



**ODIN**  
**Gasoline Mongoose**  
***CAFS***  
**Instruction Manual**

**Odin Foam Division**

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[www.odinfoam.com](http://www.odinfoam.com)



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**W.S. Darley & Co.**



Unit Model: \_\_\_\_\_

S/N: \_\_\_\_\_

Engine Make: \_\_\_\_\_

Model: \_\_\_\_\_

S/N: \_\_\_\_\_

LOFA Panel S/N: \_\_\_\_\_

Pump Type: \_\_\_\_\_

S/N: \_\_\_\_\_

Compressor Type: \_\_\_\_\_

S/N: \_\_\_\_\_

Proportioner Model: \_\_\_\_\_

Proportioner S/N: \_\_\_\_\_

Controller S/N: \_\_\_\_\_

Flowmeter S/N: \_\_\_\_\_

Water tank Model: \_\_\_\_\_

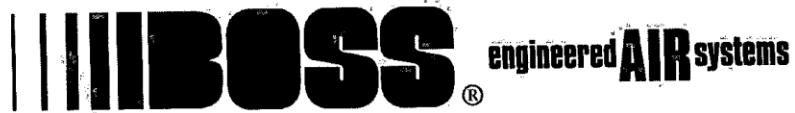
S/N: \_\_\_\_\_

Hose Reel Model: \_\_\_\_\_

S/N: \_\_\_\_\_

ROM Roll Door S/N: \_\_\_\_\_

Unit specific notes and data	



### Initial Lifetime Warranty Registration Form

All Fields must be filled out completely

Serial Number of Compressor: \_\_\_\_\_

Vehicle ID Number: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Email: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Start-up Date: \_\_\_\_\_

I wish to receive E-mail updates from BOSS Industries, LLC

I wish to receive Specials and other Promotions from BOSS Industries, LLC

Register your Warranty online at [www.bossair.com](http://www.bossair.com)

by phone: (800) 635-6587 - Fax (877) 254-4249

or Mail: 1761 Genesis Drive, LaPorte, IN 46350

Specifications subject to change without notice

Page 1 of 1

1761 Genesis Dr. • LaPorte IN 46350 • 219/324-7776 Phone • 219/324-7470 Fax



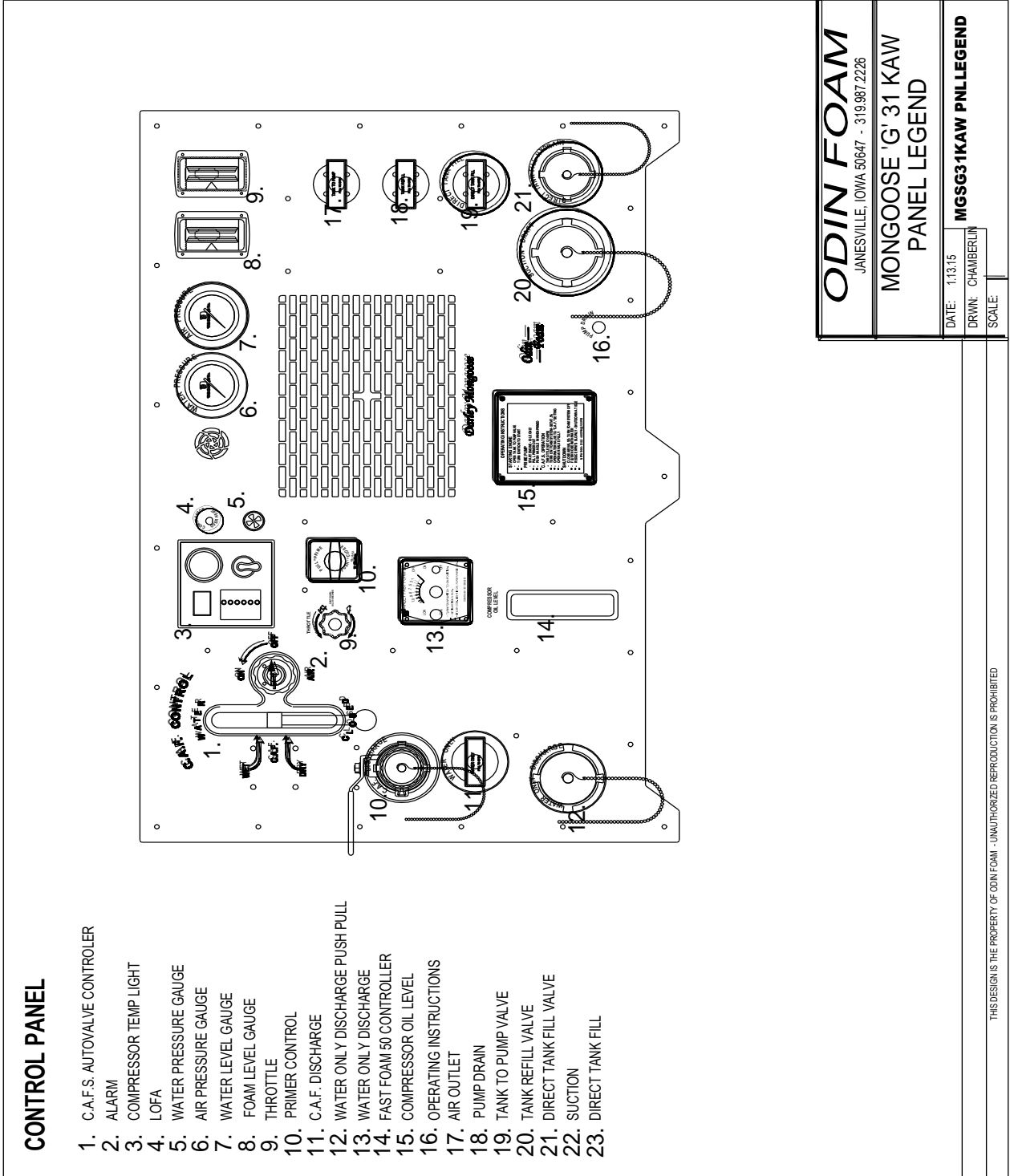
This apparatus has been fitted with a compressed air foam system. In addition to the main pump, there are two basic sub-systems that comprise a compressed air foam system on an apparatus. The first is the addition of a foam concentrate proportioner to inject foam concentrate into the water in a dedicated area of the apparatus. The second is the addition of an air compressor system to supply compressed air for foam making.

Operation of the apparatus with only the foam concentrate proportioner will result in the apparatus functioning as a conventional foam-equipped unit. Various nozzles and devices may be used to create and discharge foam. Operation of the apparatus with the proportioner and air compressor engaged will result in the engine being capable of creating compressed air foams. Compressed air foams are generally applied through straight bore devices.

The benefits of compressed air use are variable, but they are directly proportionate to the knowledge of the user. **Please read and understand this operation manual before operating the unit.**



**PAINTED PANEL**





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***Important Safety Information***

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***The warnings in this publication are not all inclusive.***

***Odin Foam cannot anticipate every potential hazard.***

***Appropriate safety rules and precautions should be followed with any tool, work method or operating procedure.***

***Improper procedures, tools and materials may cause damage or make the equipment unsafe to operate.***

***Only persons with appropriate training, skills and tools should perform these functions.***

***Improper operation, maintenance or repair of this product can be dangerous and may result in injury or death.***

***The information, specifications, and illustrations in this publication are based on information available at the time of publication.***

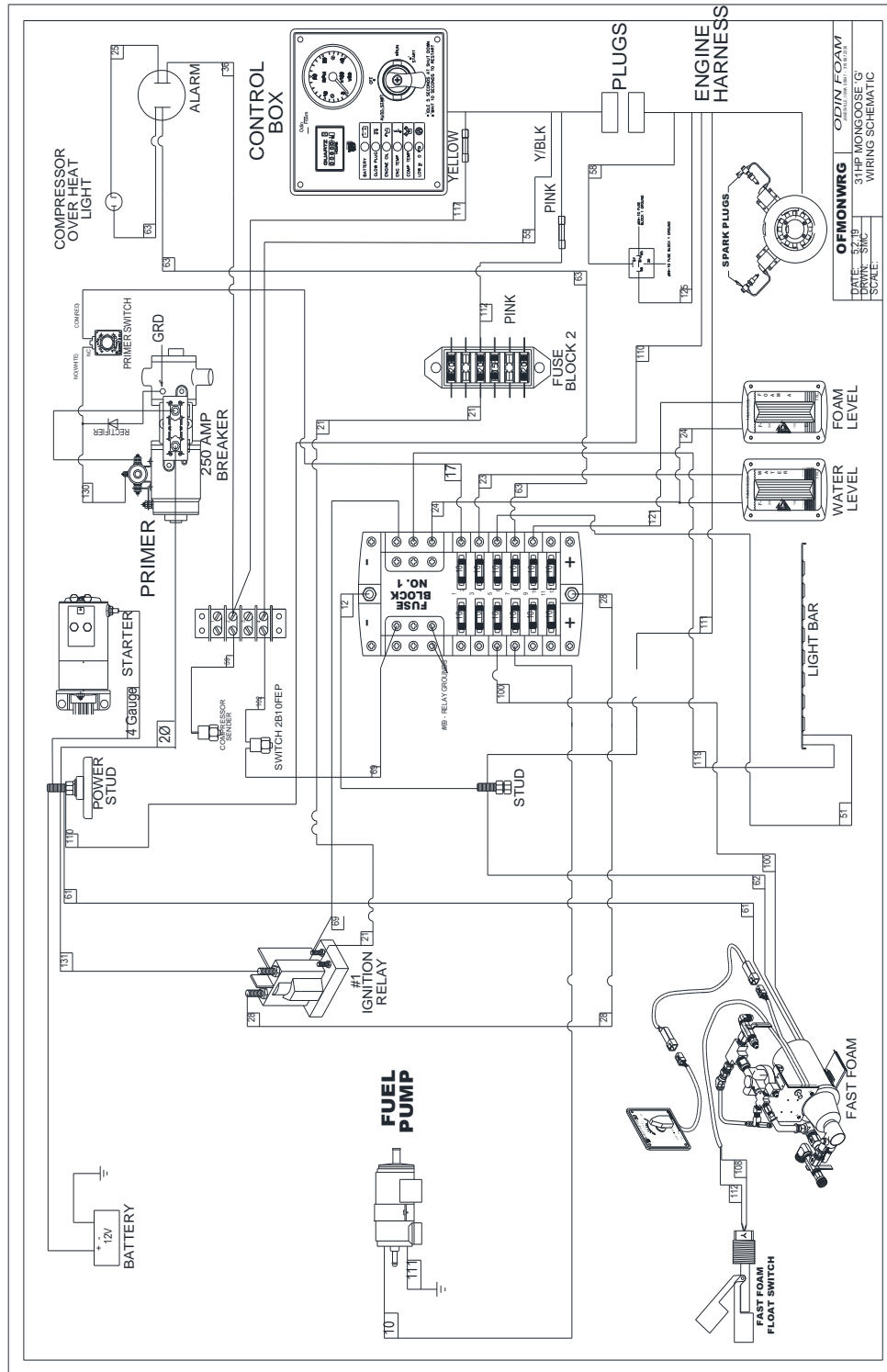
***All items are subject to change at any time without notice.***

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**INSTALLATION**

**WIRING**  
**DIAGRAM**







**INSTALLATION PLANNING**

Good planning will be the difference between an excellent job that goes well and a difficult job that goes poorly.

**Points to consider when planning the Odin Mongoose installation**

- Does the vehicle receiving the Mongoose module meet the weight and size requirements for this application?
- Control Panel Placement; is it accessible to the operator?
- Discharge Plumbing Requirements
  - A. Will the Plumbing be easier before or after module installation?
  - B. Piping and Hosing must be of sufficient size for each application; hose reel, preconnect, spray bar, etc.
- Service Access
  - A. Access to the unit, for servicing, should not be compromised.
  - B. Fluid Level Checks
  - C. Filter Changes
  - D. Inspection
  - E. Consider strongly having removable panels in the rear of cabinets  
Cabinets can block access to bottom sides of module.
- Utilities
  - A. Pre plan fuel hose and power cable runs.
  - B. Avoid pinch and rub spots on hoses and cables.
  - C. Plan for primer overboard discharge hose and Fast Foam flush overboard discharge hose



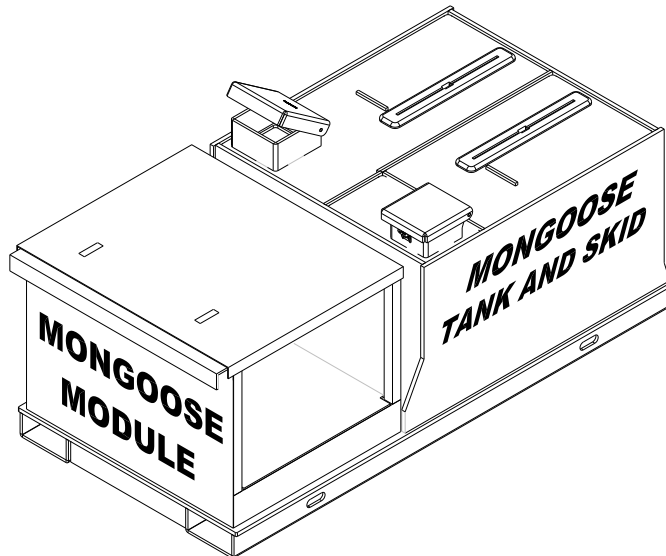
**INSTALLATION AND PLANNING**

The Odin Mongoose has been carefully engineered to give many years of service. Proper installation is vital to achieve maximum performance of the Odin Unit.

Please read all directions before installing your Module.

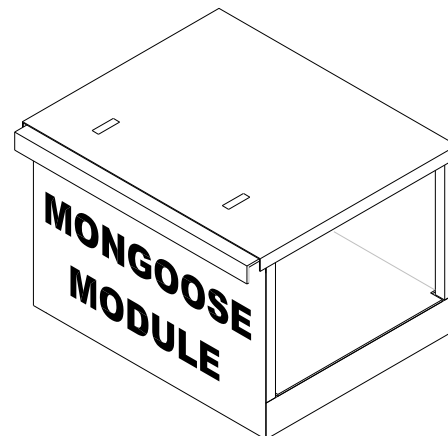
The Mongoose is built in two configurations, Skid and Non-Skid. The term “Module” refers to the Box that contains the components, plumbing and control panel.

Access to the module for maintenance and service should be considered during installation planning. Access panels placed in strategic locations on the apparatus body can greatly improve the serviceability of the unit.



The skid includes a water/foam tank mounted with the module. All of the connections between the module and tank are done at the ODIN Shop.

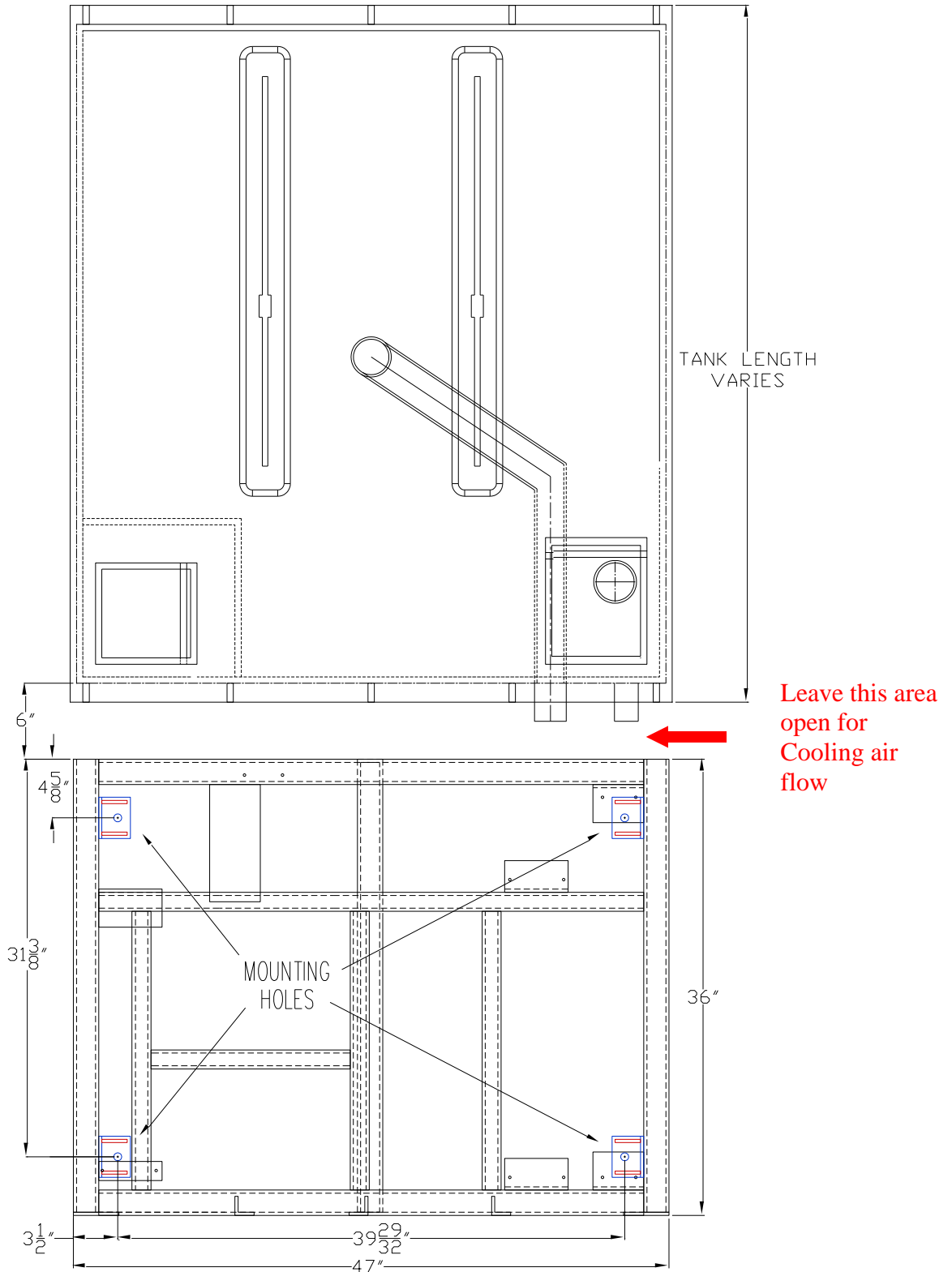
The Non-Skid module must be mated to a tank on the apparatus. See mounting instructions for additional information.





**INSTALLATION**

**TYPICAL INSTALLATION AND MOUNTING**



**INSTALLATION****CAUTION: DO NOT WELD ON THIS MACHINE, OR THE VEHICLE IT IS ATTACHED TO!**

This module may contain one or more items that will be damaged if you weld either to the CAF assembly, or to anything it is touching. The system warranty is void if you weld on any part of this machine. If it is necessary to weld on a vehicle after the system is installed, take the following preventative measures:

- Disconnect positive incoming power to module. There may be two of these.
- Disconnect negative strap to module
- If applicable disconnect Foam Pro control cables ground, strap and ground wire.
- Disconnect ECM to engine if applicable.

