

# HYDRA AIR COOLED MOLD CIRCULATOR Model MC90AC

#163525

## INSTRUCTION MANUAL



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- Warranty Information .....Insert

## SPECIFICATIONS

Temperature Range .....	250°F maximum; minimum can be as low as 15°F above the ambient air temperature, but also depends on how much heat energy the mold is putting into the circulating water
Voltage .....	230/60/1, 230/60/3 or 460/60/3; see serial # tag on machine
Amps .....	50 @ 230/60/1; 30 @ 230/60/3; 15 @ 460V
Controls:	
Type.....	Self-tuning PID-Type MicroProcessor
Voltage.....	120 VAC
Accuracy .....	Within 1% of setpoint
Pump/Motor .....	1-hp, 2850-rpm centrifugal pump rated at 30 gpm @ 38 psi; coupled to AC motor; air-cooled.
Heater (230-460/60/3) .....	9kw
Heater (230/60/1) .....	6kw
Fan Motor.....	1/4 hp, 1750 amp, 3-phase
Tank .....	12-gallon
Mold Connections .....	1" NPT
Mold Supply Outlet.....	1" NPT
Overall Size.....	35.38" L x 23.38" W x 34" H
Shipping Size (crated).....	35" L x 35" W x 58" H
Shipping Weight .....	320 lbs. (crated)

## SAFETY SUMMARY

This manual uses the following words to show different levels of danger:

**DANGER** indicates that you are very likely to be killed or injured if you don't take the needed steps to avoid the hazard. This is the highest level of warning.

**WARNING** indicates that you could be killed or injured if you don't avoid the hazard.

**CAUTION** indicates you could receive moderate or minor injuries, or equipment could be damaged if you don't avoid the hazard.

### DANGER

LIVE ELECTRIC PARTS could cause DEATH or SHOCK.

Lock out and tag out power before doing wiring.

Only qualified electricians are to do electrical work.

### WARNING

OIL in this machine could cause FIRE.

Do not use any oil in this machine.

### WARNING

Fan turns on suddenly .  
Could cause serious injury.

Keep covers closed.

### CAUTION

FITTINGS that are too tight could DAMAGE PUMP.

WEIGHT OF PIPES could DAMAGE PUMP.

Do not overtighten fitting on pump discharge.

## DESCRIPTION

The Model MC90AC water circulator controls mold temperature by circulating a mixture of water and glycol through channels in the mold. It can maintain temperatures as low as 15° F above the ambient air temperature or as high as 250° F.

The Model MC90AC consists of a stainless steel tank, air-cooled pump and motor, an electric heater, a water-to-air heat exchanger with electric fan for cooling, and electrical controls, all mounted on a welded steel, powder coated finished frame with casters for portability.

## INSTALLATION

Installation must be done only by qualified plumbers and electricians.

### 1. Inspect Shipment

Inspect carton containing unit. Remove machine from carton. Inspect machine for damage. Report any damage to carrier.

### 2. Move Circulator into Position

Position the circulator as close to mold as possible; shorter hoses lose less heat. Make sure heat from this unit will not damage any other machine or material.

### 3. Connect Discharge Line

Run a hose to mold from 1" NPT pump discharge. (See photo on page 12 to identify parts.)

Hose must be rated for 250°F and 100 psi with hot water and ethylene glycol. IMS stocks several hoses that work well for this purpose. For additional information concerning a hose that suits your needs, contact an IMS customer service representative at 1-800-537-5375 (U.S.A. & Canada).

If mold has more than one inlet, use a manifold near mold, and a single line to feed manifold. This will help prevent heat-loss. IMS also stocks manifolds for this purpose. For further information, contact an IMS customer service representative.

## INSTALLATION (continued)

### 4. Connect Return Line

Run the same type of hose used on the discharge line between 1" NPT tank inlet and mold outlet or manifold.

