5. **CAUTION: Periodically inspect the wiring for damage, loose connections or potential physical damage from moving parts or components that get extremely hot during operation.**
6. **CAUTION: Always disconnect the ground straps and control cables from the FoamPro control modules 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.**
7. **CAUTION: 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.**
8. **CAUTION: The cable shipped with each FoamPro MultiFlo unit and flowmeter are tested at the factory with that unit. Improper handling and forcing connections can damage these cables which could result in other system damage.**
9. **Periodically** inspect all hoses for wear or worn conditions. Make sure all connections and fittings are tight and secure.
10. **Use pipe, hose and fittings** that are rated at or above the maximum pressure rating at which the water pump system may operate.
11. **The components and fittings** used in this system must be compatible with the foam concentrates used and pressures at which the pump system operates.
12. **CAUTION: Make sure the electrical source of power for the unit is a constant 12-volt or 24-volt, negative ground, DC power source.**

2 Introduction

The Electronic Dual Injection Selector system allows for the injection of foam concentrate to be diverted from one injection point to another injection point in the system. The system requires the usage of a flowmeter in the main waterway serviced by each injection line and the FoamPro MultiFlo kit to interface with the main system controller.

The interface with the system controller through the MultiFlo allows for the correct water flow measurement connected with the appropriate injection point selected. When switching from one injection point to the other, the corresponding flowmeters also switch. The MultiFlo system carries the calibration for each flowmeter and passes the correct flow to the main control head. This allows for an accurate injection rate and water measurement for each line involved.

The system comes with Injection Selector Control, (2) 1.5 ft flowmeter cables, (2) 6 ft flowmeter cables, 1 Injection Check Valve (1 is shipped with the original system ordered), and (2) Injection Solenoids.

Required accessories for the installation are the MultiFlo System and an additional flowmeter (besides the one ordered with the system).

