CONAIR
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USERGUIDE
UGH004/1197

microKool
with microTrac 2,3 controls

⚠ **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at info@conairgroup.com or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

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Receiving Inspection

It is important that the following inspection be completed in the presence of the carrier's representative when the equipment is delivered.

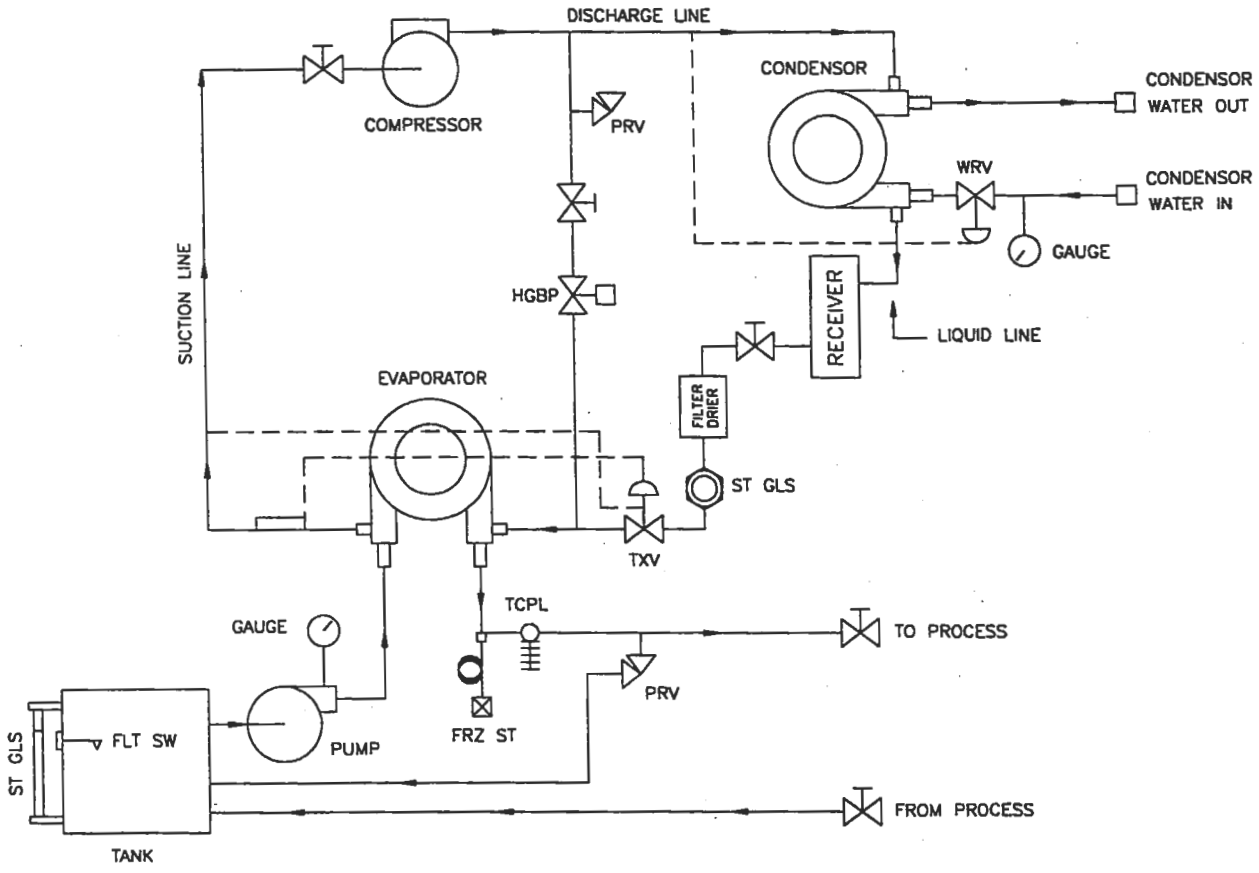
- Check all crates and cartons received against the bill of lading/shipping papers to be sure they agree.
- Check the model number and the electrical characteristics on the nameplate located on the front of the unit to determine if they are correct.
- Check for freight damage, shortages or other discrepancies and note them on the delivery receipt before signing.

In the event that damage is found, a damage claim should be immediately filed by the purchaser against the delivering carrier.

Intended Use & Limitations

Conair Tempro portable chillers are available in either water or air cooled models. The operating sequence differs only in the media that is used to remove heat from the refrigerant. Either 85° F cooling tower water or 90° F ambient air can typically be used.

Typical water cooled plumbing diagram

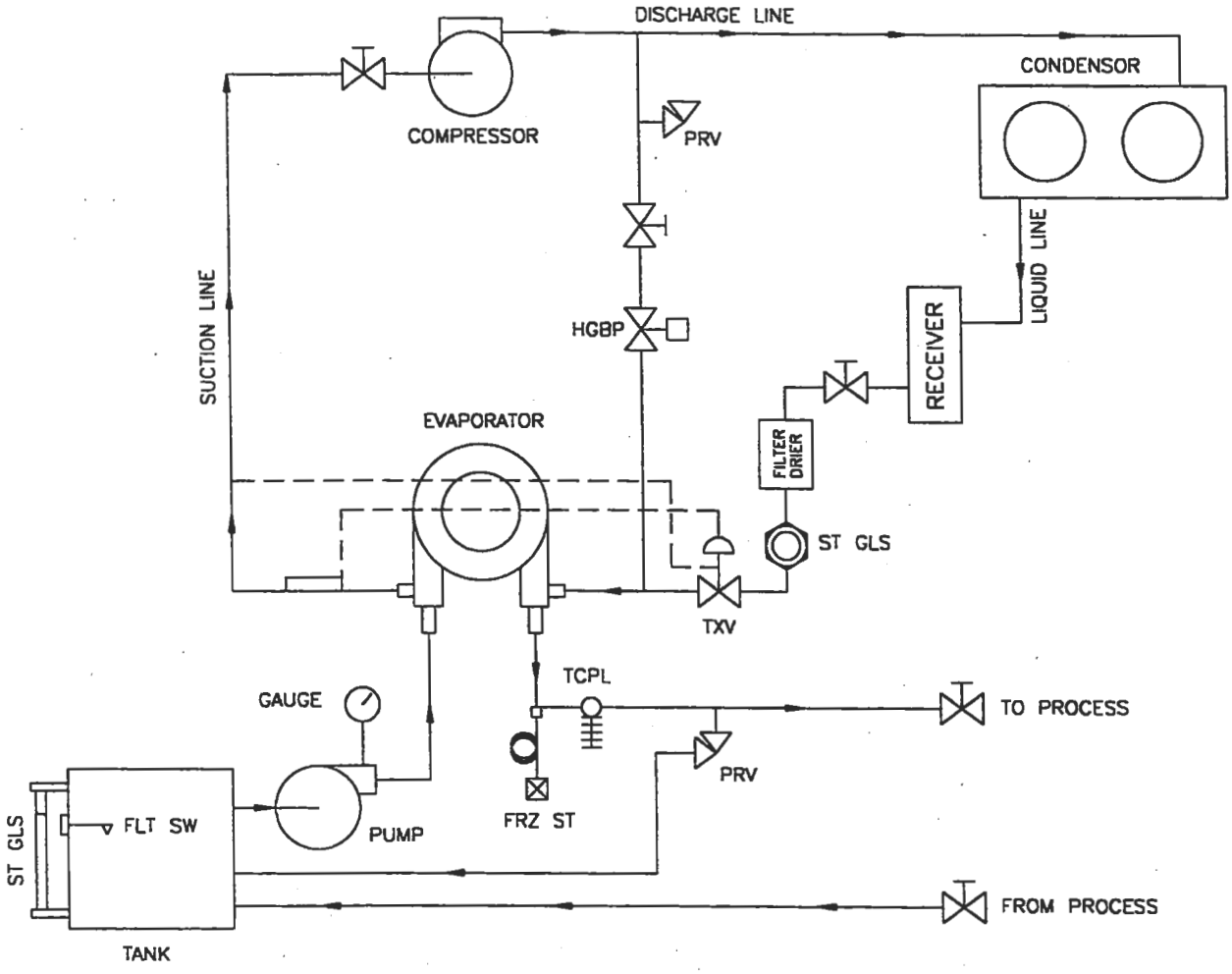


Water cooled models utilize proven tube and tube heat exchangers (condensers) to condense the hot, compressed, refrigerant gas from the compressor to a cool liquid. Aluminum finned, copper tube condensers are used on air cooled models for the same purpose.

The cool liquid refrigerant passes through a filter/dryer which protects the system from moisture or other contaminants. An in-line sight glass gives a visual indication of proper refrigerant charge and any dangerous moisture present in the system.

The refrigerant passes through a thermal expansion valve where is expands, cools and is precisely metered into the refrigerant heat exchanger (evaporator) where the heat is removed from the process water.

Typical air cooled plumbing diagram



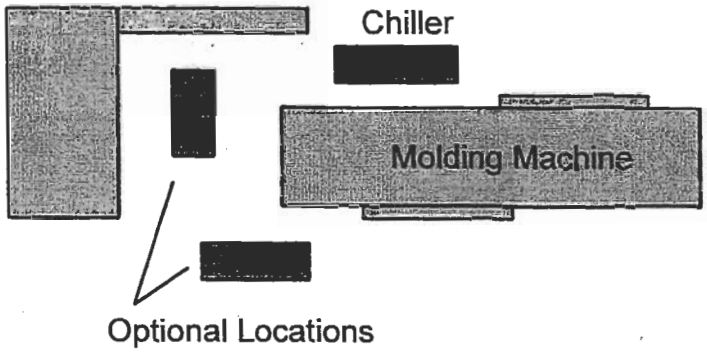
As the refrigerant passes through the evaporator, it extracts the heat from the process coolant and expands to a heat-laden gaseous state. The refrigerant gas is then compressed by the compressor before again giving up its heat by the condensing in either the water or air cooled condenser.

Standard operating set points are be between 20° F and 65° F LWT. Adequate freeze protection is required.

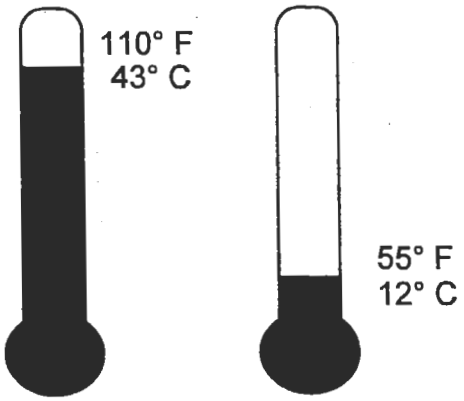
Getting Started

Environmental

The portable chillers are designed for machine side use and should be placed as close to the host machine as practical.



The unit will require and operating environment which is clean and well ventilated. **Nothing should be placed on top of the unit while the unit is operating.** Water cooled units require a minimum clearance of 5 ft. around the perimeter for serviceability. Air cooled units require a minimum clearance of 5 ft. around the perimeter for serviceability. Units with fans require unrestricted outlet air flow.



