

# TURMOIL

WEST SWANZEY, NH 03469  
603-352-0053

## INSTALLATION, MAINTENANCE and OPERATION MANUAL

MODEL OC-75 R

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## **WARNING**

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**DO NOT ATTEMPT TO START UP THIS COOLER UNTIL YOU HAVE READ THROUGH THE INSTRUCTIONS COMPLETELY. IMPROPER START-UP WILL VOID THE COOLER WARRANTY AND DAMAGE THE MACHINE.**

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### **UNPACKING & INSPECTION**

Retain all cartons and packing material until the unit is operated and found to be in good condition. If the unit shows external or internal damage, or does not operate properly, contact the transportation company and file a damage claim. Under ICC regulation this is your responsibility.

### **COOLER PLACEMENT**

Place the cooler in a level location where it is accessible from the front and with enough room to make electrical and hose connections in the rear. The cooler will draw air in through the air filter on the front panel and exhale air through the rear. The Unit must be placed in an area where air intake and discharge are not impeded. Lack of adequate cool air will cause a reduction in cooling capacity and/or completely shutdown the refrigeration compressor. The cooler is provided with an air intake filter. This filter must be kept clean.

### **DESCRIPTION**

OC-R coolers are designed to provide a continuous supply of clean, water based coolant to liquid cooled spindles. The cooler is a completely self-contained unit consisting of a reservoir, digital temperature controller, circulating pump and air cooled refrigeration system. After the unit is filled and the proper electrical and plumbing connections are made, the cooler will operate virtually maintenance free, supplying cooling fluid at constant temperature and pressure.

OC-R units are designed for use indoors in a clean industrial environment. Ambient temperature should not fall below 55° F (13° C) or rise above 100° F (38° C).

### **PLUMBING HOOK-UP**

Make hose connections to the ½" FPT fittings on the rear panel tagged **DISCHARGE** and **RETURN**. Coolant flow will be out the **DISCHARGE** connection. Assemble the connector fitting to the ½" FPT Discharge/Return fittings using thread sealing tape.

### **COOLANT**

A mixture of 70% distilled water and 30% ethylene glycol should be used in the coolant system. A rust inhibitor and algacide are also recommended to protect the spindle and coolant system from corrosive attack and mineral scale deposits. Follow the directions of the machine tool manufacturer when supplying coolant.

**DO NOT USE AUTOMOTIVE ANTI-FREEZE AS COOLANT.**

### **SYSTEM FILLING**

Remove the fill port cap located on the top panel of the OC-R and fill the reservoir with clean cooling fluid. Fill the tank to the top of the level gauge. Do not overfill. After the cooler has operated for a few minutes, add more coolant as necessary to fill the tank.

### **ELECTRICAL HOOK-UP**

See the electrical diagram attached. This cooler is wired for 208-230 volt, 60 hertz, 1 phase power supply. Check the nameplate on the side of the cooler to verify proper voltage. The supply voltage must be within 10% of the rated voltage on the tag. Make power connections to the terminals tagged L1 and L2 in the electrical enclosure on the rear panel. Connect ground to the grounding terminal provided.

Terminals #4 and #5 are wired to a HIGH / LOW TEMP interlock switch. This switch opens when the coolant temperature exceeds a high / low temperature setting. See the attached instruction sheet for adjusting the high / low temperature setting. Terminals #6 and #7 are wired to a LOW FLOW interlock switch. This switch opens if the coolant flow drops below ½ GPM.

### **TEMPERATURE CONTROLLER**

This cooler is supplied with a digital temperature controller (CTC-106) mounted on the front panel. The controller maintains the coolant temperature within 0.5° F of the adjustable set-point. The temperature sensor is installed in the DISCHARGE line. The controller will alternate flashing the set point temperature (S) and the actual temperature (F). See the attached instruction sheet for operating this controller.

### **START-UP**

Once the cooler has been filled with coolant and the proper plumbing and electrical connections have been made, it can be started by pushing the ON/OFF switch on the front panel to the ON position. When the switch is pushed to the ON position, an internal green light will energize and the pump, compressor and fan will start and run continuously. Check immediately for plumbing leaks and make any necessary repairs. Check the coolant level after the few minutes it takes for the pump to circulate coolant through the external coolant loop. Add more coolant as necessary to fill the tank to the top of the level gauge.