### 5. Fill Tank

- a. Use only a mixture of water and inhibited ethylene glycol (or inhibited propylene glycol) in this circulator. If oil were used, the copper sheathing on the heater element would burn the oil and would not last. Also, the fluid flow pattern through the tank is not designed for thick fluids like oil.

Other reasons to use only glycol and water are:

- Straight water is too corrosive for this application.
- Pure ethylene glycol without inhibitors becomes acidic and corrosive in operation and will not transfer heat well.
- Automotive anti-freeze also becomes acidic when used in a relatively open system such as this machine. Its inhibitors break down in a short time, forming a gel that prevents heat transfer. Also, automotive anti-freeze contains abrasives that will destroy the pump seal.

- b. Decide on the ratio of ethylene (or propylene) glycol to water.

- (1) The *higher* the glycol concentration the better the corrosion resistance and the higher the temperature at which the circulator can be run.
- (2) The *lower* the glycol concentration the better the heat transfer ability.
- (3) Use the lowest glycol concentration that will reach the temperature you need, but use at least 30% for corrosion resistance.

## NOTE

Tank capacity is 12 gallons of hot water/glycol. Since water/glycol expands 15% when hot, never use more than 10 gallons cold. Always use at least 8 gallons cold so you are sure the heaters are covered even when some of the fluid is in the mold and hoses.

## INSTALLATION (continued)

(4) 80% ethylene glycol will reach about 250°F.

30% ethylene glycol will reach about 219°F, but will have almost twice the heat transfer ability that 80% would have.

### 6. Optional

Make any other connections your application requires. Installing insulating wrap around hoses will help prevent heat loss. For information concerning hose insulation, contact an IMS customer service representative at 1-800-537-5375.

### 7. Connect to Power

- a. Connect only to voltage listed on machine's serial number tag.
- b. Install power cord that meets local codes. Heater is 9kW (230/60/1 is 6kW), pump motor is 1 hp. Fan motor is 1/2 hp. See serial tag for full-load amp rating.
- b. Connect to a fused disconnect or circuit breaker with a minimum amp capacity of 40 amps for 230 volts and 25 amps for 460 volts.
- c. Lock out / tag out power to circuit where you are going to connect circulator. Hard wire to fused disconnect or install plug so machine can be moved easily.
- d. Do not turn power on to circuit until doing checks in INITIAL STARTUP, below.

## DANGER

LIVE ELECTRIC PARTS could cause DEATH or SHOCK.

Lock out and tag out power before doing wiring.

Only qualified electricians are to do electrical work.

## INITIAL START-UP

1. Power must be locked out and tagged out.
2. Remove front panel (below control panel). See photo on page 11. All other panels must be in place.
3. Check plumbing installation.
4. Check wiring installation.
5. Turn on plant power to circuit. Turn machine's main disconnect circuit breaker on (P. 11, Figure 1).
6. Check direction of pump rotation. It must be clockwise when viewed from end of motor. Press START button and let pump run for a few seconds; then shut it off and use a flashlight to observe motor rotation. If direction is reversed, have qualified electrician lock out / tag out power and reverse any two power leads.
7. Re-Install front panel.
8. Press START button again and let unit run.
9. Check for plumbing leaks while machine is running. If there are leaks:
  - a. Stop machine. Lock out and tag out power.
  - b. Correct leaks before starting up again.
10. Check fluid level. Ensure that fluid level reaches at least "min" on sight glass after mold and lines are filled with fluid.

**Do not fill to maximum level – fluid will expand when heated, and could overflow the tank.**

## DANGER

LIVE ELECTRIC PARTS could cause DEATH or SHOCK.

Lock out and tag out power before doing wiring.

Only qualified electricians are to do electrical work.

## WARNING

Fan turns on suddenly .  
Could cause serious injury.

Use extreme caution when running this machine with any cover removed while checking motor rotation. .

**Covers must be in place for proper airflow.**

Re-install covers before going into operation.

