

DURACHILL™

by PolyScience



Operators Manual
DuraChill™ 5 HP Air-Cooled Chiller
For Hypertherm®

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	This symbol marks chapters and sections of this instruction manual which are particularly relevant to safety. When attached to the unit, this symbol draws attention to the relevant section of the instruction manual.
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	This symbol indicates that hazardous voltages may be present.
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Read all instructions pertaining to safety, set-up, and operation.
Proper operation is the users' responsibility.


Section 1 – Safety and Warranty Information










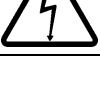
1.1 Safety

It is the user's responsibility to read and understand all instructions and safety precautions included in this manual prior to installing or operating this equipment. Contact our Customer Service Department with any questions regarding the operation of this chiller or the information contained in this manual.

	Installation, operation, or maintenance of this equipment should be performed in strict accordance with the instructions outlined in this manual. Failure to follow those instructions may increase the risk of personal injury, damage the equipment, and/or void the warranty.
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	Exercise care when unloading, loading, rigging, or moving this equipment.
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	All warning labels should be carefully observed. Never remove or obstruct a warning label.
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	Make sure that ventilation is adequate when welding or brazing around this equipment. Protect adjacent materials from flames or sparks. Keep an approved fire extinguisher close at hand.
	Always operate this equipment within the stated design specifications.
	Be sure to remove power from the equipment, reclaim the refrigeration charge, and relieve any residual pressure before cutting into the refrigeration system.
	Do not attempt to operate leaking or damaged equipment.
	Service should only be performed by fully qualified personnel.
	Follow all applicable electrical and safety codes when connecting power to this equipment.
	Do not attempt to override the power interlock switch or any other safety features on this equipment.
	Always remove power from the equipment prior to performing any service or maintenance.
	Do not move the equipment without first disconnecting power.
	Make sure the equipment's main power switch is in the OFF position before connecting or disconnecting power.

Additional Precautions

Do not attempt to operate this equipment without an appropriate cooling fluid in the reservoir.

Always empty the fluid reservoir before moving the unit.

1.2 Warranty

Thank you for purchasing this chiller. We are confident it will serve you for a long time. Our warranty to you is as follows:

The manufacturer agrees to correct for the original user of this product, either by repair, or at the manufacturer's election, by replacement, any defect that develops after delivery of this product within the period as stated on the warranty card. In the event of replacement, the replacement unit will be warranted for 90 days or warranted for the remainder of the original unit's parts or labor warranty period, whichever is longer.

If this product requires service, contact the manufacturer/supplier's office for instructions. When return of the product is necessary, a return authorization number will be assigned and the product should be shipped, (transportation

charges pre-paid), to the indicated service center. To insure prompt handling, the return authorization number should be placed on the outside of the package and a detailed explanation of the defect enclosed with the item.

This warranty shall not apply if the defect or malfunction was caused by accident, neglect, unreasonable use, improper service, or other causes not arising out of defects in material or workmanship. There are no warranties, expressed or implied, including, but not limited to, those of merchantability or fitness for a particular purpose which extends beyond the description and period set forth herein.

The manufacturer's sole obligation under this warranty is limited to the repair or replacement of a defective product and shall not, in any event, be liable for any incidental or consequential damages of any kind resulting from use or possession of this product. Some states do not allow: (A) limitations on how long an implied warranty lasts; or (B) the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights. You may have other rights that vary from state to state.

1.3 Unpacking

Your chiller is shipped in a special container. Retain the container and all packing materials until the unit is completely assembled and working properly. Set up and run the unit immediately to confirm proper operation. Beyond one week, your unit may be warranty repaired, but not replaced. If the unit is damaged or does not operate properly, contact the transportation company, file a damage claim and contact the company where your unit was purchased immediately.

Section 2 – Introduction

2.1 General Description

The PolyScience® DuraChill™ chiller offers exceptional performance, reliability, and operational simplicity. This robust self-contained chiller is engineered to provide accurate temperature control.

