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**GENERAL AIR PRODUCTS**  
**FLUID PUMPING STATIONS**

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*INSTALLATION, OPERATION & SERVICE MANUAL*

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*PROVIDING INDUSTRY THE RIGHT CHOICE;  
SAVING A NATURAL RESOURCE*

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## INSTALLATION INSTRUCTIONS

### A. Initial Inspection

When the equipment and accessories are received, they should be immediately inspected for shortages and damage. If the equipment has been damaged in shipment or shortages are noticed, immediately notify the carrier and file a claim. If hidden damage to the pumping station is suspected, it is recommended that the piping be pressurized to 80 PSI with air or an inert gas, as a check prior to rigging and/or final placement

All pumping stations are shipped with the expansion tank loose to avoid damage in transit. Refer to unit drawings for proper location. Install the expansion tank using pipe joint compound. Tighten the packing nuts on the gate valves to avoid leaks at startup.

### B. Rigging and moving

The pumping station should be lifted with a forklift under the steel base. Do not lift by any of the copper tubing.

### C. Location and Installation

Fluid pumping stations may be installed indoors or outdoors. Mount unit on a firm level base and bolt to mounting surface. Care must be used for outdoor installations to install correct antifreeze and water concentration to prevent freezing. Frozen solution will damage the pump and other components and voids warranty.

<b>PUMPING STATION SPECIFICATIONS</b>			
Horsepower	Approximate Weight (Pounds)		Connection Size
	Simplex	Duplex	
2	380	525	1 ½" Copper (1 5/8" ODS)
3	400	570	2" Copper (2 1/8" ODS)
5	425	620	2" Copper (2 1/8" ODS)
7 ½	475	695	3" Copper (3 1/8" ODS)
10	575	900	3" Copper (3 1/8" ODS)
15	600	930	3" Copper (3 1/8" ODS)

## D. Piping

All fluid piping practices should be in accordance with local codes. General fluid pumping stations are constructed using Type L copper piping and supplied with “ODS” (outside diameter sweat) connections. Copper field piping is recommended using sweat joints. Other piping material such as steel, cast iron, brass or plastic can be used. If field piping is galvanized, use uninhibited glycol. Inhibited glycol and galvanized steel must not be used together due to incompatibility of zinc with the inhibitors of the glycol/water mixture. Whenever components made from different materials are piped in a system, use dielectric isolation of the materials to help prevent galvanic corrosion. All threaded pipe connections must be sealed and any flanged connections gasketed; use extra sealant or Teflon tape or the glycol/water solution will leak.

Correct sizing of pipe is critical to assure smooth operation and keep operating costs to a minimum. Calculation of total system friction pressure loss determines optimum pipe line size. For closed-loop systems, do not include static head pressure of system piping, as equal and opposite forces cancel out upward and downward head. All elbows, tees, valves and system component pressure drops must be considered when determining pipeline size. Standard pump selection at rated flow is based on 100’ total dynamic head (approximately 45 PSIG pressure available).

PUMP STATION PRESSURE DROP VS FLOW RATE												
HP	2				3				5			
FLOW (GPM)	10	20	30	35	40	50	60	70	80	90	100	119
SIMPLEX PRESSURE DROP (PSI)	.38	.77	1.5	2.0	.84	1.3	1.8	2.4	3.0	3.8	4.6	6.3
DUPLEX PRESSURE DROP (PSI)	.6	1.2	2.4	3.2	1.3	2.1	2.7	3.6	4.7	5.8	7.1	9.8
HP	7 ½				10			15				
FLOW (GPM)	125	150	175	183	200	225	230	250	275	300	325	350
SIMPLEX PRESSURE DROP (PSI)	1.3	1.8	2.4	2.8	3.1	3.9	4.0	4.7	5.6	6.6	7.8	9.1
DUPLEX PRESSURE DROP (PSI)	2.1	2.9	3.8	4.3	4.9	6.1	6.4	7.4	8.9	10	12	14

Table is based on 40% Propylene Glycol at 90°F.

Proper use of valves (gate type, full port ball type or globe type) is recommended to allow for isolation of components in the event of maintenance to reduce closed circuit system glycol/water loss. The fluid pumping station has a 1/2" NPT drain valve. A fill valve assembly should be installed at high points of system for charging.

All General fluid pumping stations are completely plumbed to reduce installation costs of system components. A closed expansion tank is provided utilizing a rubber diaphragm to compensate for surges in the system. The diaphragm is actuated by air pressure (approximately 12 PSI charged); a valve is located on the tank for changing the air charge. An air purger and automatic air vent are included for removal of air bubbles, which are induced in the system during filling. Additional air bubbles will continue to be purged and vented as the system operates at higher temperatures. Vents at system piping high points are required to assure release of air.

