



Integrated Crossmount Operating Instructions

Applies to Model

160-80-DC

Unit Serial Number _____

Waterous
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OPERATING INSTRUCTIONS

Check the following fluid levels daily or prior to starting unit:

- Engine oil
- Engine coolant
- Compressor system oil (oil level should be visible within the sight glass on the sump and should be checked daily or before or after used)
- Foam concentrate
- Onboard water supply

MULTIPLE USES

The Waterous integrated crossmount compressed air foam unit can be operated in several pumping modes; water only, foam solution without compressed air, compressed air foam and compressed air only for support operations such as operating air tools, filling rescue air bags, etc. It is possible to pump foam solution from one discharge while pumping compressed air foam from another, or varying foam consistencies (expansion ratios) from different discharges simultaneously.

NOTE: Monitor engine and compressor instruments during any and all operations.

WATER PUMPING OPERATIONS

All unit operations begin with pumping water. These steps must be followed for operations involving pumping water, foam solution, compressed air or compressed air foam.

Connect the hose(s) to the desired discharge(s).

Prior to starting the engine, the Auto Sync controls should be in the UNLOAD position, which allows the air compressor to “free wheel” without pumping air.

- If pumping water from an on board booster tank, fully open the tank to pump valve. If pumping from an overboard source, the tank to pump valve should be fully closed.
- If so equipped, turn on the main power switch to the CAFS unit.
- To start the engine, open the Vernier throttle one to two counter-clockwise turns, move the ignition switch to the “ON” position, and push the start button to crank the engine until it starts.

WATER PUMPING OPERATIONS (continued)

- Throttle-up to desired pressure. If pump pressure is absent, it will be necessary to prime the pump utilizing the Waterous Jet Primer (or equivalent installer supplied priming system). The Jet Primer utilizes compressed air from the onboard compressor system, which is passed through a venturi, creating a vacuum within the water pump.
 - To prime with Jet Primer, move the Auto Sync controls to the FIXED position to build air pressure. Once air pressure has risen, move the Jet Primer air and vacuum valves to the open positions. The rush of air through the priming venturi will be audible. As water is drawn into the pump, some will be vented through the venturi and spill onto the ground. When the water discharge pressure gauge rises, the pump is primed.
 - After prime is achieved, close the Jet Primer air valve. For water only operations, move the Auto Sync controls back to the UNLOAD position.
- Open desired discharge valves and throttle-up to desired pressure.

CAUTION: Running the unit with a dry fire pump can cause damage to the pump and air compressor system.

FOAM SOLUTION OPERATIONS

Follow the instructions above for water pumping operations. Turn on the foam proportioner to inject foam concentrate into the water stream. Refer to the foam proportioner operation manual for instructions in the proper operation of the installed proportioning system.

COMPRESSED AIR FOAM OPERATIONS

Follow the instructions above for foam solution operations. Safe operations dictate the presence of foam concentrate in the water stream prior to the injection of compressed air. If foam concentrate is not present, unmixed water and air is discharged through a nozzle in an erratic manner. This is a condition known as “slug flow.”

Discharge pressures for compressed air foam operations typically range between 80 And 120 PSI in a flow state. Set water discharge pressure at the desired level.

NOTE: Compressed air foam does not have the hydraulic characteristics of plain water or foam solution. Therefore, standard pump hydraulics practices do not apply to CAFS operations.

- Move Auto Sync controls to the AUTO position. Air pressure as shown on the air pressure gauge should rise to within plus or minus 5% of the water discharge pressure. The Auto Sync system will balance the air and water pressures throughout a range of 40 PSI up to 150 PSI. Optimal compressed air foam system performance occurs at discharge flow pressures of 80-120 PSI.
- Set proportioner at 0.2% - 0.4% for normal Class A combustibles. The type and brand of foam concentrate used and the tactical dictate proportioning rates objective.

COMPRESSED AIR FOAM OPERATIONS (cont'd)

- Open desired discharge valves by pulling the “TEE” handle approximately 1½” from the closed position. Controlling the amount of foam solution entering the discharge stream sets the foam expansion ratio. High solution flows restrict the amount of air admitted and result in lower expansion or “wet” foam. To produce higher expansion or “drier” foam, simply gate back the amount of solution admitted.
- Fully open the air valves to the desired discharge(s). Adjust the solution now to produce the desired foam consistency.

Foam is formed during the transition through the hose. To produce acceptable finished foam, sufficient hose length must be provided on the discharge. Refer to “Suggested Guidelines” on page 10 for minimum hose lengths for CAFS operations.

WARNING

Nozzle reaction force is significantly increased at the time the nozzle valve is opened in compressed air foam operations. **OPEN CAFS NOZZLES SLOWLY!**

SHUT-DOWN PROCEDURE

- Close air valve(s)
- Turn off Foam proportioner
- Flow clear water through discharge hose(s) until no bubbles are present
- Close discharge valve(s)
- Move Auto Sync controls to UNLOAD
- Shut engine down

After the engine is shut down, the compressor system will vent itself, creating an audible hiss as compressed air is evacuated from the pressure vessel/sump.

COMPRESSED AIR ONLY OPERATION

- Follow instructions for water pumping operations without opening discharge valves. Air compressor cooling is via water that is circulated by the fire pump through the compressor cooler and returned back to the booster tank. Compressed air only operation time is limited by the amount of available cooling water. The water in the booster tank will eventually become heat saturated and ineffective at cooling the air compressor. **Watch the compressor temperature gauge closely!** Compressor system overheat is also indicated by the panel mounted warning light and alarm (if installed).
- After engine start, ensure that the water pressure as shown on the panel mounted gauge rises. Move Auto Sync controls to the FIXED position. Air pressure will rise to the preset pressure setting on the air compressor, approximately 150-PSI with the engine throttled-up. For lower operating pressures, move the Auto Sync controls to the AUTO position and uses the engine throttle to control the air pressure.
- Connect the air discharge hose to the fitting on the pump operator's panel and open the air supply valve.
- Extended compressed air only operations necessitate connection of an external water source to the pump inlet and closing of the tank to pump valve for proper compressor cooling. In this case, cooling water will flow into the booster tank at 10-20 GPM, eventually overflowing the tank.