## NORMAL OPERATION

1. Circulator must have been installed according to INSTALLATION and must have gone through checks detailed in INITIAL START-UP.
2. Turn on power to circuit. Turn circuit breaker on.
3. Press PUMP ON button. The PUMP ON light will come on. The pump must remain on at all times. The heater and fan will not work if the pump is turned off.

The RETURN TEMPERATURE DISPLAY will show the temperature of the water returning from the mold.

The controller will show the TANK TEMPERATURE as the *top* set of numbers on the controller. The output temperature will be a couple degrees higher than the tank temperature, due to friction through the pump.

The SETPOINT will be shown as the *bottom* set of numbers on the controller.

4. Turn HEATER CIRCUIT switch on. (If you know that you will not be using heat, you can leave this switch off.) The HEATER CIRCUIT ON light will stay on whenever the heating circuit is on. This does not mean that the heater is on; it only means that the heater circuit is available if the controller calls for heat.
5. Set temperature setpoint to needed level.

Keep in mind that the mold temperature does not match the fluid temperature you set. When heating, the mold is usually cooler than the fluid; when cooling, the mold is usually a little hotter. Controller will turn on power to heater or will turn on cooling fan to maintain temperature.

To adjust the setpoint (see figure 3 on page 8), press the UP arrow to increase the setpoint or the DOWN arrow to decrease the setpoint.

6. If the tank temperature falls below the setpoint:
  - The OP1 light on the controller will come on, indicating that the control relay is sending power to the heater power relay.
  - If the heating circuit is on, the heater will come on.
  - You will see the tank temperature rise until it meets the setpoint.

## DANGER

LIVE ELECTRIC PARTS could cause DEATH or SHOCK.

Lock out and tag out power before doing service.

Only qualified electricians are to do electrical work.

## NORMAL OPERATION (continued)

7. If the tank temperature rises above the setpoint:
  - The OP2 light on the controller will come on, indicating that the control relay is sending power to the cooling fan power relay.
  - The cooling fan will come on.
  - You will see the tank temperature fall until it meets the setpoint (or reaches the lowest temperature that the ambient temperature allows.)
8. To shut down circulator:
  - a. Turn down temperature, to allow heaters to cool.
  - b. After about 5 minutes, push red stop button.

## MAINTENANCE

1. Check tank level often; the water should show on the sight glass. Always check when water is cold.
2. See component manuals for repair procedures. All parts are available from IMS.
3. Clean filter often. Use vacuum. If necessary, use detergent and water. Dry thoroughly.
4. Keep heat exchanger coils (radiator) clean. Use soft brush.

## WARNING

Fan turns on suddenly .  
Could cause serious injury.

Lock out / tag out power before removing cover to clean heat exchanger.

**Covers must be in place for proper airflow.**

Re-install covers before going into operation.

## TROUBLESHOOTING

### 1. Motor and Heater Not Working:

- Check water level. It should be between the red lines on the sight glass. The low-level float switch shuts off power to the machine if the water level drops too low.
- Is main disconnect ON?
- Is machine plugged in?
- Is there power to circuit that machine is plugged into?
- Turn machine circuit breaker OFF then ON.
- Press STOP switch fully. Then press START switch.
- Have qualified electrician check function of float switch.

### 2. Tank temperature *below* setpoint and not rising. Pump is on.

- Is HEATER CIRCUIT switch ON?
- Is controller's OP1 light on?
- Compare tank temperature reading to return temperature reading.
- Have qualified electrician check controller output relay.
- Have qualified electrician check heater power relay.
- Have qualified electrician check heater elements.

## DANGER

LIVE ELECTRIC PARTS could cause DEATH or SHOCK.

Lock out and tag out power before doing service.

Only qualified electricians are to do electrical work.

