

Installation, Operation, Repair and Parts Manual

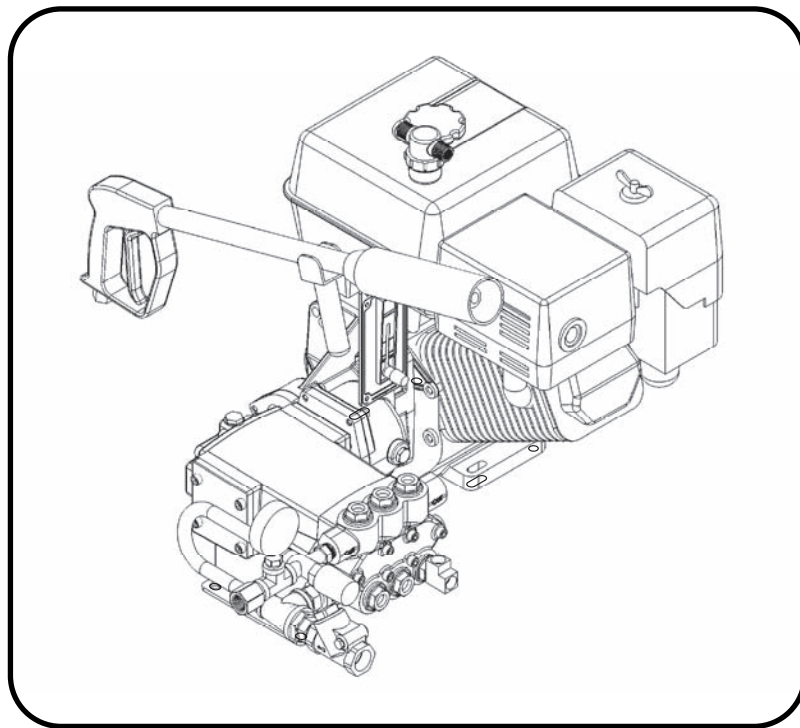
Description

The Hypro High Pressure System is a gas motor-driven, flow-based proportioning system that injects foam concentrate at a desired percentage at a fixed water flow rate. The basic Hypro High Pressure System is shown below. The system will accurately deliver from 0.3% to 3.0% foam concentrate at the rated system pressure and flow rate. The system will accurately inject foam concentrate while the system is running at recommended operating speed and pressure. Foam percentage indication is instantaneously given on the foam monitoring panel supplied.

The foam concentrate is directly injected into the system at the head of the pump. It is then fed as foam solution into the adjustable foam spray gun.

The pump inlet is equipped with a check valve to prevent contamination of the water supply.

The Hypro High Pressure Foam System is designed for Class A foam concentrate (per NFPA 1150) applications and calibrated for viscosity ranges up to 60 CPS.



Model No. 1508B-130EFS



General Safety Information

NOTE

Notes are used to notify of installation, operation, or maintenance information that is important but not safety related.

CAUTION

Caution is used to indicate the presence of a hazard, which will or may cause minor injury or property damage if the notice is ignored.

WARNING

Warning denotes that a potential hazard exists and indicates procedures that must be followed exactly to either eliminate or reduce the hazard, and to avoid serious personal injury, or prevent future safety problems with the product.

DANGER

Danger is used to indicate the presence of a hazard that will result in severe personal injury, death, or property damage if the notice is ignored.

1. **WARNING:** Use pressure relief device on the discharge side of the pump to prevent damage from pressure buildup when the pump discharge is blocked or otherwise closed and the power source is still running. For trigger gun operation, or where discharge is frequently shut off, pressure unloader valves are recommended. The Turbo Stream system is equipped with a pressure relief device and should not be removed.