### **OPERATION**

When power is supplied to the cooler and the PUMP ON/OFF switch is turned to the ON position, the pump, compressor and fan start and run continuously. Set the digital temperature controller to the desired temperature.

When the controller calls for cooling, the solenoid valve on the liquid line is open and refrigerant flows through the expansion valve to absorb heat and evaporate in the evaporator/heat exchanger. When the controller calls for heating, the solenoid valve on the liquid line closes, stopping the flow of refrigerant to the expansion valve. The compressor keeps pumping refrigerant out of the evaporator causing the suction pressure to drop. When the suction pressure

drops to about 25 psi, the hot gas bypass valve opens, allowing hot refrigerant gas to bypass the condenser and enter directly into the evaporator where it is cooled by the circulating coolant. The cooler should now be ready for continuous operation.

### **PUMP PRESSURE**

The coolant is circulated at a rate of 4 GPM by a regenerative turbine type pump. An adjustable pressure relief bypass valve has been installed in the discharge line to limit the maximum pump pressure that can be developed. The factory set pressure limit is 60 psi. To adjust the discharge pressure, turn the adjustment stem on the relief valve clockwise to increase pressure and counterclockwise to decrease pressure.

### **SAFETY INTERLOCKS**

#### **HIGH TEMPERATURE INTERLOCK**

This cooler has a HIGH TEMPERATURE interlock warning built into the temperature controller. See CTC-106 controller instructions attached. If the coolant temperature entering the cooler is higher than the high temperature setting the cooler will continue to run but contacts across terminals #4 and #5 will open.

#### **LOW TEMPERATURE INTERLOCK**

This cooler has a LOW TEMPERATURE interlock warning built into the temperature controller. See CTC-106 controller instructions attached. If the coolant temperature leaving the cooler is lower than the low temperature setting the cooler will continue to run but contacts across terminals #4 and #5 will open.

#### **LOW FLOW INTERLOCK:**

The cooler is supplied with a flow switch mounted in the return line to prevent damage to the spindle if coolant flow is substantially reduced. If the coolant flow drops to approximately ½ GPM the cooler will continue to run but contacts across terminals #6 and #7 will open.

### **MAINTENANCE**

Every Turmoil cooler is carefully assembled from the finest components by skilled craftsmen. Each cooler is thoroughly tested and inspected before it leaves the factory. However, in order to obtain efficient service and long life from this cooler, it must be given proper care as with any other piece of mechanical equipment.

Once each week check the coolant level in the system reservoir. Replenish as required any loss to evaporation. The coolant must be kept clean, and should be changed every 2000 hours of operation or at least once a year.