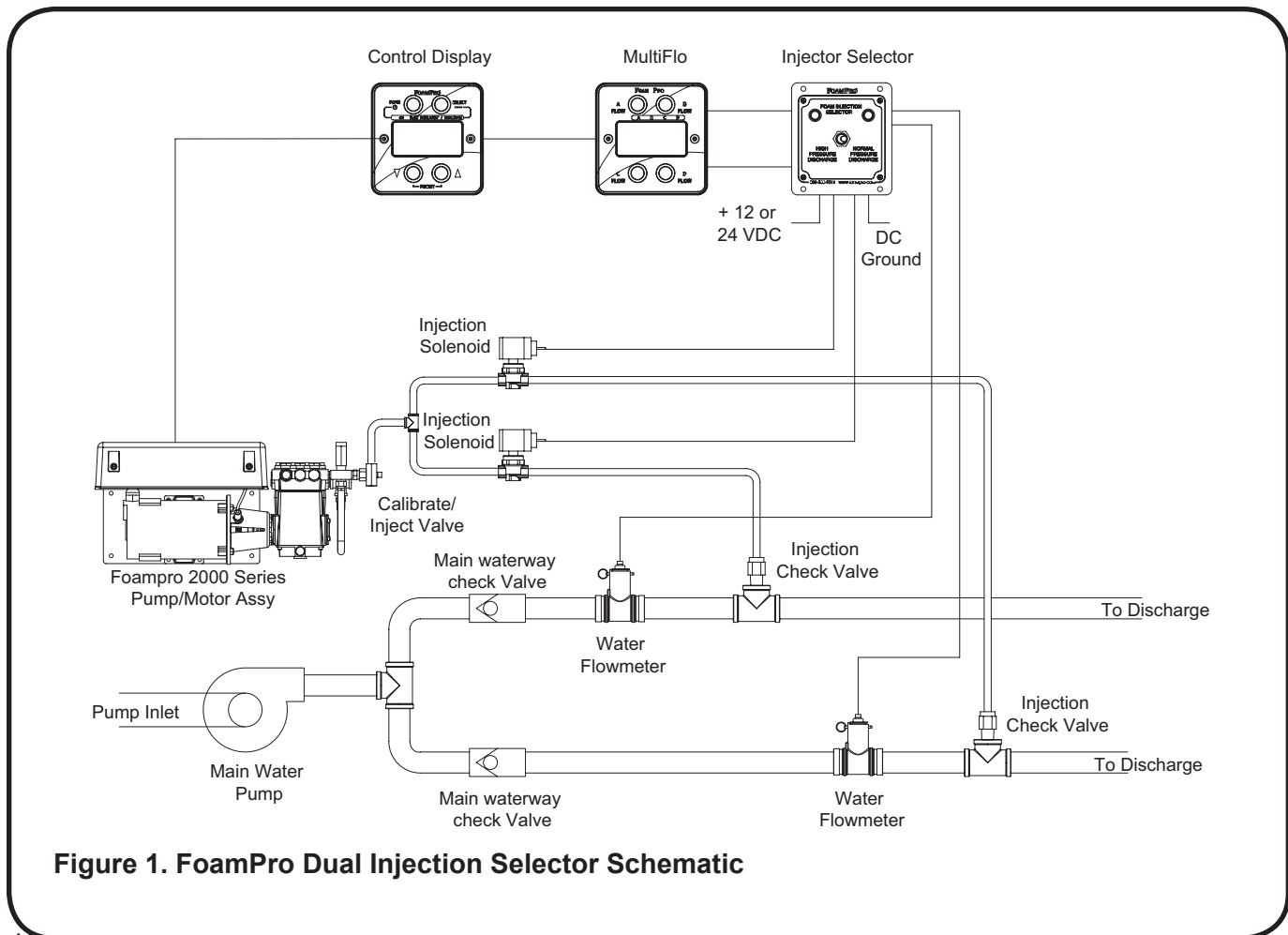


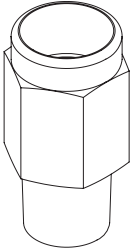
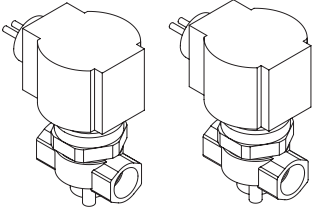
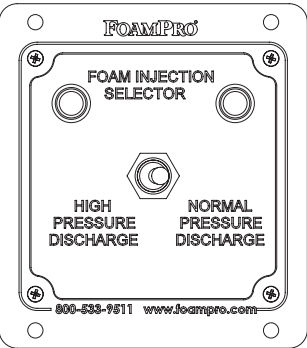


Figure 1. FoamPro Dual Injection Selector Schematic

3 What You Get

Dual Injection Selector Kit



Dual Injector Selector Control

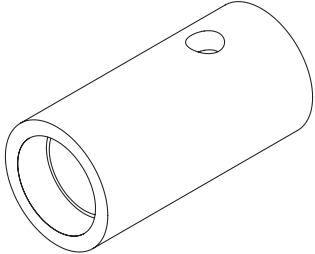
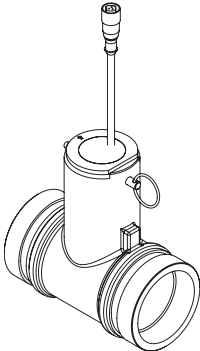
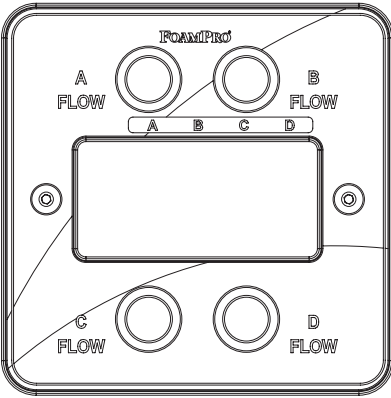
Injector Solenoids (2)

Injection Check Valve (1)

1 1/2 ft Flowmeter Cable (2)

6 ft Flowmeter Cable (2)

Required System Accessories



MultiFlo System

Waterway Flowmeters (2 Total)

Main Waterway Check Valves (2 Total)

4 What You Supply

ITEMS NEEDED:

1. Fittings and hoses from the discharge of the foam pump to the injection points must be compatible with the foam concentrates being used. Use fittings of brass, 300 series stainless steel or other corrosion resistant materials. Hoses and fittings are to be rated at 400 psi (28 BAR) minimum working pressure or the maximum discharge pressure of the fire pump, whichever is greater.
2. DC voltage to the Injector Selector Controller of the appropriate voltage (12 or 24 V DC). Current draw is under 5 amperes. Use of standard 14 AWG automotive wire that is grease and fuel resistant is recommended. When connecting the wires to the terminals and the ground lug, remove only ¼ inch of the insulation from the end of the wire. Support all wiring and take care to prevent short circuits.

5 Plan Ahead

Because of the potential differences in fire apparatus plumbing and foam system configuration, it is not practical to depict exactly how each FoamPro unit will be installed on a particular apparatus. Most of the information contained in this manual, however, will apply to any situation.

Read these sections thoroughly. Plan and design where and how to install this equipment in the apparatus before beginning the actual installation.

6 Plumbing Component Installation

The system diagram on the following page (figure 2) shows the plumbing diagram for the Dual Injector Selector system. Always use hose, fittings, and components that are compatible with the foam agents being used and the pressure ratings that they will be subjected to. Ensure all connections are tight and leak free.

The diagram shows only the discharge side of the plumbing for the system. Refer to the specific manual for your system when designing and installing the inlet plumbing to the FoamPro system.