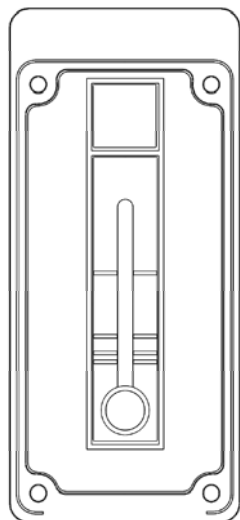
FAILURE TO FOLLOW THIS WARNING MAY RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND WILL VOID THE PRDUCTION WARRANTY.

2. **WARNING:** Do not pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in explosive atmospheres. The pump should be used only with liquids that are compatible with the pump component materials. Failure to follow this warning may result in personal injury and/or damage and will void the product warranty.
3. **Do not pump** at a pressure higher than the maximum recommended pressure [1450 psi (100 BAR)].
4. **Do not run** the system at greater than recommended capacity.
5. **Do not permanently remove** or alter any guarding devices or attempt to operate the system when these guards are removed.

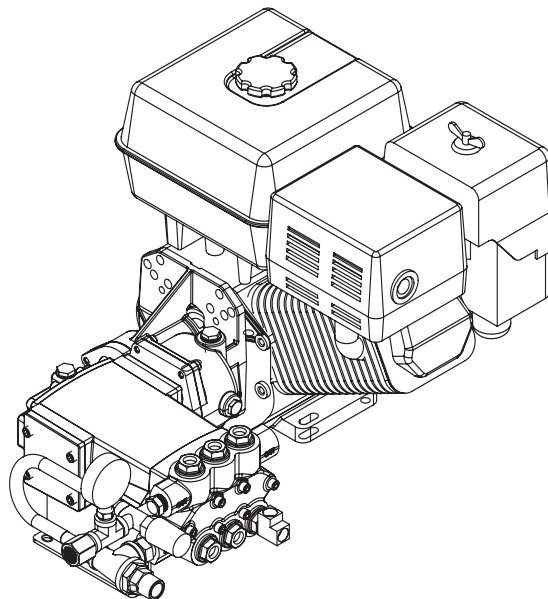
6. **Always disconnect the power source** before attempting to service any part of the system.
7. **Release all pressure** within the system before servicing any of its components.
8. **Drain all concentrate and water** from the discharge system before servicing any of its component parts.
9. **Periodically** 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: ENSURE THAT THE ELECTRICAL SOURCE OF POWER FOR THE UNIT IS THE APPROPRIATE 12 VOLT NEGATIVE GROUND DC SYSTEM.**
13. **Secure all discharge lines** before starting the pump. An unsecure line may whip, causing personal injury and/or property damage.
14. **Any electrical system** has the potential to cause sparks during service. Take care to eliminate explosive or hazardous environments during service and repair.
15. **CAUTION: Do not attempt to operate the system at or above a temperature of 130°F (55°C).**
16. **CAUTION: Periodically inspect the pump and the system components.** Perform routine maintenance as required. Failure to perform routine maintenance may cause damage to individual system components; pump, motor, and gearbox assemblies. See the maintenance section of this manual for recommended maintenance procedures and intervals between maintenance work.
17. **CAUTION: Read and understand “Operating Instructions” section before attempting to operate the unit.**
18. **CAUTION: The components shipped with each Hypro unit are tested at the factory. Improper handling and forcing connections can damage the components which could result in other system damage.**

System Component Description

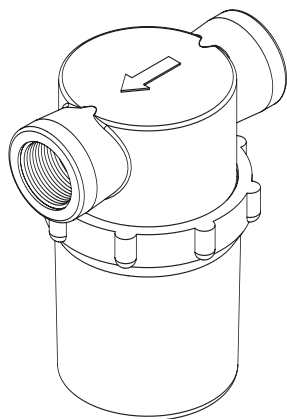
The following components are packaged with the Model 1508B-130EFS Hypro High Pressure System:



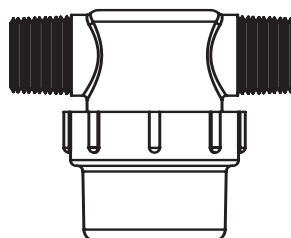
Control Panel



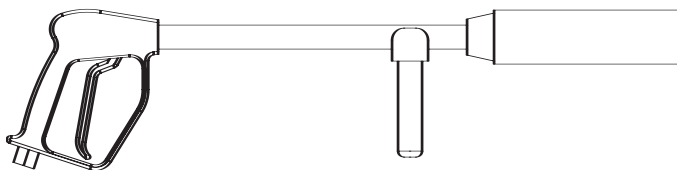
Pump/Motor Assembly



Inlet Water Strainer



Foam Concentrate Strainer



Foam Spray Gun/Wand

Installer Supplied Parts

The Hypro High Pressure System is provided with the major components and accessories required for installation. Due to differences in chassis and apparatus configurations, the installer must provide plumbing to satisfy individual 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 Pages 5 and 6.

Suction Lines

Corrosion-resistant fittings and hoses from the foam tank to the foam concentrate inlet of the pump must be used. Use 5/16-inch minimum inside diameter hose for the foam inlet. Corrosion-resistant fittings and hoses from the water source to the inlet of the pump must be used. Use only 3/4-inch minimum inside diameter hose for the water inlet. Use components that are rated for 23 in [584.2 mm] Hg vacuum and 50 psi [3 bar] pressure or greater for all suction line inlets. The components used must be compatible with all foam concentrates to be used. All fittings used must be made of brass, 300 series stainless or other corrosion-resistant materials. Before selection of components, check for compatibility with foam concentrate. The use of clear suction hose is recommended to allow viewing of foam and water priming operations. The pump must be positioned to allow gravity feed from the foam tank and water source or a net positive suction head (NPSH) is required.

Discharge Lines

Fittings and hoses from the foam solution discharge of the pump to the foam spray nozzle must be supplied by the installer. Hose end fittings on gun and pump are 1/2-inch [12.7 mm] NPT. Hose lengths and sizes are shown below. All hoses must be rated for 1800 psi [124.1 BAR] minimum working pressure. Fittings and hoses must be compatible with all foam concentrates to be used. Use fittings of brass, 300 series stainless or other corrosion-resistant material that is compatible with foam concentrates to be used. Thermal relief valve must be plumbed to discharge away from operator.

Hose Length	Hose Inside Diameter (ID)
0 - 50 Feet	3/8-inch Hose
0 - 200 Feet	1/2-inch Hose
0 - over 200 Feet	5/8-inch Hose

Check Valves

Check valves have been included with the system at the water inlet to help prevent back flow of foam concentrate or foam solution. The system should be disconnected from exterior water supplies when not in use. A complete system flush should be performed before storage to prevent component failure due to evaporation of foam and water within the system.

Foam Concentrate Tank

A foam concentrate tank must be supplied to suit the capacity required for the apparatus application. The tank should meet NFPA minimum standards for the design capacity, including filler size, venting and drain facility. A shut-off valve is recommended to allow cleaning of the strainer.

Electrical Requirements

Electrical wiring must be supplied to the engine starter switch. SEE ENGINE MANUAL for detailed electrical hook up specifications.

CAUTION: Always disconnect ground before electrical arc welding on any Hypro equipment. Failure to do so will result in a power surge through the system that could cause irreparable damage to the electronic components.

Installation Planning

Because of the potential differences in apparatus plumbing and foam system configuration, it is not practical to depict exactly how each Hypro unit can best be installed onto a particular apparatus. 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 Hypro 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 location of the components to be installed such as: foam tank, water tank, foam system, and display panel. Try to position the components to minimize fittings and hose lengths. Position the system in an accessible area.

The foam system should be positioned below the foam tank discharge to allow gravity feed to the pump. Place the foam tank where refilling with 5 gallon [19 liter] containers and other methods is suitable for the end user. The water inlet pressure must not exceed 3 psi [0.21 bar].