The ambient operating temperature of the chiller must not exceed 110° F (43° C) with 95% relative humidity, non condensing, or fall below 55° F (12° C). In storage or shipment the unit can withstand a minimum of -40° F (-40° C). Units must be protected against freeze-up to a minimum of 10° F below the desired set point. Use only industrial grade Ethylene Glycol, corrosion inhibitors are allowed. Do NOT use automotive antifreeze. Consult the Conair Tempro parts department for available fluids for use.

micro Kool Selection Guide

Model Number	Maximum Chiller Capacities (tons) at Various Leaving Coolant Temperatures[1]									
	20°F	25°F	30°F	35°F	40°F	45°F	50°F	55°F	60°F	65°F
Air Cooled - 85°F Ambient Temperature										
MPA-1.5	0.71	0.78	0.86	0.94	1.04	1.13	1.25	1.36	1.48	1.62
MPA-2	1.04	1.15	1.26	1.39	1.52	1.67	1.84	2.00	2.19	2.38
MPA-3	1.59	1.75	1.93	2.12	2.33	2.56	2.81	3.06	3.34	3.64
MPA-4	2.13	2.34	2.57	2.83	3.10	3.41	3.75	4.08	4.45	4.85
MPA-5	2.49	2.73	3.00	3.30	3.62	3.98	4.38	4.77	5.20	5.67
Air Cooled - 95°F Ambient Temperature										
MPA-1.5	0.66	0.73	0.80	0.88	0.97	1.06	1.17	1.27	1.39	1.52
MPA-2	0.99	1.08	1.19	1.31	1.44	1.58	1.74	1.90	2.07	2.25
MPA-3	1.50	1.65	1.82	2.00	2.19	2.41	2.65	2.89	3.15	3.43
MPA-4	2.00	2.20	2.42	2.66	2.92	3.21	3.53	3.85	4.19	4.57
MPA-5	2.34	2.57	2.83	3.10	3.41	3.75	4.12	4.49	4.89	5.34
Water Cooled - 85°F Condenser Water Supply										
MPW-1.5	0.66	0.75	0.85	0.97	1.20	1.24	1.42	1.59	1.78	1.99
MPW-2	0.87	0.99	1.13	1.28	1.46	1.65	1.88	2.10	2.36	2.64
MPW-3	1.45	1.65	1.87	2.13	2.42	2.75	3.12	3.49	3.91	4.38
MPW-4	1.91	2.17	2.47	2.81	3.19	3.63	4.12	4.61	5.17	5.79
MPW-5	2.21	2.51	2.85	3.23	3.68	4.18	4.75	5.32	5.96	6.50

1 Capacities are based on cooling pure water (50°F or higher) or a 30% ethylene glycol solution (45°F or lower). Deduct 0.2 ton per additional horsepower for oversized pumps. To obtain standard flow rates (gpm), multiply by 2.4. One chiller ton equals 12,000 Btu/hr. Consult factory for other conditions. Listed capacities may vary +/-5% according to the compressor manufacturer's specifications.

micro Kool Specifications

Model Number	Comp. (hp)	Std. Pump (hp)	Approx. Shipping Weight (lbs)	Approx. Dimensions[1] L x W x H (inches)	Connections (inches) Chilled Water	Condenser Water	460 Volt, 3 Phase, 60 Hz Current (amps)[2] Full Load	Running
Air Cooled								
MPA-1.5	1.50	1/3	250	32 x 29 x 44	1.0	N/A	8.30	5.30
MPA-2	2.25	1/2	320	44 x 29 x 48	1.0	N/A	8.38	7.25
MPA-3	3.25	3/4	350	44 x 29 x 48	1.0	N/A	12.15	9.45
MPA-4	4.00	1.5	460	48 x 34 x 56	1.5	N/A	14.60	12.60
MPA-5	5.00	1.5	475	48 x 34 x 56	1.5	N/A	15.60	13.96
Water Cooled								
MPW-1.5	1.50	1/3	290	32 x 29 x 44	1.0	1.0	7.00	4.00
MPW-2	2.00	1/2	310	32 x 29 x 44	1.0	1.0	7.20	6.20
MPW-3	3.00	3/4	350	32 x 29 x 44	1.0	1.0	10.10	8.00
MPW-4	4.00	1.5	410	48 x 34 x 56	1.5	1.5	12.80	10.80
MPW-5	5.00	1.5	425	48 x 34 x 56	1.5	1.5	13.80	12.16

1 Length and width dimensions represent actual footprints and do not include the control consoles (add 7.5" to lengths).

2 Multiply by 2 for 230/3/60 operation or by 2.21 for 208/3/60 operation. Listed currents include the standard pumps. Consult factory for other requirements.

micro Kool Flow and Condenser Data

Model Number	Standard Chilled Water Flow Rate[1] (gpm)	Pump Discharge Pressure[2] (psi)	85°F Condenser Water Requirement (gpm) at Various Leaving Chilled Water Temperatures[3]				Condenser Fans		
			50°F[4]	55°F	60°F	65°F	Qty.	Motor hp	Flow cfm
Air Cooled									
MPA-1.5	3.0	19					1	1/6	1,050
MPA-2	4.4	27					2	1/6	1,704
MPA-3	6.7	35	N/A	N/A	N/A	N/A	2	50w	2,420
MPA-4	9.0	36					2	1/4	4,237
MPA-5	10.5	36					2	1/4	4,237
Water Cooled									
MPW-1.5	3.4	19	4.3	4.8	5.3	6.0			
MPW-2	4.5	27	5.6	6.3	7.1	7.9			
MPW-3	7.5	35	9.4	10.5	11.7	13.1	N/A	N/A	N/A
MPW-4	9.9	36	12.4	13.8	15.5	17.4			
MPW-5	11.4	36	14.3	16.0	17.9	19.5			

1 Based on 50°F chilled water supply to process, 2.4 gpm per ton and operation in 85°F ambient for air cooled models.
2 See pump performance curves for pump discharge pressure capacities at various flow rates. Consult evaporator water pressure drop curves to estimate actual NET chiller discharge pressures.
3 Based on cooling tower water at 25 psi minimum. Consult factory for other conditions.
4 Minimum condenser water flow requirement. Do not reduce. Consult factory for other conditions.

Electrical

Caution! 

It is strongly recommended that when installing the electrical portion of the portable chiller all wiring, disconnects, and fusing follow the National Electrical Code and any local electrical codes for your area.

Warning! 

Always maintain a safe ground and always disconnect the incoming power before an attempt is made to open the unit or other nonstandard operating procedures, such as routine maintenance.

The electrical specifications are located on the nameplate mounted on the side of the unit, (see figure below). This will indicated the required voltage, number of phases, frequency, full load amps, disconnect fuse size, and minimum wire connection size for this unit. The electrical hookup should be identical, with a maximum of +/- 10% variance in voltage.

The electrical hookup should be also run through a fused disconnect, sized in accordance with the nameplate amperage and conforming to Article 250 of the National Electrical Code.

CONAIR TEMPRO

Part of the Conair Group

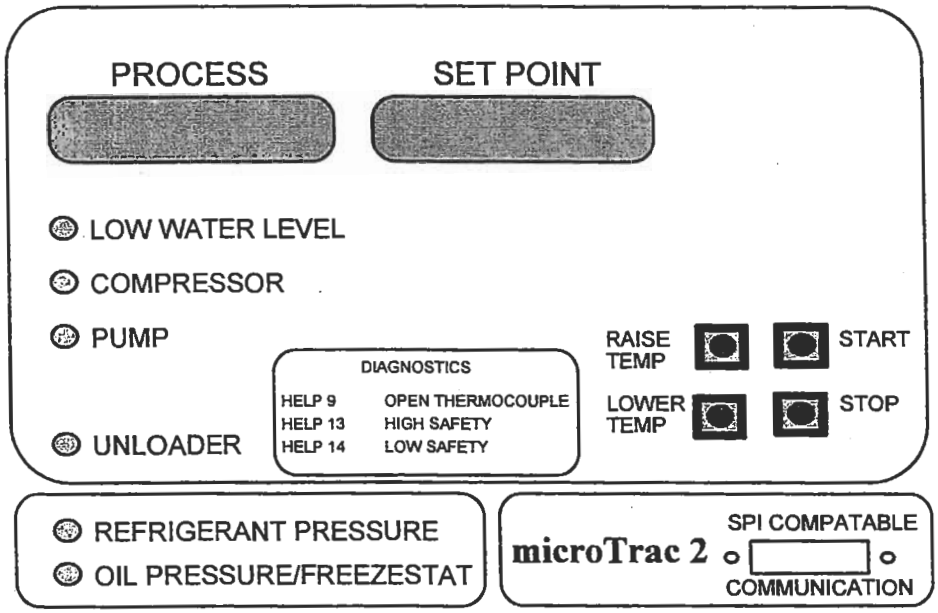
MINI-PORTABLE CHILLERS

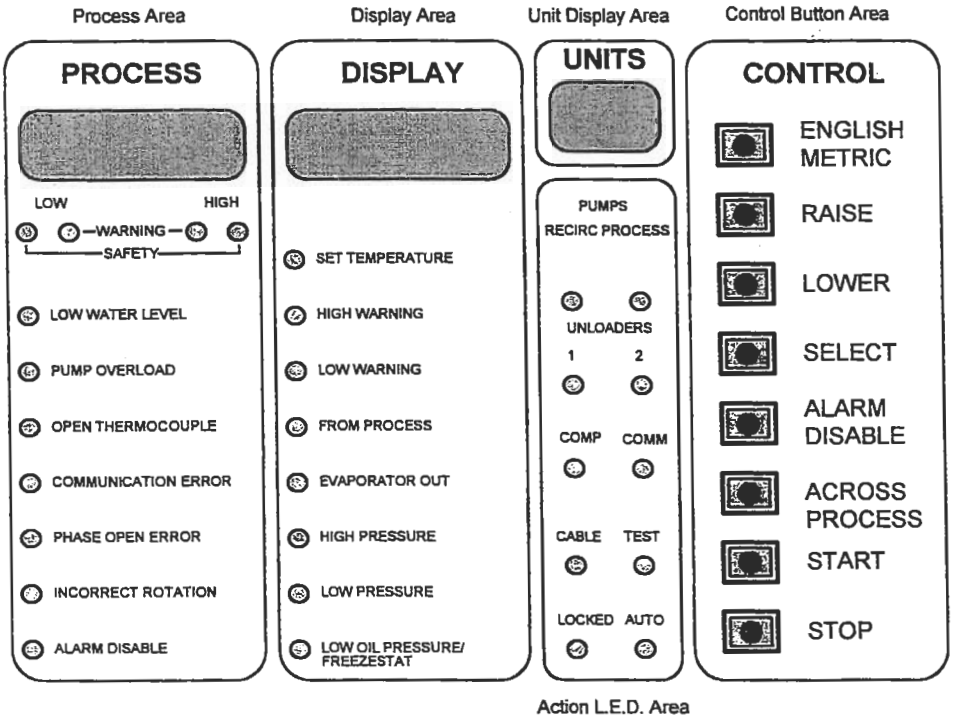
1175 DAVIS ROAD, ELGIN, IL 60123-1315, (708)888-8800

MODEL:	TEMP RANGE:	SERIAL#:
VOLTS:	PHASE:	HZ:
UNIT FLA:	DISC FUSE SIZE:	MIN AWG:
PROC PUMP HP:		FLA:
COMP HP:		FLA:
NO. FANS:	HP EA:	FLA EA:
R22:	TESTED BY:	SCHEM#:

Electrical

Upon power hookup, the control display will indicate the number of hours the control has been in operation by displaying "X" in the process screen. "X" being the number of hours and "H" in the display screen, or set point, indicating hours. All L.E.D.s will be lit for 5 seconds.