**CAUTION: USE CARE WHEN ATTACHING BATTERY CABLE TO SYSTEM – DO NOT CROSS POLARITY!**



### **Installation Instructions**

#### **Module Mounting - Choose a location:**

- The Odin unit has a very specific tank design requirement. The correct tank design must be used. Prints are available from The Odin Foam Division. Cooling airflow is of great importance for a successful installation. Consult Odin if there is any question about your application.
- Sides are an option. If the gap between the unit and the sidewalls of the truck body is small, they are not necessary. If there is a chance for debris to enter, install sides.
- Utility ingress and egress is out the bottom or through the side.
- Control panel should be within operating reach.
- Maintain “gap” between module and tank for proper air flow. See “Cooling Air Flow” print on following pages.

#### **Bolt down:**

- Use 1/2” x 13 Grade 8 cap screws, large washers and Teflon nuts to bolt module. Drill 2 – 9/16” holes in mount tabs, or side tubes, close to front, and 2 – 9/16” holes in rear of module. Do not over tighten screws, 35 lbs torque.

#### **Hosing:**

- There are a variety of hoses necessary to connect the Mongoose to the tank system. Improper hose type, size of installation can cause the system to malfunction or fail. The Fast Foam Hoses are included.

#### **Hosing Tips:**

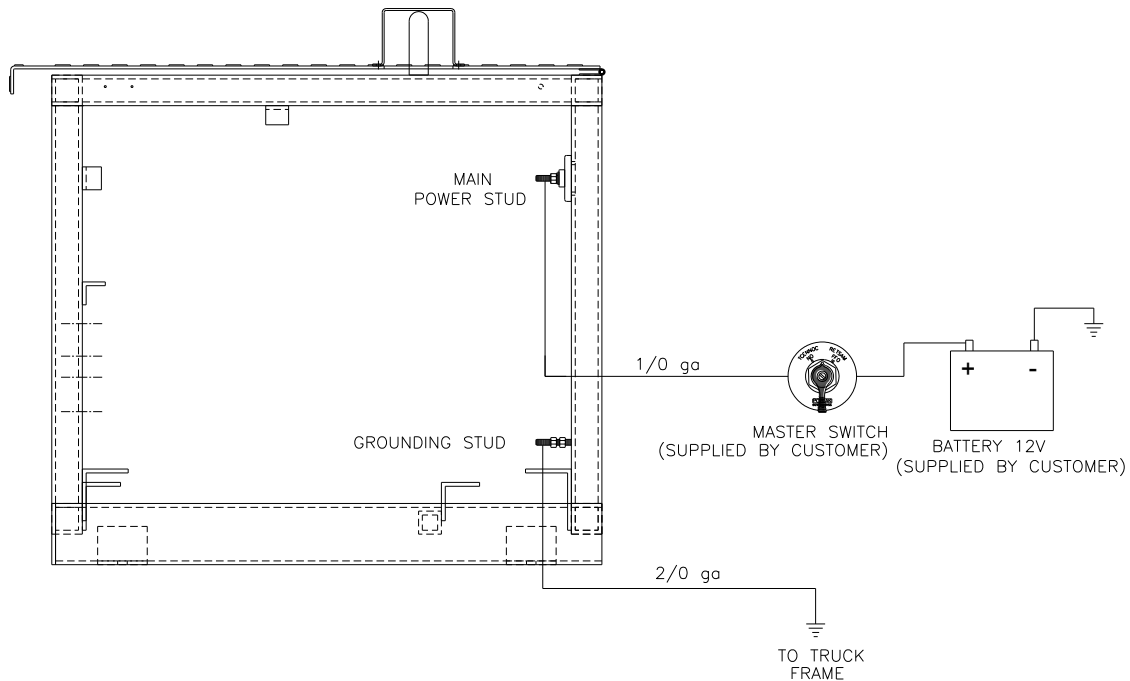
- Secure hoses along various spots along the hose run; do not secure hoses to moving parts or hot parts (i.e., drive shafts or exhaust system components.)
- Attach hose protectors or chaffing gear to the hose anywhere there is contact with a sharp edge or a potential rub spot.
- Any hose that carries water or air should be laid out in such a way that they could drain naturally. Low spots or “Bellies” are water traps that invite freeze-up damage.



## INSTALLATION

### Electrical (Battery) Connections

- The Module requires a 12VDC power source to operate. The unit is designed to tie into the apparatus electrical system. The power supply to the Module must be run through a master disconnect switch.
- The power supply cable must be 1/0 or larger. The power supply cable (+ 12VDC) connects to the stud terminal inside the unit. **(See Detail Below.)**



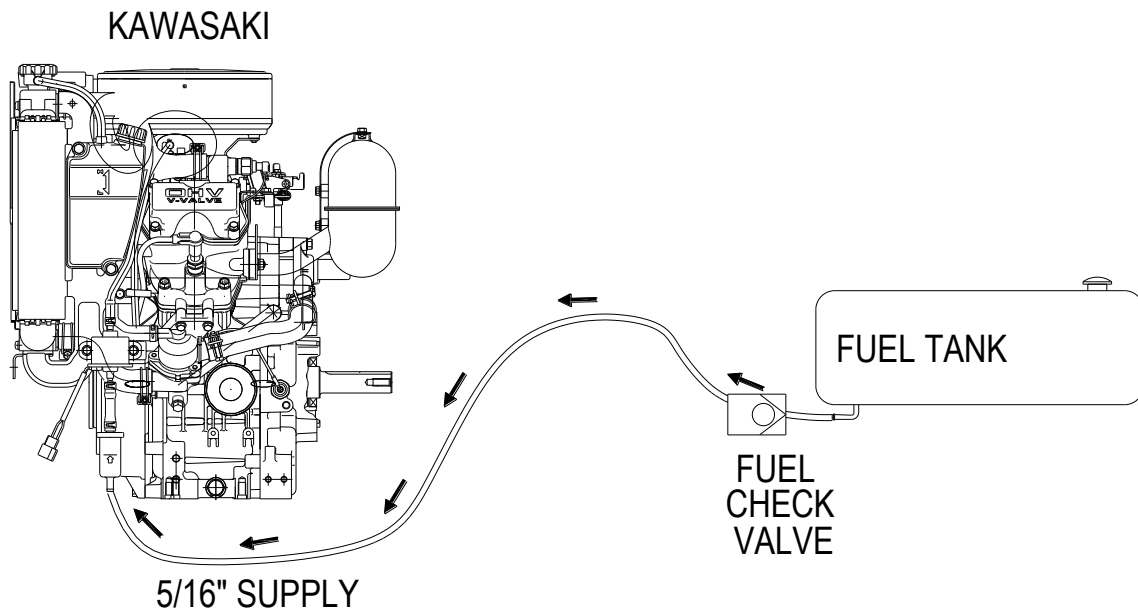
- The Module frame must be securely grounded to the apparatus chassis ground. Use 1/0 cable or a ground strap of similar size.
- The use of an electrical compound is recommended on all power and ground connections.
- Breakers should not be used as they will trip under heavy starter loads.
- If a battery switch is used, check for adequate rating for power.



**INSTALLATION**

**Fuel Supply / Return Connections**

- Size 5/16" Fuel Supply
  - **Danger - Do not install fuel tank in module. Danger – keep fuel tank away from engine heat, sparking wire potential and excessive engine hot air!**
  - **If fuel pump ships loose, or is needed, locate the fuel pump as close as possible to the fuel tank.**
  - **A short fuel supply and filter are already connected to the engine. You will need to locate the filter and connect the tank hose to this.**
  - **The fuel tank should be located on grade or above the engine with 8 feet of hose or less.**
  - **The fuel tank should be away from all heat and hot air flow. Inside cabinet applications require further venting outside.**
  - **For longer runs, or lifting from below grade of the engine, an additional lift pump may be required**
  - **A fuel check valve should be located as close to gas tank as possible if the tank is below the intake of fuel at the engine.**
  - **Locates gas tank in a cool area**



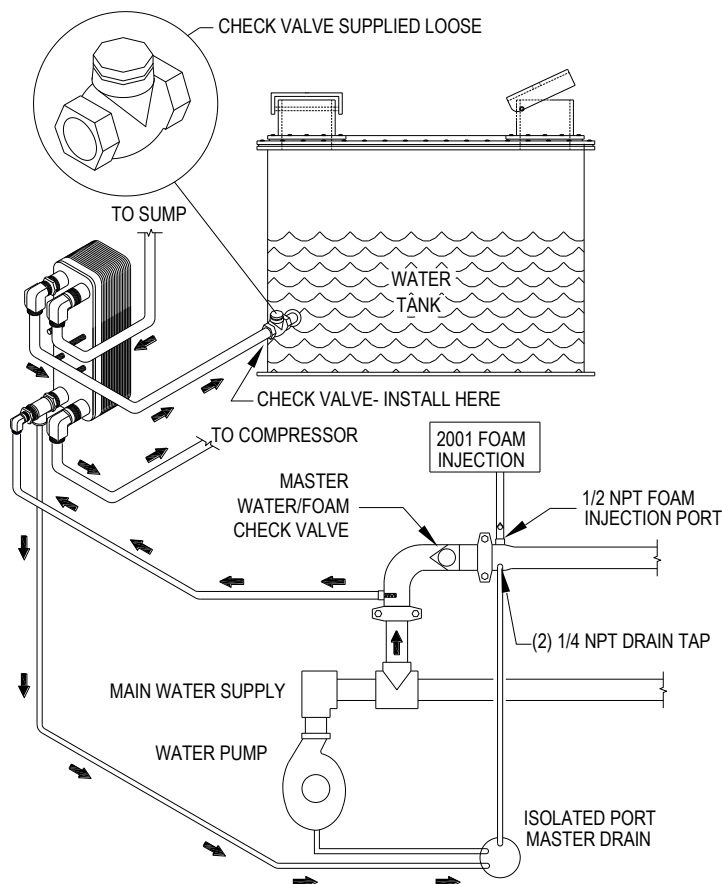


## INSTALLATION

### Water / Foam Tank Connections

#### Compressor Cooling Water (Heat Exchange)

- A. Size 3/8" less than 12' run.
- B. Size 1/2" Greater than 12' run.
- C. Type – Hydraulic Hose or Air Brake Hose
- D. Connections - Cooling water return (hot) – From the check valve on the Heat Exchanger to the apparatus water tank. **Detail Below.)**

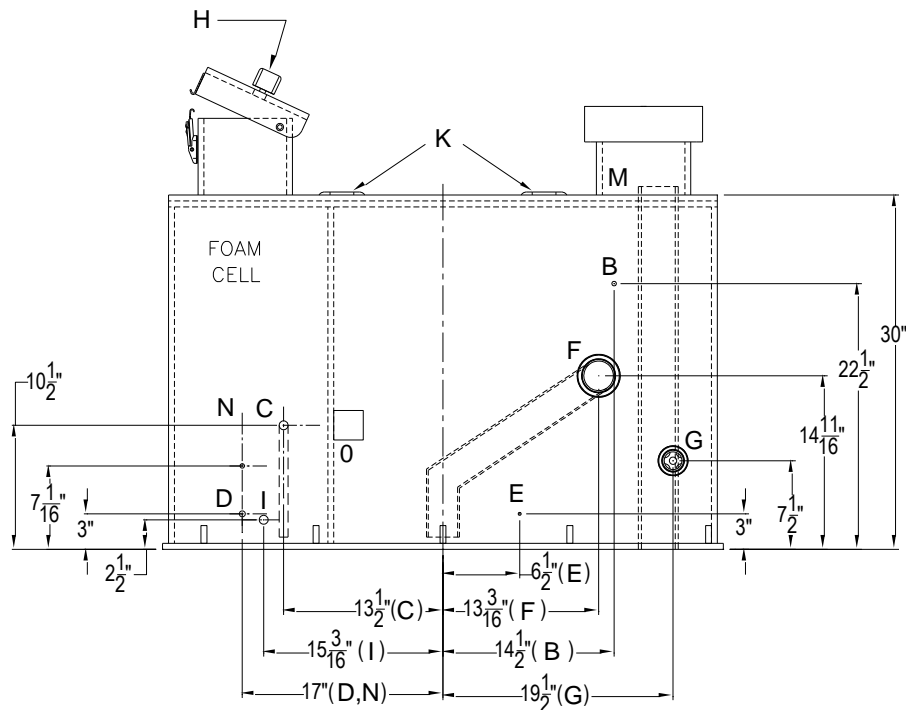






**INSTALLATION**

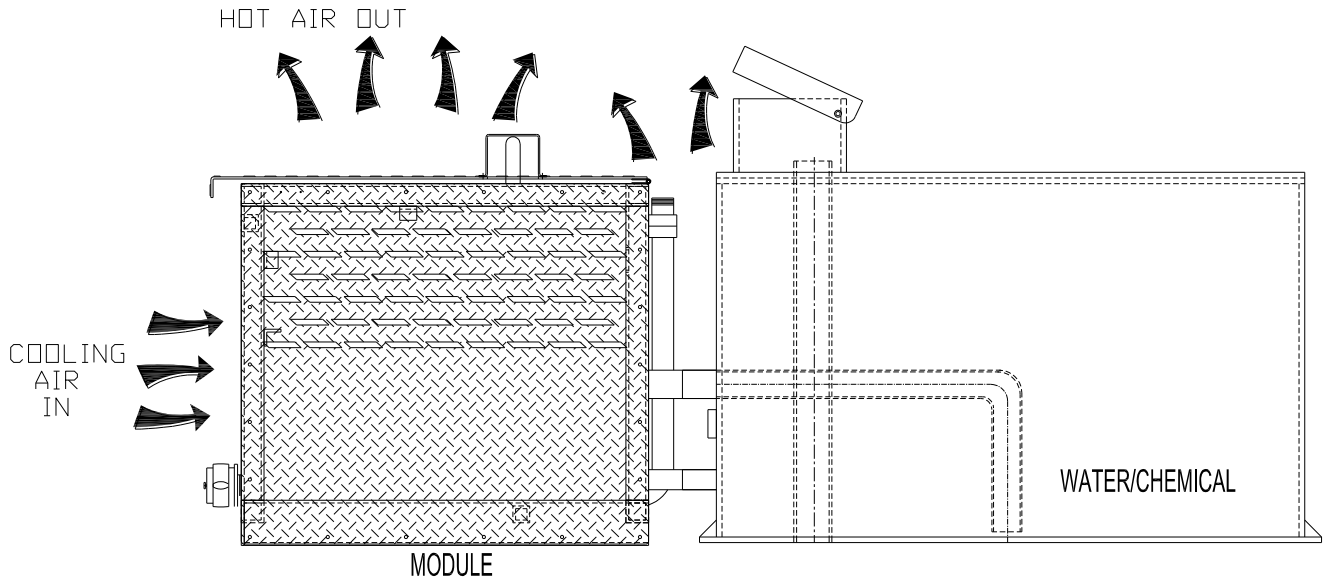
FNPT = FEMALE NATIONAL PIPE TAPER	
EQUIPMENT INSTALLED	
A.	N/A
B.	3/8" FNPT COOLER LINE
C.	3/4" FNPT FOAM SUCTION - SS FLANGE
D.	1/2" FNPT LO-CON SENSOR (NO BACK PLATE) 1/2" THICKNESS
E.	1/4" FNPT WATER LEVEL SENDER
F.	2-1/2" FNPT TANK TO PUMP
G.	1-7/8" OD STUB OR 1-1/2" FNPT TANK REFILL/DIRECT TANK FILL
H.	1-1/8" Ø FOR FIRE RESEARCH CAP
I.	3/4" FNPT DRAIN HOLE
K.	SQUARE BOLT HOSE REEL PAD
M.	3" OVERFLOW PIPE
N.	3/8" FNPT FOAM RETURN
O.	3/4" X 2-1/2" X 2-1/2" CLAMP MOUNT PAD





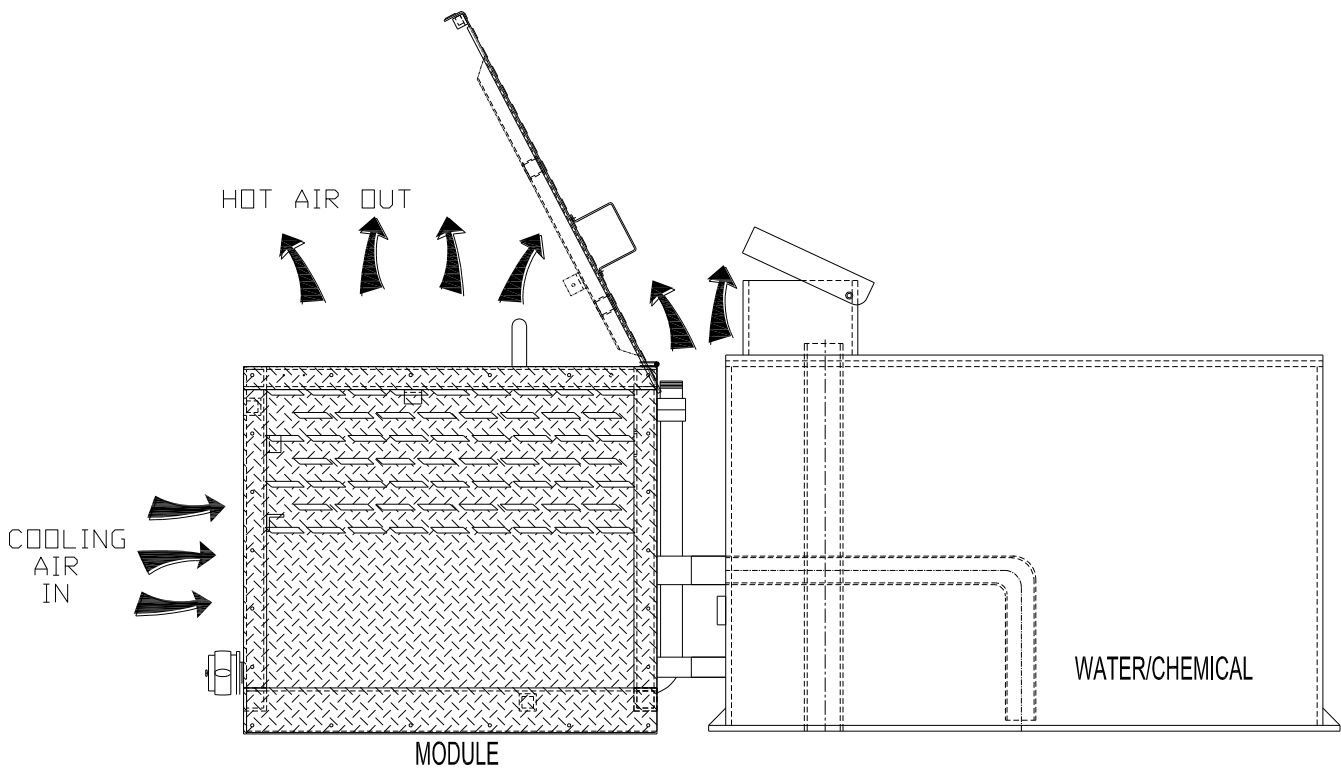
**OPERATION**

**Cooling Air Flow**



**For extended duration pumping on hot days  
The lid may be opened to keep the unit cool!**

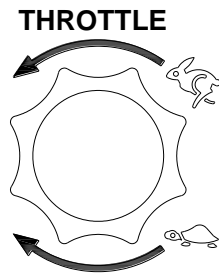
**STARTING THE SYSTEM**



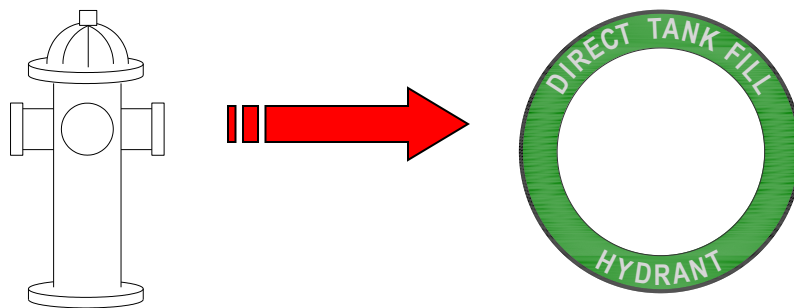


**IMPORTANT OPERATION NOTES**

- 1) The Vernier throttle is very powerful. Once you attain full pressure at no flow (static pressure) of 140 psi, **STOP** increasing the throttle mechanism. If you continue to throttle past the stop point of the throttle system, the cable will be pulled off the engine, and the linkage can be bent.