Determine a location for the display panel on the unit that is visually accessible while the system is in operation. The display panel should be located on the same horizontal plane as the system and foam tank.

Determine a safe place for the thermal relief valve drain hose, and be sure it drains in a safe location away from operator.

Plumbing Component Installation

The following diagram (Figure 1) provides recommended guidelines for the location of the system components that handle foam concentrate, water, and foam solution.

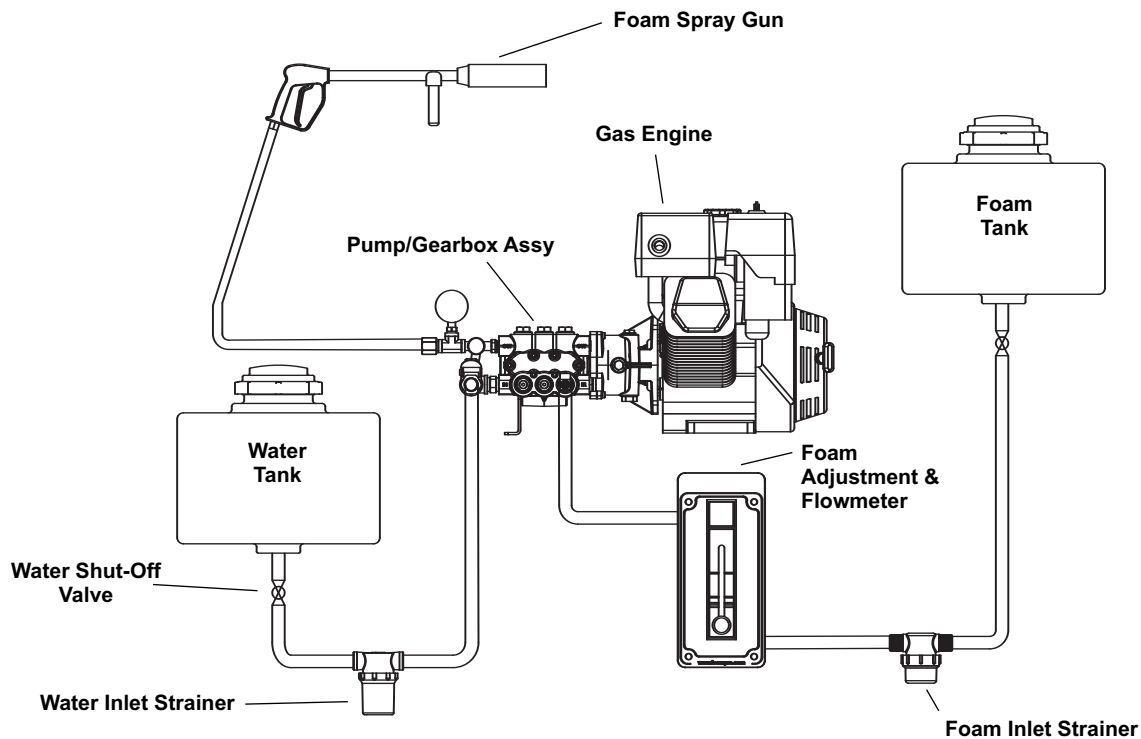


Figure 1 Hypro High Pressure System Plumbing

Plumbing Component Installation - continued

Pump/Motor Base Assembly

The pump/motor base assembly must be mounted in the horizontal position. The system can be run at 15 degrees on any plane to the horizontal and may be run intermittently at 30 degrees to the horizontal plane. The base of the system must be anchored to a surface or structure that is ridged and of adequate strength to withstand the vibration and stresses of apparatus operation. The drawings on page 10 provide the mounting dimensions for the Hypro High Pressure pump/motor base assembly. Flexible hose is required to make the hose connections to the Hypro High Pressure System. DO NOT hard pipe the system.

Protect the hoses and wiring to prevent chafing and abrasion during operation of the foam system. Protect the foam pump base unit from excessive spray and debris. See engine manual for allowed engine operating conditions.