**AIR FILTER:** Keep Clean.

**CONDENSER:** Condenser fins should be cleaned of dust and dirt regularly.

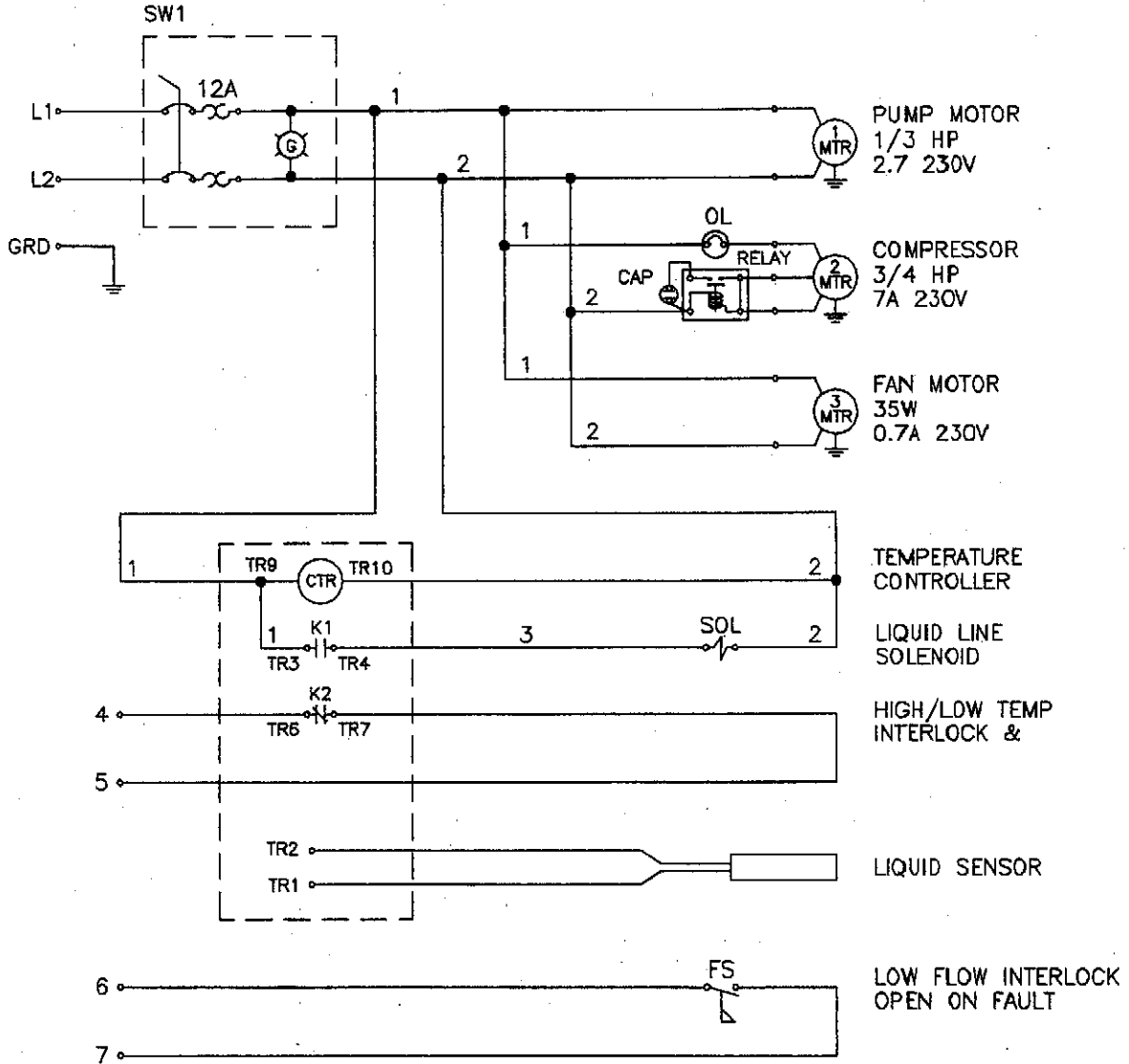
**PUMPS:** See Pump instructions attached.

**TROUBLESHOOTING**

PROBLEM	CAUSE	SOLUTION
Cooler runs excessively	A. Dirty Air Filter B. Blocked Air Flow C. Low Refrigerant Charge D. Cooler Undersized	Clean Remove Blockage Repair Check Heat Load
Cooler operative but not cooling	A. Condenser Clogged B. Low Refrigerant Charge C. Flow Blockage D. Faulty pump	Clean Repair Repair Repair / Replace
Cooler inoperative	A. Faulty Power Source B. Faulty compressor C. Faulty thermostat	Check & Correct Replace Replace
Coolant leaking	A. Loose connection B. Faulty pump seal	Repair Repair
No Coolant Flow	A. Faulty pump B. Pump bypass set too low C. Obstruction in lines	Repair or Replace Adjust Repair