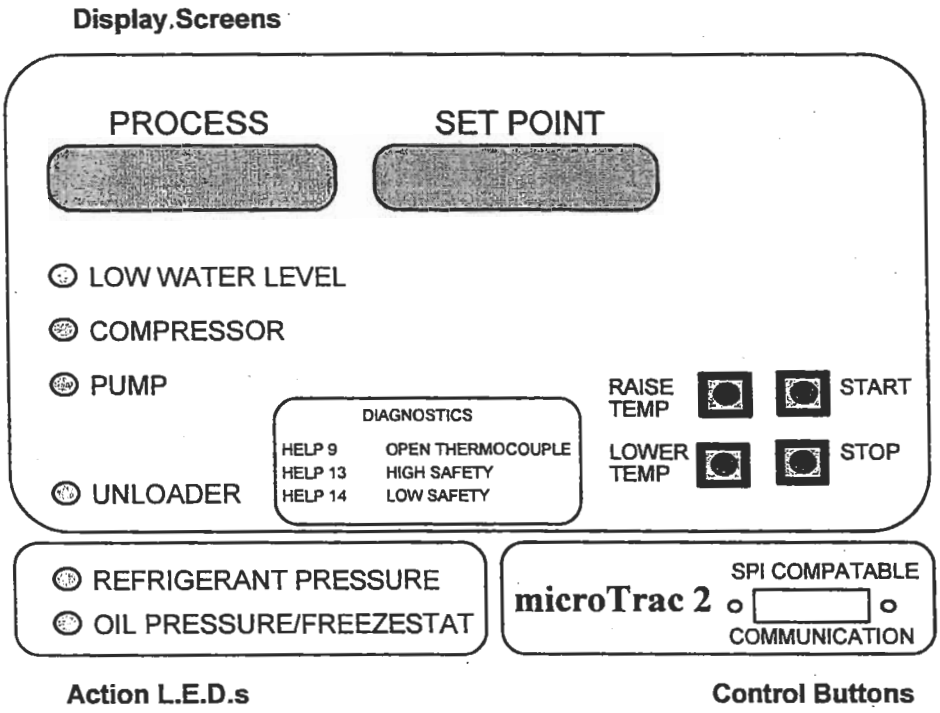




microTrac 3

Layout & Functions of the microTrac 2 Control Panel

The microTrac 2 control panel consists of 3 areas that provide information and control. These 3 areas are; Display Screens, Action L.E.D.s, and Control Buttons.



Display Screens

- Process Display — This screen will continuously monitor and display the process temperature of the chiller.

- Set Point Display — This screen will display the temperature set point by selected by the operator through the use of the Raise (Orange) and Lower (Blue) buttons.

Action L.E.D.s

There are two categories of L.E.Ds on the microTrac 2. L.E.D.s that monitor the action of the chiller and L.E.D's that indicate a problem has occurred. The action monitoring L.E.D.'s include: Compressor, Pump, and Unloader.

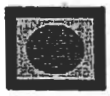
- Compressor — The Compressor L.E.D. will light indicating the compressor has been turned on by the controller. This will only occur if the proper pump operation is initiated.
- Pump — The Pump L.E.D. indicator will light when the chiller pump is turned on by the controller.
- Unloader — The Unloaders L.E.D. will light indicating the hot gas bypass valve, has energized due to load falling below chiller capacity.

The L.E.Ds that indicate a problem has occurred with the chiller are: Low Water Level, Refrigerant Pressure, and Oil Pressure / Freezestat.

- Low Water Level — The Low Water Level L.E.D. will light indicating the reservoir level has dropped below the minimum level causing the chiller to cease operation. Once adequate water exists, the light will extinguish and the chiller will start itself as long as the Stop (Red) button has not been pressed. Chillers without reservoirs sense this condition via a flow switch in the To Process line.
- Refrigerant Pressure — The Refrigerant Pressure L.E.D. will light indicating that the refrigerant circuit pressure is at an unacceptable level, high or low. See further details in the Troubleshooting section of this manual.
- Oil Pressure / Freezestat — The Oil Pressure / Freezestat L.E.D. will light indicating one of two possible failures. Oil pressure pertains to discus compressors only, (10 ton and above), and is reflective of the compressors oil pump to maintain an adequate pressure differential. Freezestat is a safety shut down to prevent damage to the evaporator from freeze-up of the water/glycol solution. Refer to the Troubleshooting section of this manual for further details.

Control Buttons

There are 4 control buttons on the microTrac 2 controller. When a button is depressed you will feel a click to confirm your actions. When a button is held down the button will repeat its function until the button is released. No two buttons should be pressed at the same time.



Raise (Orange)
The raise button is used to raise the temperature set point. The temperature set point will be raised 1 degree for each time the button is pressed.

Lower (Blue)
The lower button is used to lower the temperature set point. The temperature set point will be lowered 1 degree each time the button is pressed.

Start (Green)
The start button is used to activate the chiller into normal operation. The compressor may not start immediately if anti-short cycle timer, (5 min.), is engaged.

Stop (Red)
The stop button is used to stop the operation of the chillers, however, the process and set point screens will still show their respective values.

Communication

The microTrac 2 provides SPI compatible communication with a host machine. Events that are capable of being monitored and/or changed are:

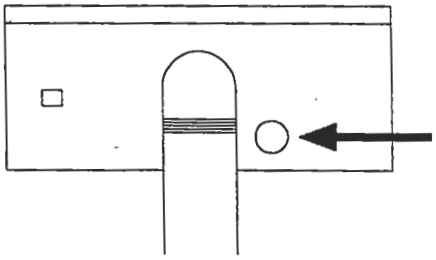
Alarms
Temperature Settings
Starting the Unit
Stopping the Unit

The following are the steps to take to activate SPI communication

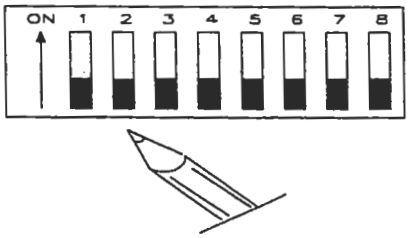
Warning! 

Make sure the chiller is stopped operation and the power supply has been disconnected.

- Raise the operator panel. In the rear of the panel is a round hole exposing the communication setting switches. There is a bank of eight switches. They are set to the "OFF" position upon leaving the factory.



- Switches 1 through 5 determine the network address and switches 6 and 7 determine the baud rate.



- Using the following chart, set the baud rate, and address for the unit. Every unit on the network must have a different address. Switches 1 through 5 determine the network address.
- Plug the male DB9 connector from your host machine into the SPI communications port located on the front of the operator panel.
- Reconnect the power supply and start the unit.
- The chiller now has SPI communication enabled.

Switches 1 through 5 determine the network address.

Address	Switches				
	1	2	3	4	5
32	X	X	X	X	X
33		X	X	X	X
34	X		X	X	X
35			X	X	X
36	X	X		X	X
37		X		X	X
38	X			X	X
39				X	X
40	X	X	X		X
41		X	X		X
42	X		X		X
43			X		X
44	X	X			X
45		X			X
46	X				X
47					X
48	X	X	X	X	
49		X	X	X	
50	X		X	X	
51			X	X	
52	X	X		X	
53		X		X	
54	X			X	
55				X	
56	X	X	X		
57		X	X		
58	X		X		
59			X		
60	X	X			
61		X			
62	X				
63					

"X" = ON, " " = OFF

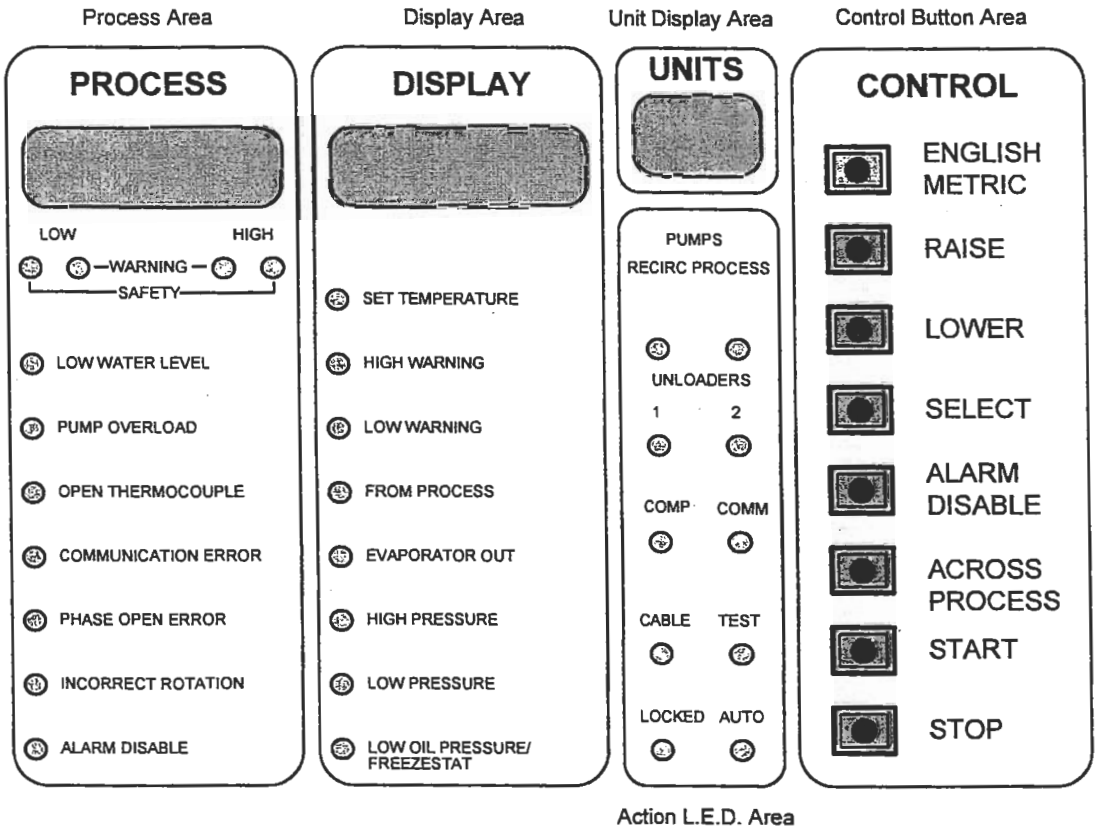
Switches 6 and 7 determine baud rate.

Baud Rate	6	7
1200	X	X
2400		X
4800	X	
9600		

"X" = ON, " " = OFF

Layout & Functions of the microTrac 3 Control Panel

The microTrac 3 control panel consists of 5 areas that provide process information and control. These 5 areas are: process area, display area, unit display area, control button area, and action L.E.D area.



Process Area

This area consists of a display screen and 11 L.E.D., (Light Emitting Diode), indicators. The process area will constantly monitor the operations of the chiller and display the current to process temperature in the screen. The L.E.D. indicators in this area are used to indicate any alarm condition that may occur. These indicators are covered in the troubleshooting section of this manual.