WARNINGS

- Compressed air can be dangerous. Read and understand the operating instructions for the Waterous compressed air foam unit and individual components prior to operating.
 - DO NOT use the compressed air foam unit as an air source for SCBA or any breathing air supply.
 - Discharge outlets that are capped, hose lines that are valved and charged and the air compressor sump may contain compressed air. Relieve all pressure BEFORE attempting to remove any caps, fittings, and nozzles or to perform maintenance to prevent serious personal injury.
 - Nozzle reaction force is significantly increased at the time the nozzle valve is opened in compressed air foam operations. **OPEN CAFS NOZZLES SLOWLY!**
 - Operating the compressed air foam unit with water and compressed air pumped through a discharge without foam concentrate will create a potentially dangerous condition known as "Slug Flow" where unmixed pockets of water and air are passed through the nozzle, causing erratic nozzle reaction.
 - For compressed air foam operations, use only fire hose that is rated at 200 PSI or higher working pressure.
 - The unit operator should have a thorough understanding of "Boyle's Law" (The law of compressed gases) prior to operating the compressed air foam unit.
-

Waterous/Boss SCA-9D Water Cooled Rotary Screw Air Compressor

HOW IT WORKS

The air compressor used in this application is a Boss SCA-9D, oil flooded rotary screw type. Rotary screw air compressors are very common in industrial applications. This type of compressor injects oil into itself, where it lubricates, seals, cools, and silences the compressor. The oil is then entrained into the air discharge from the compressor. This air/oil mixture is discharged into a sump tank where most of the oil separates from the air. The oil is then sent via hydraulic hose to a combination cooler/filter unit. It is cooled to remove compression and friction heat, filtered, and sent to the oil injection port on the compressor. The cycle is then repeated.

The oil mist that remains in the air stream is recovered by an air/oil separator system. This system recovers the oil mist in a spin-on cartridge that has a siphon tube that picks-up the recovered oil for return to the air compressor.

A modulating inlet valve controls the compressor's air output. The inlet valve is opened and closed by the Auto Sync pressure control system.

The compressor cooling system circulates water from the fire pump through the compressor oil cooler and back to the tank to remove heat from the compressor oil system. The compressor oil temperature should not exceed 250°F. If this occurs, check the water supply, pump prime, and restrictions in the cooling water system and for low oil level in the sump.

The air compressor (air end) is mounted to the transmission of a Waterous CPT2 single stage pump and driven by a dry Poly Chain. The pump / air end are directly driven by the engine.

It is important to ensure that there is a water supply to the pump whenever the engine is running. Pump and/or compressor damage may result from running the pump dry.

AIR COMPRESSOR SYSTEM SERVICE AND MAINTENANCE

Excessive heat build-up and oil system contamination is most common causes of compressor system problems and premature wear. With proper operation and maintenance, the compressor system should far outlast the vehicle it is mounted on. Adherence to the following guidelines will prevent potentially costly damage.

1. There is a sight gauge on the oil reservoir. The oil level should be at $\frac{1}{2}$ of the window. Check the oil on level ground, prior to system start up. If the system has been run wait 10 minutes for the oil to stabilize before trying to determine the level. The compressor uses hydraulic oil. The oil is classified by an ISO standard as ISO 68 viscosity and is sold under various trade names. Many are sold as a “anti-wear” oil, and the manufacturer will call it AW-68. The oil is available at most oil distributors or auto parts stores.
2. The oil should be changed after the first 30 hours of system operation. After that the oil should be changed annually. There is a drain cap available at the bottom of the sump. The oil fill cap is located on the end of the unit.
3. Change the compressor system oil filter at the same time as the oil is changed (see Maintenance Items for reorder information).
4. Run the compressor for 2 minutes after changing the oil, and then re-check the oil level and add oil as necessary. **DO NOT OVERFILL.**
5. Visually inspect the system periodically for signs of leaks. Check the Check the air compressor Poly Chain drive for proper tension and signs of wear monthly or more frequently as dictated by the amount of use. Proper tension on the Poly Chain is to a no slack setting or slightly loose (about 70 psi with Krikkit belt tensioner gauge). If in doubt, **do not tighten the Poly Chain. An over-tightened Poly Chain may cause equipment failure and may void the product warranty.**
6. Inspect the compressor air intake filter and clean or replace as necessary. The environment in which the unit operates will determine the frequency of air filter service and replacement. In any situation, replace no less frequently than yearly.
7. Replace the oil / air separator cartridge every 24 months, or if the oil consumption of the unit suddenly increases. A sudden increase may be caused by a hole or tear in the separator media allowing oil to carry through and discharge with the compressed air. (see Maintenance Items for reorder information).
8. Completely drain the water from the compressor oil cooler in cold weather to prevent freeze damage.
9. Run system on a regular basis for 15 to 20 minutes to flow air and circulate water. This should be done, at a minimum, weekly but preferably daily. This will keep the system operating like new and prevent potential issues.