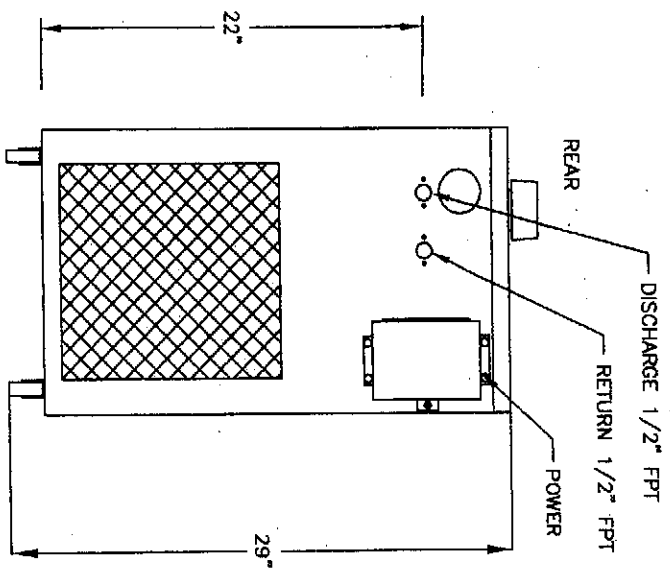
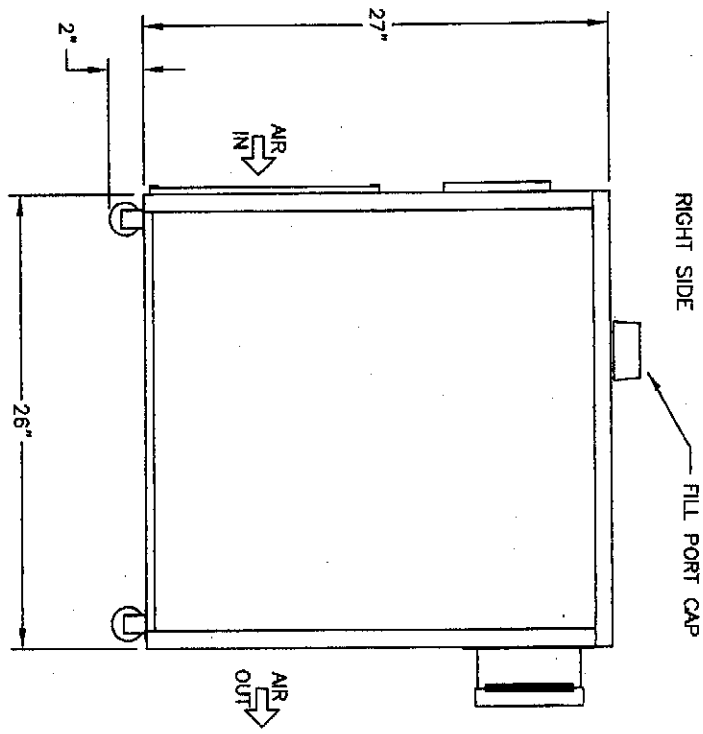
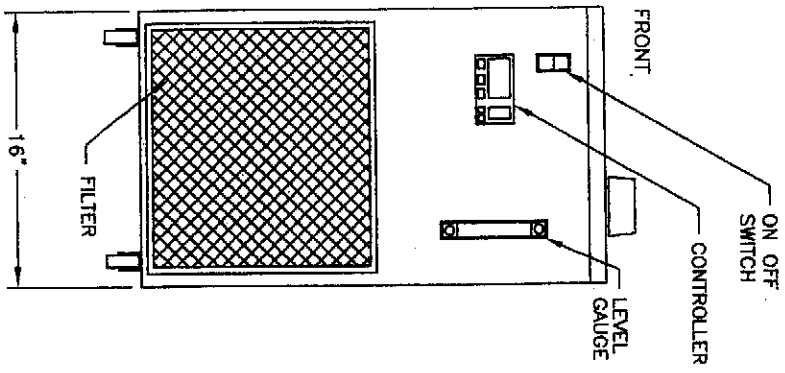
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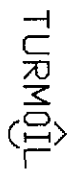
## OC-75 R ELECTRICAL DIAGRAM