Line Strainers

There are two line strainers provided with the Turbo Stream unit. The pump inlet line strainer has 3/4-inch NPT female threaded ports and is to be installed on the water inlet of the foam pump. The water supply hose should have adequate wall stiffness to withstand the vacuum of the pump while it is in operation (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 components (1800 psi [124.1 BAR] minimum).

Check Valves

A 3/4-inch check valve is included at pump inlet. A foam injection check valve is included.

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. Most Class A foam concentrates (per NFPA 1150) are less corrosive and therefore may not require flushing. It is important to flush and drain the entire system before long periods of storage to prevent component malfunction.

Thermal Relief Valve

A thermal relief valve is included with the system to prevent pump overheating during unloading.

Electrical Equipment Installation

Electrical Connections

See engine manual for detailed electrical connections only if engine is equipped with electric start.

Making Sure Everything is Working Right

System Check

Check fuel level and oil level per engine manual prior to running system. Check pump and gear case oil level prior to running system. Pump and gear case should be filled with oil per manual instructions.

Check the function of all components before using the system. Also check that all plumbing and components are tight and functional.

Check to see that water supply lines, strainers and foam tank lines are free of debris and plumbed correctly. Any leaks in the system will cause poor system performance and operation.

Calibration & Setup

Calibration

The Hypro High Pressure System has been calibrated at the factory. To check calibration of the system, the following procedure should be used:

- 1) Start the system. Run the engine to an RPM that produces 8 GPM (3345 Engine RPM) of pump water inlet flow. Tools needed for the test are a pitot tube or other calibrated flowmeter to test the system inlet water flow, a graduated bucket to remove and calibrate foam concentrate, and a stop watch to measure volume unit/time of foam concentrate and water flow.
- 2) Open the control knob of the display panel to start foam injection, while holding the spray gun in the on position, run the system for a few minutes. The system will not inject foam concentrate while the system is unloading.
- 3) Turn the injection control knob to the desired foam injection calibration point. Start the stop watch and record the necessary volumes or flow rates of foam concentrate and water.
- 4) Measure the amount of foam concentrate in the container and compare that to the calculated amount. (Main flow rate X injection rate X minutes flowed [8.00 GPM X 0.005 (0.5%) injection rate X 5 minutes = 0.20 gallons]).
- 5) **CAUTION:** Long periods of pump deadheading may result in pump damage due to overheating of water in the system. The system is equipped with a thermal relief valve to eliminate damage to the pump during unloading. It is recommended to idle down the system during unloading if the system must stay running during transportation.
- 6) **CAUTION:** System may only be calibrated with Class A foams with a viscosity from 10-60 CPS. Use of other lower or higher viscosity Class A foams will create error in calibration and setup. Use only quality Class A foams.
- 7) Measure the amount of concentrate injected over time and compare to the level indicated on the display panel during this time. The output of the Hypro High Pressure System must be set at a constant 8 GPM + 0.20 GPM/ -0.5 GPM. Injection rate is easily changed by turning the foam % control knob on the display panel. The foam percentage is indicated on the display panel and is read using the largest diameter of the foam percent float. Repeat at each indicated % if desired.
- 8) The water inlet flow rate may be adjusted by changing the engine RPM. Increasing the engine RPM will increase the flow rate. Decreasing the engine RPM will decrease the water inlet flow rate. Varying engine RPM will change calibration settings.

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 system, 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 as much as 100%.

Pressure Relief Valve Adjustment

The pressure relief valve is factory tested and preset at 1800 psi [124.1 BAR]. During normal 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 1800 psi [124.1 BAR].

- 1) Start the system and run the engine to maximum RPM while turning the foam spray gun to the on position.
- 2) Turn off the foam spray gun. The relief pressure will be indicated on the provided pressure gauge as the relief valve functions.
- 3) If required, adjust the relief valve by turning the adjuster clockwise to increase relief valve pressure and counter-clockwise to decrease pressure.
- 4) Repeat above steps as needed.