- 2) Always intake hydrant or any pressurized source through the **Direct Tank Fill** inlet! Do not use the **Suction** inlet for anything but drafting operations.



- 3) The CAFS system is designed to generate the correct pressure through the **Tank To Pump** inlet only. In addition, excessive pressure to the suction pipe will exceed the pressure capability of the suction gauge- specially calibrated to read vacuum levels for drafting.

The engine system has a charging rate of 13 amps. The operation in CAFS or solution mode for sustained periods will require use of the chassis engine to maintain a positive charge on the battery system. The Fast Foam will use up to 19 amps at full pressure. It will take a couple hours for a fully charged - full size battery to show some discharge.



An idling chassis engine will have plenty of reserve power for the system, and should be used when on fire scene with long use.

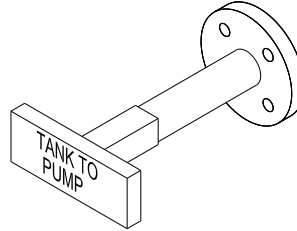
#### HIGH ALTITUDE

The Mongoose sustains full engine power at lower elevations. As you increase in elevation from sea level, losses are incurred by both the engine and the compressor. In order to maximize the output potential where most operations occur - lower elevations - upper elevations of 4000 ft and above will have losses in performance. **Restraining maximum flows** in this situation is the best way to deal with excessive power losses.



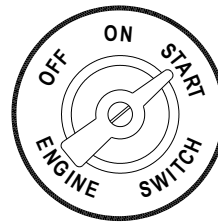
**OPERATION**

**1. Open tank to pump valve**



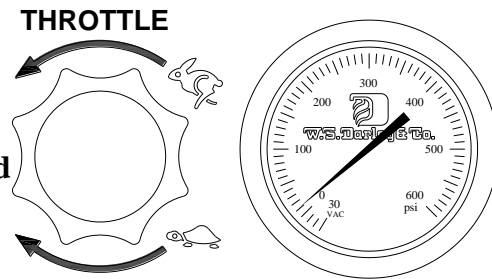
**2. Turn ignition switch to start. Turn over engine 5 seconds or less.**

**If engine does not start, try  
Switching choke position and  
Re-try starting.**



**3. Once the engine has started, idle.**

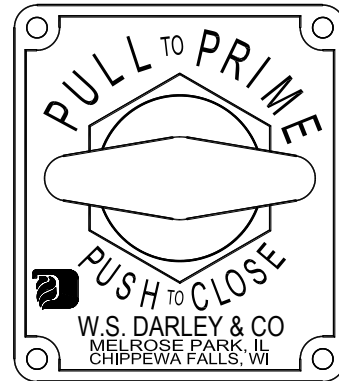
**Check the water pressure gauge. It should  
Show 10 psi or more. Prime if necessary.**





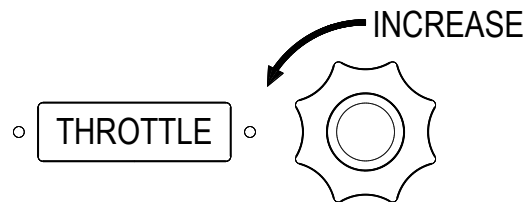
PRIMING THE PUMP

1. Pull Primer if necessary.



2. Increase Throttle to desired water pressure.

CAFS pressures are 75 to 150 psi.

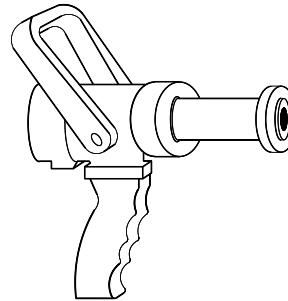




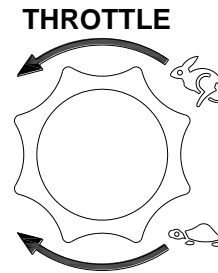
**OPERATION**

**C.A.F.S. OPERATION**

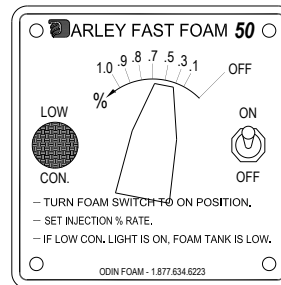
1. Select proper nozzle for C.A.F.S.



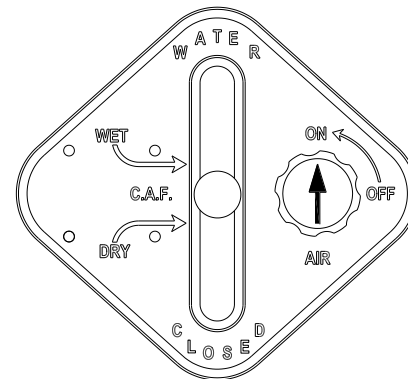
2. Throttle static pressure to 90-140 psi  
Higher throttle points create more air  
Volume and pressure.



3. Turn foam switch to "ON" position.  
Set proportioner knob to .5% \*\*\*



4. Open water valve to "C.A.F." designation.
5. Open air valve to ON position. \*



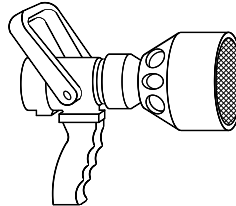
**\*The concentrate, water and air settings  
Described in CAFS operation instructions is  
a good starting point. All of the adjustments  
are variable to suit operational requirements**



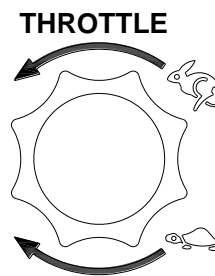
**OPERATION**

**SOLUTION OPERATION**

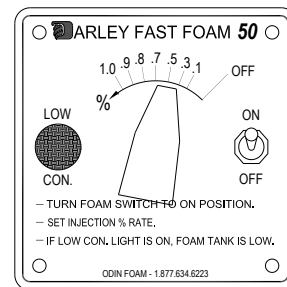
1. Select proper foam nozzle



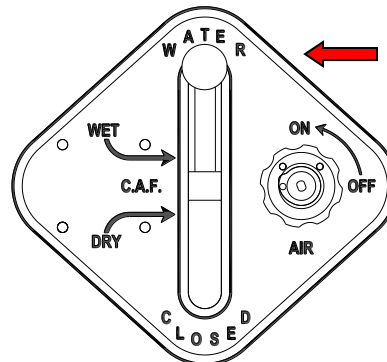
2. Choose desired throttle for correct position. Any water pump pressure is “OK”.



1. Turn foam switch to “ON” position  
Set to desired concentrate proportion %.



4. Open water valve to “WATER”  
Setting.



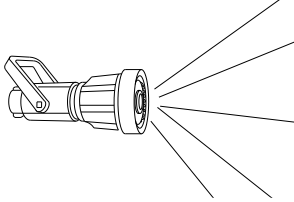




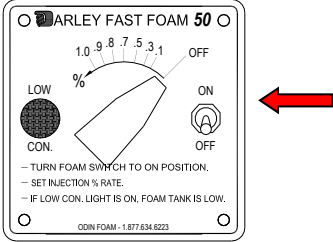
**OPERATION**

**WATER ONLY OPERATION**

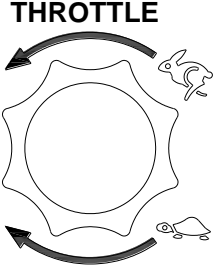
**1. Select proper nozzle**




**2. Shut off Foam Switch**




**3. Position throttle  
For desired Pressure**



**4. Connect hose to water only outlet**



**5. Open rod fully**

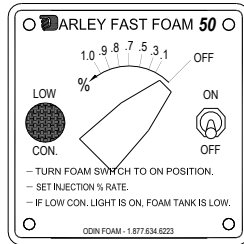




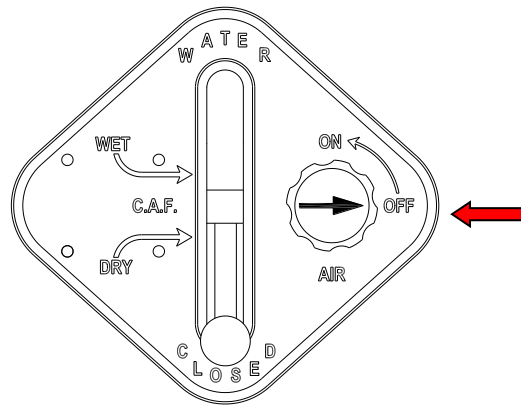
**OPERATION**

**FLUSHING & SHUTTING DOWN THE SYSTEM**

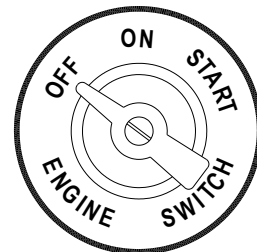
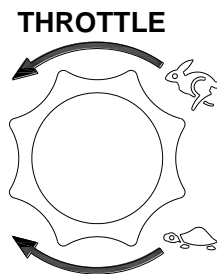
**1. Shut off Foam Switch**



**2. Close the air valve.**



**3. Reduce RPM'S slowly.  
Shut Down At Idle.**





## DRAINING & WINTERIZING

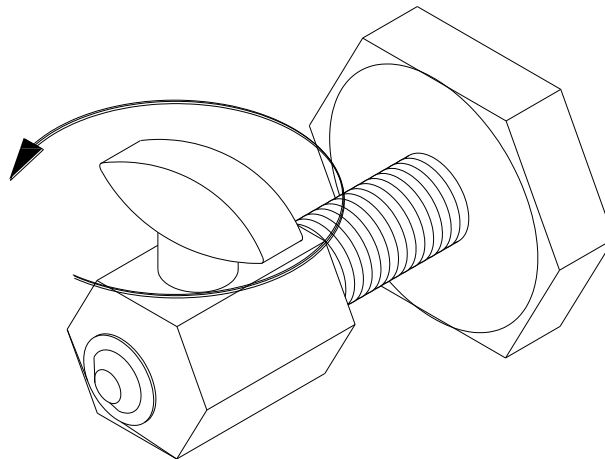
Precautions must be taken to prevent damage to the CAF system when operating in freezing conditions. Odin equipment comes with provisions to completely drain and winterize the pump and plumbing.

### Drain Valve's

The *Drain Valves* are normally connected to the various “low points” in the system with ¼” hose. Due to the small inside diameter of ¼” hose, sediment build-up can quickly block the hose. The frequency and severity of drain hose blockage will be determined by the amount of contamination in the water being run through the water pump.

There is a quick method to clear out the drain hoses on the unit. Connect a pressurized water source to the suction inlet of the water pump and open the *Master Drain Valve*. Allow the water to run through the *Master Drain Valve* until the water runs clear.

In addition, open all valves to 1/2 open position, all caps removed from discharges and on level ground. Best also to drive rig through a few hills to tip water back and forth for most thorough draining.

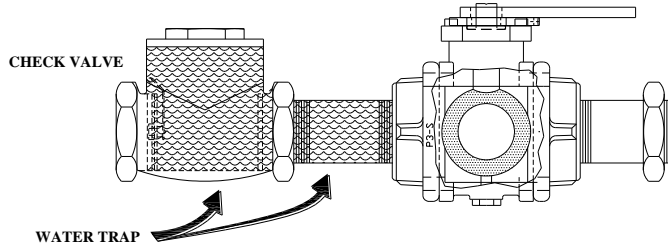


**DRAIN**

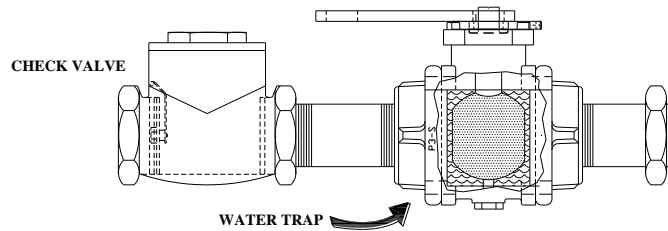


**OPERATION**

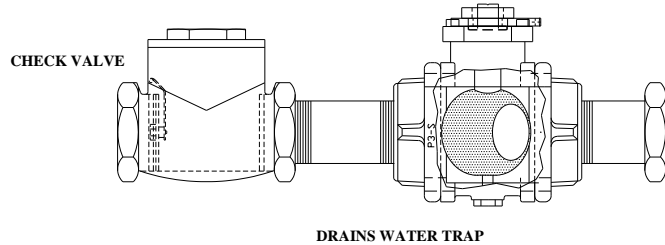
**VALVE CLOSED**



**VALVE OPEN**



**VALVE SET @ 1/2**



**DRAINS WATER TRAP**



**cold weather operations.**

**Prevent  
freeze-  
up  
damage  
during**

A CAF system contains a variety of valves and check valves. “Water traps” can be created in valves and check valves. When draining and “winterizing” the CAF system, all valves should be placed in the half open/closed position, to prevent “water traps”.



## Darley 2BE31KAW PUMP

### OPERATION INSTRUCTIONS MODEL 2BE PORTABLE PUMP

**WARNING: Do not use this pump for hose testing.**

See Engine Instructions Before Operating This Unit

#### LUBRICATION

Change the engine oil, & maintain its level according to the recommendations of the engine manufacturer. These recommendations should be found in the engine manual supplied by the engine manufacturer.

#### PREPARATION FOR PRIMING

Check coupling gaskets and connect hose lines with coupling properly tightened.

Any size of suction and discharge hose may be used, depending on the volume of water required.

Be certain that the suction hose (or pipe) is absolutely air tight. The pump will not lift water if the suction side of the pump has the slightest air leak.

A strainer with openings not larger than 1/4" mesh must always be used on the end of the suction line when pumping dirty water.

Avoid air traps in suction hose if possible.

Keep the suction intake strainer well above the bottom of stream or pond to prevent pickup of soil and other foreign matter. If the strainer must lie on the bottom, a metal plate or pan should be laid under it.

The suction intake should be submerged several inches to prevent sucking in air. A cover laid over the top of strainer will allow the pump to operate with a minimum of submergence.

Close drain valve and all other openings into pump casing.

Do not start the engine until everything is in readiness for pumping, with hose couplings properly tightened, and pump discharge valve partly open.

#### TO PRIME A PUMP NOT EQUIPPED WITH PRIMER

Install a foot valve and strainer on the submerged end of suction line.

Suction line must slope down all the way from the pump to water.

Pour water into the pump through the discharge opening until pump casing and suction line are completely filled, before starting the engine.

**NOTE:** If your pump is equipped with a discharge check valve, it will be necessary to prop it open.

#### RUNNING THE ENGINE

Read the engine operator's manual before operating this unit.

Never start the engine with wide open throttle.

Never run the pump at high speed at any time unless it is discharging water.

Never run the pump at any speed without water longer than the short interval required for priming.

#### ALL DIESEL ENGINES

All diesel engines must be throttled back by the operator in high load situations. This must be done to prevent over-fueling the engine as is evident by black exhaust smoke. Careful readjustment of the throttle will not cause a decrease in pump performance. Throttle back until pump performance just begins to decrease.

**CAUTION:** Over-fueling the engine will cause dilution of the engine oil with diesel fuel and premature wear on the cylinder walls and bearings.



**Darley 2BE31KAW PUMP**

**Operation and Maintenance**

When operated within rated operating conditions of this pump, these seals will provide trouble free service for extended periods.

Properly selected and applied mechanical shaft seals are leak free and require no adjustment. Should the seal area develop a leak, investigate the cause as soon as possible. Seal failure, leakage, may be the result of; worn seal faces, leaking bellows, or damaged o-rings. These failures may be attributed to bearing failure, impeller blockage, impeller imbalance, seal housing contamination, operating beyond pump design rating, or dry running,

Mechanical shaft seal design relies on the sealed media, in this case, water, to cool and lubricate the sealing surfaces. Therefore, extended dry operation may cause overheating and scoring or damage to the sealing surfaces, resulting in excessive leakage or a much shortened seal life.

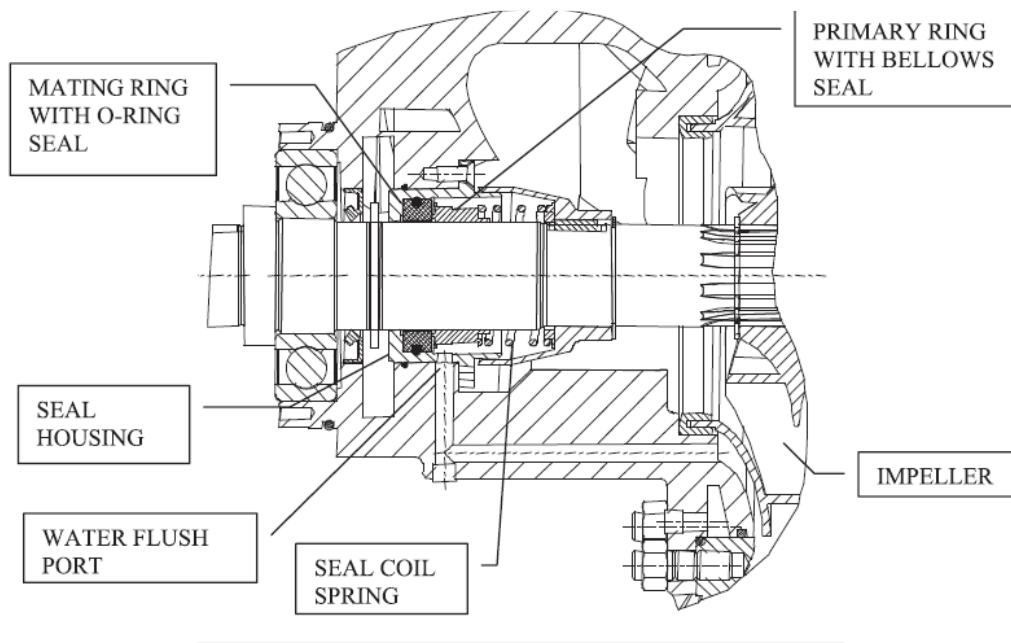
To maximize seal life, minimize operation at pump pressures higher than pump rating. While operating at pressures beyond rating will not immediately damage the seal, it will increase sealing surface wear rate.