Maintenance Schedule

	Check oil level and for oil leaks	Change Compressor Oil	Change Oil Filter	Change Separator Cartridge
Daily or After Each Use	X			
Annually	X	X	X	
Every 24 Months	X	X	X	X

MAINTENANCE ITEMS

COMPRESSOR		
AIR FILTER	CO85005	(Waterous part # 2030043)
SEPARATOR FILTER	LB 1374/2	(Waterous part # 2030015)
HYDRAULIC FILTER	WD920	(Waterous part # 2030058)
BELT TENSIONER GAUGE		
	KRIKIT	(Waterous part # 8070076)
POLY CHAIN		
	8MGT-1000-21	(Waterous part # 1030013)
HYDRAULIC OIL		
ISOAUW68 Anti-Wear, Low-Foaming, Anti-Foaming		
ENGINE		
<i>(refer to Engine Manual for Maintenance Schedule)</i>		
OIL FILTER		
	Waterous part # 2030074	
FUEL FILTER		
	Waterous part # 2030075	
AIR FILTER		
	Waterous part # 2030080	

CAFS NOZZLE / FLOW RATE / HOSE COMBINATIONS

NOZZLES

Compressed air foam can be discharged through various types and sizes of nozzles. Fog nozzles breakdown the bubble structure of the foam, resulting in "wetter" or reduced expansion foam. Similarly, when utilizing smooth bore nozzles with a given hose diameter, smaller tips will discharge "wetter" foam.

FOAM CONCENTRATE RATIOS

Proportioner settings of 0.2% and 0.3% are typically adequate to produce compressed air foam that is formed in a hoseline and used on Class A combustibles. Higher settings will result in a "drier" appearing foam. Lower settings may result in "slug flow" or discharge pulsation caused by insufficient foam concentrate in solution to form foam in the hoseline.

For Class B or other type foam ratio settings, follow the instructions provided by the foam concentrate manufacturer.

HOSE

Utilize fire hose that is rated by the hose manufacturer for use with CAFS. Since the foam is formed during its transition through the hoseline, it is important to utilize the minimum recommended hose lengths, unless a static mixer is utilized. There is significantly less friction and head loss with compressed air foam as compared to water or foam solution. Hence, effective fire streams can be achieved with longer hose lays. Refer to the Suggested Guidelines for the Production of Mid-Range Compressed Air Foam.

NOTE

Compressed air foam systems have the ability to produce foam of shaving cream consistency. While this type of foam is highly stable and possesses a long drain time, it is essential to ensure that the foam will release sufficient water to extinguish a fire in a direct attack situation. This type of foam is typically suited for defensive operations such as exposure protection, barriers or fuels pretreatment.

SUGGESTED GUIDELINES FOR THE PRODUCTION OF MID-RANGE COMPRESSED AIR FOAM

1" HOSE DIAMETER

1 GPM to 1 CFM

1/2" Tip Water Flow: 15 GPM Air Flow: 15 CFM

Disch. Pressure: 125-150 PSI

Min/Max Hose Length: 35' to over 400'

3/4" Tip Water Flow: 20 GPM Air Flow: 20 CFM

Disch. Pressure: 125-150 PSI

Min/Max Hose Length: 35' to over 200'

1-1/2" HOSE DIAMETER

1 GPM to 1 CFM

1" Tip Water Flow: 30-40 GPM Air Flow: 30-40 CFM

Disch. Pressure: 110-150 PSI

Min/Max Hose Length: 100' to over 800'

1-3/8" Tip Water Flow: 50-60 GPM Air Flow: 50-60 CFM

Disch. Pressure: 110-150 PSI

Min/Max Hose Length: 100' to over 400'

For 2-1, simply double the water flow.

Example:

1" Tip Water Flow: 60-80 GPM Air Flow: 30-40 CFM

This will produce a wetter foam.

Air Circuit - Fixed and Auto Pressure Final Adjustments

Air Control circuit is preset and adjusted at the factory prior to shipments. In most cases, the factory settings will provide satisfactory performance for typical CAFS and auxiliary air applications. The FIXED air operation is factory set at 145-150 PSI. The AUTO air operation is set (or trimmed) to match fire pump discharge pressure (+/- 5%).

If the air control circuit requires changing or the circuit has lost its factory setting, the following procedure can be used to “fine tune” the system.

1. Preset the Inlet Air Trim Valve (IATV) by closing the valve, then opening it 3 turns.
2. Preset the Piloted Balance Trim Valve (PBTV) to full open.
3. Start the fire pump and, at idle, establish water flow either through a discharge or tank recirculation.
4. The Auto Sync Control Panel should be in the UNLOAD mode and all air discharges closed.
5. Start the air compressor by placing the compressor engage switch to “ON.”
6. The main air pressure gauge should read 40-50 PSI. In the UNLOAD mode, this minimum pressure is always present to provide compressor oil circulation.

We are ready to proceed with final adjustments for the FIXED and AUTO modes.

FIXED air mode:

1. To set the pressure for the FIXED operation, first locate the “Fixed Pressure Regulator.” The regulator has an adjustment screw with lock nut.
2. Loosen the regulator’s lock nut.
3. Go to the Auto Sync Panel and place controls to the FIXED position. The compressor will build pressure to some valve and hold (regulate).
4. While monitoring the air pressure gauge, adjust the screw on the Fixed Pressure Regulator until the desired pressure is reached. Turning the screw IN will INCREASE pressure and turning the screw OUT will DECREASE pressure.
5. Once the desired regulated pressure is achieved, tighten down the lock nut.
6. Verify the fixed regulator is performing by varying the compressor speed and monitoring the air pressure gauge. The pressure should remain steady at your fixed pressure setting.

With the final adjustments to the FIXED air mode complete, proceed with setting the AUTO air mode.