Display Area

The display area consists of a display screen and 8 L.E.D. indicators. The display screen shows the value of the item indicated by the selected L.E.D. indicator. Example, if the Set Temperature indicator is on, the display screen will show the temperature set point. This area is used in conjunction with the select (gray), raise (orange), and lower (blue) buttons.

Unit Display

This area consists only of the smaller display screen. This will differentiate between degrees Fahrenheit and degrees Celsius by displaying °F or °C. Use the English / Metric button to toggle between the two units of measure.

Action L.E.D. Area

This area consists of 10 L.E.D. indicators that will indicate what action the unit is taking at the present time.

- Recirc Pump

No recalculation pump is present in the single pump micro Kool chiller. Although the L.E.D. will remain active.

- Process Pump

The process pump L.E.D. indicator will light when the pump is turned on by the controller.

- Unloaders (1&2)

The unloaders L.E.D.s will light indicating the hot gas bypass valve has energized due to load falling below the chiller capacity. This provides capacity control and temperature regulation.

- Compressor (COMP)

The compressor L.E.D. will light when the compressor has been energized by the controller. The compressor operation will only be initiated if the pump is in operation, or the flow switch has been activated on units less pump and tank.

- Communication (COMM)

The comm L.E.D. will flash on, indicating that communication with a host machine has been enabled. When the host machine makes a change to the microTrac 3 control parameters, the comm L.E.D. will flash off. The display L.E.D. for any parameter that has been changed through communication will also flash when selected.

- Cable

The cable L.E.D. will light indicating the control panel cable that links the control panel to the mother board is improperly connected, or it is not a proper cable.

- Locked

The locked L.E.D. will light when the locking key has been enabled. The control panel locking key is a user option as well as a factory installed option. For more information on the locking key option, see the section on basic operation and extra features. All units are shipped with a locking jumper wire installed, making sure factory preset default values are loaded.

- Auto

The auto L.E.D. will flash when the auto start capability is enabled. The L.E.D. will remain flashing when the unit is started or stopped by the autostart option. For more information on the autostart option, see the section on basic operation and extra features.

Control Buttons

The control button area contains 8 different buttons. When a button is pressed you will feel a click as well as hear a high pitch beep to confirm you action. When a button is held down the button will repeat its function until released. This repeated function will be accompanied by consecutive audible beeps. No two buttons should be pressed at the same time.

- English / Metric (Brown)

The English / Metric button will toggle the process and display screens between degrees Fahrenheit and Celsius. The unit display screen will change to °F and °C respectively.

- Raise (Orange)

The raise button is used to raise the setable parameters. The selected parameter will be raised 1 degree each time the button is pressed.

- Lower (Blue)

The lower button is used to lower the setable parameters. The selected parameter will be lowered 1 degree each time the button is pressed.

- Select (Gray)

The select button will skip through the setable parameters in the display area in a top to bottom sequence. The indicator L.E.D.s will indicate which parameter has been selected while the display screen will show the value of the particular parameter.

- Alarm Disable / Enable (Yellow)

The alarm button will toggle the audible alarm and external alarms, (optional), on and off during an alarm condition. However, when the alarm is sounded and the alarm disable button is pressed, the alarms disable L.E.D in the process area will light indicating that an alarm condition has occurred and that the audible alarm(s) have been disabled. Once the condition has been corrected, press the alarm disable button again to enable the audible alarms. If the alarms disable L.E.D. is illuminated, alarms will be indicated on the L.E.D. panel but will not activate audible or external alarms.

- Across Process (White)

Pressing the across process button will cause the display screen to read the temperature difference between To and From Process lines.

- Start (Green)

The start button is used to activate the chiller into normal operation conditions as specified by the setable parameters.

- Stop (Red)

The stop button is used to stop the operation of the chiller, however the process, display, and units screens will still show their respective values.

Basic Operation & Extra Features of the microTrac 3 Control

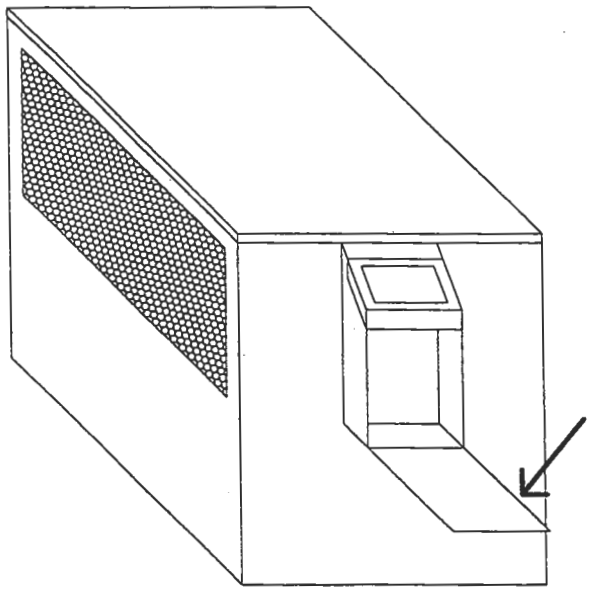
Alarm Conditions

When an alarm condition occurs, the first step is to press the alarm disable (yellow) button. This will disable the audible alarm along with the optional external alarm(s). However the alarm disable L.E.D. will illuminate indicating an alarm has gone off. The condition will be indicated by the lit L.E.D. in the process area of the control panel. Use the section titled Trouble Shooting to determine the problem and to find the suggested course of action.

Warning! 

When attempting maintenance of any kind, disconnect the power supply first!

Some failure conditions will not be displayed, such as a mother board output fuse clearing. This will result in the inability of another device, such as a process pump to function and will be displayed by the appropriate L.E.D. The fuses are located on the mother board in the lower right portion of the board. Replace the blown fuse with 1 amp 5 x 20 mm. replacement fuses. See the replacement parts section of this manual for the Conair Tempro part number.



Other alarm conditions may display "HELP 100" through "HELP 112". If any of these alarms occur, the controller has found an error with itself. Make a note of the message and call the Conair Tempro customer service number. See the section on Troubleshooting of this manual for a more detailed description of alarm conditions causes and remedies.

Connecting a Printer

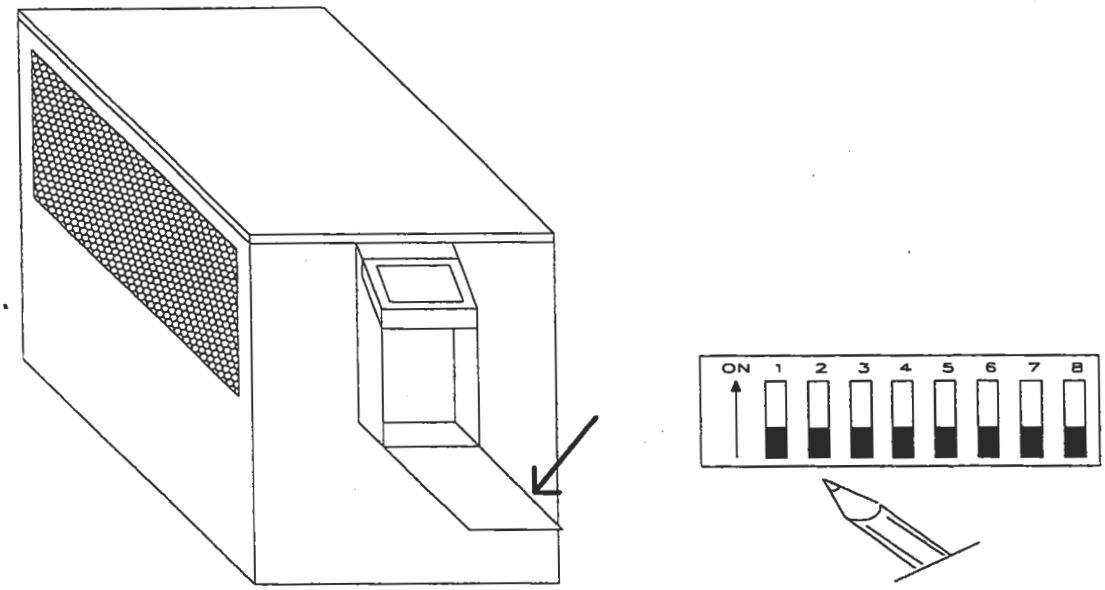
Printing is only possible when the optional printer cable has been installed at the factory. If the printer cable has been installed, **disconnect the power supply** and open the electrical box access panel.

Warning!

When attempting maintenance of any kind, disconnect the power supply first!

Locate the switches on the mother board, just to the right of the master reset. Switch number 2 enables the printer port.

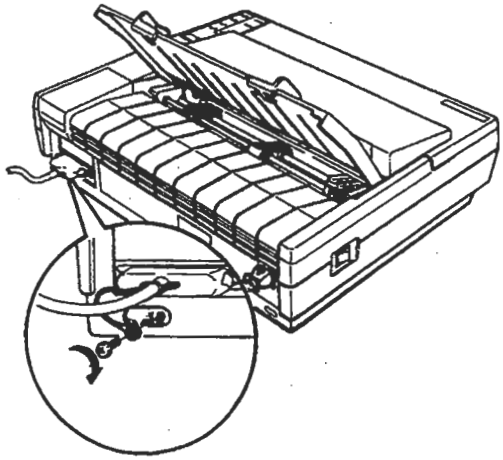
Use a ball point pen to change switch 2, labeled "Printer On" to the "On" position. "On" will be indicated on the switch block by an arrow.



- Close and lock the electrical box.

- Connect a standard DB25 male parallel printer cable to the printer port mounted on the electrical panel.

- Connect the other end of the cable to the parallel port on your Epson compatible printer.



- Make sure the printer is on-line. The on-line light will be lit on the printer indicating this condition. If the on-line light is out, press the on-line button on the printer and/or check the cable connections.

- Reconnect the power supply.

- Once the chiller is in standard operation, the printer will start to print out a line by line representation of the process. A new line will print every five seconds.

Adding a Key Lock

The key lock option will effectively lock the control panel and prevent changes to the chiller's settings. With the unit locked the control buttons status are as follows:

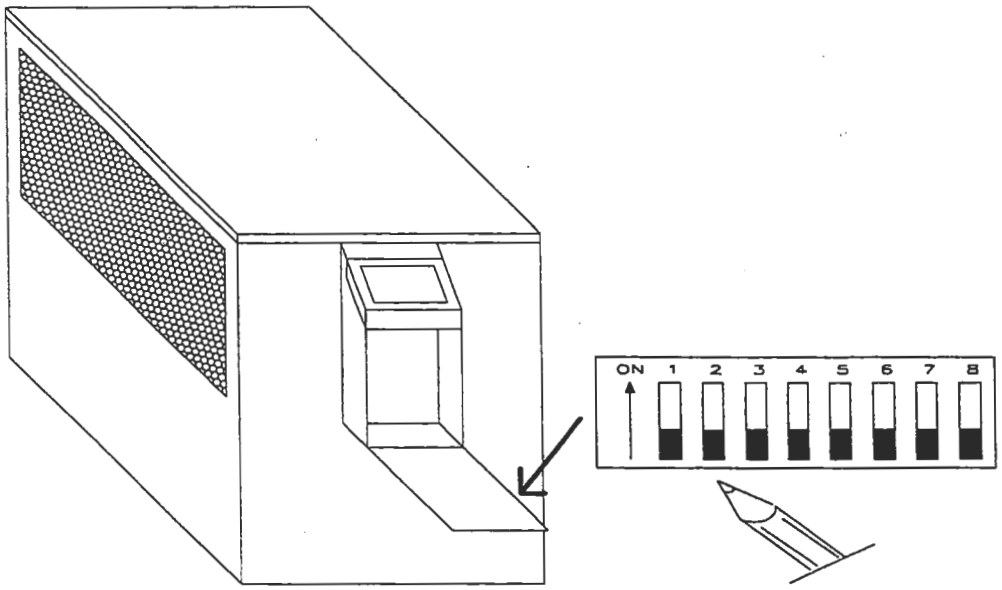
Unit Locked with Configuration Switch 3 ON

Unlocked Buttons	Locked Buttons
English/Metric	Raise
Across Process	Lower
Select	Alarm Disable (will function as alarm silence)
Start	
Stop	

Warning!