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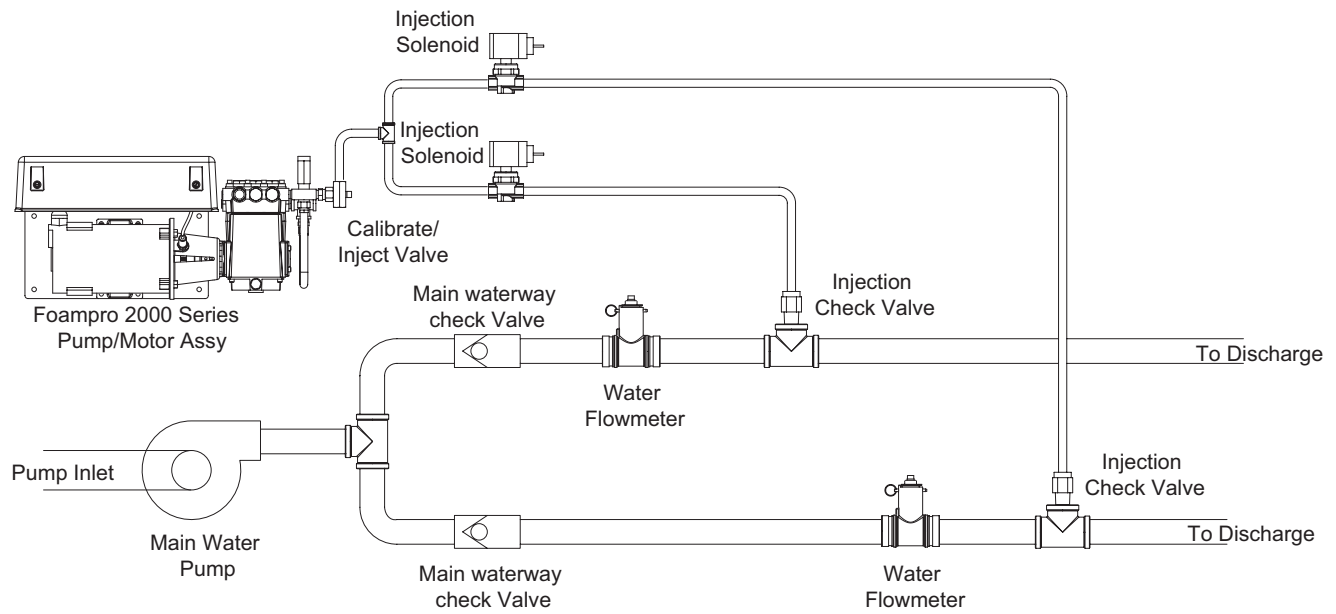


Figure 2 Dual Injector Selector Plumbing

A. 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 15) 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]

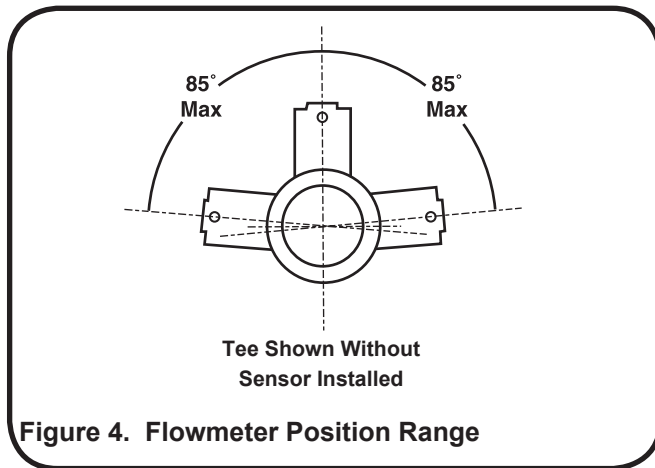
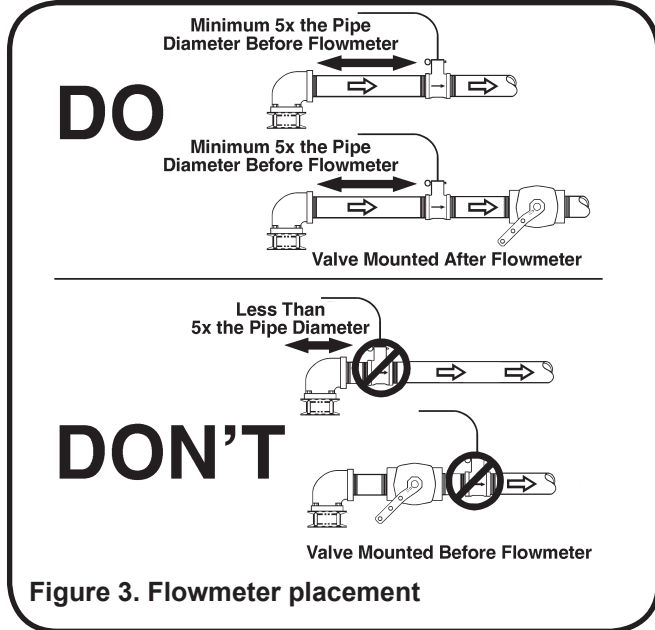
- b. The downstream plumbing of the flowmeter is not as critical; but again, straight runs without fittings help maintain accurate flow readings.
- c. Do not mount a flowmeter directly after an elbow or valve. Valves create severe turbulence when they are “gated-down”.
- d. Try to mount the flowmeters in a position that is accessible for routine inspection and maintenance. The FoamPro MultiFlo System consists of the FoamPro MultiFlo Control Module and flowmeter cables to monitor up to four (4) paddlewheel flowmeters.

FOAMPRO PADDLEWHEEL FLOWMETERS

The FoamPro paddlewheel-style flowmeter fittings are specially designed tees and manifolds that make

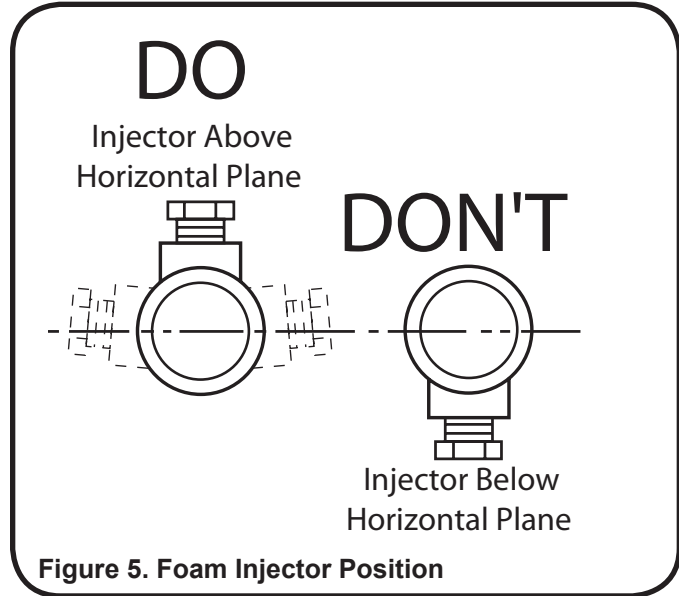
Installation and Operation Manual

inspection and maintenance of the flowmeter 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 4.