RECOMMENDED PROPYLENE GLYCOL TO WATER RATIO		
VOLUME PERCENT GLYCOL	VOLUME PERCENT WATER	FREEZE PROTECTION
0	100	32°F
10	90	26°F
20	80	19°F
30	70	9°F
40	60	-7°F
45	55	-16°F
50	50	-28°F

Glycol will provide freeze protection, and act as a rust inhibitor; do not use excessive amounts, as heat transfer efficiency will be reduced. Inhibited propylene glycol is the preferred coolant because of environmental concerns, but your system may have been selected and rated based on plain water or an ethylene glycol mixture. Consult the sales quote for your equipment to determine optimal coolant mixture.

Please review the discussion in Section D – “PIPING” regarding material compatibility.

When charging the system, open all vents and valves, except drain valves and fill pre-mixed coolant mixture at high point fill valve, closing each vent or valve as it leaks liquid. When system is full and prior to system startup, run pumps and allow air to purge from mixture. Check coolant level and add coolant mixture as necessary. (This practice should be done several times until all air is removed from system solution.)

#### E. Wiring

The electrical installation should be in accordance with the National Electrical Code and any local codes and regulations. Standard units may be wired for either 208-230/3/60 or 460/3/60 power. The unit is factory wired per the specific customer purchase order voltage

specification. **Check nameplate voltage to be sure it is in agreement with the power supplied. If voltage on site is different from factory wiring, contact the factory for instructions.** The pump station must be connected to a fused or non-fused disconnect switch rated for the fuse size, phase, and voltage listed on the serial label. A disconnect switch must be provided by others in the field. The disconnect switch must be rated for at least 5kA SCCR (short circuit current rating) with proper fuses installed. Refer to wiring diagram for units supplied.

#### F. Start-up and Maintenance

Prior to start-up, check pump(s) for proper wiring and rotation. If pump rotation must be reversed interchange any two incoming power phase wires in the control panel. Do not change wires at the pump.

Check pump station piping connections and valves for leaks. Correct as required.

All pumps have maintenance-free pump seals.

Job site environmental conditions should be reviewed periodically to assure component life expectancy.

#### START UP CHECK LIST FOR FLUID COOLER AND PUMPING STATIONS

1. Check that all motors are securely fastened.
2. Has correct Glycol/water mixture been installed?
3. Are all valves except drain valves open?
4. Do units have the correct voltage connected?
5. Is pump station interlock circuit wired to cooler run circuit?
6. Are all fuses installed?
7. Check all motors for proper rotation direction.

## **SIMPLEX PUMPING STATION OPERATING INSTRUCTIONS**

1. Operation is controlled by selector switch, SS-1 in the control panel. SS-1 must be in the "ON" position to run the pumping station. The jumper between 1 & 3 on the terminal block in the control unit may be removed and replaced with a set of normally open run contacts controlled by the customer's BMS. When the circuit is closed by SS-1, the green "POWER" pilot light will light.
2. When selector switch SS-1 is turned to the "ON" position, the pump will start and the green "PUMP" pilot light PL-2 will light.
3. Flow switch, FS-1, monitors that the fluid in the closed loop is flowing. If flow stops, timer TD-1 will begin timing and after timing out, the red "ALARM" light PL-3 will light and H-1 alarm horn will sound. In addition, motor starter MS-1 and "PUMP" pilot light PL-2 will de-energize. The factory setting is 10 seconds and must not be changed.
4. The alarm is silenced by depressing "RESET" push button PB-1, which will energize and latch alarm reset relay CR-1.
5. There is an interlock contact on the motor starter that can be wired to the cooling device to energize the cooler when the pumps are operating and which will turn the cooler off when the pumping station is turned off.