When attempting maintenance of any kind, disconnect the power supply first!

Turning configuration switch 3 to the OFF position, will unlock the RAISE and LOWER buttons. However only the set point can be raised or lowered, not the safeties or warnings.



The key lock can be installed as either a factory installed option or by the customer. The key lock kit can be ordered from Conair Tempro using part number 05000129

Installing the Key Lock

- **Disconnect the power supply** and open the electrical box access panel.
- Switch configuration switch 3 to either the ON or OFF position depending on your application.
- Knock out a 7/8" diameter hole at a clear spot on the side of the electrical enclosure.
- Feed the wires from the locking device, included in kit 05000129, through the locking key hole and pull the locking key device through so that it is mounted flush with the side of the panel.
- Feed the two wires through the locking bolt and bolt the locking device to the panel.
- Run the wires down the inside of the electrical box to the chiller terminal block.
- Make sure the wire insulation has been pulled back at least 1/8". Insert one wire into the 110 VAC port and screw it down tight. Insert the other wire into the key port and screw it down tight.
- Check the connections and close the electrical access panel.
- Reconnect the power supply. The key lock will now function as previously stated.

Auto Start

The auto start mode enables the chiller to start automatically with either a timing device or when the process molding machine starts. There are two configurations of the auto start operation: contact closure and voltage source.

Warning!

When attempting maintenance of any kind, disconnect the power supply first!

Contact Closure Start

- Open the electrical panel. The panel will swing down exposing the electrical components.
- Using panel knockout equipment, punch a small hole on the left side of the electrical enclosure. The hole should be large enough to connect conduit for the wires from your switching device.
- Connect standard conduit to the hole and insert the two leads from your switching device through the conduit and into the electrical enclosure.
- Locate the chiller terminal block, mounted on the back of the enclosure. Connect one wire from the switching device to the 110 VAC terminal and the other to the auto start hot terminal. Connect a wire from the auto start common terminal to the neutral terminal. Make sure all contacts are screwed down tight.
- Switch configuration switch 4, labeled " Auto Start/Stop " , on the mother board to ON. ON will be designated by the arrow on the switch block.
- Close the electrical enclosure and reconnect the power supply. The Auto Start L.E.D. in the action L.E.D. area will flash indicating the auto start mode is enabled. When the chiller has been started or stopped through the auto start mode the Auto Start L.E.D. will remain flashing.

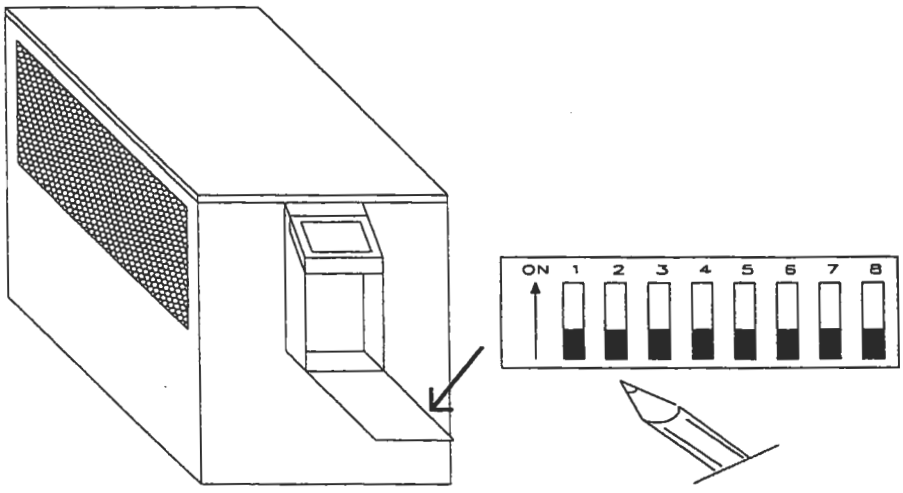
Voltage Source

The voltage source configuration is used when it is desired to have the chiller start along with the process machine that has 110 VAC power outputs, such as a molding machine.

Warning!

When attempting maintenance of any kind, disconnect the power supply first!

- Open the electrical enclosure. The panel will swing down exposing the electrical components.
- Using panel knock out equipment, punch a small hole in the left side of the electrical enclosure. The hole should be large enough to connect conduit for the wires from your switching or timing device.
- Connect standard conduit to hole and insert the two leads from the process machine through the conduit and into the electrical cabinet.
- Locate the chiller terminal block mounted on the back of the electrical enclosure. Connect the 110 VAC hot lead from the process machine to the auto start hot terminal and the neutral lead to the auto start common terminal. Make sure all contacts are screwed down tight.
- Switch configuration switch 4, labeled " Auto Start/Stop " , on the mother board to ON. ON will be designated by the arrow on the switch block.
- Close the electrical enclosure and reconnect the power supply. The Auto Start L.E.D. in the action L.E.D. area will flash indicating the auto start mode is enabled. When the chiller has been started or stopped through the auto start mode the Auto Start L.E.D. will remain flashing.



Preventative and Routine Maintenance

A program of regular inspection, cleaning and preventative maintenance by trained personnel will contribute greatly to long service life of this product.

Warning! 

Where maintenance procedures call for shut down - disconnect the power supply before proceeding! High voltage or unexpected auto start operation can be hazardous!

Periodic Inspection

- Read essential temperatures and pressures periodically to see that they indicate normal operation.
- Record these readings on a log sheet, supplied on page 52.
- If any abnormal operation is observed, see the troubleshooting section of the manual.

Monthly Inspection

- Check cooling water treatment system, (for water cooled units).
- Wipe down the external surfaces of the unit.
- **Shut the unit down, open the main disconnect.**
- Inspect the control panel. Check for loose wires, burned contacts and signs of overheated wires.
- Apply power to the unit and restart, check performance of the controls.
- Check the sight glass for proper refrigerant charge while the unit is operating at full load.

Vessel Maintenance

- The efficient performance of the evaporator and condenser heat transfer surfaces is essential for proper maintenance of your portable chiller.
- If these surfaces accumulate a film of dirt, scale or slime, their performance efficiency will degrade substantially.

- The refrigerant side of the heat transfer surface does not foul since refrigerant is a good solvent and is in a closed filtered cycle.

Evaporator Cleaning

- The surfaces of the heat transfer system exposed to water can foul from minerals and other contaminants in the water system. A program of water treatment can slow the rate of fouling on heat transfer surfaces, but will not eliminate it.
- The effects of fouling can be detected by recording full load performance data on the log sheet. Degrading performance over time may signify fouling.
- Check the supply water for the cause of fouling, i.e., minerals, dirt, slime, and algae.
- The evaporator should be cleaned with chemicals and procedures that are suitable for the kind of fouling.
- Clean the evaporator water side surfaces at least annually, and more often if severely foul water is used.
- To remove minerals and slime, cleaning must be done chemically. The proper chemicals can be recommended by a water treatment specialist.
- It is important to rinse the system thoroughly after cleaning to remove the chemicals before they attack the metal surfaces.

Water Cooled Condenser Cleaning

- To remove dirt, slime, and algae fouling from the condenser tubes; cleaning must be done chemically. Consult a water treatment specialist.

Condenser / Evaporator Replacement

- Neither water cooled condensers, nor evaporators are repairable. In the event of internal tube failure, contact the Conair Tempro parts department for replacements.

Air Cooled Condenser Cleaning

- The face of the condenser should be inspected regularly for dirt and clogging. It should be cleaned at least one a month. More frequent cleaning will be required if conditions are bad and the condenser picks up dirt very quickly. If the condenser is allowed to get too dirty the unit will run a high pressure and performance will be poor and the fan motors may overload.

- Clean the dirty coils with a soft brush, flush with cool water, or commercially available coil cleaners.

Refrigerant Charge

- All Chillers are given a complete charge of refrigerant at the factory. See the unit nameplate for the type and amount of refrigerant charge for your model. The total refrigerant shown is for the entire system.

- In order to check for proper refrigerant charge, look in the liquid line sight glass with the aid of a flashlight during system operation. At full load conditions the sight glass should be clear. Bubbles may be visible while hot gas valves are energized. This is normal and does not signify that refrigerant charge is low.

Recharging

- If recharging is necessary, additional or replacement of refrigerant must be performed by qualified Conair Tempro service personnel.

Troubleshooting

Warning! 

The procedures in this section should be performed ONLY by qualified service personnel. Failure to take appropriate precautions could result in serious injury of death!

Symptom	Possible Cause	Solution
Unit will not start.	Power turned off.	Check main disconnect and fuses.
	Control circuit fuses blown.	Check fuse on chiller terminal block. (Control board does remain illuminated)
	Loose wiring connection.	Turn power off! Check all wires / cables for tightness. Stranded wire tends to flow over time.
	Alarm condition exits.	Check control board for possible errors.
	Compressor time delay in effect.	Wait for the 5 minute anti-cycle timer to elapse. Do not apply heat load until compressor starts.
Compressor hums but does not run.	Low input voltage.	Check main supply voltage. It must be within 10% of nameplate rating.
	Phase loss.	Check for phase open error. Check main supply fusing and fusing and phase-to-phase voltages. If OK, check phase continuity through the compressor contactor. Check the wiring at the compressor.

Symptom	Possible Cause	Solution
Compressor cycles on low pressure cut-out.	Refrigerant charge low.	Check for leaks. Repair and recharge as required.
	Low pressure switch setting incorrect.	Factory standard setting 50# cut-in, 30# cut-out. Reset to factory parameters.
	Low load and low flow rate through out chiller.	Check line size to and from process. Possible excessive resistance or closed valves in piping.
	Restricted liquid line.	Check for temperature differential across filter drier, replace if required. Open liquid line shut-off valve fully. Check for closed suction valve at the compressor, open fully. Expansion valve clogged, inoperative or misadjusted. Check superheat.

Air Cooled

Symptom	Possible Cause	Solution
Compressor cycles on high pressure cut out.	Condenser dirty.	Clean air coil.
	Fan(s) inoperative.	Check for overload. Confirm rotation.
	Excessive ambient temperatures.	Ambient temperature above 100°F (38°C) will create problems.
	Insufficient air flow.	Obstructions at the condenser inlets and/or outlets must be removed.
	Improperly set high pressure switch.	Factory standard setting = 375# cut-out.