**CAUTION: DO NOT RUN THE PUMP DRY EXCEPT MOMENTARILY AND AT LOW SPEEDS**



**CAUTION: DO NOT USE THIS PUMP FOR HOSE TESTING**





**Darley 2BE31KAW PUMP**

REVISIONS			
LTR	DESCRIPTION	DATE	CHG. NO. APPR'D
A	REMOVED PLASTIC PLUG #22	27MAR2008	2008-111 TED

REP. NO.	NAME OF PART	QTY.
1	PUMP CASING	1
2	O-RING - PUMP CASING	1
3	HEX NUT	20
4	STUD	16
6	RETAINING RING	1
7	BEARING	1
8	IMPELLER SHAFT KEY	1
9	OIL SEAL	1
10	IMPELLER SHAFT	1
11	INBOARD HEAD	1
12	STUD	4
13	LOCKWASHER	4
14	IMPELLER	1
15	SEAL BOX, MECHANICAL	1
16	SEAL RING	1
17	IMPELLER KEY	1
18	IMPELLER WASHER	1
19	IMPELLER NUT	1
20	IMPELLER COTTER KEY	1
21	MECHANICAL LIP SEAL	1
23	DRAIN	1
24	QUAD RING	1
25	RETAINING RING	1

DIRECTION OF WATER PRESSURE ON SEAL #21  
SCALE: 2:1

 <b>W.S. DARLEY &amp; Co.</b> MELROSE PARK, IL - CHIPPEWA FALLS, WI	
DWG - 2BE ASSY, X SECTION FLOUROLOY SEAL	
TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	DATE 26SEP2007 <b>DBC0305</b>
DR'N DMD CHKD TED TRCD	SCALE 1/2

OLD PART NO. —

DO NOT SCALE PRINT

ALL DIMENSIONS IN INCHES UNLESS NOTED

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY & CO. UNAUTHORIZED REPRODUCTION IS PROHIBITED



## COMPRESSOR

### AIR COMPRESSOR

The system is capable of generating large volumes of compressed air foam at relatively high pressures. All personnel who operate the machinery or work off the hose lines must be aware that compressed air foam has more properties of air than water. A large amount of pressure can be stored in the hose lines even after the system has been shut off. It is possible for there to be significant recoil if an appliance is cracked open, even if the system has been shut down for quite a long time.

**USE ONLY THE PRESCRIBED COMPRESSOR OIL.** DEXTRON III / MERCON Automatic Transmission Fluid

**REPLACEMENT PARTS MUST BE MANUFACTURER'S ORIGINALS.** Replacement hoses must be the same types as the originals to insure that they will withstand the pressures and heat that are generated in normal operation.

**DO NOT VOID YOUR WARRANTY.** If the system is not running properly, have a qualified person try several outlined procedures to remedy the problem. If the problem persists, call Odin Foam Division. Spare parts are available through Odin Foam Division.

### IMPORTANT WARRANTY AND SAFETY INFORMATION

When working on the compressor, the following points must be followed to prevent:

- *Injury to personnel*
- *Damaging the compressor*
- *Voiding your Bauer warranty*

- A. **DO NOT** attempt to service any part while the compressor is operating.
- B. **USE** only the proper metric tools and proper replacement parts for service and repair work.
- C. **MAKE SURE** the entire system has been relieved of pressure before performing any service or repair work. Make sure the system cannot be started while it is being worked on.





## COMPRESSOR

### AIR COMPRESSOR

- D. **NEVER WELD** on any of the pressure vessels or alter them in any way.
- E. **NEVER USE ANY FLAMMABLE SOLUTIONS** for cleaning parts.
- F. **METICULOUS CLEANLINESS MUST BE OBSERVED** during service and repair work. Keep out dirt by covering the parts and exposed openings with a clean cloth, paper, or adhesive tape.
- G. **REPLACE ALL GUARDS** and panels before putting the system back in service.
- H. **BEFORE RELEASING THE UNIT** for operation after it has been maintained or overhauled, check whether the operating pressure, temperature, and time adjustments are correct and the control and alarm devices are in perfect working order.

### WEEKLY

The system should be run once a week to check for proper operation and keep moving parts lubricated. Run the system for enough time (about 10 minutes) to allow the engine and compressor to reach full operating temperatures. Flow some air at about 30 CFM out of an outlet to ensure lubrication of the compressor modulating and control valves. It is not necessary to discharge water.

**AIR COMPRESSOR****WHEN PUMPING WATER THAT CONTAINS PARTICULATE**

If the water being pumped is turbid (muddy or cloudy) or has small rocks or other debris, it is important for the operator to monitor the compressor temperature closely as the cooling system for the compressor uses pressurized water from the top of the water pump. While some units specify a large cast-ye strainer on the suction to the water pump to make sure the water delivered to the pump is reasonably clean, small rocks or other debris can still plug the water-cooling system for the air compressor. A small pipe strainer is located at the top of the pump where a 3/8" hose goes to supply cooling water to the compressor heat exchanger which in turn returns the water to the tank. Check and clean both the cast-ye strainer and the small pipe strainer whenever suspect water has been run through the system.



## GENERAL DESCRIPTION

### Compressor Function Testing

The rotary screw air compressor in an Odin CAF System works automatically when the system functions properly. Performing a simple weekly function check will help assure the system continues to give reliable service.

When function testing the compressor, you will be flowing *air only* from a discharge. Use of hearing protection is recommended.

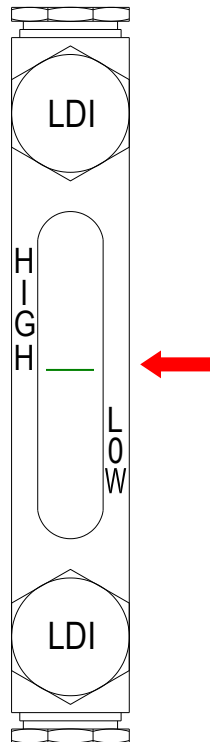
### CAF Compressor Function Test Procedure

1. Start the unit and bring it up to normal operating temperature. (Be sure that there is sufficient cooling water for the compressor, on units equipped with a heat exchanger.)
2. Select the pointed valve to prime on the panel. Don't open the valve for priming though. The compressor should go to full pressure( 140 psi to 150)
3. Check that at full throttle static the air psi is within 5 psi of the water. Adjust air pressure control if not.
4. Return the prime system to run.
5. **Auto Balance Test-** Slowly advance the throttle until the water pressure is steady at 100 psi. The air pressure should follow the water pressure (A slight time lag is acceptable.) and balance to within  $\pm 9$  psi.
6. Repeat step 3 @ 125 psi.
7. **High Pressure Limit Test-** Advance the throttle to full power. (Indicated water pressure should exceed 150 psig.) The air pressure should be limited to 140 to 150 psig.
8. **Modulation Test-** Full throttle. Observe the air pressure gauge modulation. The air pressure should remain within  $\pm 10$  psi of the high-pressure setting (150psi).
9. Remove all caps and hoses from a CAF discharge. (Be sure to clear the discharge area of personnel)
10. **Air Flow Test-** Advance the throttle to full power. Open the selected air valve until the master air pressure gauge indicates 100 psig. (Most cfm gauges are calibrated for 100 psi) Record the airflow reading.
11. **Blow Down Test-** Retard the throttle to idle, allow a cool down period. Shut down the compressor and listen for the "hissing noise" of air being evacuated from the pressure vessel. The blow down should last 30-45 seconds. **Do not attempt to restart the compressor until the Blow Down cycle is complete!**

A qualified technician should repair discrepancies.



## Air Compressor Oil Level Sight Gauge

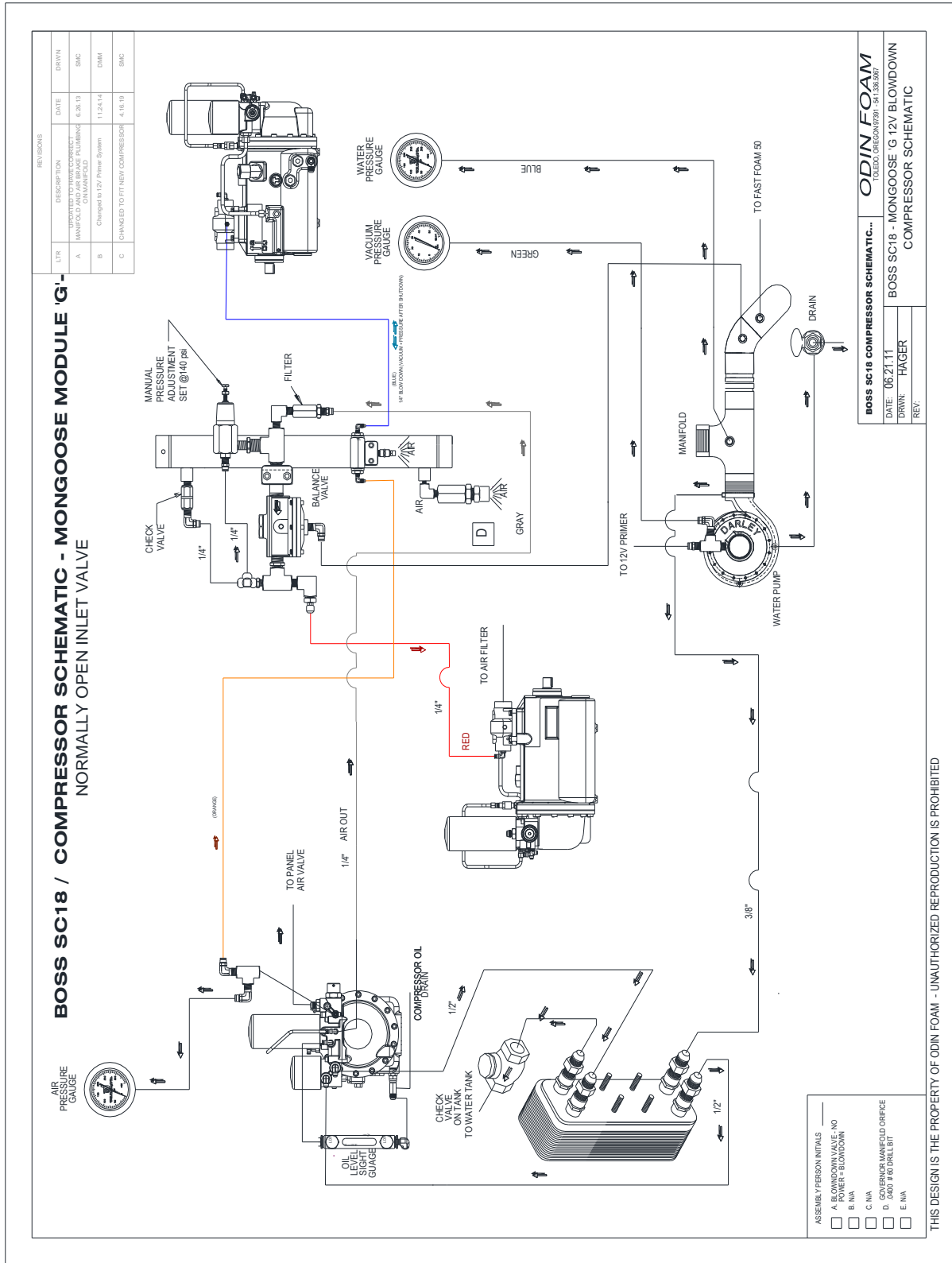


Maintain the oil level between  $\frac{1}{4}$  and  $\frac{1}{2}$  the sight glass. Over  $\frac{1}{2}$  gauge level will indicate over full tank.

Check this only when system is cold and on level ground. If over filled oil will flow out discharge air.



DRIVE SYSTEM

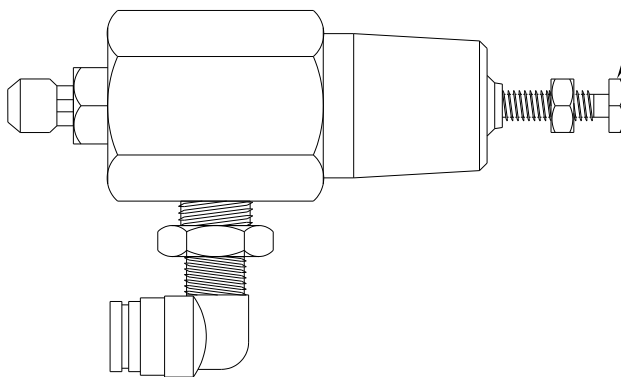




## COMPRESSOR SCHEMATIC MANUAL PRESSURE ADJUSTMENT

- This usually never needs adjustment.
- Start the engine and bring the system to full operating water pressure. Make sure the engine is warm. Do not flow any water or air during the initial adjustments; keep the system at standby static flow.
- Open the hatch lid, and locate the manual pressure for the compressor.
- While the system is running per above, loosen the 7/16" locknut below the adjustment slotted screw. Turn the slotted screw to adjust the air pressure – in is higher pressure, out is lower pressure.
- Adjust the air pressure (monitor the air pressure gauge) to match the maximum static water pump pressure. This will typically be a setting of 140 to 150 psi.
- Lock the 7/16" locknut.

MANUAL  
PRESSURE  
ADJUSTMENT  
SET @150 psi

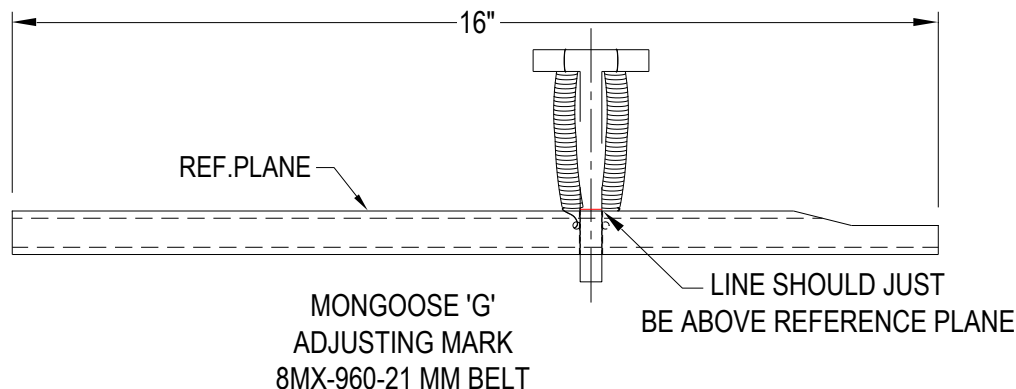


## Belt Adjustment

The Odin CAFS unit is equipped with a patented drive system, which utilizes a *Gates Poly-Chain*® belt and pulley system. The *Poly-Chain* belt is not designed to operate under tension. Belt adjustment is preset at the factory, and is usually adequate for a hundred hours of use. Belt adjustment should be periodically checked (every 100 hours or annually) using the belt adjustment tool provided with the unit.

### Belt Adjustment Procedure

- 1) **Belt adjustment must be done when the system is “cold”**
- 2) Loosen all six 9/16” bolts on the compressor bracket (1) (See Figure 1).
- 3) Use a large pry bar to move the compressor bracket to proper adjustment.
- 4) Hold belt adjustment tool (2) firmly against the belt (3) on the top side of the pulleys (4 & 5) (See Figure 2).
- 5) The belt “slack” adjustment has an (6) indicator line on the adjustment tool (2). When the reference plane (7) is aligned to the indicator line, the belt is at the proper adjustment (See Figure 3).
- 6) When the belt is at the proper adjustment, re-tighten the 9/16” bolts on the compressor bracket (1) (See Figure 1).
- 7) Re-check the belt tension using the belt adjustment tool (2) after tightening 1 9/16” bolt on each side. To see if within the desired range. Re-adjust if necessary.
- 8) Tighten all six bolts and recheck tension.
- 9) Run the system up to the normal operating temperature. (HOT)
- 10) Shut down the system and re-check the belt adjustment.
- 11) You may notice that the “slack” is much tighter than when the system cold. After fully cooled down( next day ) re-check the belt once more to make sure that it is correctly adjusted.





# Belt Adjustment

FIG.1

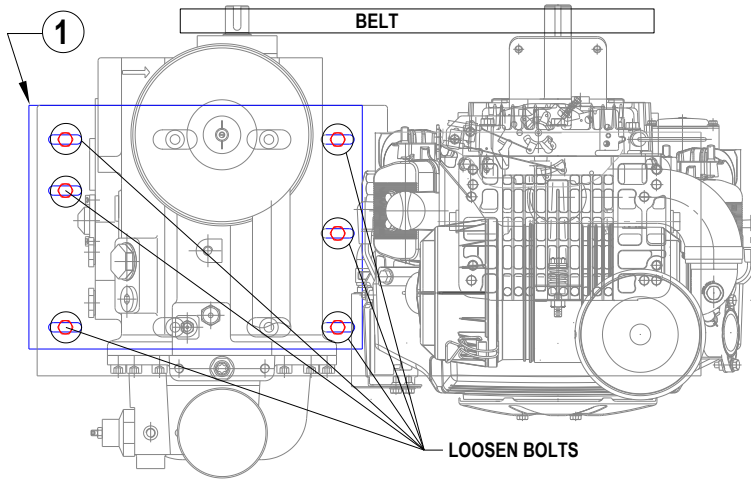


FIG. 2

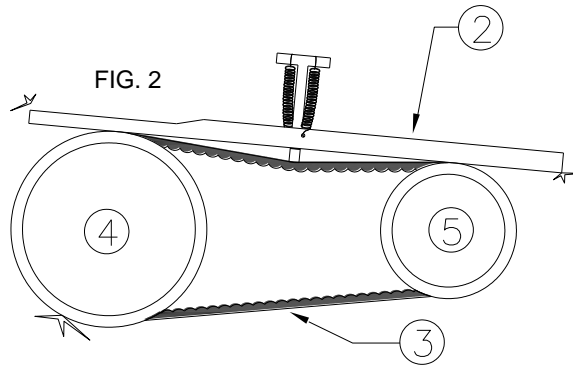
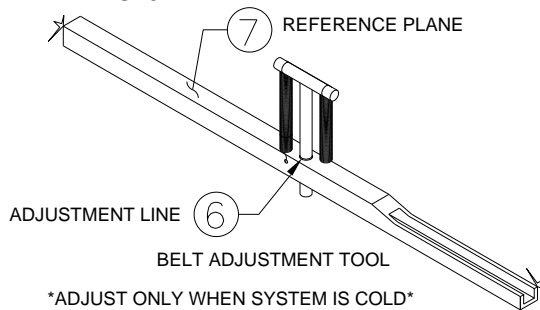