Operating Instructions

Preparations Before Starting the System

- 1) Fuel: Check fuel level in tank. Do not overfill tank. Use fresh, clean automotive fuel. **NOTE: DO NOT FILL FUEL TANK WHEN ENGINE IS RUNNING.**
- 2) Engine Oil: Before checking or refilling with engine oil, make sure the engine is stopped and placed on a stable, level surface. Use oil recommended for ambient air temperatures at which the engine will be running. Change oil according to manufacturer's recommendation. (At least once after the first 20 hours and every 100 hours thereafter.)
- 3) Pump Oil: Before checking or refilling with pump oil, make sure the engine is stopped and placed on a stable, level surface. Use oil recommended for ambient air temperatures at which the pump will be running. Change oil according to manufacturer's recommendation, using SAE 30 weight non-detergent oil. Check oil level before running the system using the oil level dip stick on the pump.
- 4) Gear Case Oil: Before checking or refilling with gear case oil, make sure the gear case and engine are stopped and placed on a stable level surface. Use oil recommended for ambient air temperatures at which the gear case will be running at. Change oil according to manufacturer's recommendation, using SAE 90 weight non-detergent oil. Check oil level before running the system using the oil level hole on the side of the gear case.
- 5) Check to see that water supply lines, strainers and foam tank lines are free of debris and plumbed correctly. Any leaks in the system will cause poor system performance and operation.

Starting the System

IMPORTANT: Before starting engine, be sure discharge hose is secure.

- 1) Turn the engine switch located by the recoil starter to the ON position.
- 2) Turn the fuel cock to the ON position.
- 3) Push the throttle lever to a slightly open position.
- 4) Operation of the choke lever
 - a) When engine is cold:
 - i) In cold weather, start engine with choke in the fully closed position.
 - ii) In warm weather, start engine with choke in half-closed position.
 - b) When engine is warm:
 - i) Start engine with choke in fully open position.
- 5) Start the engine with electric start key or recoil starter.

Operation of the System

- 1) Idle the engine for 3 to 5 minutes or until operating temperature is achieved.
- 2) **CAUTION:** Do not run the Hypro High Pressure System for long periods during unloading. Long periods of pump deadheading may result in pump damage due to overheating of water in the system.
- 3) Open the throttle lever to the upper zone after engine has reached operating temperature.
- 4) Once the system is primed, you will note a load on the engine; adjust RPM to proper speed for your pumping application.
- 5) Adjust the foam concentrate injection percentage with the display panel to the desired percentage while the system is running at full capacity (8 GPM).

Stopping the System

- 1) Stop pump for a short time:
 - a) Run throttle all the way down (fully to the right).
 - b) Turn engine switch to OFF position.
- 2) Stopping pump for storage:
 - a) Turn fuel cock to OFF position instead of turning the engine off.
 - b) Let the engine idle for 2 to 3 minutes until fuel in the carburetor is depleted and engine stops.
 - c) Drain the pump and flush pump after use.
 - d) Drain all fuel from engine.
 - e) Store system in clean, dry environment.

Transporting the System

- 1) Secure gun, hose, tank lids, and other system equipment prior to transport.
- 2) Turn fuel cock on engine to OFF position prior to transport. Failure to do so may result in flooding of the cylinder and contamination of the crankcase oil with gasoline.

Maintenance

1. Daily: Inspect wiring, hoses, pump, gear case, engine and connectors for tightness, corrosion, leaks and/or damage.
2. Daily: Check engine oil level and refill as necessary.
3. Monthly: Remove and clean the foam and pump inlet strainer screens. Flush as required.
4. Monthly: Check pump gear case oil level and refill as necessary.
5. Monthly: Check gear case oil level and refill as necessary.
6. Monthly: Change engine oil every month or every 100 hours, whichever comes first.
First oil change is to be done at 20 hours.
7. Annually: Drain the pump oil and refill pump gear case with SAE 30 weight non-detergent oil. Check for foreign materials in the drained oil (water or debris).