AUTO air mode:

1. With the fire pump operating at 100 PSI main discharge and minimum flow, place the Auto Sync controls to the RUN position.
2. Monitor main water discharge pressure gauge and the air pressure gauge. The pressure readings should be the same. If not, proceed to step 3.
3. The Inlet Air Trim Valve (IATV) is the first valve to adjust.
 - a. If the air pressure is too high, close the trim valve in half turn increments, monitoring both water and air pressure gauges, until the pressures match. Once the pressures match, no further adjustments are needed, proceed to step 5.
 - b. If the air pressure is too low, open the trim valve a half turn, then check water and air pressure gauges.
 - c. If the air pressure is still too low, open the trim valve another half turn. If air pressures match, no further adjustments are needed, proceed to step 5.
 - d. If air pressure is still too low, proceed to step 4.
4. The Inlet Air Trim Valve (IATV) is now four turns open from fully closed. It is not desirable to have the trim valve open more than four turns. In order to extend its range, go to the Piloted Balance Trim Valve (PBTV).
 - a. From the fully open position, close the PBTV one turn then check water and air pressure gauges.
 - b. If air is still too low, close the PBTV one additional turn and check gauges.
 - c. Keep repeating this process until air pressure matches or is slightly higher than water pressure.
 - d. The final adjustment can be done using the IATV and step 4.
5. Verify the piloted balance valve is performing by varying the fire pump discharge pressure and monitoring the water and air pressure gauges. The air pressure should follow the water pressure and match it. If not, repeat the final adjustment procedure.



Troubleshooting Guide

Applies to all CAFSystems

Waterous
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Troubleshooting

Compressor System

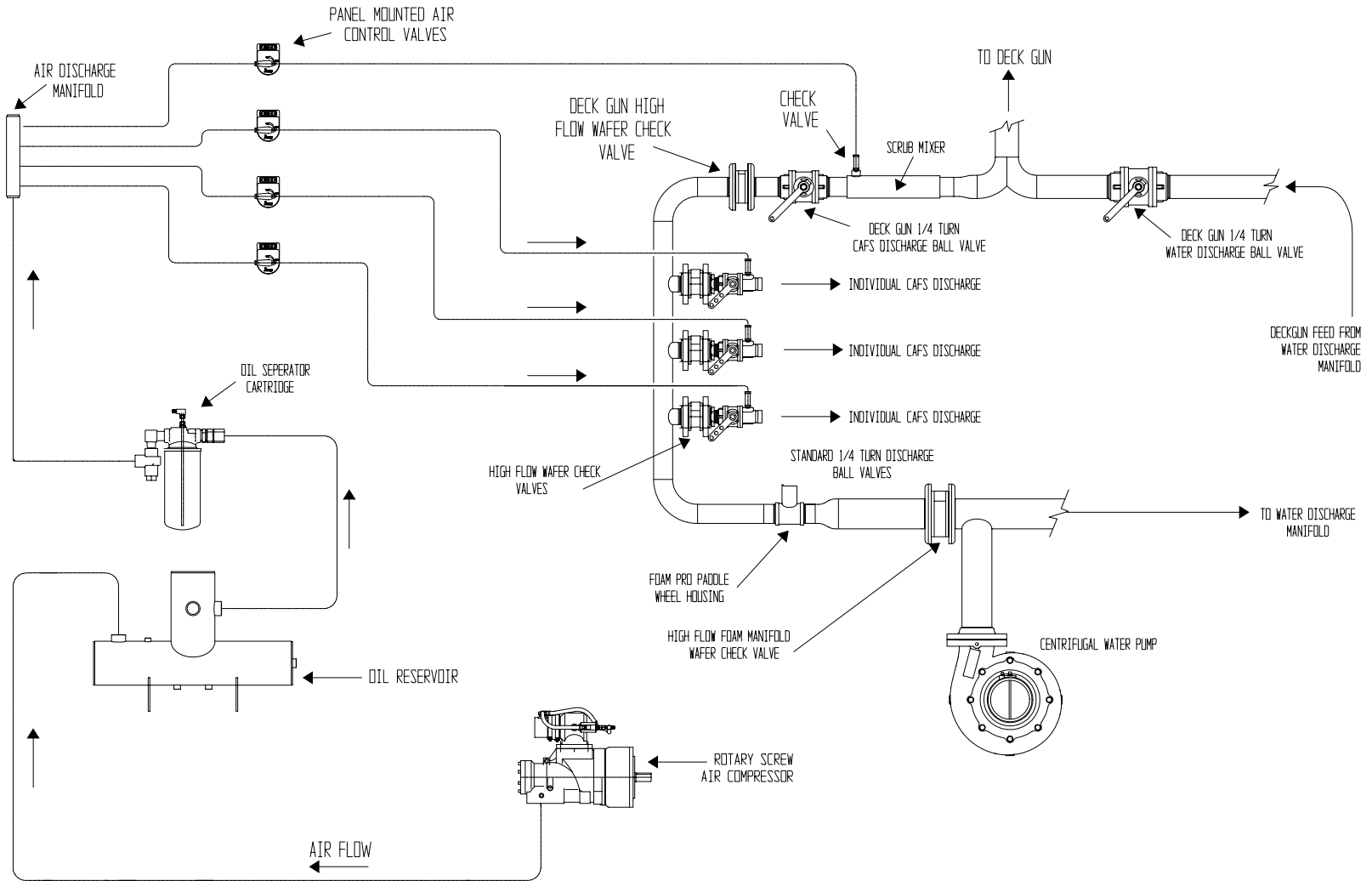
Observed Symptom	Probable cause	Suggested fix
Lack of air pressure from compressor		
Compressor not engaging	Lack of air supply to clutch (for air-clutch systems)	Repair air leak or re-establish air supply
	No PTO engagement	Confirm OK TO PUMP light is on, if not check wiring for damage or disconnected wire, check PTO.
Compressor engaging. No air supply to discharges or insufficient air supply.	Auto-Sync switches not in correct position.	Confirm 40 PSI in UNLOAD position (200 CFM systems) and 50+ in run position. Smaller compressors have lower UNLOAD pressures. Verify when in FIXED/RUN whether pressure reflects 145-150 PSI
	(electric valves) Verify there is power to the air solenoid and check operation of solenoid.	Air discharge solenoid not working Repair/replace solenoid Air solenoid working - leak between solenoid and discharge. Repair leak.
	Air check valve defective	Replace or correct installation.
	Trim valve out of adjustment	Refer to trim valve instructions
	Restricted minimum pressure valve	Clean rust or debris from valve
	Air plumbed before discharge valve seal	Relocate to discharge side of discharge valve
	Incorrect air line size	Size according to discharge and replace line with correct size.
	System functioning correctly, pressure gauge reading obviously incorrect.	Gauge malfunction, air line detached
FIXED has pressure but AUTO has no pressure	No water supply to balance valve.	Check line for proper installation, with no kinks or obstructions. Refer to trim valve instructions.
Air discharge pressure too high	Red hose circuit (compressed air control) has leak or is disconnected.	Repair leak or attach hose