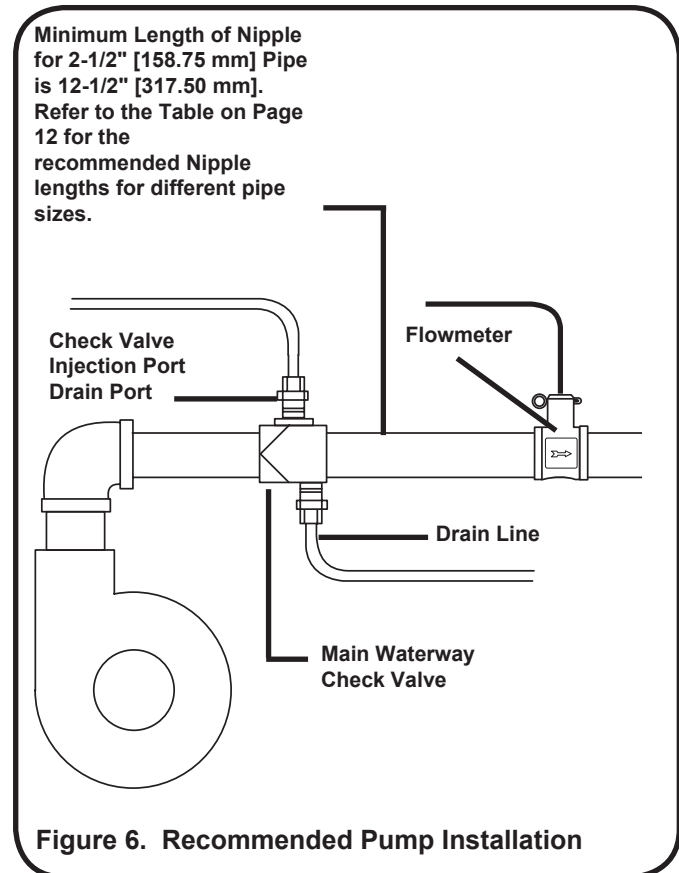


B. CHECK VALVES

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 11 to 13 psi [0.7 to 0.9 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 6). This will avoid sediment deposits or the formation of an ice plug.



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 6.



C. Injection Solenoid Valves

The injection solenoid valves determine which discharge line receives the injected foam concentrate. Ensure that the voltage shown on the label on the solenoid matches the system voltage. The inlet port (from the foam pump) is labeled on the bottom of the valve as shown in Figure 7.

Make sure the valve is mounted in a horizontal position as shown in Figure 8.

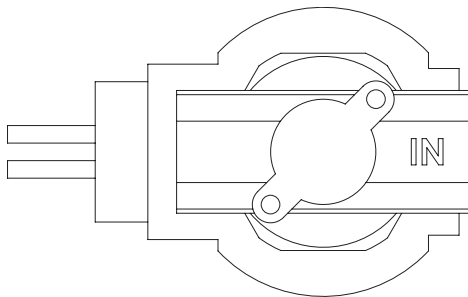


Figure 7. Solenoid Inlet Location

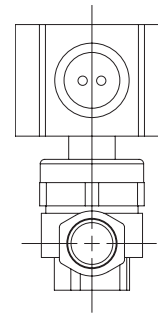


Figure 8. Solenoid Position

7 Electrical Equipment Installation

ELECTRICAL CONNECTIONS

Follow the system electrical diagram (Figures 9 and 10) 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 master circuit breaker off.
- **DO NOT** cut molded cables.
- Provide at least 5 amps of power to the injector selector Module. Use 14 AWG (minimum) wire directly to the battery or battery master switch.

- The 3435-0107 systems are designed for 12-volt, negative-ground systems only. The 3435-0101 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. 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.

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- 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. 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 9). A color-coded decal on the motor driver box identifies each cable connection (Refer to Manual 829 for further information).

B. MultiFlo MODULE

The MultiFlo module is designed to be mounted in the operator's panel of the apparatus. Once the MultiFlo module is mounted, connect the short 3 pin cable from the top receptacle on the MultiFlo module to the 3 pin connector on the Digital Display Control module. Connect a 3 pin cable from port A on the MultiFlo module to the NP OUT receptacle on the Injector Selector module. Connect a 3 pin cable from the B port on the MultiFlo module to the HP OUT receptacle on the Injector Selector module. (Refer to the MultiFlo Manual 880 for further information) Install the protective caps supplied on the unused receptacles.