### TROUBLESHOOTING (continued)

3. Tank temperature above setpoint and not falling. Pump is on.
- Is the FAN light on?
  - Can you hear feel hot air coming through the vents in the top?
  - Is controller's OP2 light on?
  - Are all covers on machine? You will not get good airflow across the heat exchanger (radiator) if any covers are removed.
  - Compare tank temperature reading to return temperature reading.
  - Have qualified electrician check controller output relay.
  - Have qualified electrician check fan contactor and overload.

## WARNING

Fan turns on suddenly .  
Could cause serious injury.

Use extreme caution when checking fan function. Qualified electrician only.

**Covers must be in place for proper airflow.**

Re-install covers before going into operation.

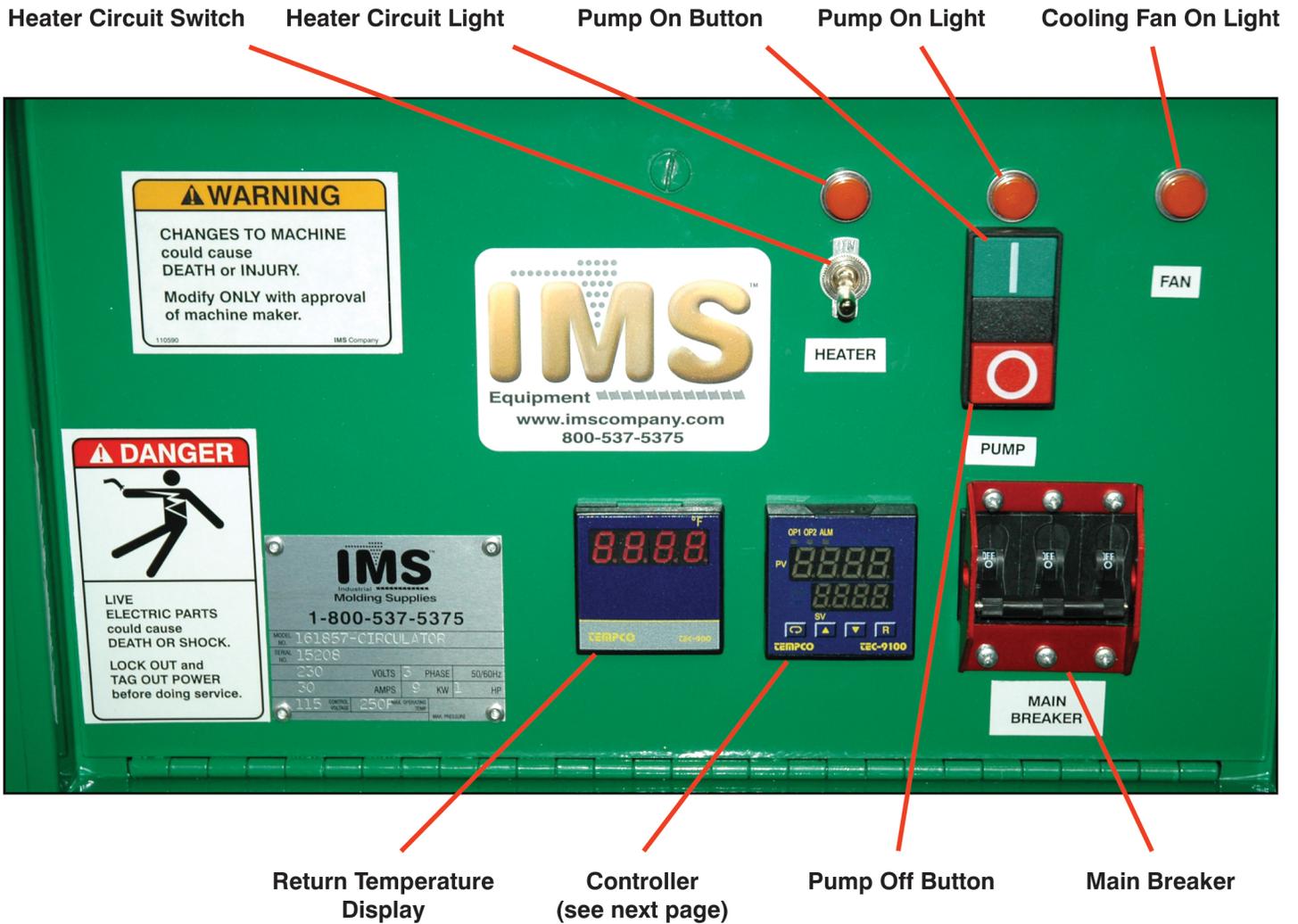
**Figure 1**  
**FRONT AND LEFT SIDE VIEW**