Standard Features

- Process temperatures from 32° to 86°F (0° to 30°C)
- Ambient temperatures from 14° to 104°F (-10° to 40°C)
- ±2°F (±1.11°C) temperature stability
- High efficiency vertical air exhaust
- Accurate microprocessor control with LED temperature readout
- Over/under temperature process fluid alarms
- Copeland Scroll® compressor
- Stainless steel centrifugal pump
- Integral pump and compressor protection
- Locking casters
- NEMA 12 style electrical enclosure with door-mounted power disconnect
- Power phase monitor
- Full Flow Bypass Valve
- Low tank level indicator/alarm – Dual Float Switch

2.2 Component Identification

Your Chiller consists of three basic sub-systems:

- Control system
- Fluid circulation system
- Cooling system

This section describes these sub-systems in detail and includes information on the available options.

See Sections A.1 and A.2.

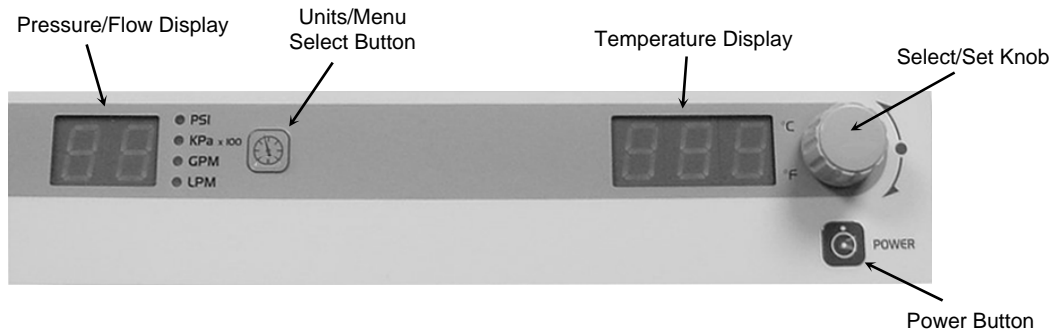
2.2.1 Control System

This system controls and monitors Chiller operation. It consists of a microprocessor-based controller linked to the various sensors, gauges, valves, switches, and signal input/output connections on the unit.

Control Panel — Temperature set point, temperature units, and other operating parameters are set via the Control Panel. Operating information is displayed on a local LED readout.

TEMPERATURE CONTROLLER PCB = Part No.: 500-367

POWER SUPPLY PCB = Part No.: 215-513



Power Switch / Disconnect — The main power switch is located on the front door of the unit. This switch also functions as a power disconnect when access to the unit's electrical components and terminal blocks is required; the access door cannot be opened until the Power Switch / Disconnect is placed in the Off position.

DISCONNECT SWITCH = Part No.: 215-629

Temperature Probe — An internal RTD is used to measure fluid temperature downstream of the pump. Its reading is displayed on the Control Panel LED.

PLATINUM TEMPERATURE PROBE = Part No.: 200-450

Pressure Sensor — Measures fluid pressure at the outlet of the Chiller.

PRESSURE TRANSDUCER = Part No.: 750-757

2.2.2 Fluid Circulation System

This system governs the circulation of fluid through the unit.

Reservoir Tank — This polyethylene tank is used to maintain stable temperature control and an adequate reserve of fluid for the system. It is equipped with a float switch that monitors fluid level and activates an alarm if the level drops too low.

Tank Sight Glass or Level Indicator — This indicator serves as a convenient means of checking the liquid level within the Reservoir Tank.

Process Pump — The high pressure turbine pump is used to pump fluid from the Reservoir Tank to the process.

1HP TURBINE PUMP

200-240/380-460V 50/60Hz = Part No.: 505-174

575-600V 60Hz = Part No.: 505-178

Recirculation Pump — The stainless steel centrifugal pump assures adequate flow through the evaporator to optimize heat transfer.

½ HP CENTRIFUGAL PUMP

200-240/380-460V 50/60HZ = Part No.: 505-175

575-600V 60HZ = Part No.: 505-177

Dual Float Switch — If fluid level should fall below the upper float switch (7 gallons low) the right hand display will alternately show “**EF1**” and fluid temperature, Audible alarm will intermittently sound. This will continue indefinitely until attended to.