FIG. 3







**Darley Fast Foam 50  
Class "A" Foam Proportioner**

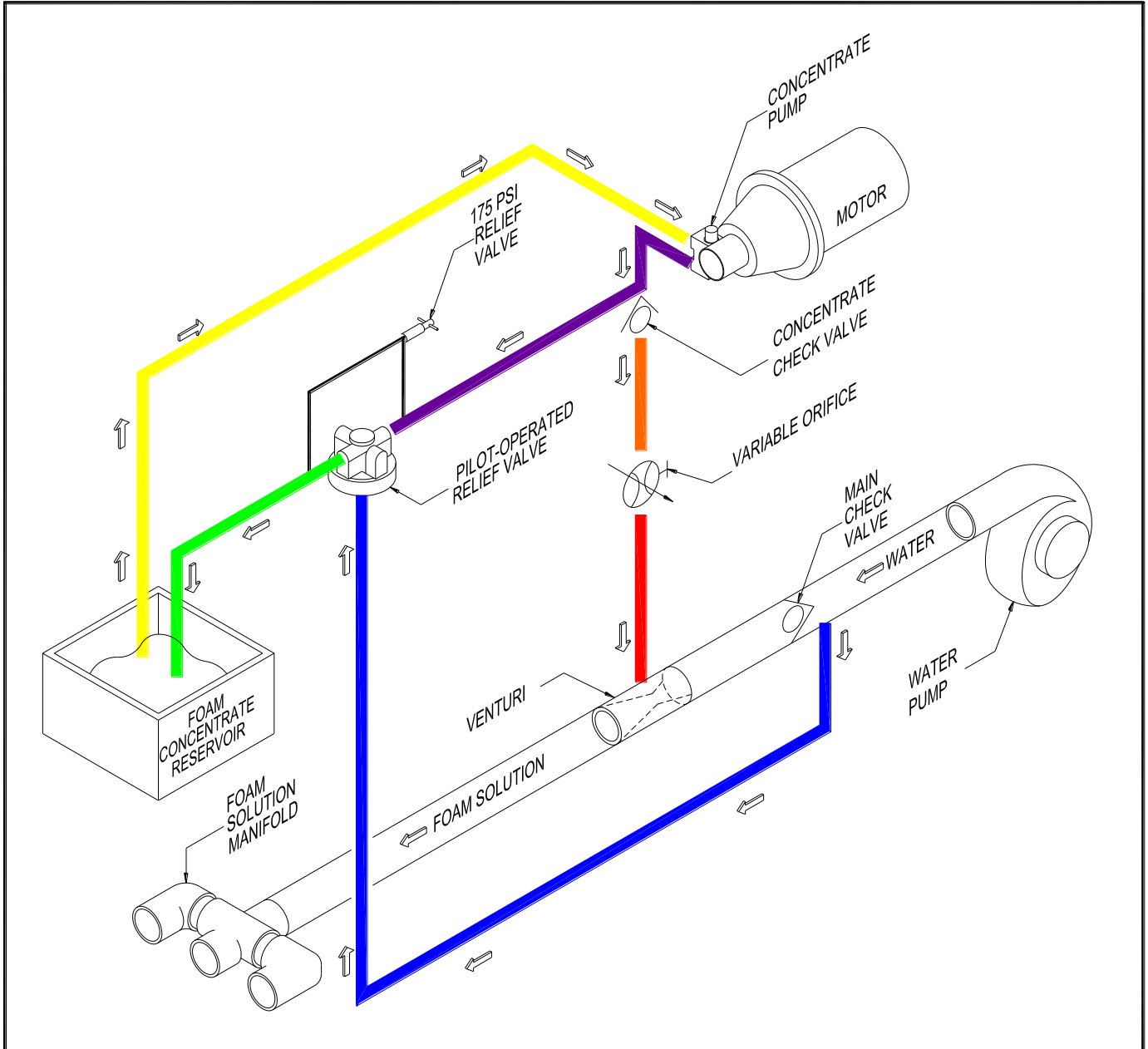
**PRINCIPLE OF OPERATION**

The Darley Fast Foam is a BALANCED-PRESSURE, VENTURI PROPORTIONER.

- A. Foam concentrate is drawn from the reservoir, into the concentrate pump through the yellow line.
- B. The foam concentrate is discharged into the pilot-operated, relief-valve assembly through the purple line.
- C. The pilot-operated relief valve maintains concentrate pressure to match the water pressure. The pilot pressure (blue line) is taken before the main check valve.
- D. The pilot-operated relief valve controls the concentrate pressure by allowing excess concentrate to flow back to the reservoir through the green line.
- E. When no water is flowing through the Venturi the water pressure at the injection point is equal to the concentrate pressure. In this condition all of the concentrate flows through the pilot-operated relief valve and back to the reservoir. No concentrate flows into the water in a no water flow condition.
- F. When water flows, the Venturi creates a pressure drop. The concentrate pressure is equal to the pilot water pressure. The concentrate enters the plumbing after the venturi pressure drop.
- G. The concentrate injection percentage is set with a variable-orifice ball valve. Concentrate flows from the pump to the ball valve through the orange line. Concentrate flows from the ball valve into the venturi through the red line.
- H. The concentrate check valve is installed to prevent water back-flow into the concentrate system.
- I. The main check valve is installed to prevent concentrate back-flow into the water pump and water tank.
- J. The pressure relief valve is set at 175 PSI to prevent damage to the concentrate pump.



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**



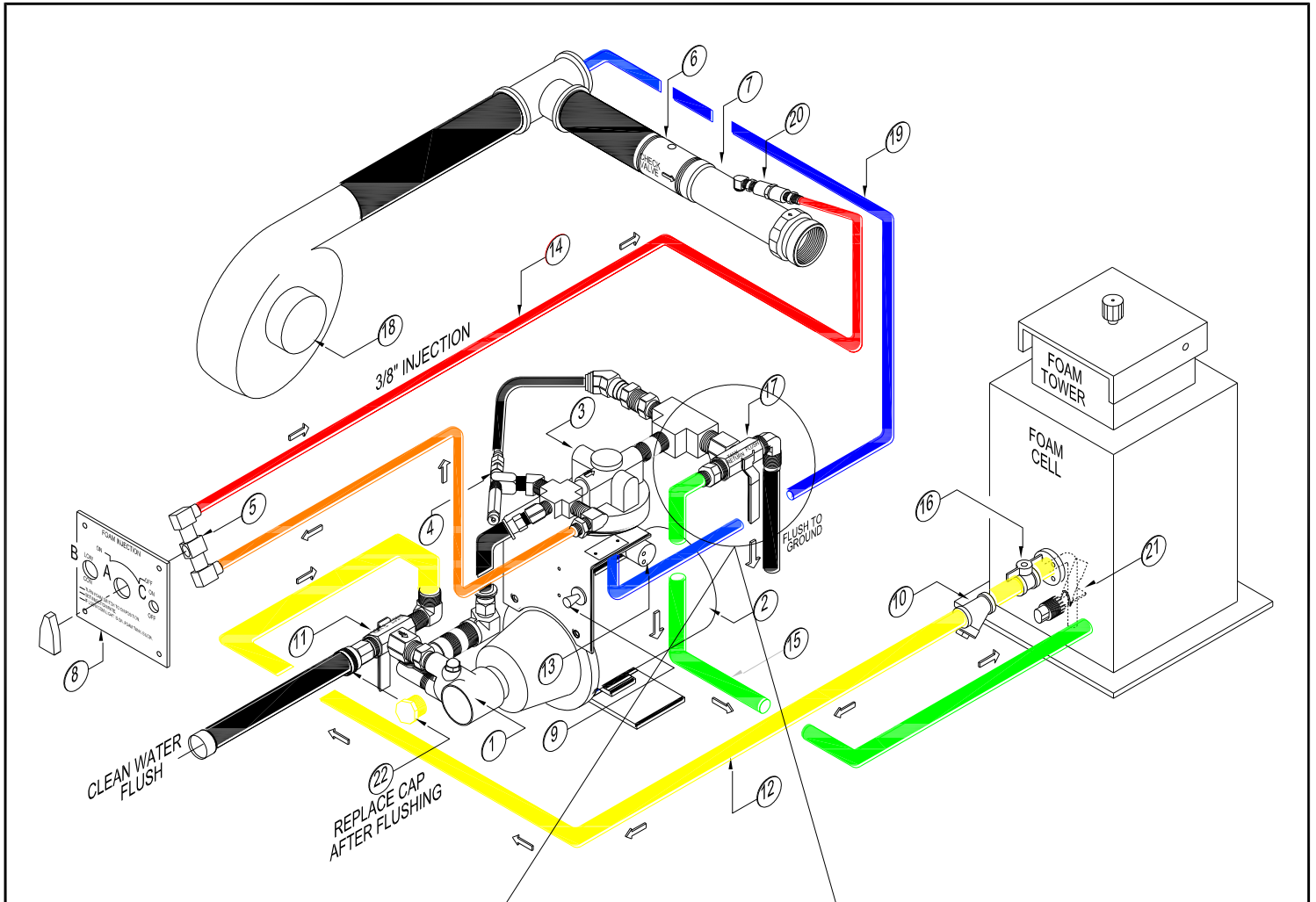


**PLUMBING LEGEND**

1. Concentrate Pump
2. 12 VDC Motor
3. Pilot Operated Relief Valve
4. Pressure Relief Valve
5. Metering Valve (panel Mount)
6. Main Check Valve
7. Venturi
8. Panel Placard
9. Over-Ride Switch
10. Suction Strainer
11. Suction Side 3-Way Valve
12. Suction Line ¾"
13. Pump to Metering Valve Line 3/8"
14. Injection Line 3/8"
15. Concentrate Return Line 3/8"
16. Foam Cell Shut-Off Valve
17. Concentrate Return / Flush 3-Way Valve
18. Water Pump
19. Pilot Pressure Line (Water Pump Pressure) ¼"
20. Concentrate Injection Check Valve
21. ¾" PVC Plug (Odin Part no. 00007799)
22. CAP



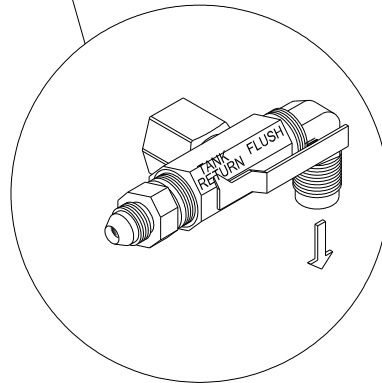
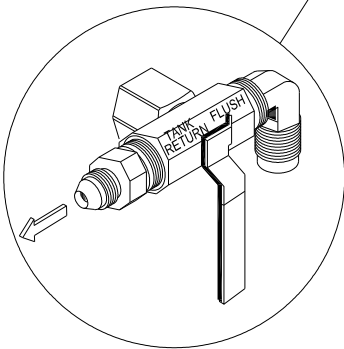
**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**



DFF-04

3-WAY VALVE  
UNDERSTANDING

HANDLE POINTER  
DIRECTS FLOW  
TO OPPOSITE  
SIDE OF VALVE



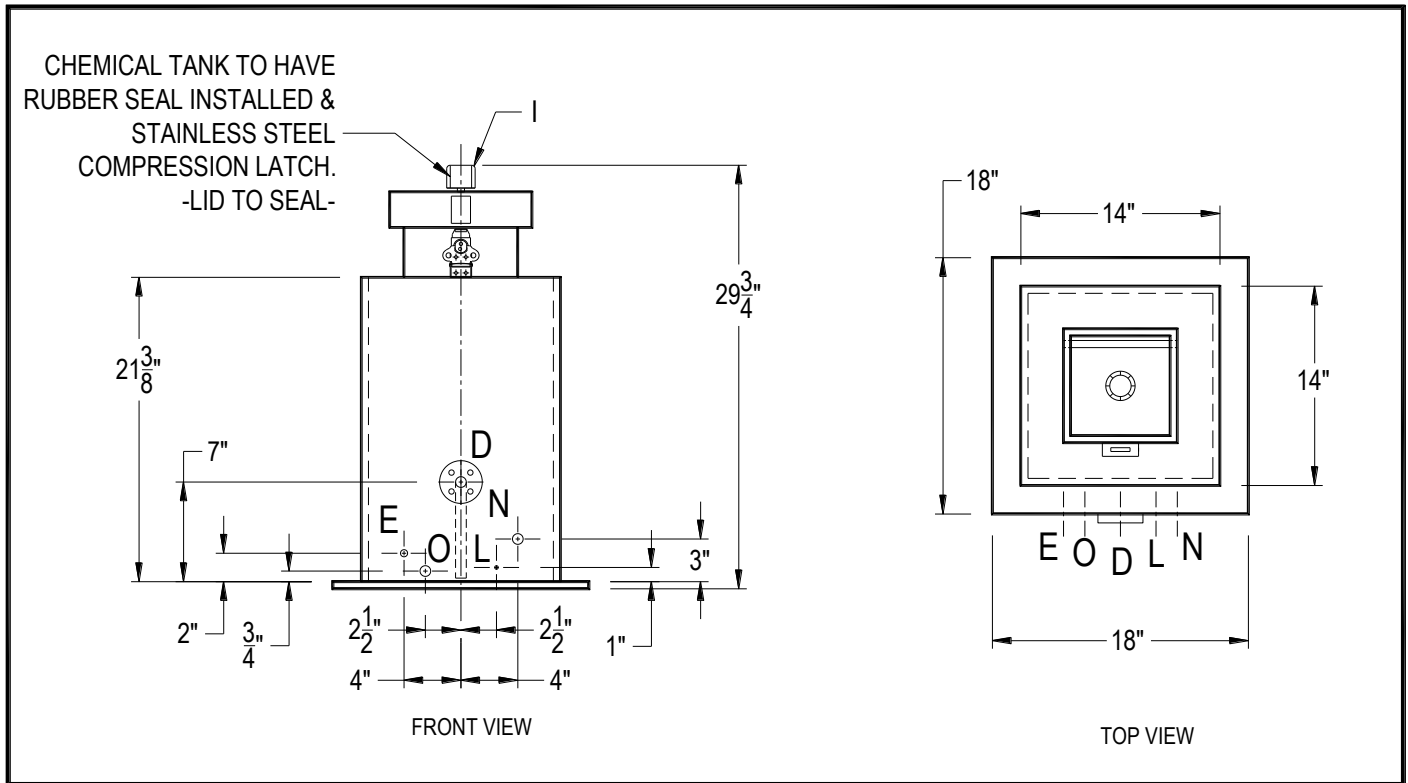


**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**FOAM CELL SPECIFICATIONS**

FNPT = Female National Pipe Taper  
 NFPA = National Fire Protection Association

- D = 3/4" FNPT Foam Outlet
- E = 1/2" FNPT Lo-Con Sensor
- I = Vacuum Cap
- K = Foam Viewer P/Glass (Located on side of Cell)
- L = 1/4" FNPT Foam Level Sender
- N = 3/4" FNPT Foam Return
- O = 3/4" NFPA Drain Return



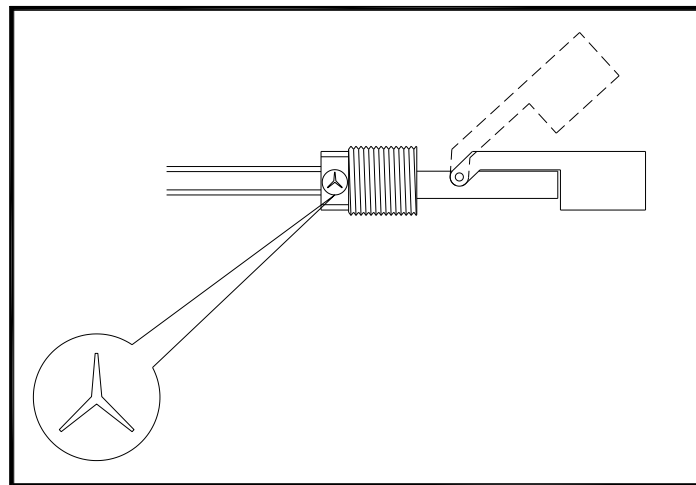
**Figure DFF-05  
 FOAM CELL TOWER**



**FOAM CONCENTRATE TANK SETUP**

Foam tank design is an important consideration on a mobile apparatus.

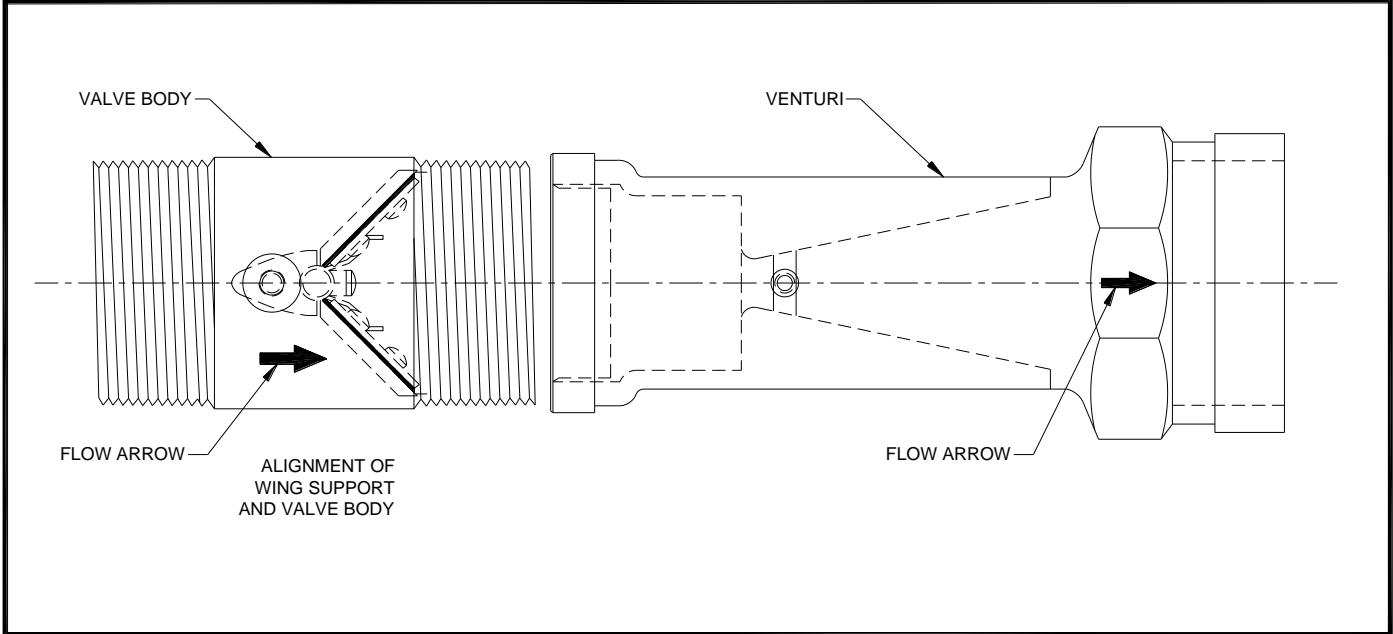
- Position the foam concentrate suction line a minimum of ½” from the bottom of the tank. This will help prevent picking up debris from the bottom of the tank.
- The float switch will turn the pump off when the concentrate level drops and the switch closes. Position the switch above the level of the suction line. Insure that a minimum of 1 gallon of concentrate remains in the foam tank when the float switch activates. The residual concentrate will help prevent pump overheating.
- Be sure that the tank is properly vented.
- The supplied foam strainer must be used.
- A foam tank shut-off valve is recommended.
- Use ODIN diagram for foam cell hole orientation, location and sizes.
- Foam cell must be able to “gravity” concentrate to pump head of Fast Foam.



