

Waterous CAFS Customer's Troubleshooting Guide

It is important to know what to do if your compressed air foam system is not operating properly. This troubleshooting guide should help you diagnose, isolate and fix the problem encountered.

Problem	Cause	Fix
Lack of air supply from air compressor		
Is the air compressor engaging?	No – Lack of air supply to air clutch (Eclipse)	Repair air leak or re-establish air supply to air clutch. Check operation of the electric 3-way solenoid valve.
	No – No PTO engagement	Confirm "OK TO PUMP" light is illuminated. If not, repair as needed.
	Yes – Confirm Auto-Sync settings	Pressures should be as follows: Air PSI of 20–50 when in FIXED and UNLOAD Air PSI of 20–50 when in AUTO and UNLOAD Air PSI of 45–150 when in FIXED and RUN Air PSI to match pump discharge PSI in AUTO and RUN (+/- 5%)
Air compressor operating properly, no air supply to discharges		
Air compressor operating properly, no air supply to discharges	Malfunctioning air discharge solenoid(s)	Verify power and operation of discharge solenoid(s). Repair or replace as needed. Verify proper wiring to solenoid (polarity sensitive) – See F-1031, Section 3013 for wiring schematic.
	Malfunctioning air check valve(s)	Verify direction of check valve (arrow to discharge) and correct as needed.
	Air inlet trim valve out of adjustment	Reference "Control Air Circuit Calibration Instructions" in F-1031, Section 4218.
	Debris in air inlet trim valve (AITV)	Clean debris from air inlet trim valve (AITV).
FIXED and RUN develops PSI but AUTO and RUN fails to develop PSI		
FIXED and RUN develops PSI but AUTO and RUN fails to develop PSI	Lacking water supply to balance trim valve	Reference "Control Air Circuit Calibration Instructions" in F-1031, Section 4218.
Air discharge PSI does not match water PSI (+/- 5%)		
Air discharge PSI does not match water PSI (+/- 5%)	Air discharge pressure higher than water discharge pressure	Circuit has an air leak or is uncoupled. Trace the red hose circuit to locate leaks and repair as needed.
	Air PSI gauge is not tapped into correct location	Verify that the air PSI gauge is tapped into the AUTO/SYNC control.
	Water PSI gauge is not tapped into correct location	Verify that the water PSI gauge is tapped into location shown on the dimensional assembly.
	Air inlet trim valve out of adjustment	Reference "Control Air Circuit Calibration Instructions" in F-1031, Section 4218.
Safety pop-off valve opening		
Safety pop-off valve opening	Balance trim valve completely closed	Reference "Control Air Circuit Calibration Instructions" in F-1031, Section 4218.
System overheating		
System overheating	Oil level in the air compressor is low	Check for oil leaks and repair as needed. Use ISO 68 viscosity hydraulic oil, filling to the middle of the sight glass.
	Plugged water strainer at heat exchanger	Remove strainer and clean screen.
	Inadequate water supply	Verify that water is being circulated within the pump (TANK TO PUMP valve completely open with the TANK FILL valve 1/4 open).
	Overheated water supply	Supply the pump with fresh cool water and open a discharge valve or TANK FILL valve, allowing the heated water to be dumped to atmosphere.

Problem	Cause	Fix
Temperature gauge inoperative	Wires unconnected	Check wire connections at the gauge, sending unit and power supply.
	Wires improperly connected	Check wiring for proper sequence (green to large terminal; yellow to small terminal) – See F-1031 Section 3013.
Excessive oil consumption	Reservoirs overfilled with oil	Check oil level while on a level surface. Reduce level to middle of the sight glass.
	Flowing in excess of 200 CFM	Reduce RPM and flow CAFS and recheck oil level.
	Oil/Air filter torn or damaged	Result of flowing air in excess of 200 CFM. Replace air filter, flow CAFS, shut down the pump for 15 minutes and check oil level.
	Oil siphon line and check valve	Check oil siphon line for obstruction and inspect check valve for operation.
Excessive compressor bleed down time (time may vary)	Inlet air trim valve closed too far	Reference “Control Air Circuit Calibration Instructions” in F-1031, Section 4218.
	Debris in inlet air trim valve	Clean valve and reference “Control Air Circuit Calibration Instructions” in F-1031, Section 4218.
Engine stalls upon compressor engagement	Auto-Sync in FIXED or AUTO and RUN position	Place the Auto-Sync in the AUTO and UNLOAD settings.
	Engaging compressor when under load	Operating under this condition causes the compressor oil to accumulate in the compressor creating a condition similar to a hydraulic pump. To correct, allow air to bleed off, restart the compressor and immediately begin flowing air through a discharge.
	Air compressor locked up	Due to a lack of compressor oil/lubrication. Repair or replace the compressor.
Air flow digital display stuck at “0” CFM	Magnet uncoupled in air flow sensor	Turn air flow on and off allowing magnet to re-couple. Reference Page 4 for instructions.
	Faceplate glass in contact with collar	Remove faceplate and add spacer (gasket) to allow clearance.
	Digital display cable defective/uncoupled	Check cable to ensure it is coupled. If cable is coupled, remove the cable to check for closed circuit.
	Air flow meter does not power up	Check for damaged connectors in the meter or cable. Check pin connections for tightness and proper fit.
Air flow digital display stuck at “high” CFM	Magnet uncoupled in air flow sensor	Engage compressor and move large amounts of air out of a discharge, cycling the air flow on and off until the magnet re-coupled. Reference Page 4 for instructions. NOTE: It may be necessary to manually couple the magnet and collar by removing the faceplate on the flow meter.
Poor foam solution (wet or dry)	Using wetting agent in place of foam	Flush system and install Class “A” foam.
	Lack of foam	Check if the Foam Pro system is on. Check if there is foam in the reservoir. Make sure the foam supply valve is on and the Y strainer clean. Reference the Foam Pro instruction manual.
	Incorrect size air lines to discharges	Refer to “Air Distribution Hose Size Guidelines” in F-1031, Section 3013.