Observed Symptom	Probable cause	Suggested fix
System overheating	Inadequate water flow through cooler	Ensure adequate water flow through pump Check Y strainer for obstruction, clean and reinstall Drain and flush cooler water tubes
	Adequate water flow through cooler.	On-board tank used for cooling for a prolonged period - water too hot to effectively cool the compressor. Locate source of lower temperature water.
		Low compressor oil level: Check oil level - Adjust level to half of the sight glass on level surface.
		Check the hydraulic lines for kinks Change oil filters
		Temperature sending unit and or gauge circuit malfunction. Check wire connections at sending unit
High Oil Consumption	Overfull compressor oil	Adjust level to half of the sight glass on level surface.
	Excess of 200 CFM air flow (on 200 CFM systems)	Back down RPM's and flow CAFS to relieve pressure, then recheck Replace Air/Oil Separator Filter
	Air/oil Separator Filter torn or damaged (could be caused by air flow of higher than 200CFM)	System being operated at higher than capacity
"Excessive" compressor bleed down time on shutoff	Systems vary in bleed down time.	If Auto-Sync is operating correctly, and compressor output is within spec, do nothing.
Engine stalls upon compressor engagement	Engaging compressor while under load	Allow compressor to bleed down before re-engagement
	Running system without flowing air causes oil to accumulate in compressor acting like hydraulic pump	Bleed down air, restart compressor, and move air
	Underrated engine horsepower	Raise engine RPM
	Auto-Sync in FIXED/RUN setting	Engage in AUTO/UNLOAD, then switch to FIXED/RUN
	High oil level	Check oil level, adjust level to half of the sight glass with vehicle parked on a level surface
	Compressor locked up	Repair/replace compressor

Observed Symptom	Probable cause	Suggested fix
Compressor locked up	High oil level (compressor is flooded) Sump fire Low oil level or no oil	Check oil level, adjust level to half of the sight glass with vehicle parked on a level surface Check system and repair Check system and repair
Air flow meter stuck at "0" CFM Air flow meter stuck at high CFM	Magnet uncoupled in meter	Turn air flow on and off to re-couple Move large amounts of air out discharge and turn air flow on and off to re-couple
Poor foam (wet or dry) or no foam (assuming air pressure to discharges is OK) Discharge hose shaking (slug flow)	Using wetting agent and not foam concentrate. Foam proportioning control turned too low. Foam proportioning control OFF or turned too low, foam tank empty.	Use foam concentrate Increase amount of concentrate delivered to manufacturer recommended amount. Make sure proportioner is turned on, foam supply valve is open, foam tank has concentrate, Y strainer is clean, and supply line is connected to injector.
	Foam proportioner ON, setting correct, and tank has foam concentrate, but not providing foam solution.	Refer to foam proportioner manufacturer's instructions for detailed calibration and troubleshooting instructions
Foam in the water system (when proportioner turned off)	Foam concentrate was poured into the on-board water tank Foam manifold drain lines not isolated from water drain lines Cooler line plumbed from foam manifold Foam manifold check valve defective	Flush tank and pump with clean water, refill Isolate to separate drain valve Relocate line to discharge side of pump Rebuild/replace check valve
Water in compressor oil/air	Leaking inside cooler Freeze damage Defective air check valves Missing air check valves for discharges	Isolate cooler and check for leaks, replace if needed, check drain Replace or check Install check valves

Observed Symptom	Probable cause	Suggested fix
Clutch smoking	Engaging in RUN position Slight air leak from solenoid to clutch High RPM engagement Not allowing compressor to bleed down before engaging clutch again Contaminated clutch disc	Engage in AUTO/UNLOAD only Repair air leak Engage in lower RPM Allow for bleed down Clean or replace
Safety pop off valve opening at low pressure	Auto-Sync system out of balance Sump fire damaged pop off valve	Adjust the Auto-Sync system, making sure to not open the trim valve on the compressor more than 3 turns. Check system for other damage and replace valve
Safety pop off valve repeatedly opening	Trim valve or inlet completely open	Refer to trim valve instructions