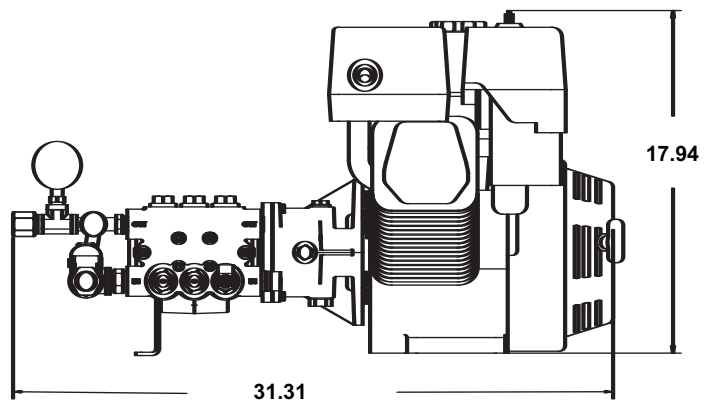
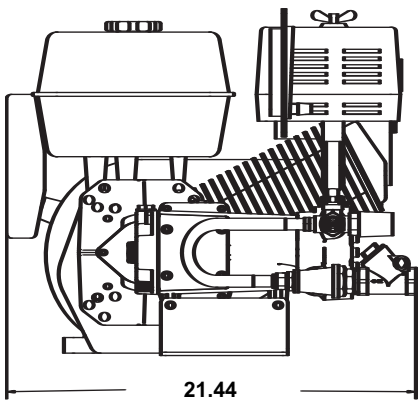
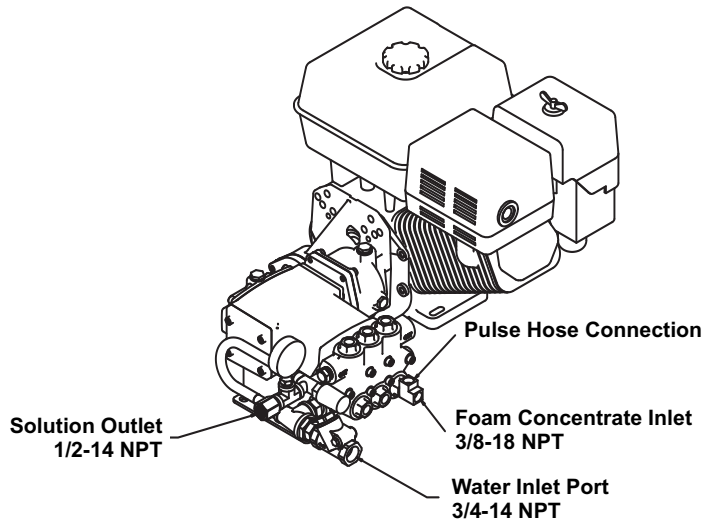
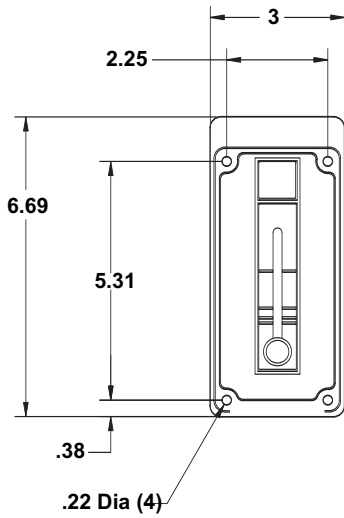
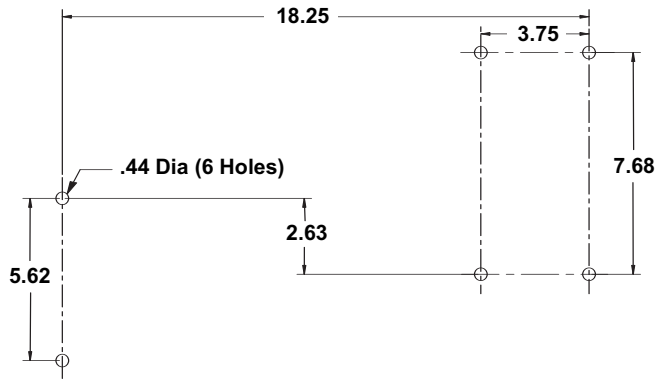
Note: Water quality, flushing and storage techniques, environment and usage may have an effect on your maintenance schedule. To ensure equipment longevity, it is recommended to adjust your schedule accordingly.