CUSTOMER		CUSTOMER PART NUMBER		REV
—		—		A
SIZE	SHOP ORDER NUMBER	SHEET	SCALE	
A	—	1 OF 1	1:1	



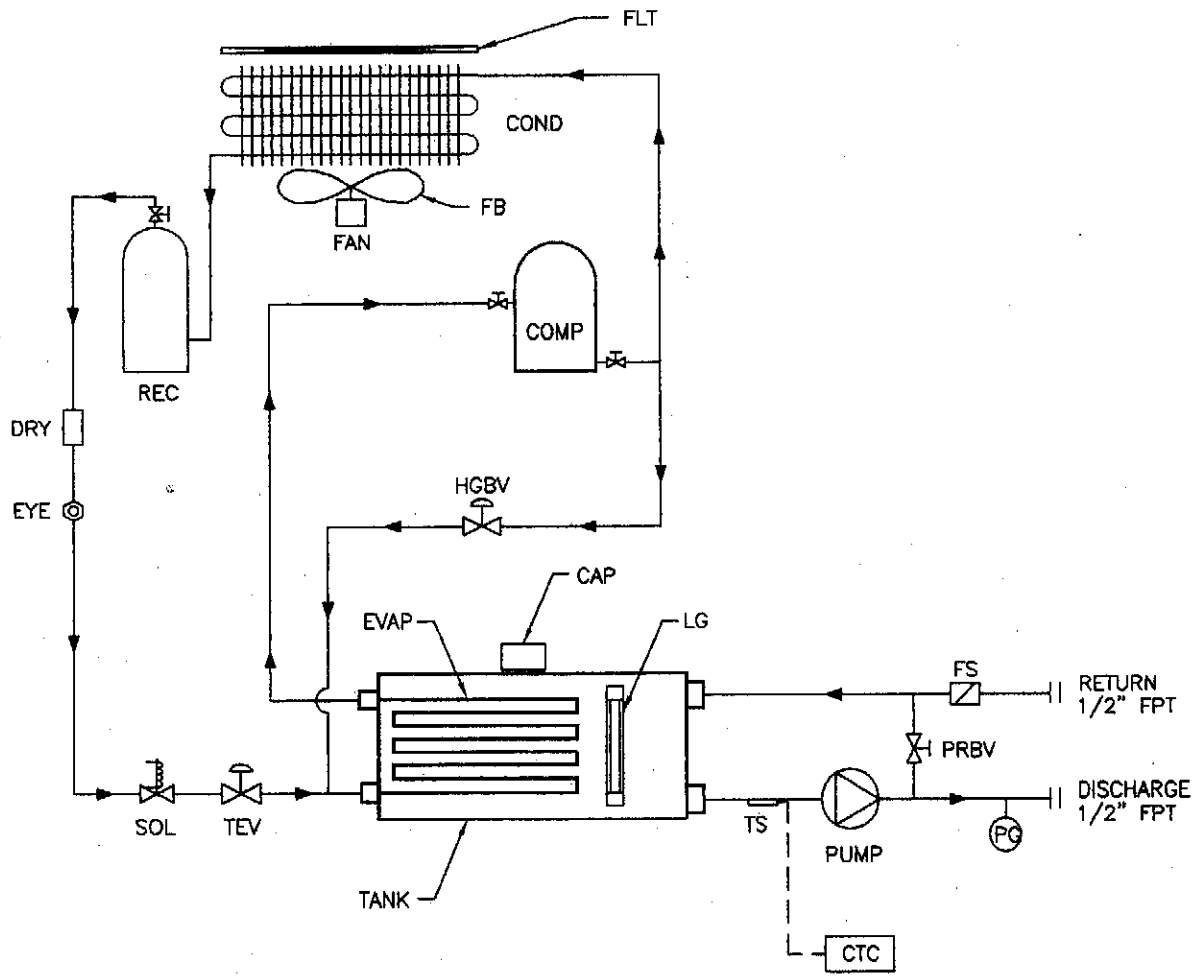
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DATE:	1/23/2003	REV A	PAGE	1 OF 1

OC-75 R  
DIMENSIONS



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### OC-75 R FLOW DIAGRAM

CUSTOMER		CUSTOMER PART NUMBER		REV
-		-		A
SIZE	SHOP ORDER NUMBER	SHEET	SCALE	
A	-	1 OF 1	1:1	