C. Injector Selector Module

The Injector Selector module is designed to be mounted in the operator's panel of the apparatus. See Figure 15 for dimensional cut-out information. Once the module is mounted in the panel connect a 3 pin flowmeter cable from the NP IN receptacle to the flowmeter for the

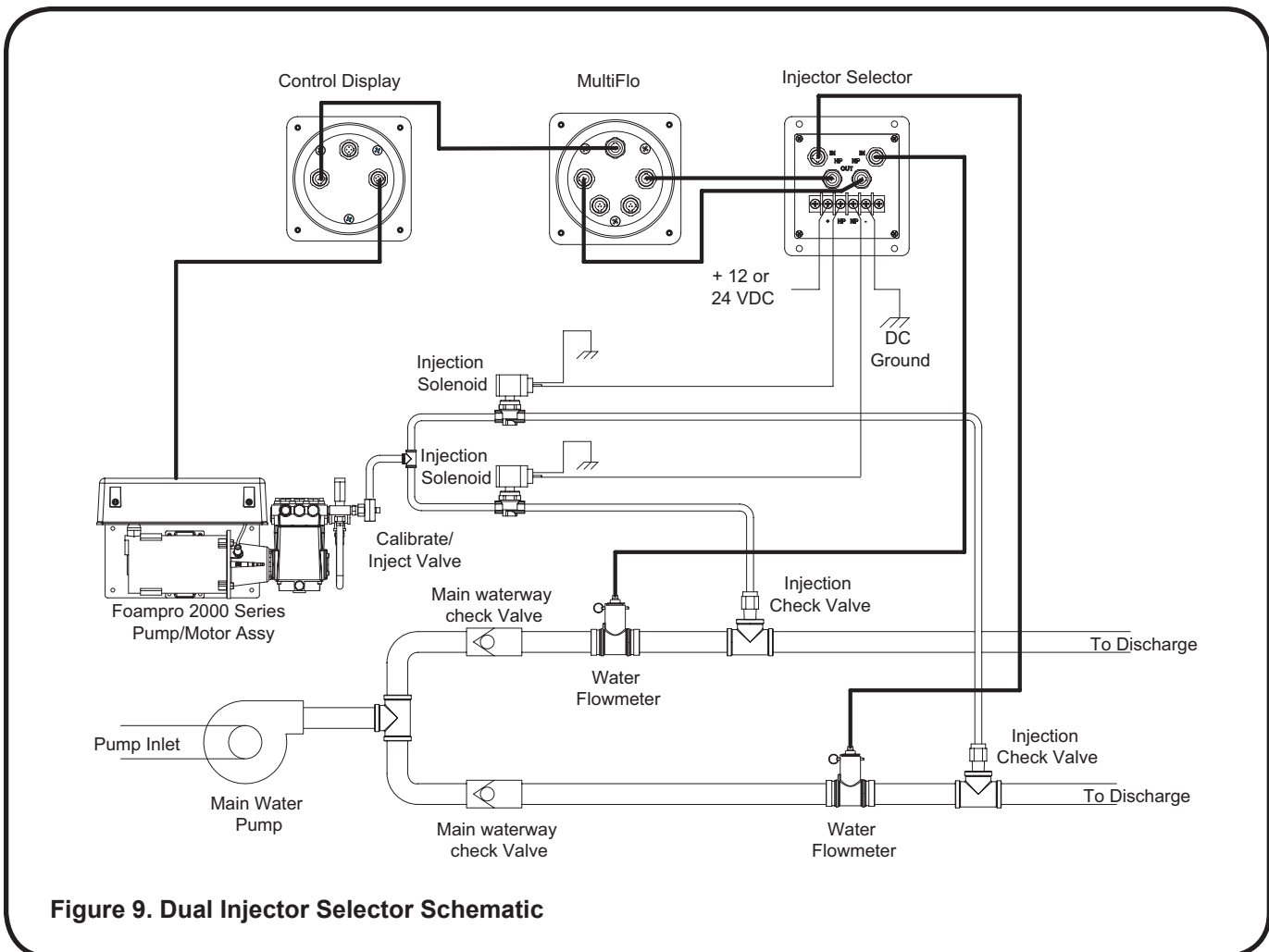


Figure 9. Dual Injector Selector Schematic

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NP discharge line. Connect a 3 pin flowmeter cable from the HP IN receptacle to the flowmeter for the HP discharge line.

Attach a 14 AWG wire from the NP terminal on the terminal strip on the Injector Selector module to either of the wires on the injector solenoid for the NP line. Attach a 14 AWG wire from the HP terminal on the terminal strip on the Injector Selector module to either of the wires on the injector solenoid for the HP line. Attach the other wires on the injector solenoids to a common ground.

Attach a 14 AWG wire from the master battery switch to the + terminal on the terminal strip and a 14 AWG wire from the - terminal to the common ground.

Install clamp-on beads at the locations indicated in Figure 11. Use a small amount of RTV silicone, electrical tape or heat shrink tubing to keep the beads from moving after installation. The clamp-on beads must be slid up as close as possible to the connectors on the cables.

Round coils of extra flowmeter cable in the pump compartment act as an antenna. While the flowmeter cables cannot be shortened, various lengths of premolded cable are available to minimize the "extra" cable in the truck. When routing flowmeter cables, take care to 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 round coils (see Figure 12).