Problem	Cause	Fix
Foam in water system	Foam dumped into the water tank	Flush water tank and pump until foam is cleared.
	Foam cell is leaking into water tank	Condition applies to tanks utilizing a common wall(s) between the foam tank and the water tank. If a leak is confirmed, repair the foam tank and flush the water tank and pump until foam is cleared.
	Foam proportioning manifold check valve malfunction	If the above conditions have been corrected, the final cause for foam in the water tank may be the result of a malfunctioning foam manifold check valve. To troubleshoot, cap off one foam discharge that is plumbed to the foam manifold, open that discharge valve and increase the pump discharge to 30–40 PSI. Disengage the pump and monitor the corresponding discharge PSI gauge, looking for a drop in discharge pressure. If the PSI drops, it indicates the foam manifold check valve is leaking and requires repair.
Water in compressors oil/air	Leaking heat exchanger	Isolate the heat exchanger and check for leaks. Replace if necessary. (Typical cause is freezing.)
	Discharge air check valve(s) malfunctioning	Confirm direction (arrow towards discharge valve). Replace if necessary.
Clutch smoking	Engaging compressor with the Auto–Sync in the RUN setting	Disengage compressor and place Auto–Sync settings to AUTO and UNLOAD, then engage the compressor.
	High RPM engagement	Reduce engine RPM and engage in the AUTO and UNLOAD settings.
	Not allowing for compressor to bleed down prior to re–engaging	Allow ample time for compressor to bleed down. Re–engage the compressor in the AUTO and UNLOAD settings.
	Contaminated clutch disc or plate	Inspect the clutch disc and plate for contaminants (oil, dirt, foam, etc.). Clean or replace as necessary.
	Low air pressure or supply leak	Check pressure at supply side. Check supply line for leaks.
Safety pop–off valve opening at low pressure	Sump fire damaged pop–off valve	Check the system and oil level. Replace the pop–off valve. Once repaired, operate the compressor watching for air or oil being discharged from the pop–off valve. One indication of a pop–off valve failure is oil present throughout the pump compartment. Check for signs of sump fire.

Eclipse Air Flow Meter

Field Instructions for Re-Coupling Air Flow Meter Indicator

The Eclipse CAFS unit is supplied with a “Hedlund” brand flow sensor. The sensor is located on the left side of the compressor tank and is wired to a digital display readout mounted on the pump panel.

The flow meter sensor is an inline type using an internal piston assembly with permanent ring magnet. Externally, the flow meter sensor has a flow indicator ring that is magnetically coupled to the internal piston assembly. As air flows through the flow meter sensor, the internal piston assembly moves proportionally to the given airflow. As the piston assembly moves, the magnetically coupled flow indicator ring moves with it. In addition, as the indicator ring moves, the electronic signal is sent to the digital readout. This varying electronic signal is what is changing the digits in the display.

Under the right conditions, the internal piston assembly and the flow indicator ring may uncouple. This will result in a digital reading that will not change and appears to be stuck. This condition typically will occur if the flow meter sensor is subjected to a sudden rush of high volume of air (or a sudden decrease).

If you experience this condition and the flow indicator ring uncouples, use the procedure below to re-couple the flow indicator ring.

1. Close all air discharges.
2. Set Auto-Sync controller to UNLOAD and FIXED.
3. Engage compressor.
4. Set Auto-Sync to RUN and FIXED.
5. Increase compressor speed (typically engine speeds of 1200–1300 RPM) or until the digital display reads about 210 SCFM.
6. Simultaneously open 2–3 air discharge valves (or 1 monitor air discharge, if so equipped) to atmosphere.
7. Reduce the engine speed slowly to idle. As you reduce engine speed, you should see the flowmeter digital display registering the changes. This means the flow indicator has been re-coupled to the internal piston assembly. If not, repeat Steps 4 thru 7 and open 3–4 air discharge valves in Step 6.
8. Set Auto-Sync to UNLOAD.
9. Close air discharge valves.
10. Disengage the compressor.