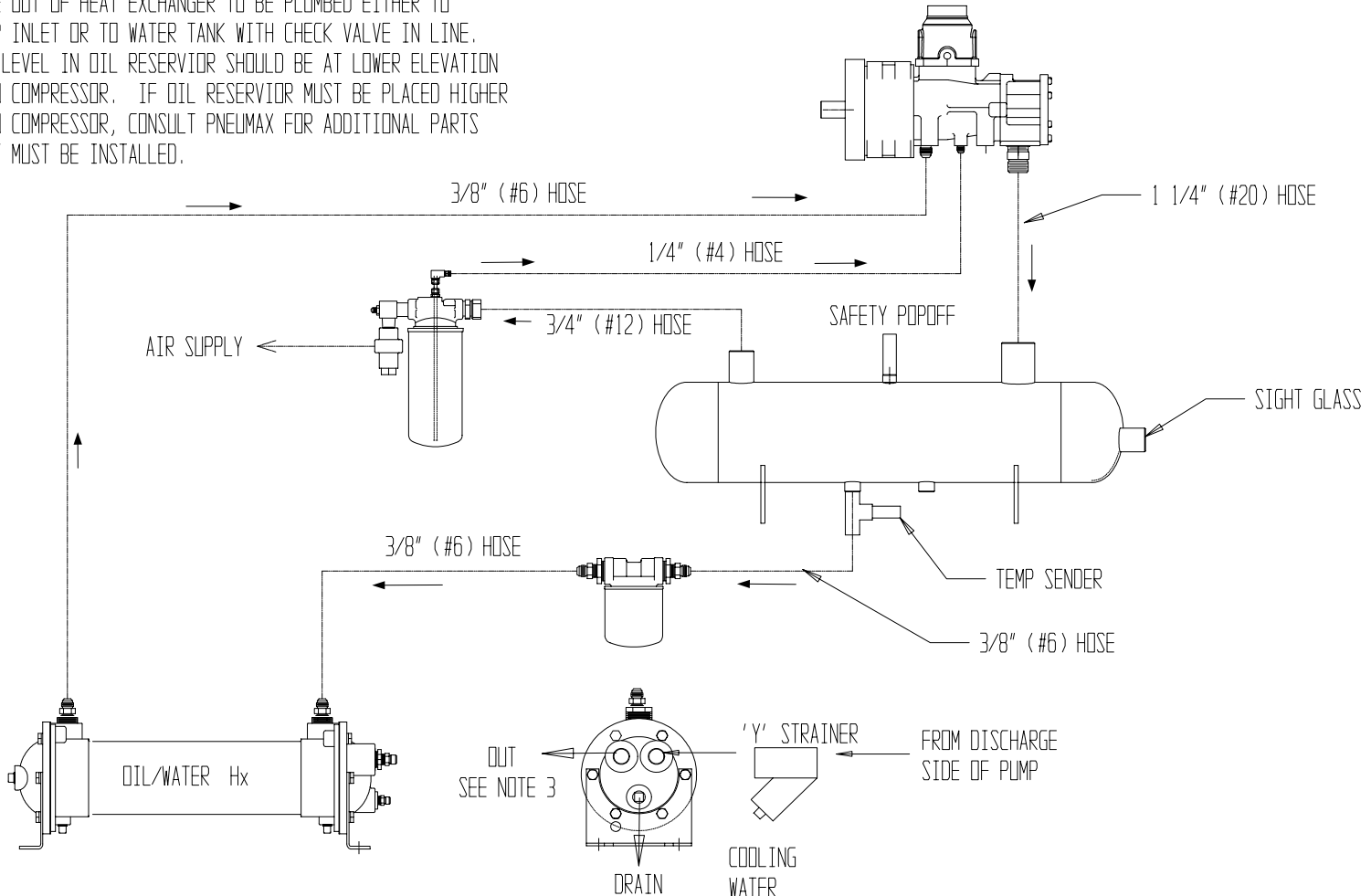
Basic Compressed Air Foam System (CAFS) Schematic



NOTES:

1. USE HYDRAULIC HOSE ONLY
2. DO NOT INSTALL VALVE IN COOLING WATER LINE
3. LINE OUT OF HEAT EXCHANGER TO BE PLUMBED EITHER TO PUMP INLET OR TO WATER TANK WITH CHECK VALVE IN LINE.
4. OIL LEVEL IN OIL RESERVIOR SHOULD BE AT LOWER ELEVATION THAN COMPRESSOR. IF OIL RESERVIOR MUST BE PLACED HIGHER THAN COMPRESSOR, CONSULT PNEUMAX FOR ADDITIONAL PARTS THAT MUST BE INSTALLED.

REV	DESCRIPTION	DATE	ECR #
A	COMPRESSOR OUTLET HOSE WAS 1"	--/--/----	-----



8557 N. 78TH AVE.
 PEORIA, AZ 85345
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DO NOT SCALE DRAWING
 TOLERANCE UNLESS OTHERWISE SPECIFIED
 .XX +/- 0.030 1/X +/- 1/16
 .XXX +/- 0.010 ANGLES +/- 0.5°