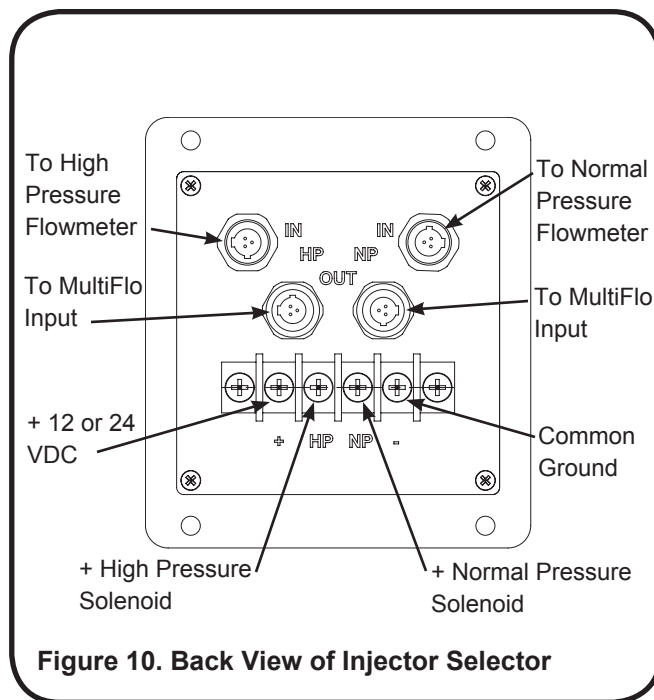


Figure 10. Back View of Injector Selector

CAUTION: The cable shipped with each FoamPro MultiFlo unit is tested at the factory with that unit. Improper handling and forcing connections can damage these cables, which could result in other system damage.

D. EMI/RFI Suppression

An EMI/RFI (Radio Frequency Interference) suppression kit comes with each flowmeter and is included with each FoamPro system. The clamp-on beads included in the kits, 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 equipment is mounted.

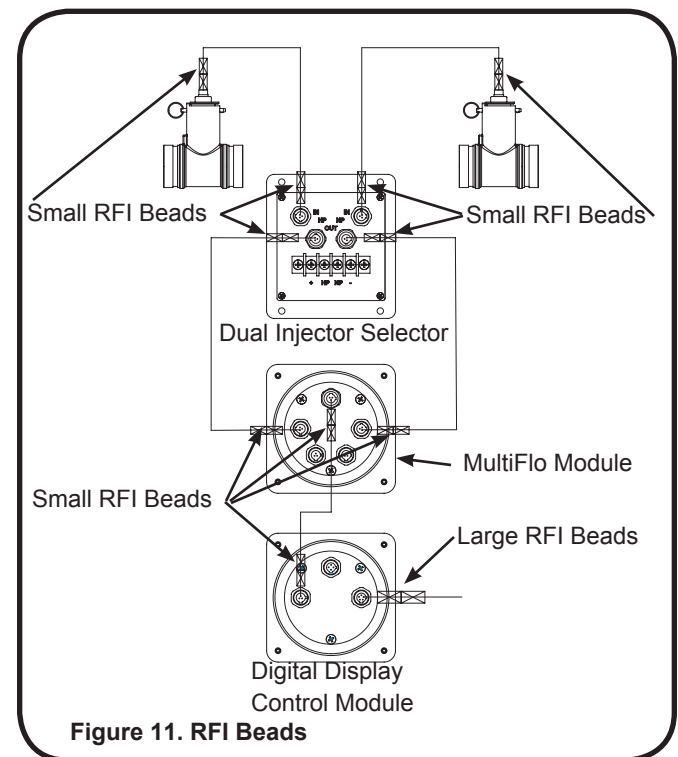


Figure 11. RFI Beads

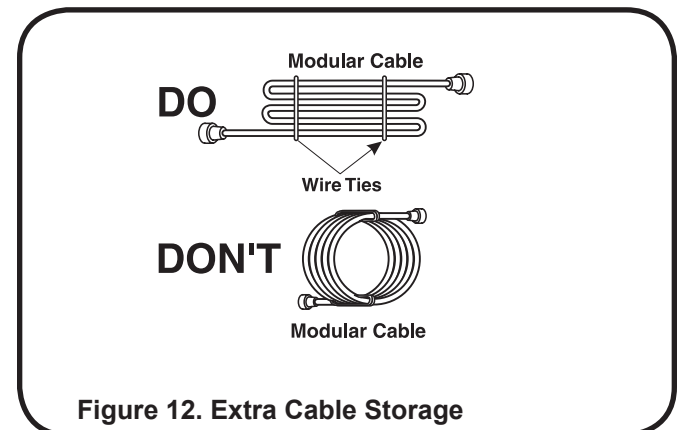


Figure 12. Extra Cable Storage

8 Calibration Procedures

System Setup Procedures

The FoamPro Dual Injection System is designed to allow easy calibration of both flowmeters and foam pump .

Foam Pump Set Up and Calibration

The set up and calibration for the 2000 Series FoamPro is very easy. Refer to the Operator's manual, Form 829, for your particular system for the proper procedures.

Water Flowmeter Calibration

Two methods of calibration may be used, flow and total volume. The calibration process makes adjustments to each flowmeter display reading.

NOTE: The FoamPro MultiFlo system 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: Each flowmeter must be calibrated after installation. Individual flowmeters will require calibration after sensor replacement.

Flowmeter calibration is done by using the MultiFlo Control Module function buttons. Refer to the Operator's manual, Form 880, for the proper procedure.