**Figure DFF-06  
FLOAT SWITCH ORIENTATION**



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**



**Figure DFF-07**  
**VENTURI / CHECK VALVE**  
**(MOUNT HORIZONTALLY)**  
**Recommended Method**



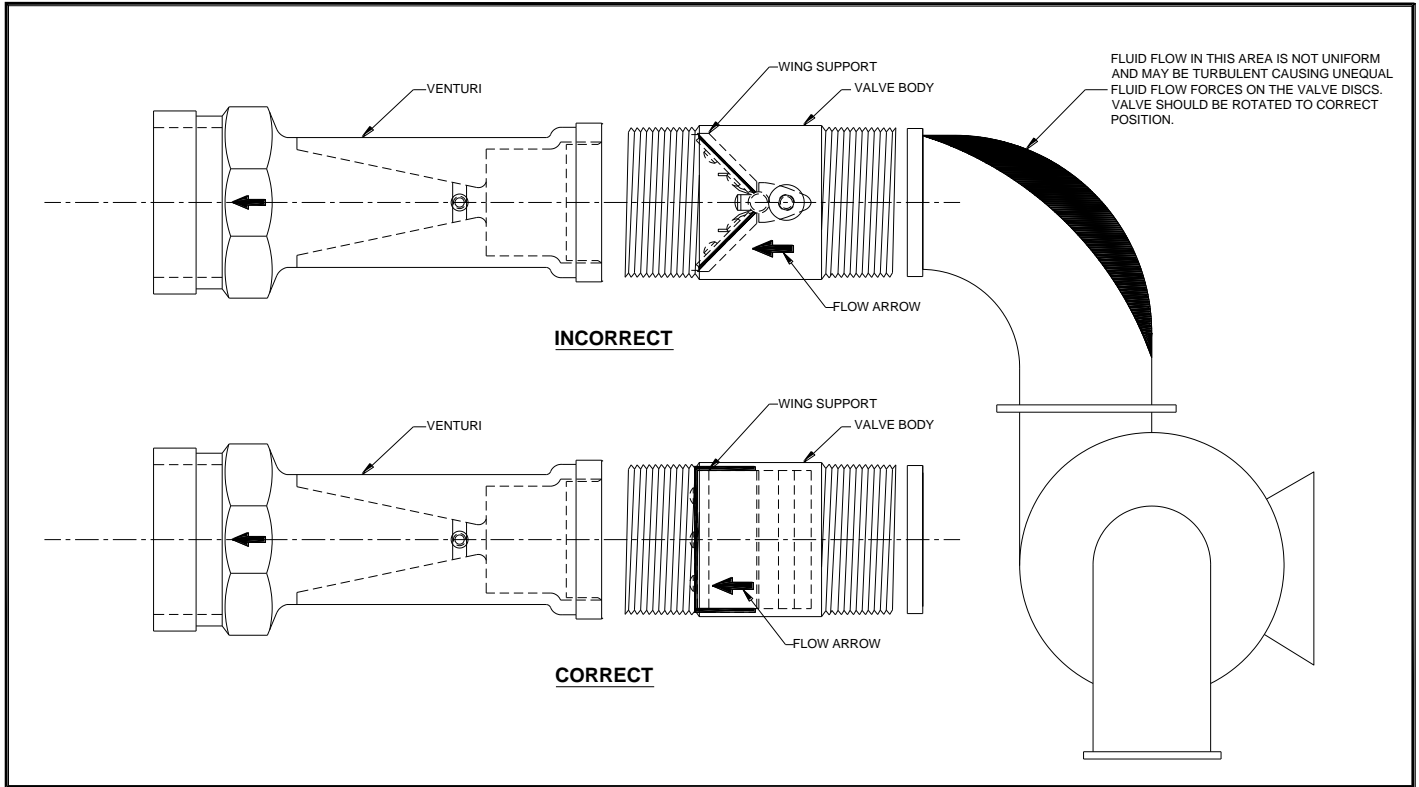
**CHECK VALVE INSTALLATION INSTRUCTIONS**

- Remove check valve from packaging and inspect for any shipping damage or loose fasteners. All fasteners have been set with Loctite ®. If damaged in shipping, save original box and box contents.
- If valves are being stored, they should be in a weather-protected area, preferably indoors.
- Open and close the discs of your valve a few times by hand to insure freedom of movement.
- The flow arrow on your valve indicates the direction of flow upon installation.
- Use hex end of "Venturi" for wrench contact.
- The check valve is not suitable for use on the discharged of reciprocating or positive displacement compressor or pump. Pulsating and cyclic flow will damage the valve.
- If this valve is installed in a horizontal line, make sure the screws protruding through the top and bottom of the valve body are in a vertical position.
- If the valve installation is in a vertical line with upward flow, the position of the wing support is not important.
- If valve is installed vertically, check for proper winterizing drain for trapped water.
- Check for correct flow direction of Venturi/Check valve.

For best performance, it is best to not have 90's or valves within 6" of Venturi inlet and outlet.



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**



**Figure DFF-08  
CHECK VALVE INSTALLATION INSTRUCTIONS**



## OPERATION MANUAL

### Motor / Pump Installation Instructions:

- Install pump on horizontal surface only.
- Mount in accessible area to allow for oil level check and for access to the bypass switch.
- The pump must be below Foam Cell, for “gravity” feed into the pump inlet.
- The strainer must be plumbed into the Suction line.
- Check the pump oil level before starting operation.
- Hose according to schematic. It is highly recommended to use the supplied parts. For reliability and extended life, brass or stainless steel fittings are acceptable. Zinc or steel fittings are not. Cutting of hoses is permissible; however adding length to hoses is positively discouraged.

### Hosing requirements:

- Special considerations – The Balance Valve uses a water pressure signal to control the foam output pressure. It is vital that the signal line be dedicated and uncorrupted. Do not “tee” this control line into any other line, either at the source or at the drain. Provisions must be made to drain this line for winterizing. Failure to winterize can cause damage to the Balance Valve.
- The water psi signal control pressure should be taken from a point before the Check / Venturi in the pressure plumbing.  
*See drawing (DFP-04) balloon #19.*



## **FAST FOAM ELECTRICAL INSTALLATION**

The Fast Foam uses a 12 VDC motor with maximum current requirement of 40 amps. If using on smaller portable pumps, check for adequate amperage.

- **ELECTRICAL POWER CONNECTION REQUIREMENTS:**

### Motor Power

Using #10 awg wire, connect the white wire directly to the (+) terminal of the battery.

### System Ground

Using #10 awg wire, connect the black wire to the (-) terminal of the battery, or a good ground on (-) ground systems. The use of silicone dielectric compound is recommended on all ground connections.

### Control Power

Using #14awg wire, connect the green wire to a switched power (+) source (ignition switch). This is a low amperage control circuit. If this is switched by the ignition circuit, the Fast Foam cannot be inadvertently left on when the vehicle is shut down.

- **FAST FOAM SYSTEM CONNECTIONS**

The Fast Foam control panel connects to the motor with a pre-wired 4-pin plug. The standard wire loom length is 12'. Wire loom extensions are available if needed.

The low-concentrate float switch must be installed for the system to operate properly.

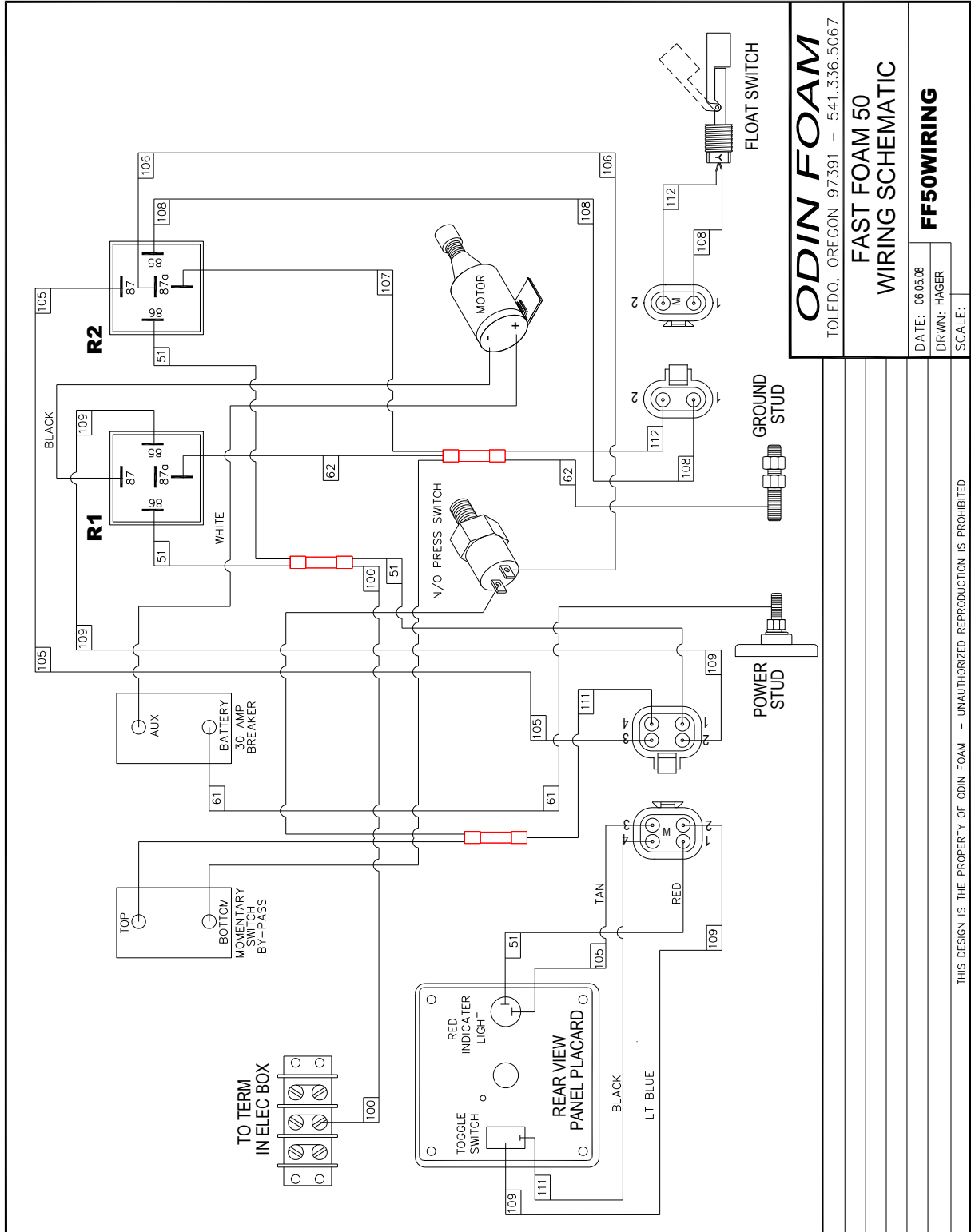
The low-concentrate float switch is installed as per figure DFF-05.

The low-concentrate float switch connects to the motor with a pre-wired 2-pin plug. The standard length is 12'. Extensions are available if needed.



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**Figure DFF-09  
FAST FOAM 50 ELECTRICAL SYSTEM SCHEMATIC**

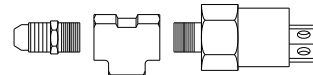




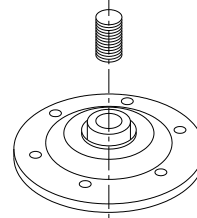
**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**Figure DFF-09  
FAST FOAM 50 ELECTRICAL SYSTEM SCHEMATIC**

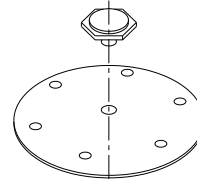
PILOT  
PRESSURE  
PORT



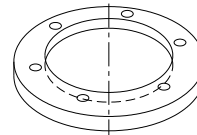
PRESSURE  
SWITCH



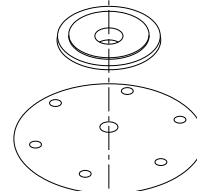
BONNET



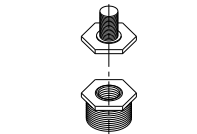
DIAPHRAGM



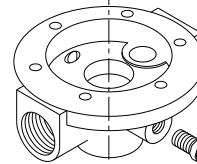
CALIBRATION  
RING  
(NOTE: ANGLE BEVEL SIDE)



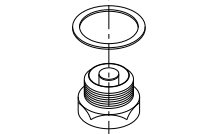
DIAPHRAGM



VALVE SEAT

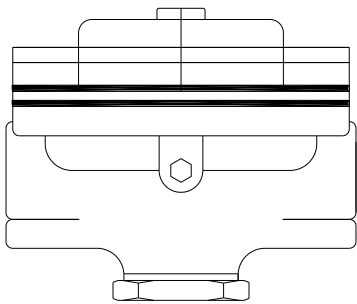


BODY



SEAL

PLUG



**Figure DFF-10  
PILOT OPERATED RELIEF  
VALVE**

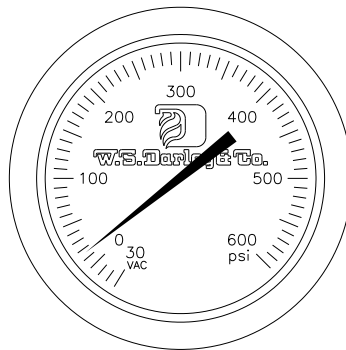


## **IMPORTANT INFORMATION!** **PLEASE READ!**

### Understanding of the Chemical Foam system

2. The Fast Foam 50 is **powered up** when the water pump is at operating pressure of 15 psi or more.

## **WATER PRESSURE**



3. The Fast Foam system is **engaged** when the toggle on the control panel is switched to the ON position.



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**Figure DFF-11  
PILOT OPERATED RELIEF VALVE  
(EXPLODED  
PRIMING & TESTING**

TO ESTABLISH A PRIME IN THE FAST FOAM PUMP USE THE FOLLOWING PROCEDURE:

Set the suction side 3-Way valve to the "INJECT" position.

Set the concentrate return 3-way valve to the "FLUSH" position.

Fill the foam cell above the level of the float switch.

Place the overboard flush Hose into a container.

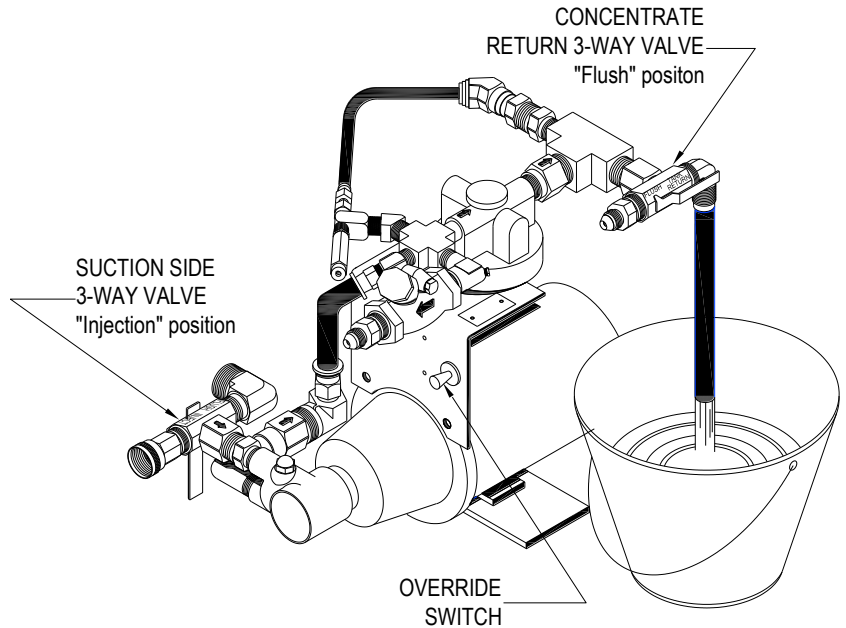


Figure DFF12  
PRIMING AND TESTING CONFIGURATION

Set the "ON/OFF" switch To the "ON" position.

Set the "% " valve to "OFF"

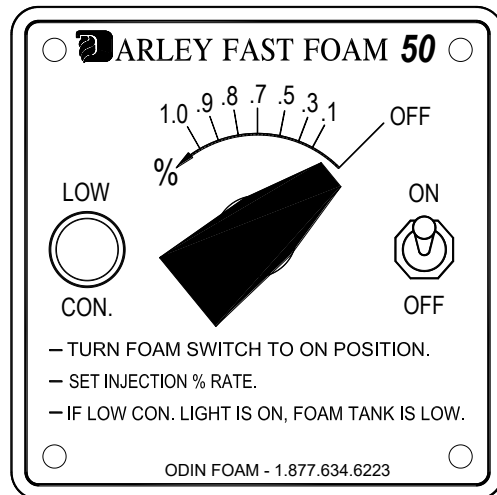


Figure DFF13  
DARLEY FOAM INJECTION PLACARD





**PRIMING & TESTING CONT.**

TO ESTABLISH A PRIME IN THE FAST FOAM PUMP USE THE FOLLOWING PROCEDURE:

Hold the "**OVERRIDE**" switch down.

- \* The Override Switch will over ride the pressure switch and low con switch.

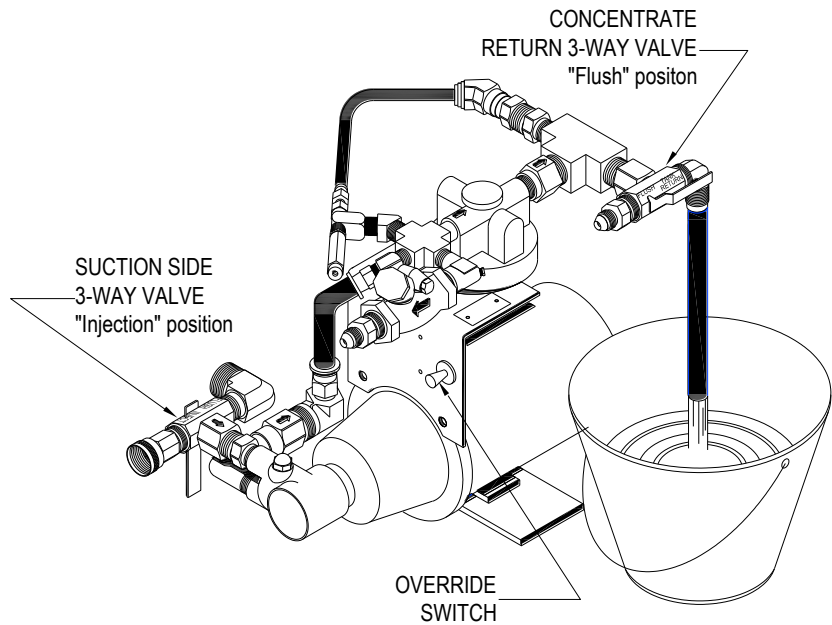


Figure DFF14  
PRIMING AND TESTING CONFIGURATION

The priming and testing configuration can be used to prime the system or test and trouble shoot or simply pump out the foam cell.



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**SETTING UP THE FAST FOAM FOR CONCENTRATE INJECTION OPERATION**

Set the suction side 3-way valve to the "INJECT" position

Set the concentrate return 3-way valve to the "TANK RETURN" position.