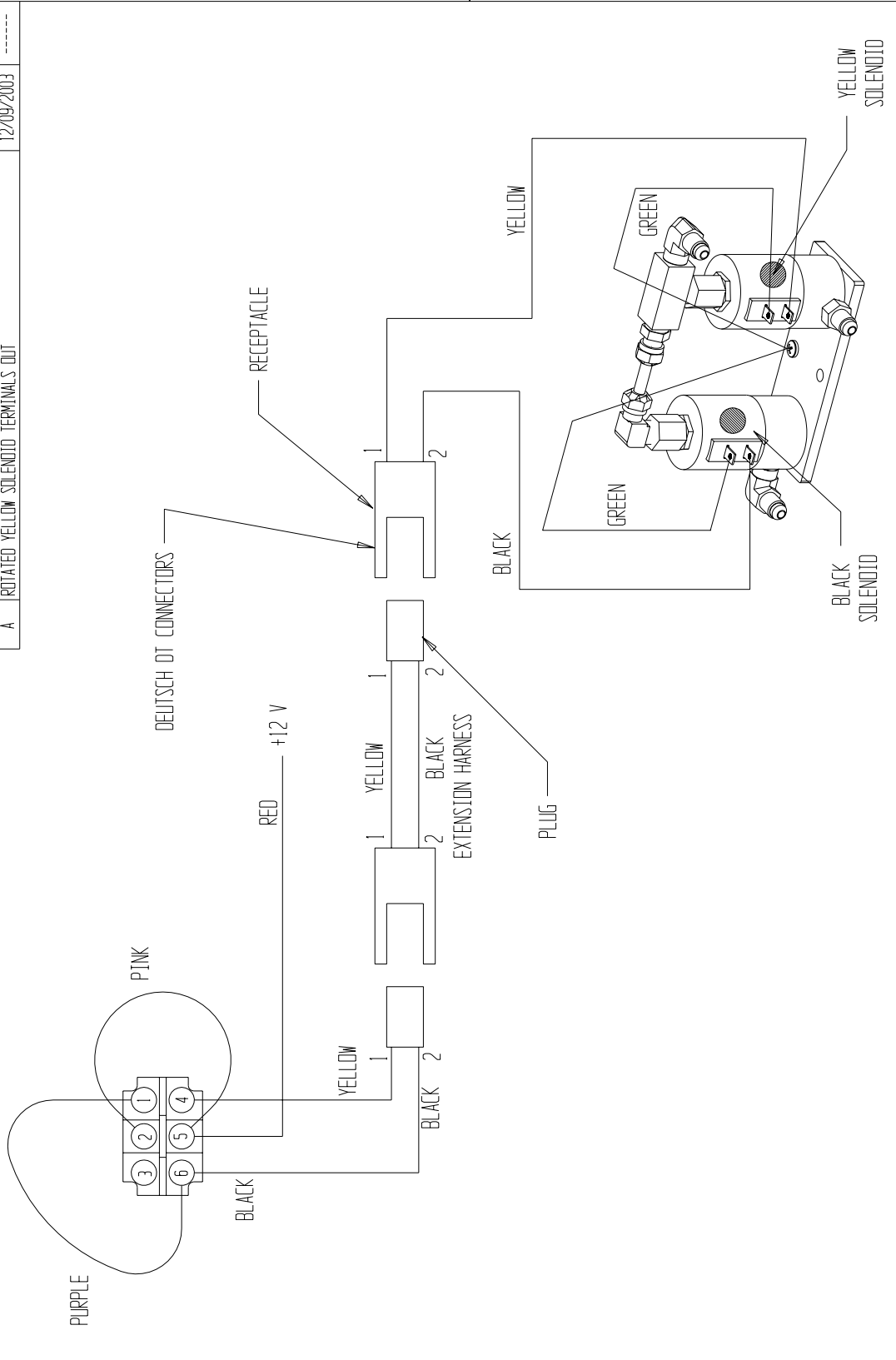
This print is the property of Pneumax, Inc. and is loaned to you subject to return on demand unless otherwise agreed to in writing by Pneumax, Inc. Its contents are confidential and must not be copied or submitted to third parties for use or examination.