9 Operation

The FoamPro Dual Injection system constantly monitors the flow signals from the flowmeter sensor chosen by the operator through the Injector Selector Module.

The pump operator monitors the flow reading of the chosen discharge flowmeter. The system is automatic and requires no adjustment after the initial installation calibration. The value is displayed on the FoamPro Digital Display Control Module.

Once the discharge line to inject foam into is selected, the operation of the system is identical to the standard operating procedures found in the Operator's manual for the system being used. (Refer to Form 829 for standard operating procedures)

10 Diagnostic Procedures

The FoamPro Dual Injection Selector is designed to allow an easy method of confirming operation of the paddlewheel flowmeters and which selected line is to be operated.

The MultiFlo diagnostics procedures can be found in the Operator's manual Form 880.

The diagnostic procedures for the FoamPro 2000 series system can be found in the Operator's manual Form 829.

The Dual injection diagnostics are as simple as checking the correct position of the switch and the indicator lamp for the proper discharge chosen. The solenoids can be tested with a voltmeter or test light.

11 Parts Identification

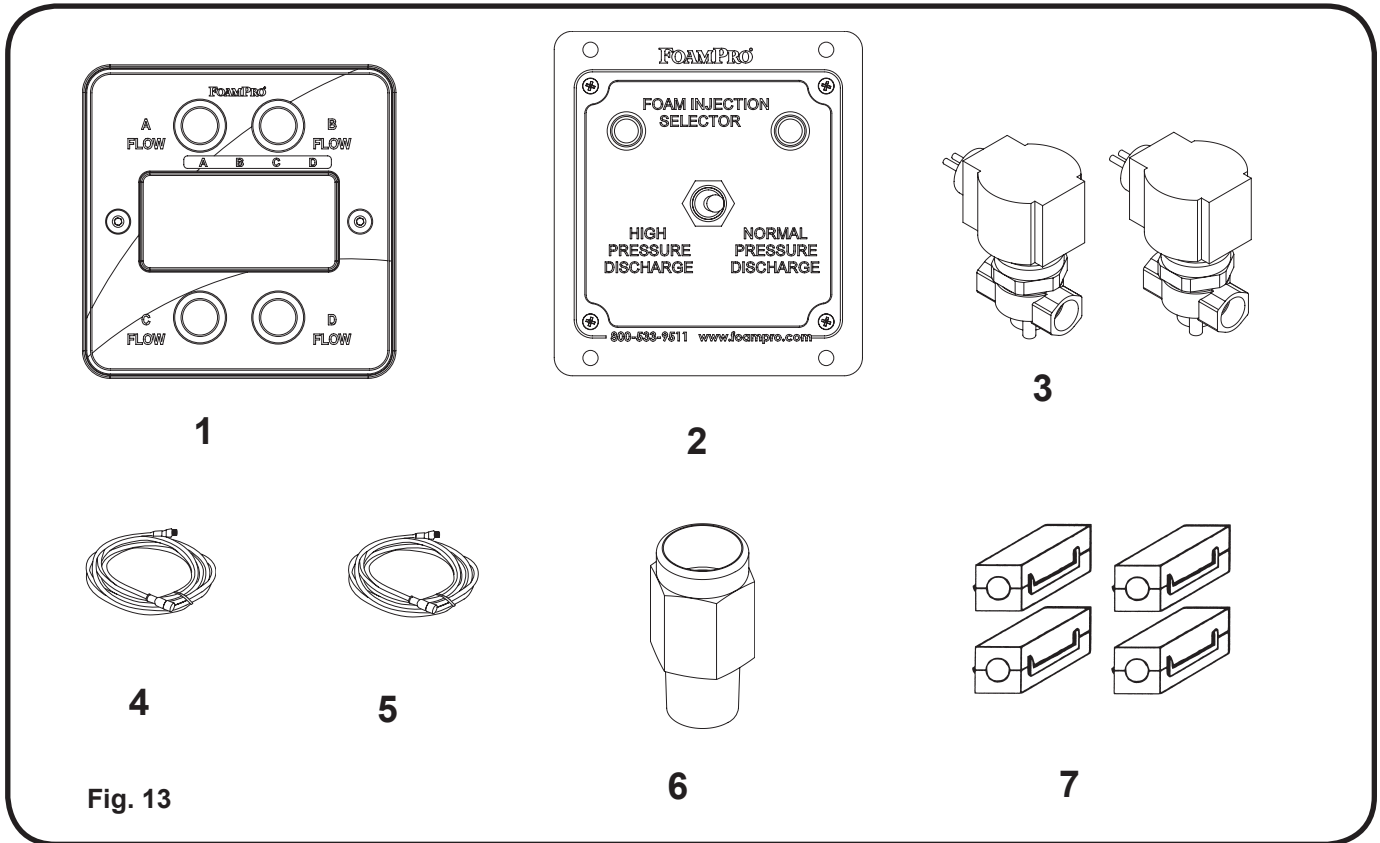


Fig. 13

Ref.	Part No.	Description	Qty
1	2527-0140	FoamPro MultiFlo Control Module Kit Refer to Operator's Manual Form 880 for components	1
2	2527-0065	Dual Injector Selector Module 24 VDC	1
	2527-0074	Dual Injector Selector Module 12 VDC	
3	2525-0025	Injector Solenoid 24 VDC	2
	2525-0028	Injector Solenoid 12 VDC	
4	2520-0063	Flowmeter Cable 1.5 ft	2
5	2520-0045	Flowmeter Cable 6 ft	2
6	3320-0055	Injection Check Valve	1
7	2404-0200	EMI Beads	8