## **DUPLEX PUMPING STATION OPERATING INSTRUCTIONS**

1. Operation is controlled by selector switch, SS-1 in the control panel. SS-1 must be in the "ON" position to run the pumping station. The jumper between 1 & 3 on the terminal block in the control unit may be removed and replaced with a set of normally open run contacts controlled by the customer's BMS. When the circuit is closed by SS-1, the green "POWER" pilot light will light.
2. The Alternating Relay (ALT) should be set to "ALTERNATE" position to equalize run time on pumps. When the station is turned on, Pump 1 will start and green "PUMP 1" pilot light PL-2 will be lit. To change from Pump 1 to Pump 2, without a flow alarm, press momentary push button PB-1 "RESET" on the control panel door.
3. Flow switch, FS-1 monitors that the fluid in the closed loop is flowing. If flow stops, timer TD-1 will begin timing and after timing out, red "ALARM" light PL-4 will light and H-1 alarm will sound. The factory setting is 10 seconds and must not be changed.
4. If timer TD-1 times for 10 seconds, its contacts change state. TD1 normally closed contacts open, causing the alternator (ALT) contacts to switch position. This switches the active pump. When flow resumes, the flow switch opens and TD-1 is reset.
5. The alarms may be silenced by depressing "RESET" push button PB-1 which breaks the latching circuit of TD-1.
6. There is an interlock contact on each motor starter, wired in parallel, that can be wired to the cooling device to energize the cooler when either one of the pumps is operating and will de-energize the cooler when the pumping station is turned off.
7. Whenever the pumping station is de-energized, by normal turn off with the selector switch SS-1, the alternating relay TR-1 reverts to Pump 1. To change from Pump 1 to Pump 2 at start up press momentary push button PB-1 "RESET" on the control panel door.

IMPORTANT: Set switch as shown to share run time between pumps.  
Pump A will run until power is cycled using on/off switch or flow switch is open for at least 10 seconds. Then pump B will run until power is cycled or flow switch is opened for At least 10 seconds.



Set to “ALTERNATE” position as shown.



# General Air Products Warranty Policy

## GENERAL PROVISIONS & LIMITATIONS

General Air Products, Inc. (the "Company") warrants to each original purchaser ("Purchaser") of its new products from the Company or its Authorized Distributor that such products are, at the time of delivery to the Purchaser, made with good materials and workmanship. No warranty is made with respect to:

1. Any product, which has been repaired or altered in such a way, in the Companies judgment, as to affect the product adversely.
2. Any product, which has, in the Companies judgment been subjected to negligence, accident, improper storage, improper installation or application.
3. Any product, which has not been operated or maintained in accordance with the recommendations of the Company.
4. Components or accessories manufactured, warranted and serviced by others.
5. Any reconditioned or prior owned product.

Claims for items described in 4. above should be submitted directly to the manufacturer.

## WARRANTY PERIOD

The Company's obligation under this Warranty is limited to repair or, at its option, replacing during normal business hours at the designated facility of the Company, any part that in its judgment proved not to be as warranted within the applicable Warranty Period as follows.

## COMPONENTS

All non-consumable components are warranted for 12 months from the date of purchase. Consumables are not covered under warranty. The unit must have been installed by either a factory authorized distributor or agent in accordance with the factory recommendations taking into account all other local site conditions not originally noted to the factory. The unit must be operated and maintained in accordance with the Factory recommendations and original design conditions. Failure to provide such proof of the above may void warranty.

## LABOR TRANSPORTATION & INSPECTION

The Company will repair or replace any product or part thereof which in the Companies judgment is proved to be not as warranted. Labor costs are not covered under warranty.

All costs of transportation of product, labor or parts claimed not to be as warranted and, of repaired or replaced parts to or from factory shall be borne by purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by the Company, transportation prepaid by Purchaser, to establish a claim under this warranty.

Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period of the product upon which installed to the same extent as if such parts were original components.

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## DISCLAIMER

THE FOREGOING WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY AGREED THAT, EXCEPT AS TO TITLE, THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUORY, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY.

THE REMEDY PROVIDED UNDER THIS WARRANTY SHALL BE THE SOLE, EXCLUSIVE AND ONLY REMEDY AVAILABLE TO THE PURCHASER AND IN NO CASE SHALL THE COMPANY BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES. UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOSSES OR DELAYS HOWSOEVER CAUSED.

No statement, representation, agreement, or understanding, oral or written, made by any agent, distributor, representative or employee of the Company which is not contained in this Warranty will be binding upon the company unless made in writing and executed by an officer of the Company.

This warranty shall not be effective as to any claim which is not presented within 30 days after the date upon which the product is claimed not to have been as warranted. Any action for breach of this warranty must be commenced within one year after the date upon which the cause of action occurred.

Any adjustment made pursuant to this warranty shall not be construed as an admission by the Company that any product was not as warranted.

## PROMPT DISPOSITION

The Company will make a good faith effort for prompt correction or other adjustment with respect to any product, which proves to be defective within the warranty period. Before returning any product, write or call the distributor, agent or authorized company from which the product was purchased, describing defect and giving date and number of original invoice, a well as proof of Factory supplied consumables and proof of scheduled maintenance. Title and risk of loss pass to buyer upon delivery to the common carrier.

## PRODUCT SUITABILITY

Many States, Localities and Countries have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While General Air Products, Inc. attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used? Before purchase and use of a product, please review the product application, and national and local codes and regulations, and be sure that the product, installation, and use will comply with them.