SIZE	WEIGHT	SHEET	DRAWN
A	---	1 of 1	10/17/2002 DBB
USED ON: 80-P, CESSG			

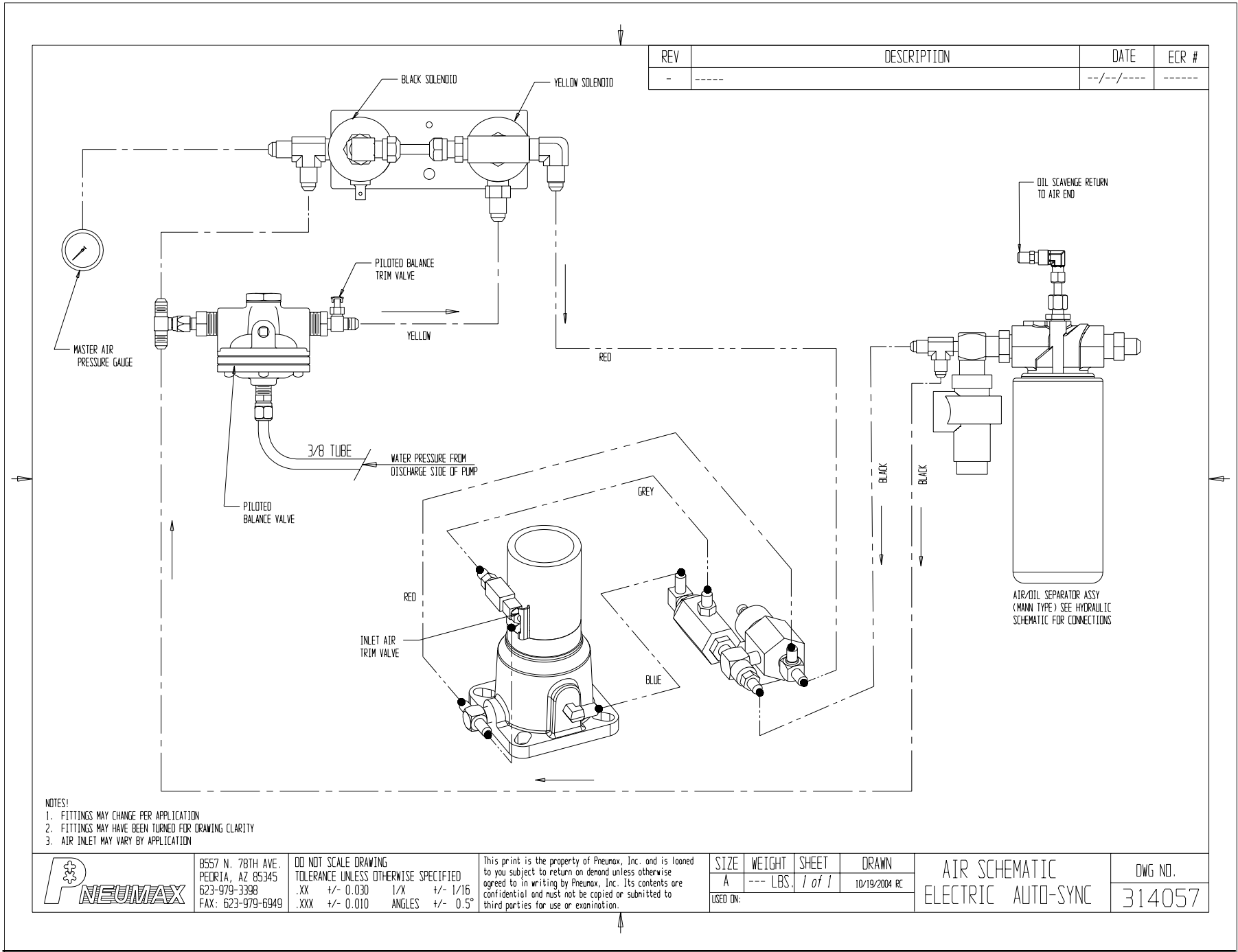
HYDRAULIC SCHEMATIC

DWG NO.
 314034

REV	DESCRIPTION	DATE	ECR #
A	ROTATED YELLOW SOLENOID TERMINALS OUT	12/09/2003	-----



	8557 N. 78TH AVE. PEORIA, AZ 85345 623-979-3398 FAX: 623-979-6949	DO NOT SCALE DRAWING TOLERANCE UNLESS OTHERWISE SPECIFIED XX +/- 0.030 1/8 .XX +/- 0.010 ANGLES +/- 0.5°	SIZE WEIGHT SHEET A --- 1 of 1	DRAWN 3/13/2003 DRB	SCHEMATIC, ELECTRIC AUTO-SYNC	DWG NO. 314039
	This print is the property of Peumax, Inc. and is loaned to you subject to return on demand unless otherwise agreed to in writing by Peumax, Inc. Its contents are confidential and must not be copied or submitted to third parties for use or examination.					



REV	DESCRIPTION	DATE	ECR #
-	----	--/--/----	-----

- NOTES:
 1. FITTINGS MAY CHANGE PER APPLICATION
 2. FITTINGS MAY HAVE BEEN TURNED FOR DRAWING CLARITY
 3. AIR INLET MAY VARY BY APPLICATION

	8557 N. 78TH AVE. PEORIA, AZ 85345 623-979-3398 FAX: 623-979-6949	DO NOT SCALE DRAWING TOLERANCE UNLESS OTHERWISE SPECIFIED .XX +/- 0.030 1/X +/- 1/16 .XXX +/- 0.010 ANGLES +/- 0.5°	This print is the property of Pneumax, Inc. and is loaned to you subject to return on demand unless otherwise agreed to in writing by Pneumax, Inc. Its contents are confidential and must not be copied or submitted to third parties for use or examination.	SIZE A WEIGHT --- LBS. SHEET 1 of 1 DRAWN 10/19/2004 RC	AIR SCHEMATIC ELECTRIC AUTO-SYNC	DWG NO. 314057
	USED ON:					

CONDITIONAL WARRANTY POLICY

WATEROUS warrants, to the original Buyer only, that products and parts manufactured by WATEROUS will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date the product is first placed in service, or five and one-half (5-1/2) years from the date of shipment by WATEROUS, whichever period shall be the first to expire; provided the Buyer notifies WATEROUS, in writing, of the defect in said product within the warranty period, and said product is found by WATEROUS to be nonconforming with the aforesaid warranty. When required in writing by WATEROUS, defective products must be promptly returned by Buyer to WATEROUS at WATEROUS' plant at Peoria, Arizona, or at such other place as may be specified by WATEROUS, with transportation and other charges prepaid. A **Returned Material Authorization (RMA)** is required for all products and parts and may be requested by phone, fax or mail. The aforesaid warranty excludes any responsibility or liability of WATEROUS for:

- (a) damages or defects due to accident, abuse, misuse, abnormal operating conditions, negligence, accidental causes, or improper maintenance, or attributable to written specifications or instructions furnished by Buyer;
- (b) defects in products manufactured by others and furnished by WATEROUS hereunder, it being understood and agreed by the parties that the only warranty provided for such products shall be the warranty provided by the manufacturer thereof which, if assignable, WATEROUS will assign to Buyer, if requested by Buyer;
- (c) any product or part, altered, modified, serviced or repaired other than by WATEROUS, without its prior written consent; and
- (d) the cost of dismantling, removing, transporting, storing, or insuring the defective product or part and the cost of reinstallation.
- (e) normal wear items (including, but not limited to belts, hoses, check valves, packing, strainers, filters, light bulbs, anodes, intake screens, mechanical seals, etc.).

This warranty is subject to WATEROUS' Conditions of Sale (detailed on WATEROUS Invoice) as currently in effect all of which are herein incorporated and by this reference made a part hereof.

All other warranties are excluded, whether express or implied by operation of law or otherwise, including all implied warranties of merchantability or fitness for purpose. WATEROUS shall not be liable for consequential or incidental damages directly or indirectly arising or resulting from the breach of any of the terms of this limited warranty or from the sale, handling, or used of any WATEROUS product or part. WATEROUS' liability hereunder, either for breach of warranty or for negligence, is expressly limited at WATEROUS' option:

- (A) to the replacement at the agreed point of delivery of any product or part, which upon inspection by WATEROUS or its duly authorized representative, is found not to conform to the limited warranty set forth above, or
- (B) to the repair of such product or part, or
- (C) to the refund or crediting to buyer of the net sales price of the defective product or part.

Buyer's remedies contained herein are exclusive of any other remedy otherwise available to Buyer.



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