**Figure 2**  
**REAR AND RIGHT SIDE VIEW**

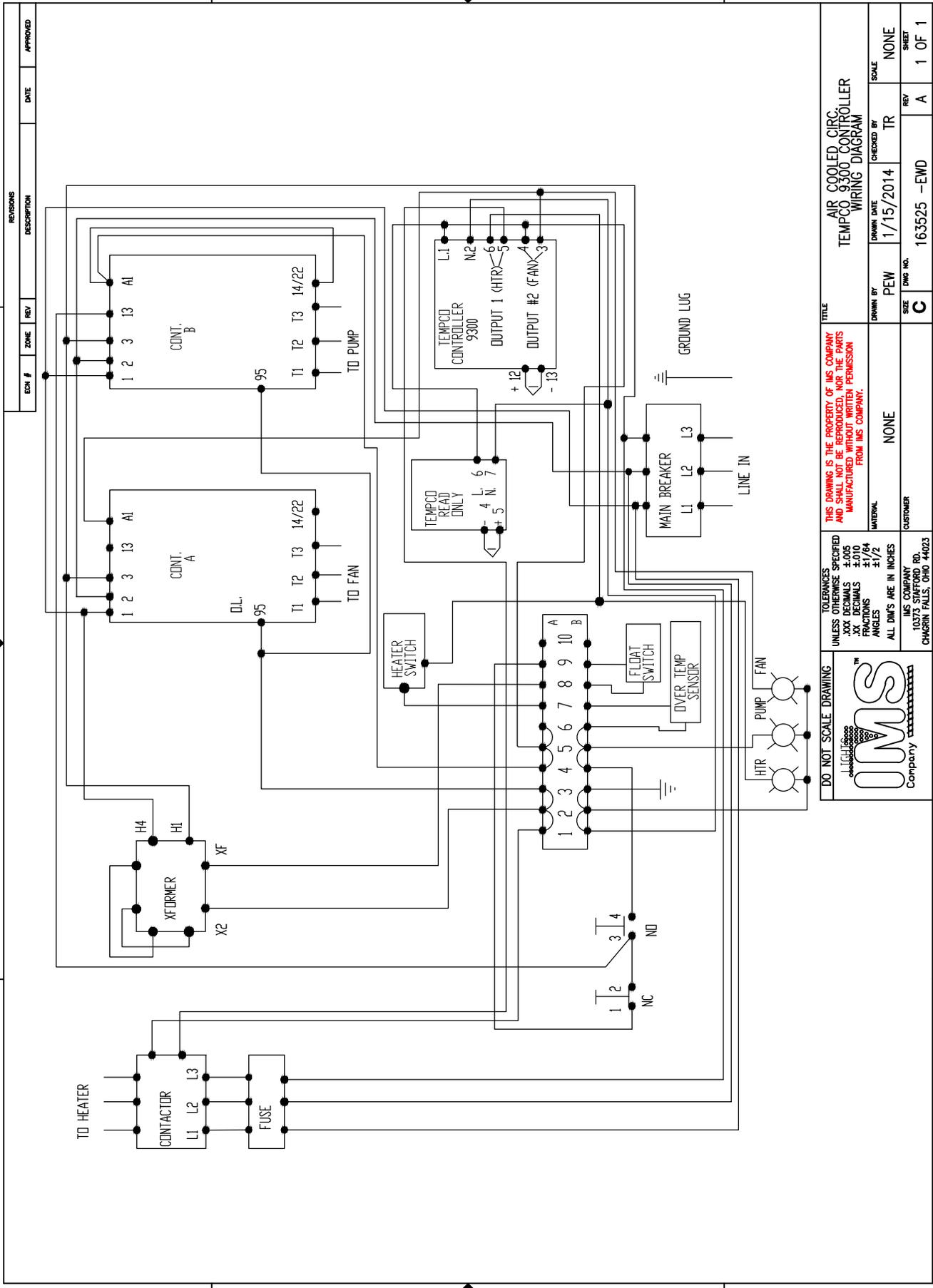


**Figure 3**  
**CONTROL PANEL**



**Figure 4**  
**CONTROLLER**





REVISIONS		DATE		APPROVED	
ECN #	ZONE	REV	DESCRIPTION	DATE	APPROVED

<p><b>DO NOT SCALE DRAWING</b></p> <p>IMS Company</p>		<p>UNLESS OTHERWISE SPECIFIED</p> <p>XXX DECIMALS ±.005</p> <p>.XX DECIMALS ±.010</p> <p>FRACTIONS ±1/64</p> <p>ANGLES ±1/2</p> <p>ALL DIM'S ARE IN INCHES</p> <p>IMS COMPANY 10375 STAFFORD RD. CHARMIN FALLS, OHIO 44023</p>		<p><b>THIS DRAWING IS THE PROPERTY OF IMS COMPANY AND SHALL NOT BE REPRODUCED, IN ANY PARTS MANUFACTURED WITHOUT WRITTEN PERMISSION FROM IMS COMPANY.</b></p>		<p><b>TITLE</b></p> <p>AIR COOLED CIRC. TEMPCO 9300 CONTROLLER WIRING DIAGRAM</p>	
<p>DO NOT SCALE DRAWING</p>		<p>DATE</p> <p>1/15/2014</p>		<p>CHECKED BY</p> <p>TR</p>		<p>SCALE</p> <p>NONE</p>	
<p>DRAWN BY</p> <p>PEW</p>		<p>DWG NO.</p> <p>163525</p>		<p>REV</p> <p>A</p>		<p>SHEET</p> <p>1 OF 1</p>	
<p>MATERIAL</p> <p>NONE</p>		<p>CUSTOMER</p> <p>163525 -EWD</p>		<p>SIZE</p> <p>C</p>		<p> </p>	

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## REPLACEMENT PARTS