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

Troubleshooting

These Turbo Stream 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.

Installation Drawings



Notes

Limited Warranty on Hypro/SHURflo Agricultural Pumps & Accessories

Hypro/SHURflo (hereafter, "Hypro") agricultural products are warranted to be free of defects in material and workmanship under normal use for the time periods listed below, with proof of purchase.

- Pumps: one (1) year from the date of manufacture, or one (1) year of use. This limited warranty will not exceed two (2) years, in any event.
- Accessories: ninety (90) days of use.

This limited warranty will not apply to products that were improperly installed, misapplied, damaged, altered, or incompatible with fluids or components not manufactured by Hypro. All warranty considerations are governed by Hypro's written return policy.

Hypro's obligation under this limited warranty policy is limited to the repair or replacement of the product. All returns will be tested per Hypro's factory criteria. Products found not defective (under the terms of this limited warranty) are subject to charges paid by the returnee for the testing and packaging of "tested good" non-warranty returns.

No credit or labor allowances will be given for products returned as defective. Warranty replacement will be shipped on a freight allowed basis. Hypro reserves the right to choose the method of transportation.

This limited warranty is in lieu of all other warranties, expressed or implied, and no other person is authorized to give any other warranty or assume obligation or liability on Hypro's behalf. Hypro shall not be liable for any labor, damage or other expense, nor shall Hypro be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product. This limited warranty covers agricultural products distributed within the United States of America. Other world market areas should consult with the actual distributor for any deviation from this document.

Return Procedures

All products must be flushed of any chemical (ref. OSHA section 1910.1200 (d) (e) (f) (g) (h)) and hazardous chemicals must be labeled/tagged before being shipped* to Hypro for service or warranty consideration. Hypro reserves the right to request a Material Safety Data Sheet from the returnee for any pump/product it deems necessary. Hypro reserves the right to "disposition as scrap" products returned which contain unknown fluids. Hypro reserves the right to charge the returnee for any and all costs incurred for chemical testing, and proper disposal of components containing unknown fluids. Hypro requests this in order to protect the environment and personnel from the hazards of handling unknown fluids.

Be prepared to give Hypro full details of the problem, including the model number, date of purchase, and from whom you purchased your product. Hypro may request additional information, and may require a sketch to illustrate the problem.

Contact Hypro Service Department at 800-468-3428 to receive a Return Merchandise Authorization number (RMA#). Returns are to be shipped with the RMA number clearly marked on the outside of the package. Hypro shall not be liable for freight damage incurred during shipping. Please package all returns carefully. All products returned for warranty work should be sent **shipping charges prepaid** to:

HYPRO
Attention: Service Department
375 Fifth Avenue NW
New Brighton, MN 55112

For technical or application assistance, call the **Hypro Technical/Application number: 800-445-8360**, or send an email to: **technical@hypropumps.com**. To obtain service or warranty assistance, call the **Hypro Service and Warranty number: 800-468-3428**; or send a fax to the **Hypro Service and Warranty FAX: 651-766-6618**.

*Carriers, including U.S.P.S., airlines, UPS, ground freight, etc., require specific identification of any hazardous material being shipped. Failure to do so may result in a substantial fine and/or prison term. Check with your shipping company for specific instructions.