Water Cooled

Symptom	Possible Cause	Solution
Compressor cycles on high pressure cut out. Manual reset required at pressure switch on water cooled units.	Condenser dirty.	Clean tubes.
	Insufficient condenser water flow.	Check flow source, closed valves, etc. Check for minimum 25 psi at condenser water inlet. Check for proper water regulating valve operation, factory preset for 85°F condenser supply water = 210 psi head pressure.
	Condenser supply water temperature excessive.	Temperature above 95°F may present problems. Check cooling tower fan, nozzles, fill, etc.
	Improperly set high pressure switch.	Standard factory setting = 290# cut-out.

All Units

Symptom	Possible Cause	Solution
Compressor cycles on high pressure cut out. Manual reset required at pressure switch on water cooled units.	Refrigerant overcharge.	Pump system down, if not possible due to high pressure trip - overcharge. Have a qualified service technician adjust the charge properly.
Unit cycles off / on, Freezestat cut-out.	Setting too high for the desired set-point.	Adjust to protect chiller based on the concentration of ethylene glycol used. Set to cut-out 5°F above the freeze point of the solution. The solution should protect the chiller to 10°F below the set point. Minimum 10°F.

All Units

Symptom	Possible Cause	Solution
Unit cycles off / on, freezestat cut-out.	Freezestat installed improperly.	Check that the bulb is inserted completely into the piping well and insulated.
	Freezestat defective.	Replace. Call the Conair Tempro Service Department.
High safety cut-out.	Water temperature leaving evaporator has been above 75°F for over 1/2 hr. (Standard Units) Water temperature above 100°F will cause immediate shut down.	Low evaporator flow. Defective control board.
Open Thermocouple.	The thermocouple is defective, the control displays temperature as 185°F.	Replace the thermocouple. Check for possible cause of a broken thermocouple wire. Check the junction block at the mother board and repair if possible. Check the unit and the mother board for proper earth grounding.

System Tests - microTrac 2

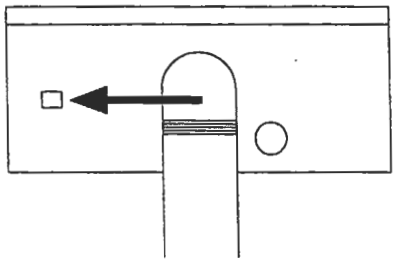
This chapter is provided for the operator to perform simple diagnostic tests on the **microTrac 2** controller.

Warning!

The procedures in this section should be performed ONLY by qualified service personnel. Failure to take appropriate precautions could result in serious injury of death!

Press the STOP (Red) button to stop the operation of the chiller.

Access the rear of the control panel and press the TEST (Black) button.



The display on the operator panel should now read "SEL 0", meaning that the test number has been selected. All available tests may be selected by pressing the RAISE and LOWER buttons until the desired test number is displayed. To start a test, press the START button. To stop a test press the STOP button. The following is a list of the currently available test routines:

Test Number	Description
0	Watchdog Test
1	RAM Test
2	L.E.D. Test
3	Button Test
4	Solid State Relay Test
7	Hour Meter

Test 0, Watchdog Test

The display will increment by tens. A failed test is indicated when the microTrac 2 performs a hardware reset before a count of 90 is reached on the display. A failed test is also indicated when the microTrac 2 does not perform a hardware reset before the count of 150 is reached on the display.

Test 1, RAM Test

The random access memory is a pattern test. During the test the "SEL" portion of the display is blanked. If the RAM was found to be good, the "SEL 1" will return to the display, otherwise "HELP XXX" will be displayed, with "XXX" representing the address in HEX notation. If a bad address is encountered, the controller must be powered down to exit the test.

Note: A similar test is executed every time the controller is turned on, displaying "HELP 102" if the test failed.

Test 2, L.E.D. Test

The display will increment from 0 to 9 followed by: "-", "E","H","L", and "P". The digits are all turned to 8 and are turned off sequentially.

Test 3, Button Test

When the controller detects a button pressed the corresponding L.E.D. in the display section of the operator panel will light. To exit the test the STOP button must be pressed twice consecutively. It is necessary to test the button repeat only on one of the four buttons.

Test 4, Solid State Relay Test

The operator panel display will read "SOL X" where "X" is the number of the solid state relay that is on. The SSR ,(Solid State Relay), selected may be changed by pressing the RAISE and LOWER buttons. The selected SSR will stay on for 30 seconds. The START button will turn on the same SSR for 30 more seconds.

Test 7, Hours On, Pump Hours, Compressor Hours, and Unloader Cycles

Select test 7 using the RAISE and LOWER buttons. Press the START button and "XX" will be displayed in the process screen and "OH" will be displayed in the display screen. The "XX" represents the number of hours the unit has been turned on, while the "OH" represents On Hours.

With the test running, press the RAISE button and the screens will now display the hours the pump has been running. "XX" will be displayed in the process screen and "PH" will be displayed in the display screen.

Press the RAISE button again and the compressor hours will be displayed. "XX" will be displayed in the process screen and the "LH" will be displayed in the set point screen.

Press the RAISE button again and the unloader cycles, how many times the unloader / hot gas solenoid has been opened and closed, will be displayed. "XX" will be displayed in the process screen and "LS" will be displayed in display screen. The number of cycles is in thousands.

Warning!

Test numbers other than those indicated should be performed only be qualified CONAIR TEMPRO service personnel. Performance of test other than those indicated by other than qualified CONAIR TEMPRO service personnel may cause serious damage to the equipment and void the warranty.

Power down the unit and then power the unit up again to restore the chiller to normal operation.

System Tests - microTrac 3

This chapter is provided for the operator to perform simple diagnostic tests on the **microTrac 3** controller.

Warning!

The procedures in this section should be performed ONLY by qualified service personnel. Failure to take appropriate precautions could result in serious injury of death!

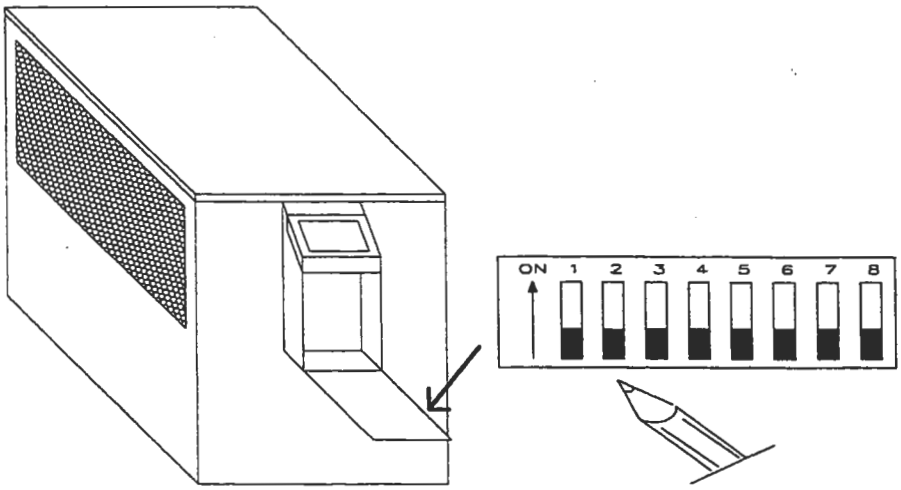
Warning!

When attempting maintenance of any kind, disconnect the power supply first!

Press the STOP (Red) button to stop the operation of the chiller.

Open the electrical enclosure. The panel will swing down exposing the electrical components.

Using a ball point pen switch configuration switch 1 labeled, "System Test Mode", on the mother board to the "ON" position. "ON" will be indicated by an arrow on the switch block.



Close the electrical enclosure and reconnect the power supply. The EPROM revision number will appear on the display for 8 seconds or until a button is pressed.

The display on the operator panel should now read "SEL 0", meaning that the test function has been selected. All available tests may be selected by pressing the RAISE and LOWER buttons until the desired test number is displayed. To start a test, press the START button. To stop a test press the STOP button. The following is a list of the currently available test routines:

Test Number	Description
0	Watchdog Test
1	RAM Test
2	L.E.D. Test
3	Button Test
4	Solid State Relay Test
10	Thermocouple Open Test

Test 0, Watchdog Test

The display will increment by tens. A failed test is indicated when the microTrac 3 performs a hardware reset before a count of 90 is reached on the display. A failed test is also indicated when the microTrac 3 does not perform a hardware reset before the count of 160 is reached on the display.

Test 1, RAM Test

The random access memory is a pattern test. During the test the "SEL" portion of the display is blanked. If the RAM was found to be good, the "SEL 1" will return to the display, otherwise "HELP XXX" will be displayed, with "XXX" representing the address in HEX notation. If a bad address is encountered, the controller must be powered down to exit the test.

Note: A similar test is executed every time the controller is turned on, displaying "HELP 102" if the test failed.

Test 2, L.E.D. Test

The L.E.D.s on the operator panel are all turned on except for the CABLE L.E.D. The L.E.D.s, except for the TEST L.E.D., are turned off sequentially. The digits are then incremented from 0 to 9 followed by: "-", "E","H","L", and "P". The digits are then all turned to 8 and are turned off sequentially.

Test 3, Button Test

When the controller detects a button pressed the corresponding L.E.D. in the display section of the operator panel will light. To exit the test the STOP button must be pressed twice consecutively. It is necessary to test the button repeat only on one of the eight buttons.

Test 4, Solid State Relay Test

The operator panel display will read "SOL X" where "X" is the number of the solid state relay that is on. The SSR ,(Solid State Relay), selected may be changed by pressing the RAISE and LOWER buttons. The selected SSR will stay on for 30 seconds. The START button will turn on the same SSR for 30 more seconds.