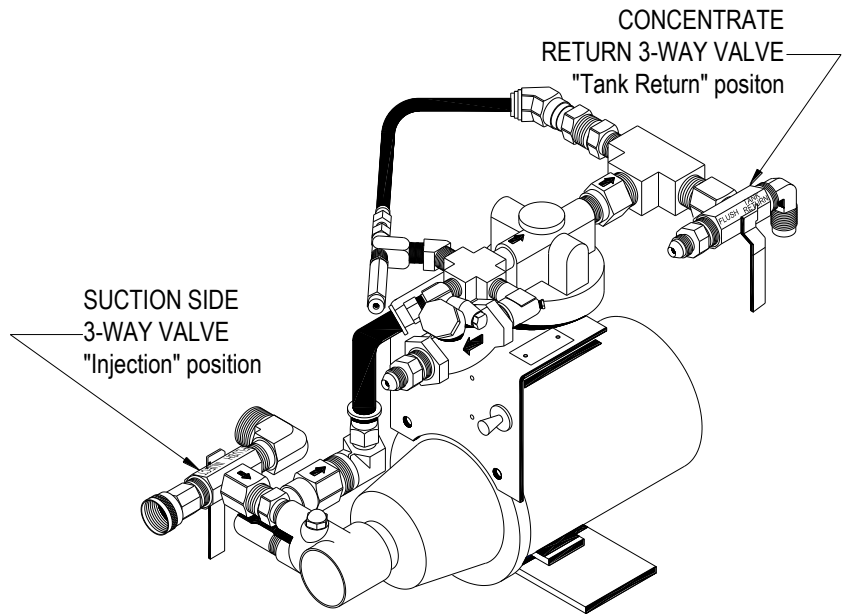


Figure DFF15  
INJECTING CONFIGURATION



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**CONCENTRATE INJECTION OPERATION**

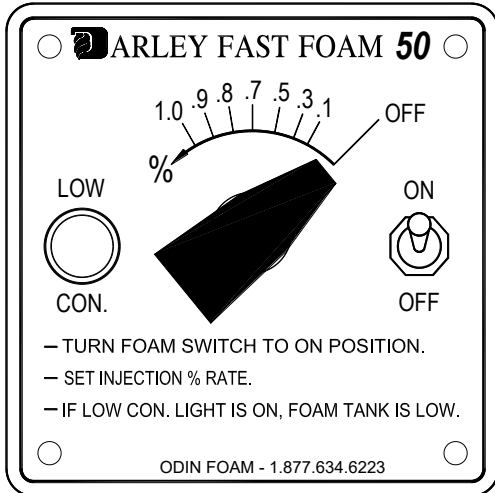


Figure DFF-16  
DARLEY FOAM INJECTION PLACARD

Set the "ON/OFF" switch to The "ON" position.

\* As a safety feature, there must be water pressure to the pilot operated relief valve for the system to operate.

Set the desired concentrate proportion % on the panel mounted valve.

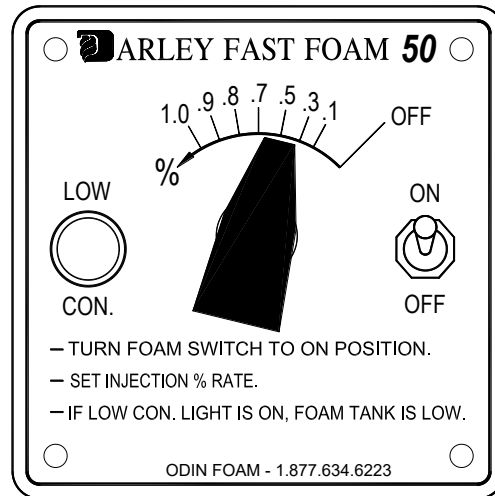


Figure DFF-17  
DARLEY FOAM INJECTION PLACARD

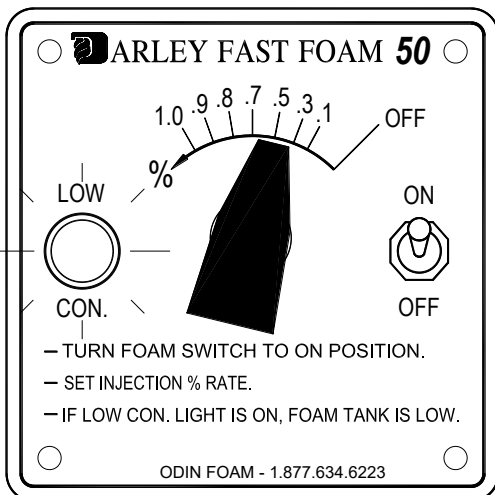


Figure DFF-18  
DARLEY FOAM INJECTION PLACARD

When the "Low Con" light is on, the foam cell is empty and the system automatically turns itself off.



**FLUSHING THE SYSTEM**

- The Fast Foam is normally kept in a “wet” condition, charged with concentrate and ready for immediate use.
- It is necessary to exercise the system preferably once a week.
- Two 3-way valves are installed on the Fast Foam to provide for a system flush
- If the Fast Foam is left idle for extended periods of time, concentrate may “gel” in the system.
- If the Fast Foam is to be stored for extended periods of time, i.e. off-season storage, flush the system according to the directions on page 24.

**To winterize:**

If freeze-up is a concern, fill concentrate pump with anti-freeze. (Remember to flush anti-freeze before placing back in service)



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

**FLUSHING CONFIGURATION**

Set the suction side 3-way valve to the **"FLUSH"** position.

Set the concentrate return 3-way valve to the **"FLUSH"** position.

Connect a garden hose to the suction side 3-way valve, or warm, not hot tap water.

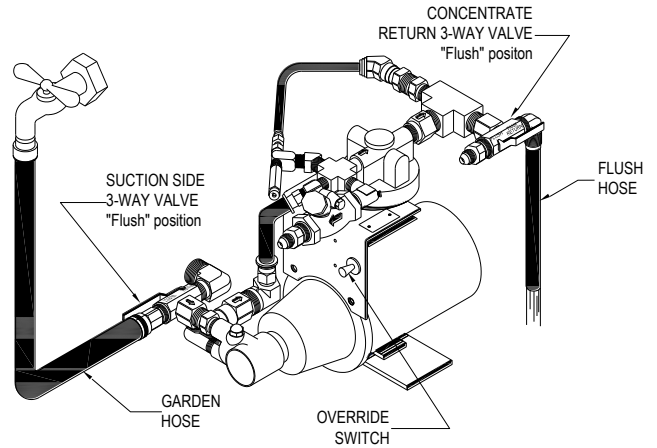


Figure DFF19  
FLUSHING CONFIGURATION

Set the "ON/OFF" switch to the **"1.0%"** position.

Set the panel mounted valve to the on position.  
Open foam discharge valve(s).

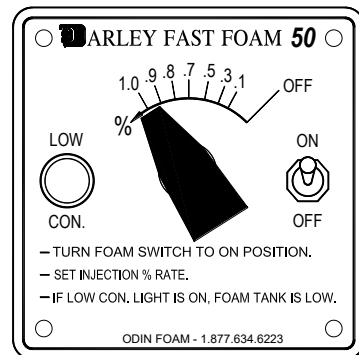


Figure DFF-20  
DARLEY FOAM INJECTION PLACARD

Hold down the **"OVERRIDE"** switch.  
Run the system until the flush hose and discharge outlet(s) run clear water.

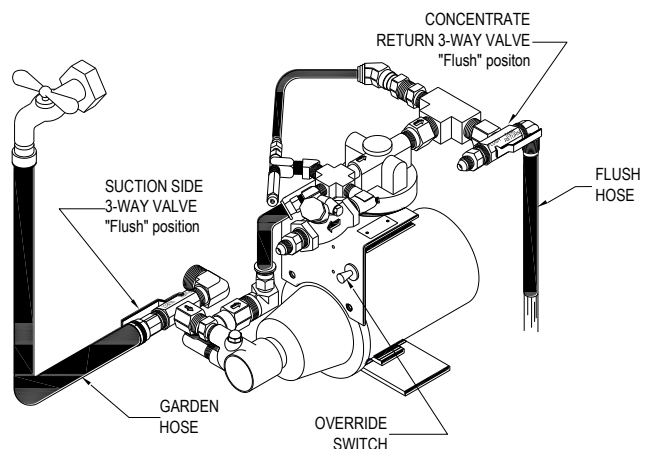


Figure DFF21  
FLUSHING CONFIGURATION



**FAST FOAM 50 CLASS “A” FOAM PROPORTIONER**

**TROUBLE SHOOTING**

<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<ul style="list-style-type: none"> <li>Milky, bubbly foam in tank</li> </ul>	<ul style="list-style-type: none"> <li>Air in pump</li> <li>Loose suction Line</li> </ul>	<ul style="list-style-type: none"> <li>Check &amp; tighten suction hoses &amp; connections</li> </ul>
<ul style="list-style-type: none"> <li>Motor does not run (low con light on)</li> </ul>	<ul style="list-style-type: none"> <li>Low concentrate level</li> </ul>	<ul style="list-style-type: none"> <li>Fill concentrate tank</li> </ul>
<ul style="list-style-type: none"> <li>Motor does not run (low con light off)</li> </ul>	<ul style="list-style-type: none"> <li>Low concentrate level</li> <li>Low con light bulb burned out</li> </ul>	<ul style="list-style-type: none"> <li>Fill concentrate tank</li> <li>Replace light bulb</li> </ul>
<ul style="list-style-type: none"> <li>Motor does not run (no water pressure indicated)</li> </ul>	<ul style="list-style-type: none"> <li>Water pressure switch not closed</li> </ul>	<ul style="list-style-type: none"> <li>Run water pump &amp; insure that there is water pressure (required to close pressure switch)</li> </ul>
<ul style="list-style-type: none"> <li>Motor does not run (water pressure indicated)</li> </ul>	<ul style="list-style-type: none"> <li>Faulty pressure switch</li> </ul>	<ul style="list-style-type: none"> <li>Test control circuits by switching control panel switch to ON. Depress &amp; hold override switch if motor turns on.</li> <li>Replace Pressure Switch.</li> </ul>
<ul style="list-style-type: none"> <li>Motor runs but not injecting concentrate</li> </ul>	<ul style="list-style-type: none"> <li>Fouled suction strainer</li> <li>Fouled metering valve</li> <li>Fouled concentrate check valve</li> <li>Pump failed</li> </ul>	<ul style="list-style-type: none"> <li>Clean strainer</li> <li>Clean valve</li> <li>Replace concentrate check valve</li> <li>Replace pump</li> </ul>



**FAST FOAM 50 CLASS "A" FOAM PROPORTIONER**

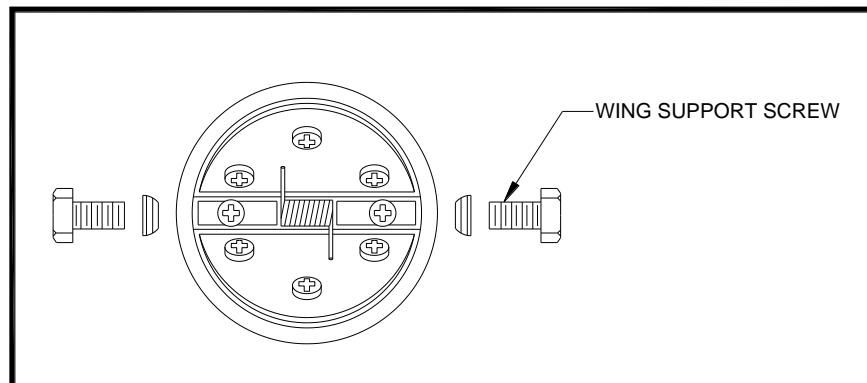
<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<ul style="list-style-type: none"><li>• Not injecting at proper rate</li></ul>	<ul style="list-style-type: none"><li>• Pilot-operated relief valve failure</li></ul>	<ul style="list-style-type: none"><li>• Disassemble &amp; clean pilot-operated relief valve (refer to Figure FF012). Rebuild kit is available.</li></ul>



## FAST FOAM 50 CLASS "A" FOAM PROPORTIONER

### COMPLETE REPLACEMENT OF VALVE INTERNALS

- Carefully remove valve from pipeline. Use only a strap-type wrench
- Hold the valve body in your hand or in a suitable vise to prevent distortion of the valve body. **NOTE: DO NOT EXERT UNDO FORCE ON THE VALVE BODY.** This may permanently affect the valve operation
- Remove all valve internals by unscrewing the wing support (see Figure 1) and any other body-support rods such as travel-stop rod (only on large size valves)



**Figure DFF-22**  
**COMPLETE REPLACEMENT OF VALVE INTERNALS**

- Inspect the inside diameter of the body to determine if the body is suitable and retains its original integrity, i.e. surface finish is good and roundness is apparent
- If valve body appears satisfactory and needs only minor cleanup, the valve is then suitable to replace the internals. **DO NOT SANDBLAST OR OTHERWISE DAMAGE THE VALVE BODY'S INNER SURFACE.**
- Make sure when you order complete internal replacement assemblies that the new assemblies are identical to the original internals. Always reference your check valve's unique serial number when ordering replacements.





### INSTALLING THE NEW ASSEMBLY

- Put some water on the elastomer seal to act as a lubricant when installing the new wing-support assembly into the valve body.
- Make sure you assemble the wing assembly correctly with the direction of flow.
- Align the wing-support, mounting screw holes and the valve-body screw holes properly. (See Figure 2)

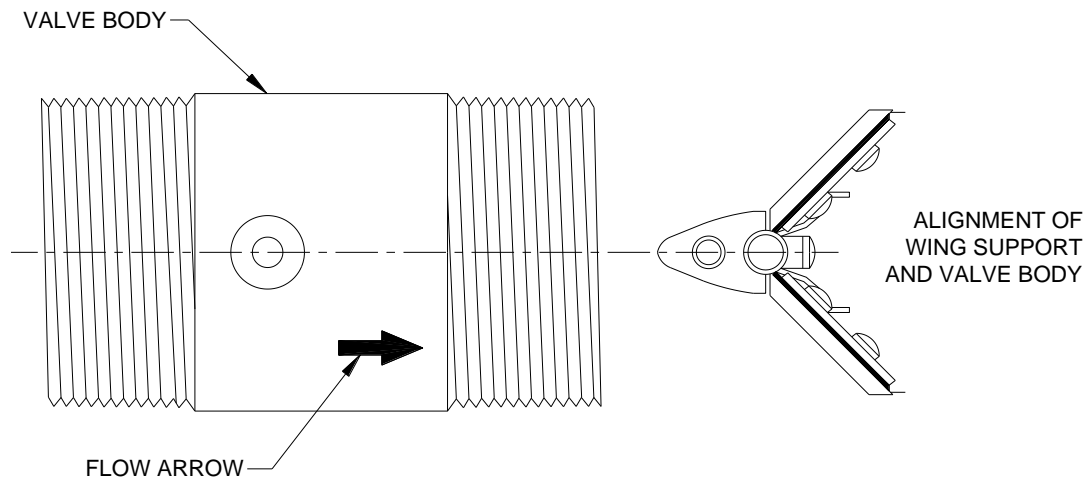


Figure FF10  
INSTALL THE NEW ASSEMBLY

- Push wing support assembly into the valve body until the holes line up properly. If you overshoot the hole alignment by half the screw hole diameter, just push the wing support assembly completely through the valve body and repeat the procedure.
- When installing the wing support mounting screws, make sure you install a new Nylite® pressure seal and apply a sufficient amount of Loctite® #242 to the screw threads. The wing support screws should be torque to 8-ft-lbs for ¼-20 screws and 48 in-lbs for 10-32 screws. Never over tighten screws. Allow Loctite® to dry 20 minutes, full cure in 24 hours.



**MAINTENANCE**

10 hrs	50 hrs	100 hrs	150 hrs	300 hrs	500 hrs	1000 hrs
Check Engine Oil level	Change Pump Oil (or 6 months)	Drain Water from Fuel Filter	Clean Fuel Pump Filter	Tighten Fuel Line Union Screws/Nuts		Change Alt. Drive Belt
Check Engine Coolant Level	Check Drive Belts	Change Air Filter Cartridges	Check Drive Belts	Change Fuel Filter (or 12 months)		
Check Compressor Oil Level	Check Engine Cooling Circuit	Check belt tension	Change Engine Oil and Filter (or 12 months)	Change compressor Oil/Filter (or 12 months)	Change Engine Coolant (or 24 months)	
Check Water Pump Oil Level	Lubricate Gear Operated Valves (When Installed)		Grease the master drain (or 12 months)		Change Compressor Air/Oil	
Check Engine Air Filter	Check Compressor Cooling Water Strainer*		Perform engine tune-up procedures		Separator Cartridge (or 24 months)	
Check Compressor Air Filter	Remove and Clean Foam Strainer					
Check Engine Radiator (Fins)						

\* When pumping water with heavy debris, a fast check of the strainer is to throttle up to 150 psi, static no flow condition. Very quickly lower the throttle to idle. Monitor that the water pressure gauge rapidly depressurizes, showing the strainer is unclogged and moving water thru the heat exchanger.