12 Installation Template

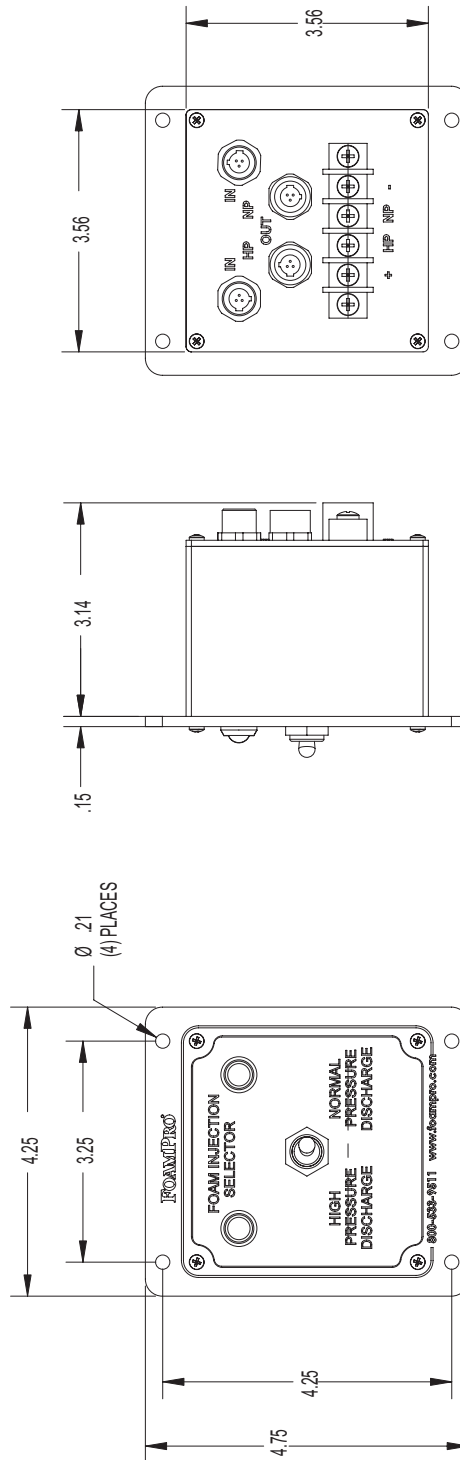
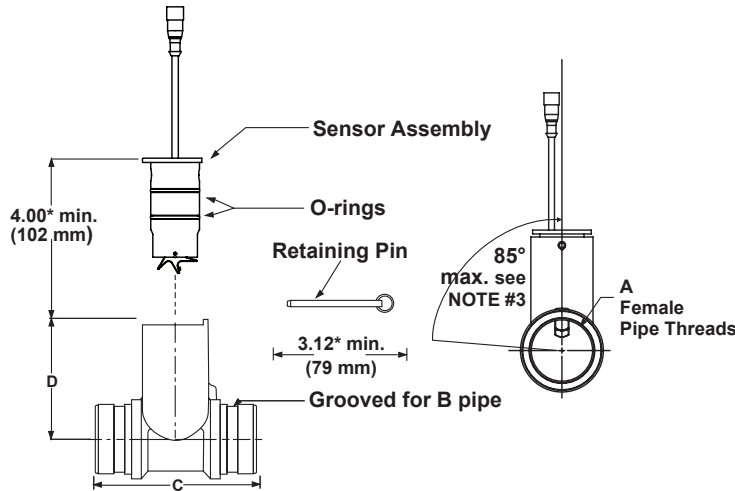


Fig. 14 Selector Module Dimensions

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FoamPro Flowmeter

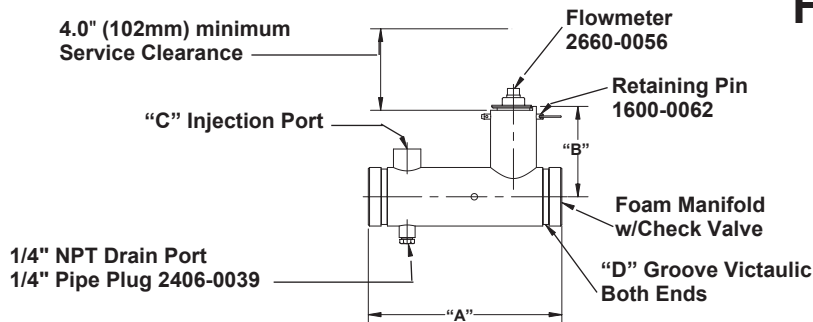


- NOTES:**
1. Use **CAUTION** not to damage sensor during assembly.
 2. Use Loctite PST 565 or equivalent Teflon tape to seal pipe threads.
 3. Maximum horizontal installation angle to allow proper water drainage. Unit may also be installed in vertical piping arrangement.

* = Minimum sensor service clearance.

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
2660-0033B	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
2660-0034B	3"—11" BSP	4" Pipe	5-1/2" [140 mm]	4-7/8" [124 mm]	30-1150	12-1380
2660-0035	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)	6.3" (160mm)	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)

13 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.