Test 10, Thermocouple Open Test

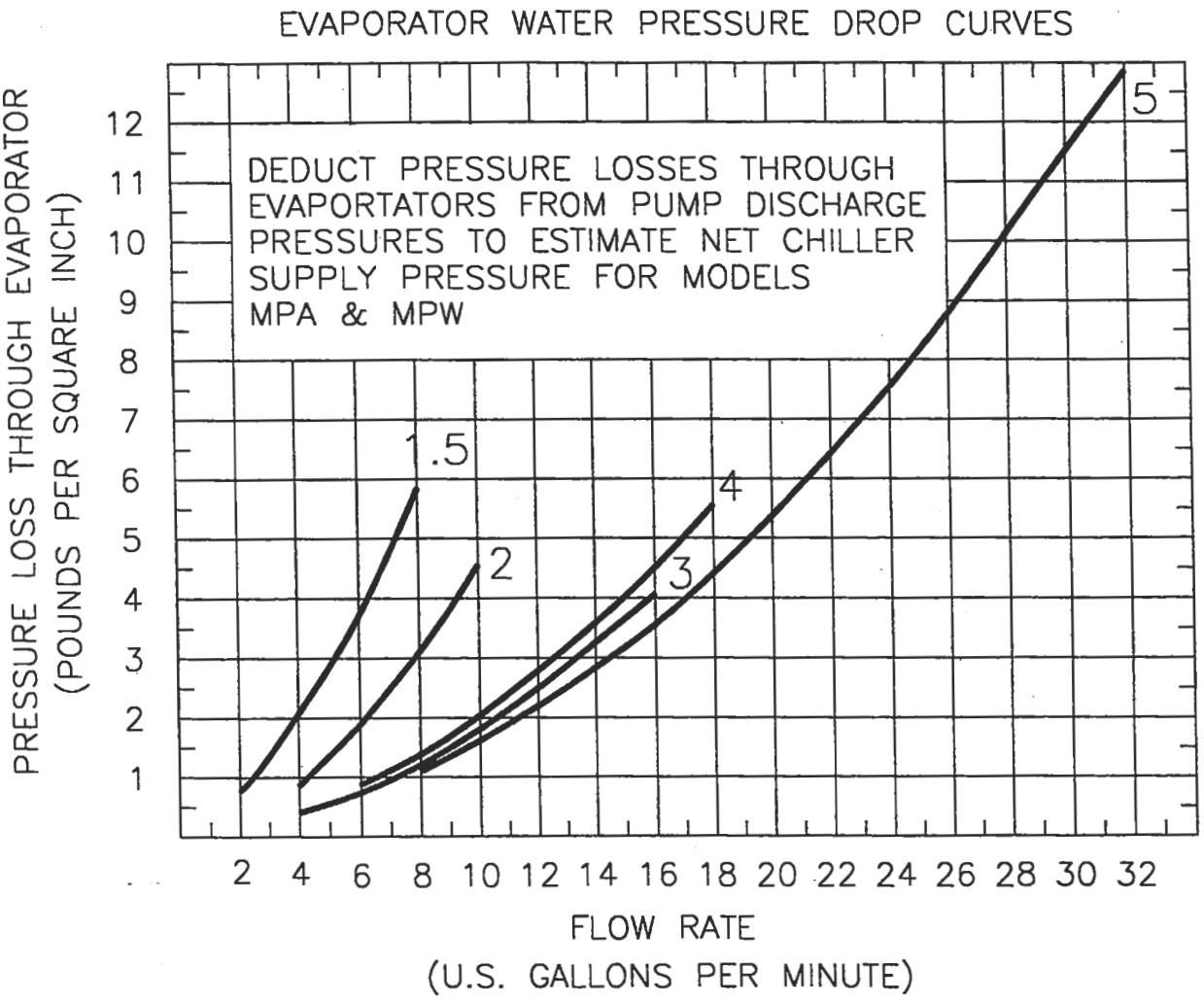
Connect jumper wire across terminals on the thermocouple channel 1 (J3), thermocouple channel 2 (J4), and thermocouple channel 3 (J5). One at a time remove the jumpers. The thermocouple open test displays data with L.E.D.s being lit when a thermocouple is open.

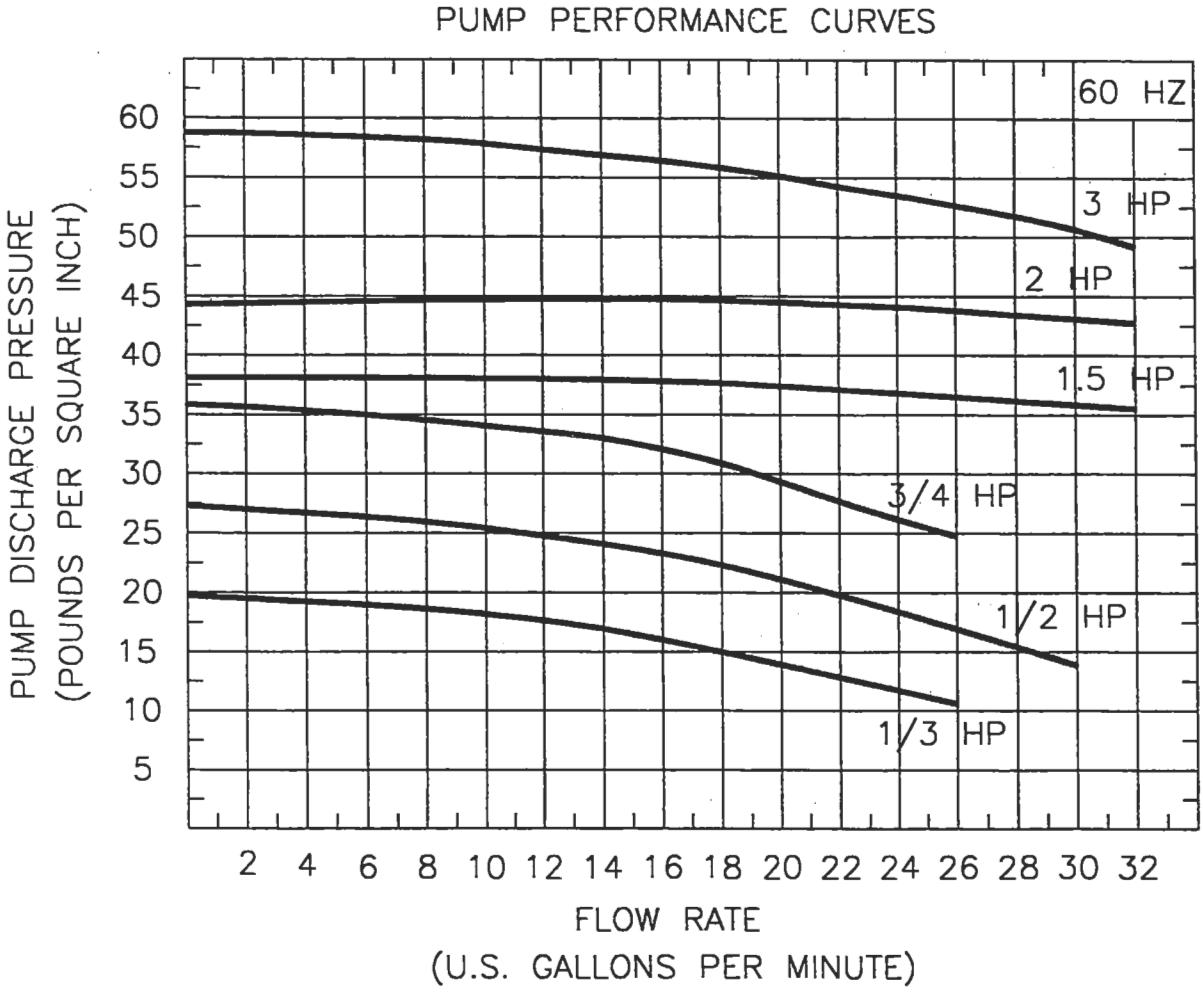
Warning!

Test numbers other than those indicated should be performed only be qualified CONAIR TEMPRO service personnel. Performance of test other than those indicated by other than qualified CONAIR TEMPRO service personnel may cause serious damage to the equipment and void the warranty.

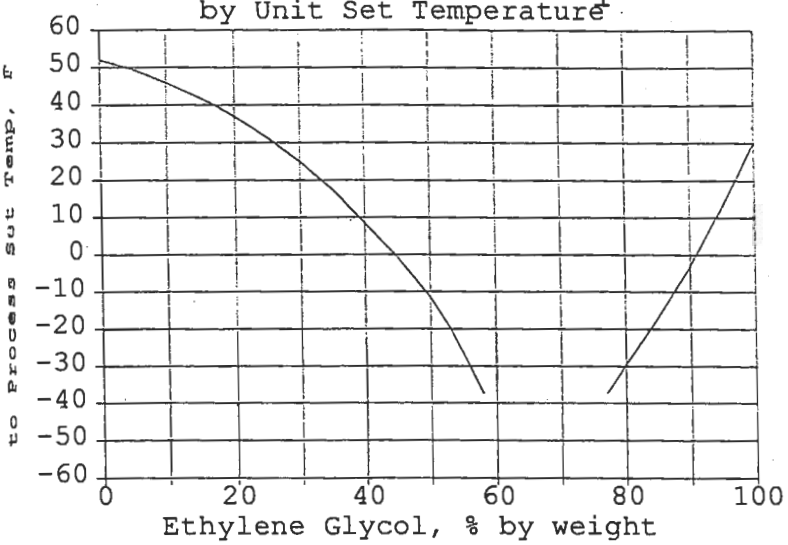
Disconnect the power supply, then using a ball point pen, switch confirmation switch 1, labeled "System Test Mode", on the mother board to the "OFF" position and then reconnect the power supply.

Technical Information

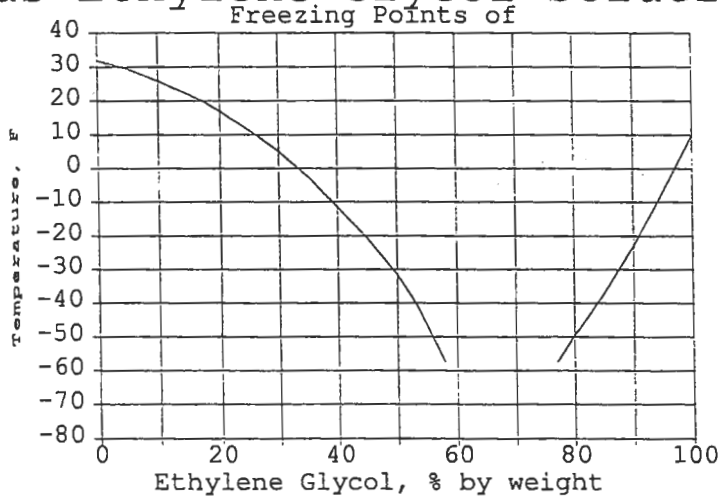



PUMP PERFORMANCE CURVES
PUMP DISCHARGE PRESSURE
(POUNDS PER SQUARE INCH)
60
55
50
45
40
35
30
25
20
15
10
5
60 HZ
3 HP
2 HP
1.5 HP
3/4 HP
1/2 HP
1/3 HP
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
FLOW RATE
(U.S. GALLONS PER MINUTE)