**MAINTENANCE**

**Engine: Kawasaki FD851D**

Description	Part Number	Capacity
Primary (Inner) Air Filter:	11013-7019	-
Secondary (outer) Air Filter:	11013-7020	-
Oil Filter:	49065-2071	-
Fuel Filter:	49019-1055	-
Oil, Engine:	Multigrade SAE 15W-40	1.9 qt (1.8 liter)

**Compressor: BOSS SCI8-new**

Description	Part Number	Capacity
Oil Filter Element	310852	
Air Filter	(C 11 100)	
Air / Oil Separator Element	311074	
Oil, Compressor	Boss Compressor Oil (retains lifetime warranty) or DEXTRON III / MERCON Automatic Transmission Fluid (voids lifetime warranty)	2.5 qt (2.4 liter)

**Drive Belt**

Description	Part Number
Belt, Compressor:	8MGT-960-21



**MAINTENANCE**



**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
<ul style="list-style-type: none"> <li>• Engine doesn't start</li> </ul>	<ul style="list-style-type: none"> <li>• Low battery power</li> <li>• Inadequate fuel</li> <li>• Compressed air in sump</li> <li>• Engine Flooded</li> </ul>	<ul style="list-style-type: none"> <li>• Charge battery and clean all connections</li> <li>• Fill tank – some pick-up tubes in tanks go dry at ¼ level</li> <li>• Allow 10 seconds after shutdown before restarting for air sump to decompress.</li> <li>• Wait for Fuel to evaporate</li> </ul>
<ul style="list-style-type: none"> <li>• Engine misses</li> </ul>	<ul style="list-style-type: none"> <li>• Air filter element dirty</li> <li>• Insufficient fuel</li> <li>• Water in fuel</li> <li>• Choke is incorrect</li> </ul>	<ul style="list-style-type: none"> <li>• Replace element. <u>Do not attempt to blow out and reuse</u></li> <li>• Fuel lines too small and/or long or lift is too high. An electric fuel pump may be necessary. Consult Odin</li> <li>• Stop system immediately. Drain and refill with clean fuel and fuel filter</li> <li>• Choke as per engine manual</li> </ul>



**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
<ul style="list-style-type: none"> <li>• Engine “lobes “</li> </ul>	<ul style="list-style-type: none"> <li>• Compressor horsepower demand changes</li> </ul>	<ul style="list-style-type: none"> <li>• This is normal and is accentuated by smaller engine applications</li> </ul>
<ul style="list-style-type: none"> <li>• Engine overheats</li> </ul>	<ul style="list-style-type: none"> <li>• Air flow is compromised</li> <li>• Engine overloaded / very high ambient temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Check for clean, unrestricted radiator fins and that in-coming and out-going air openings are not blocked</li> <li>• It is possible to overheat with high ambient, high loads or extended pump times. Reduce load &amp; open lid. Do not recirculate water with tank fill valve. Pump cooler line in unit is full time and sufficient.</li> </ul>
<ul style="list-style-type: none"> <li>• Alternator won’t charge</li> </ul>	<ul style="list-style-type: none"> <li>• Bad connections</li> <li>• Bad alternator/voltage regulator</li> </ul>	<ul style="list-style-type: none"> <li>• Cleans connections</li> <li>• Replace alternator</li> </ul>



**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
<ul style="list-style-type: none"> <li>Air compressor not creating any air pressure or air pressure is too low</li> </ul>	<ul style="list-style-type: none"> <li>Demand has exceeded compressor output</li> <li>Air compressor pressure control governor - set too low</li> <li>RPM of engine too low to support the flow of air being discharged</li> <li>Hydrant pressure in pump suction causes too high water psi; engine RPM's not high enough</li> <li>Governor relief hole is plugged</li> </ul>	<ul style="list-style-type: none"> <li>Operate fewer hose lines simultaneously</li> <li>Consult manual - raise the air pressure to match water</li> <li>Increase engine RPM to maximum – water pump pressure is too low</li> <li>Use direct tank fill with any pressurized water source</li> <li>Clean relief holes. Change compressor oil and filters. Consult Odin</li> </ul>
<ul style="list-style-type: none"> <li>Brass air psi safety relief valve opens on compressor</li> </ul>	<ul style="list-style-type: none"> <li>Manual pressure valve set too high</li> <li>Governor line loose or plugged.</li> <li>Safety relief valve broken</li> </ul>	<ul style="list-style-type: none"> <li>Readjust to balance water pump per instructions</li> <li>Repair/replace faulty part</li> <li>Replace valve</li> </ul>
<ul style="list-style-type: none"> <li>Air and water psi do not balance at static pressures</li> </ul>	<ul style="list-style-type: none"> <li>Pressure not set correctly on compressor.</li> <li>Gauges out of calibration</li> <li>Malfunctioning governor system</li> </ul>	<ul style="list-style-type: none"> <li>Readjust to balance water pump per instructions</li> <li>Replace bad gauge</li> <li>Consult Odin</li> </ul>



**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
<ul style="list-style-type: none"> <li>Hose line is erratic, jumping around, hard to hang onto the line</li> </ul>	<ul style="list-style-type: none"> <li>Condition known as “slug flow”. Created by lack of foam concentrate or low % of foam concentrate. Water and air do not mix without foam added</li> </ul>	<ul style="list-style-type: none"> <li>Eliminate airflow in line until foam concentrate can be introduced at the proper rate of 0.5%. Some foam concentrates may require special consideration or attention (i.e. higher %)</li> </ul>
<ul style="list-style-type: none"> <li>Foam is too dry; not soaking in or absorbing much heat</li> </ul>	<ul style="list-style-type: none"> <li>Ratio of air to water is too high or a very long hose line is being used</li> <li>Foam percentage is too high</li> </ul>	<ul style="list-style-type: none"> <li>Increase water flow, decrease air flow or slightly close nozzle</li> <li>Lower the foam percentage being injected.</li> </ul>
<ul style="list-style-type: none"> <li>Foam is too wet and runny; not of shaving cream consistency</li> </ul>	<ul style="list-style-type: none"> <li>Ratio of water to air is too high</li> <li>Foam percentage is too low</li> <li>Incorrect nozzle on hose line, fog nozzles break up bubbles or nozzle is partly closed</li> <li>Kink in hose or too short of run of hose (100 ft minimum)</li> </ul>	<ul style="list-style-type: none"> <li>Reduce water flow or increase air flow</li> <li>Be sure proportioner is set at least 0.3% and use good foam</li> <li>Nozzle must be at full flow with a large smooth bore tip. Be sure valve is open completely</li> <li>Straighten out kink in hose or increase length of hose line</li> </ul>





**TROUBLESHOOTING**

SYMPTOM	POSSIBLE CAUSES	CORRECTIVE ACTION
<ul style="list-style-type: none"> <li>• Compressor overheat alarm sounds</li> </ul>	<ul style="list-style-type: none"> <li>• Heat exchanger cold water pickup is blocked</li> <li>• Water in booster tank is too hot; extended periods of stand by time, especially at lower tank levels.</li> <li>• Low compressor oil</li> <li>• Oil flow is low or nonexistent</li> <li>• Thermo valve defective</li> </ul>	<ul style="list-style-type: none"> <li>• Pull out probe and clean</li> <li>• Refresh water supply with cool water on regular basis</li> <li>• Top off compressor oil when unit cool -- do not overfill</li> <li>• Clear obstructions then replace defective thermo-valve &amp; filters</li> <li>• Replace thermo valve</li> </ul>

**WARRANTY**

**DARLEY**  
**PUMP STANDARD LIMITED WARRANTY**  
**W.S. Darley and Company • 2000 Anson Drive • Melrose Park, Illinois 60160**

W.S. Darley & Co. ("Darley") warrants to the original purchaser (the "Customer") only, subject to the terms and conditions of this Limited Warranty, that Darley will, at its option, repair or replace, in whole or in part, any Pump (hereafter, "Pump") which Darley determines to be defective in materials or workmanship produced or performed by Darley, for a period commencing on the date such Pump is shipped to Customer from Darley's plant (the "Ship Date") and ending on the earlier of (three) years or 3000 hours of Pump usage following the Ship Date (the "Warranty Period"). Darley may also, at its discretion, elect to refund the purchase price to the Customer in lieu of any repair or replacement. Original Equipment Manufacturer ("OEM") Customers may transfer this warranty to their end purchasers without the written consent of Darley, provided such OEMs identify such customers by written notice to Darley. This warranty does not cover any parts or equipment which may be included in a Pump, but which are not manufactured by Darley, and such non-covered items shall carry only such warranties, if any, made by their respective manufacturers and assignable to Customer. This warranty further excludes any coverage of damage or loss to any equipment or structures in which a Pump is incorporated or to which a Pump may be attached, as well as any damage to or failure of a Pump caused by or related to misuse, accident, failure to maintain or service, abuse, negligence, applications which exceed Darley's recommended limitations, or in the event of Customer's unauthorized or improper modification(s) of a Pump (and regardless of any actual or constructive knowledge Darley may have of such modifications), or in the event a Pump has been repaired, altered, or treated by anyone other than Darley-trained technicians, Darley or its authorized service provider. The following repairs or replacement expenses are specifically excluded from the scope of this warranty: non-defective parts worn, exhausted or consumed through normal usage; consumable parts subject to routine replacement, including but not limited to pump packing, O-rings, gaskets, intake screens, anodes or filters; and routine maintenance specified in the operator's manual. Customer shall notify Darley in writing within the Warranty Period of any claim under this Warranty, to Darley's Melrose Park, Illinois office (except as otherwise directed), and Customer shall comply with Darley's reasonable claim documentation and processing according to Darley's Returned Goods Authorization form and procedures, which should be requested when making a warranty claim. Within 30 days of Customer's receipt of a Returned Goods Authorization, Customer shall return the Pump or claimed defective component thereof to Darley F.O.B. Darley's designated plant. Customer shall bear all of its own costs of dismantling, removing, shipping, storing, insuring and reinstalling Pumps or parts thereof which are submitted to Darley for warranty evaluation. Darley shall within a reasonable time examine the returned item and determine whether such item is defective, and at Darley's election, whether to repair, replace, recondition, or refund the price thereof. The amount of any refund shall not exceed Customer's purchase price. No reimbursement or allowance will be made to Customer for Darley's labor costs or other expenses of repairing or replacing defective products or workmanship, all such costs of which shall be billed to Customer. Any repaired Pumps or replacement parts shall also be covered by this limited warranty, subject to the same original Warranty Period (which shall not be extended by reason of any repair or replacement). This limited warranty shall be Customer's sole and exclusive contractual remedy for any defect or failure of a Pump or component, and as such excludes any remedy or cause of action in tort or contract against Darley or any of its suppliers or distributors for liability to Customer or to any other person for any incidental, consequential, or other damages (including but not limited to personal injury; death; property damage due to fire, water, or any other cause; loss of crops, timber, or wildlife; loss of time or interruption of operations or related costs; delays; demurrage; lost profits; or indirect or special damages) arising out of or relating to the use (including any malfunction) or inability to use any original, repaired, replaced, or substitute Pump, regardless of the reason for such damage, loss or injury. Under no circumstances will Darley's liability for any claim hereunder, including for breach of warranty or any cause of action related to an alleged breach of this warranty, exceed Customer's purchase price for the Pump or component thereof which is the subject of this warranty. THIS LIMITED WARRANTY IS THE ONLY WARRANTY MADE BY DARLEY, AND IS IN LIEU OF ANY OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ANY OF WHICH ARE DISCLAIMED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE, OR OF FREEDOM FROM PATENT INFRINGEMENT. CUSTOMER ASSUMES ALL RISK OF USING ALL PUMPS FOR ALL FORESEEN AND UNFORESEEN PURPOSES. CUSTOMER'S REMEDIES CONTAINED HEREIN ARE EXCLUSIVE. All terms of this limited warranty are subject to the standard W.S. Darley & Co. purchase contract standard terms and conditions in effect at the time of sale, and to any written modifications to this standard limited warranty agreed to by Darley and Customer (including but not limited to the Darley Pump Premium Protection Plan). Any bad faith invocation of a warranty claim, or customer's breach of purchase contract (including OEM breaches), will void Darley's obligations to Customer hereunder. The scope and operation of this limited warranty shall be interpreted under Illinois law.

**WARRANTY****ODIN FOAM DIVISION  
STANDARD LIMITED WARRANTY****ODIN FOAM COMPANY • PO BOX 327 • TOLEDO, OREGON 97391**

Odin Foam Co., a division of W.S. Darley & Co. ("Odin") warrants to the original purchaser (the "Customer") only, subject to the terms and conditions of this Limited Warranty, that Odin will, at its option, repair or replace, in whole or in part, any Odin Pump (hereafter, "Pump") which Odin determines to be defective in materials or workmanship produced or performed by Odin, for a period commencing on the date such Pump is shipped to Customer from Odin's plant (the "Ship Date") and ending on the earlier of **(Two) years or 2000 hours** of Pump usage following the Ship Date (the "Warranty Period"). Odin may also, at its discretion, elect to refund the purchase price to the Customer in lieu of any repair or replacement. Original Equipment Manufacturer ("OEM") Customers may transfer this warranty to their end purchasers without the written consent of Odin, provided such OEMs identify such customers by written notice to Odin. This warranty does not cover any parts or equipment which may be included in a Pump, but which are not manufactured by Odin, and such non-covered items shall carry only such warranties, if any, made by their respective manufacturers and assignable to Customer. This warranty further excludes any coverage of damage or loss to any equipment or structures in which a Pump is incorporated or to which a Pump may be attached, as well as any damage to or failure of a Pump caused by or related to misuse, accident, failure to maintain or service, abuse, negligence, applications which exceed Odin's recommended limitations, or in the event of Customer's unauthorized or improper modification(s) of a Pump (and regardless of any actual or constructive knowledge Odin may have of such modifications), or in the event a Pump has been repaired, altered, or treated by anyone other than Odin-trained technicians, Odin or its authorized service provider.

*The following repairs or replacement expenses are specifically excluded from the scope of this warranty: non-defective parts worn, exhausted or consumed through normal usage; consumable parts subject to routine replacement, including but not limited to pump packing, O-rings, gaskets, intake screens, anodes or filters; and routine maintenance specified in the operator's manual. Customer shall notify Odin in writing within the Warranty Period of any claim under this Warranty, to Odin's Toledo, Oregon office (except as otherwise directed), and Customer shall comply with Odin's reasonable claim documentation and processing according to Odin's Returned Goods Authorization form and procedures, which should be requested when making a warranty claim. Within 30 days of Customer's receipt of a Returned Goods Authorization, Customer shall return the Pump or claimed defective component thereof to Odin F.O.B. Odin's designated plant. Customer shall bear all of its own costs of dismantling, removing, shipping, storing, insuring and reinstalling Pumps or parts thereof which are submitted to Odin for warranty evaluation. Odin shall within a reasonable time examine the returned item and determine whether such item is defective, and at Odin's election, whether to repair, replace, recondition, or refund the price thereof. The amount of any refund shall not exceed Customer's purchase price. No reimbursement or allowance will be made to Customer for Odin's labor costs or other expenses of repairing or replacing defective products or workmanship, all such costs of which shall be billed to Customer. Any repaired Pumps or replacement parts shall also be covered by this limited warranty, subject to the same original Warranty Period (which shall not be extended by reason of any repair or replacement). This limited warranty shall be Customer's sole and exclusive contractual remedy for any defect or failure of a Pump or component, and as such excludes any remedy or cause of action in tort or contract against Odin or any of its suppliers or distributors for liability to Customer or to any other person for any incidental, consequential, or other damages (including but not limited to personal injury; death; property damage due to fire, water, or any other cause; loss of crops, timber, or wildlife; loss of time or interruption of operations or related costs; delays; demurrage; lost profits; or indirect or special damages) arising out of or relating to the use (including any malfunction) or inability to use any original, repaired, replaced, or substitute Pump, regardless of the reason for such damage, loss or injury. Under no circumstances will Odin's liability for any claim hereunder, including for breach of warranty or any cause of action related to an alleged breach of this warranty, exceed Customer's purchase price for the Pump or component thereof which is the subject of this warranty. THIS LIMITED WARRANTY IS THE ONLY WARRANTY MADE BY ODIN, AND IS IN LIEU OF ANY OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ANY OF WHICH ARE DISCLAIMED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE, OR OF FREEDOM FROM PATENT INFRINGEMENT. CUSTOMER ASSUMES ALL RISK OF USING ALL PUMPS FOR ALL FORESEEN AND UNFORESEEN PURPOSES. CUSTOMER'S REMEDIES CONTAINED HEREIN ARE EXCLUSIVE. All terms of this limited warranty are subject to the standard Odin Foam Co. purchase contract standard terms and conditions in effect at the time of sale, and to any written modifications to this standard limited warranty agreed to by Odin and Customer (including but not limited to the Odin Pump Protection Plan). Any bad faith invocation of a warranty claim, or customer's breach of purchase contract (including OEM breaches), will void Odin's obligations to Customer hereunder. The scope and operation of this limited warranty shall be interpreted under Oregon law.*



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**Phone Numbers**

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319-987-2161 Fax

**Class A Foam References**

**The National Wildfire Coordinating Group (NWCG) has sponsored the publication of the following items produced by the NWCG Working Teams. Copies of each of these items may be ordered from the National Interagency Fire Center (NIFC). To order, mail or fax a purchase order or requisition to:**

National Interagency Fire Center  
ATTN: Supply  
3905 Vista Avenue  
Boise, Idaho 83705  
FAX 208-387-5573

Orders must be from agencies or organizations, not private individuals. Use the "NFES" number for the item(s) you are ordering. Do not send money, checks, or money orders with the order. Phone orders are not accepted. You will be billed the cost of the item(s) after the items are sent. Orders from other than Federal wildland fire agencies or State land protection agencies will receive an 18% surcharge on the bill. Transportation charge, other than mail, will also appear on the bill. Questions regarding ordering procedures can be addressed to the NIFC Supply Office, 208-387-5542. Questions regarding billing procedures can be addressed to NIFC Finance Office, 208-387-5533.

PLEASE NOTE THAT THE NIFC FIRE CACHE PERFORMS INVENTORY DURING THE MONTH OF JANUARY. ORDERS ARE NOT PROCESSED DURING INVENTORY. ORDERS RECEIVED DURING THIS INVENTORY PERIOD ARE DATE STAMPED AND PROCESSED IN THE ORDER THEY WERE RECEIVED.

ESTIMATED PRICES ARE SHOWN FOR SOME OF THE ITEMS. ACTUAL PRICES WILL NOT BE KNOWN UNTIL ITEMS HAVE BEEN RECEIVED. ACTUAL COSTS WILL BE CHARGED WHEN FILLING ORDERS.

PLEASE INSURE THAT ALL ORDERS HAVE THE CORRECT NFES #'S FOR THE ITEMS BEING ORDERED.



**REFERENCE**

**INTRODUCTION TO CLASS A FOAM, 1989**

13:00 minute videotape, VHS size only

NFES 2073 \$1.96

First in a videotape series dealing with foam use. This tape is a brief introduction to class A foam technology covering foam chemistry, foam generating equipment and examples of foam application. PMS 445-1.

**THE PROPERTIES OF FOAM, 1993**

15:00 minute videotape, VHS size only

NFES 2219 \$2.12

Second in a videotape series about class A foam. Explains how class A foam enhances the abilities of water to extinguish fire and to prevent fuel ignition. Basic foam concepts including drain time, expansion and foam type are explained. This revised 1993 version differs from the original 1992 videotape only in the way "foam types" are categorized. The original 1992 version described foam types as "foam solution, fluid, dripping and dry." The 1993 revision of the video describes foam types as "foam solution, wet, fluid and dry." PMS 445-2.

**CLASS A FOAM PROPORTIONERS, 1992**

23:10 minute videotape, VHS size only

NFES 2245 \$3.49

Third in a videotape series about class A foam. Explains the workings of a foam proportioner, the device that adds a measured amount of foam concentrate to a known volume of water. Advantages and disadvantages are presented. PMS 445-3.

**ASPIRATING NOZZLES, 1992**

10:13 minute videotape, VHS size only

NFES 2272 \$1.80

Fourth in a videotape series about class A foam. Explains the difference between low and medium expansion nozzles and appropriate uses for each nozzle. PMS 445-4

**COMPRESSED AIR FOAM SYSTEMS, 1993**

20:00 minute videotape, VHS size only

NFES 2161 \$2.28

Fifth in a videotape series about class A foam. Describes equipment, including water pumps, air compressors, drive mechanisms and nozzles, that is used to generate compressed air foam. Presents rules of thumb for simple and reliable foam production. Explains procedures for safe operation. Compares compressed air foam to air-aspirated foam. Presents advantages and disadvantages of the system.

**FOAM VS. FIRE, PRIMER, 1992**

NFES 2270 \$.44

This 9-page publication covers the basics of using class A foams and discusses their adaptability to present application equipment. First in a series of three "Foam vs. Fire" publications. PMS 446-2.

**FOAM VS FIRE, CLASS A FOAM FOR WILDLAND FIRES, 1993**

NFES 2246 est. \$.50

This 28-page publication explains how to get the most fire fighting punch from water by converting water to class A foam. Discusses how and why foam works. Explains drain time, expansion ratio, foam type, proportioning, aspirating nozzles and compressed air foam systems. Also discusses application for direct attack, indirect attack, mop up, structure protection, and safety considerations. Slightly revised from 1992 edition to clarify foam types and descriptions. Second in a series of three "Foam vs. Fire" publications. PMS 446-1.

For those who would like a list of training materials and other publications available from NIFC, please order:

NFES 3362 NWCG NFES Publications Catalog est. \$2.00



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