Pump/Motor Assembly - 3 Phase .....	161851
Pump/Motor Assembly - 1 Phase .....	162977
Air Filter .....	162609
Heating element, 230 volt .....	148639
Heating element, 460 volt .....	148812
Mercury Contactor .....	106192
Controller .....	163528
Return Temperature Display .....	161839
Motor Starter Contactor .....	160234
Motor Starter Overload, 230V - 3 Phase .....	158872 (1.6 - 2.5 amp)
Motor Starter Overload, 230V - 1 Phase .....	162061 (4 - 6 amp)
Motor Starter Overload, 460V - 3 Phase .....	158978 (1 - 1.6 amp)
Motor Starter Overload, 230V - 1 Phase .....	163017 (7 - 10 amp)
Pump On/Off Switch .....	158874
Breaker, 240/60/3, 40 AMP	
Breaker, 460/60/3, 25 AMP	
Breaker, 240/60/1, 50 AMP	
Indicator Lights (Pump, Heater, Fan) .....	106263
Thermocouple, Tank/Process (36") .....	160317
Thermocouple, Return (54") .....	162072
Water Sight Glass Assembly .....	160321
Low Level Switch .....	161770
Fan Motor - 3 Phase .....	161984
Fan Motor - 1 Phase .....	163024
Fan Blades .....	161823
Heat ON Toggle Switch .....	158902
High Temperature Limit Switch .....	162549

# MAINTENANCE RECORD AND NOTES