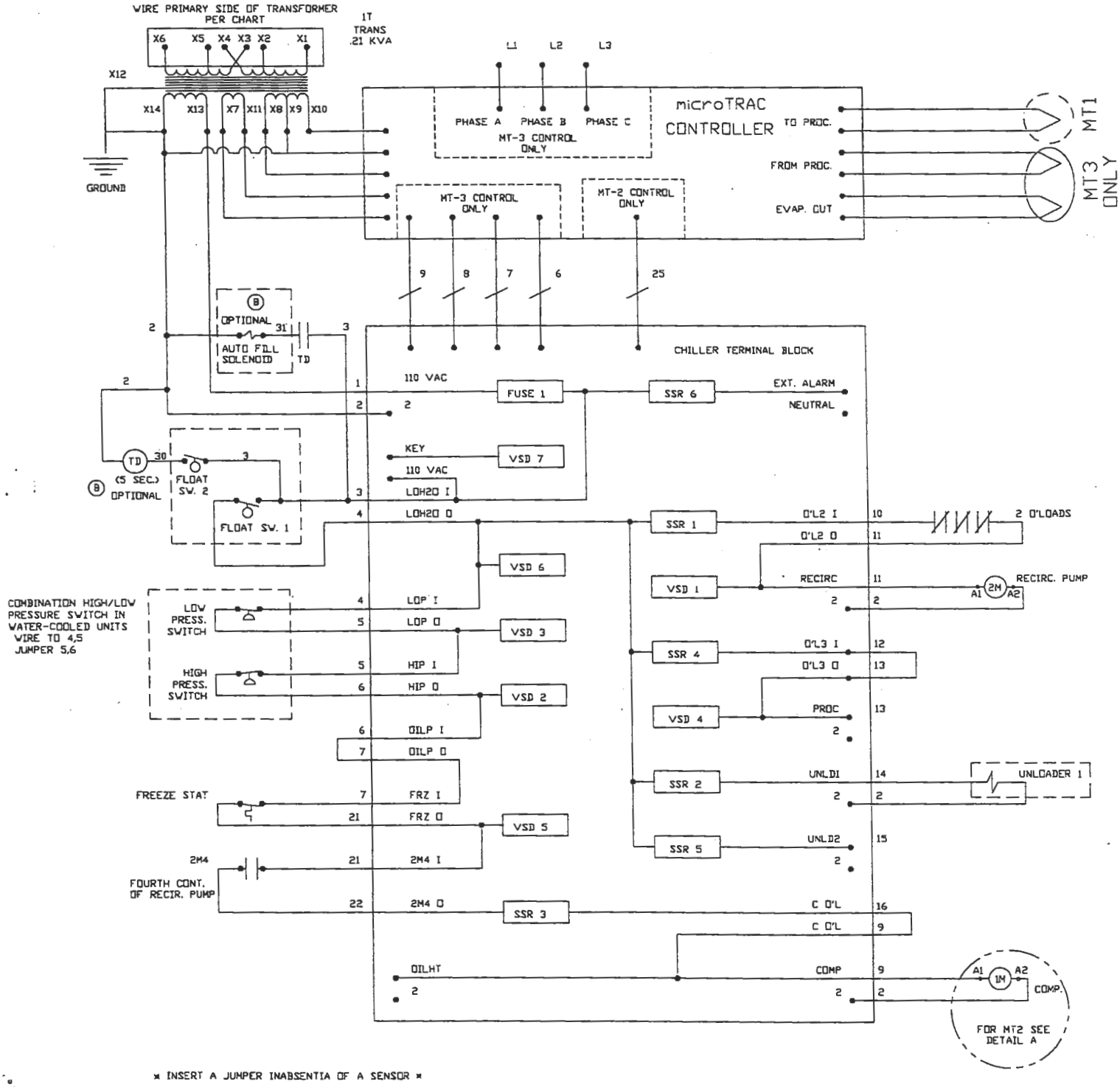
Freeze Protection Requirements



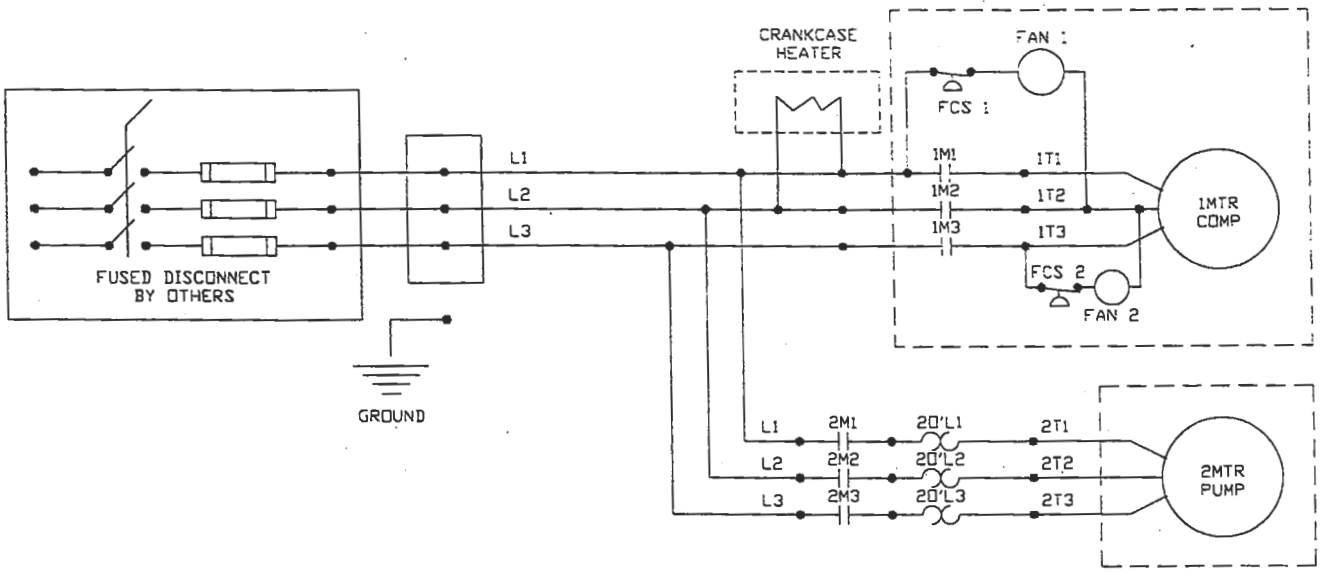
Aqueous Ethylene Glycol Solutions

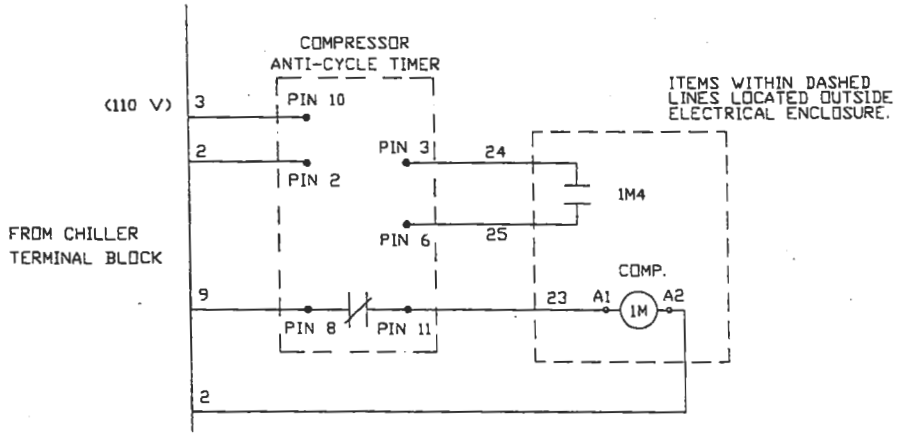


Electrical Schematic



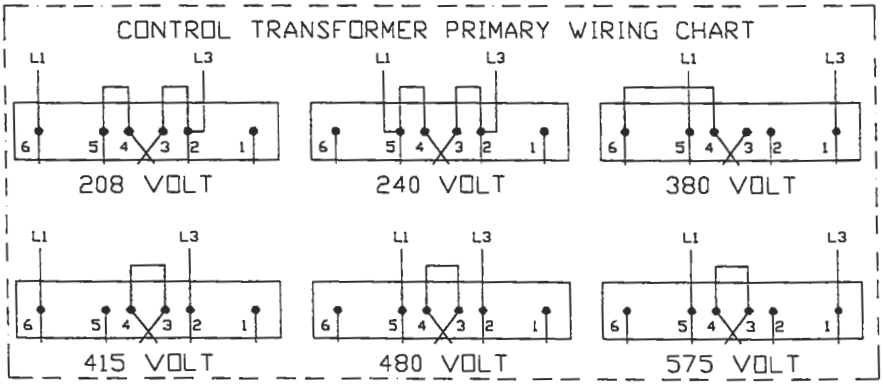
Electrical Schematic





SET TIMER AT H005M (5 MIN.)

DETAIL A



Replacement Parts

		MT2	MT3	ALL
Controls	Operator Panel	09002779	11000550	
	Mother Board MT - 3 Control (w/ RFI Shield Installed)		05300183	
	Graphic Overlay Control	09002782	11001300	
	Power Cable, 5 pin	05000302	05300322	
	I/O Cable, 6 pin		05300185	
	I/O Cable, 7 pin		05300188	
	I/O Cable, 8 pin		05300186	
	I/O Cable, 9 pin		05300187	
	I/O Cable	09000434		
	Phase Detection Harness		05300326	
	Thermocouple			09001207
	Chiller Terminal Block (w/ fuse)			11000511
	Control Transformer			11001213
	Freezestat			09000782
	Flow Switch			09000502
	Float Switch			09000657
	Solenoid Valve (Auto Make - Up)			09004500
	Time Delay Relay (Auto Make - Up)			09002422
	Control Fuse 1A			10001118
	Output Fuse 2 1/2A			10001124
Contactors	Time Delay Compressor Anti-Cycle	09002119		
	9 AMP			11002215
Overloads	12 AMP			11002016
	.06 - 1 AMP			09001843
	.08 - 1.2 AMP			09001289
	1.0 - 1.6 AMP			09001857
	1.5 - 2.3 AMP			11002550
	2 - 3 AMP			11003215
	4 - 6 AMP			11002552
	5.5 - 8 AMP			09000344
	6 - 10 AMP			09000343
Pump/Motor	10 - 15 AMP			09000345
	Assemblies (208/230/465) - 575			
	1/3 HP			09001676
	1/2 HP			09001005
	3/4 HP			09000769
	1 HP			09001274
	1 1/2 HP			09002369
	2 HP			09001071
	3 HP			09002621

		208/230V	460V	ALL
Evaporators	1 1/2 ton			09002994
	2 ton			09003039
	3 ton			09002995
	4 ton			09003041
	5 ton			09002530
Condensing Units				
	MPA - 1 1/2	09002988	09003042	
	MPA - 2	09003043	09003044	
	MPA - 3	09003033	09002990	
	MPA - 4	09003045	09003046	
	MPA - 5	09003028	09002529	
	MPW - 1 1/2	09002989	09002997	
	MPW - 2	09003038	09003047	
	MPW - 3	09003034	09002991	
	MPW - 4	09003048	09003049	
	MPW - 5	09003037	09002992	
Hot Gas Bypass Valves	1 1/2 ton, 2 ton			09003000
	3 ton			09001669
	4, 5 ton			09001270
Bypass Valve Solenoid				09004551
Filter Drier				
	1 1/2 ton, 2 ton			09003001
	3 ton			09001671
Expansion Valves	4, 5 ton			09018005
	1 1/2 ton			09002999
	2 ton			09002040
	3 ton			09003016
	4 ton			09001672
Miscellaneous	5 ton			09001266
	Water Pressure Gauge 0 - 100 #			09030005
	Water Pressure Bypass Valve			09002217
	Tank 10 GAL			09003275
	Tank 30 GAL			09002766

Portable Chiller Maintenance Log

Date	Circuit								
Comp Amps 100% / Unloaded									
Discharge									
Suction									
Evap. Press.									
Oil Press. Hi / Lo	X	X	X	X	X	X	X	X	X
Lo Press. Setting									
Hi Press. Setting									
Freestat Setting									
Evap. Water Out Temp.									
Process Water, P									
Recirc. Water, P									
Cond. Water Temp: In/Out									
Cond. Water Press: In/Out									
Cond. Fan Amps (1)									
Cond. Fan Amps (2)									
Cond. Fan Amps (3									

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call ...

If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between loading control and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

EQUIPMENT GUARANTEE

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

PERFORMANCE WARRANTY

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

WARRANTY LIMITATIONS

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.