If fluid level should fall below the lower float switch (9 gallons low) the right hand display will alternately show “**EF2**” and fluid temperature, Audible alarm will intermittently sound and after a delay the unit will turn off.

DUAL FLOAT SWITCH = Part No.: 235-064

Flow Switch — Monitors internal recirculation flow. If flow rate is less than 4 gpm or fluid level in reservoir is below lower float switch an alarm message - “**EF2**” is displayed and chiller turns off.

FLOW SWITCH = Part No.: 235-052

Strainer — Traps debris which could potentially clog the Evaporator.

RECIRCULATION PUMP ‘Y’ FILTER (3/4”) = Part No.: 400-710

PROCESS OUTLET ‘Y’ FILTER (1/2”) Part No.: 775-174

Bypass Valve — Used to prevent overloading of pump in the event that the process piping becomes restricted or clogged. Diverts flow from process line back to Reservoir Tank.

200 PSI PRESSURE RELIEF VALVE = Part No.: 776-090

2.2.3 Cooling System

The condenser on your Chiller is air-cooled. The following components are common to all systems.

Common Cooling System Components

Evaporator — Serves as the heat exchanger between the refrigeration and fluid flow system. Cools fluid before it returns to process.

BRAZED PLATE HEAT EXCHANGER = Part No.: 750-214

Compressor — The unit incorporates a 5-HP Copeland Scroll[®] compressor. The Compressor is protected from overloads through high and low refrigerant pressure cutouts.

5HP COMPRESSOR

200-230V 50/60Hz = Part No.: 750-833

380-460V 50/60HZ = Part No.: 750-813

575-600V 60HZ = Part No.: 750-832

Filter Dryer — Removes residual particulate and moisture from the refrigeration system. Must be replaced whenever the sealed refrigeration lines are opened for service.

FILTER DRYER = Part No.: 750-229

Sight Glass — Used to observe refrigerant liquid flow to Evaporator.

SIGHT GLASS = Part No.: 750-230

Expansion Valve — Controls refrigerant superheat at the outlet of the Evaporator to prevent liquid from returning to the compressor.

TXV (Thermostatic Expansion Valve) = Part No.: 750-814

Hot Gas Bypass Solenoid Valve — Injects refrigerant vapor into the Evaporator to stabilize temperature control when operating at less than a full heat load.

SOLENOID VALVE = Part No.: 750-222

COIL = Part No.: 750-216

Refrigerant Relief Valve — Automatic safety used to vent refrigeration gas in the event that pressure exceeds a factory set value. This valve is set to open at 650 PSI.

SAFETY RELIEF VALVE ¾ MPT (650PSI) = Part No.: 750-815

Condensing Fan — A 1 HP fan that draws air over the condenser coils to cool refrigerant gas. The standard fan is fixed speed and cycles on/off based on refrigerant pressure. It turns on when refrigerant pressure is 400 PSI or greater, turns off when refrigerant pressure falls below 300 PSI.

1HP FAN MOTOR

200-240/380-460V 50/60 Hz =_Part No.: 215-435

575-600V 60 Hz =_Part No.: 215-603

Refrigerant Pressure Switches — These switches automatically disconnect power from the condenser system in the event that refrigerant pressure is outside factory set high/low values. The Low Pressure Switch is set to open at 10 PSI and close at 30 PSI. The High Pressure Switch is set to cutout at 630 PSI.

HIGH PRESSURE CUTOUT SWITCH = Part No.: 235-071

LOW PRESSURE CUTOUT SWITCH = Part No.: 215-436

Fan Cycling Switch — This switch controls fan operation. The fan is turned On when the compressor discharge pressure reaches 400 PSI; it is turned Off when the discharge pressure drops below 300 PSI.

FAN CYCLING SWITCH = Part No.: 215-726

Section 3 – Specifications

3.1

Model	DA500
Process Temperature	32° to 86°F (0° to 30°C)
Temperature Stability	±2.0°F (±1.11°C)
Ambient Operating Temperature	14° to 104°F (-10° to 40°C)
Compressor (nominal HP)	5 HP Copeland Scroll®
Refrigerant Charge (R-410A)	10 lbs.
Cooling Capacity ¹	4.66 tons 16,384 watts 55,920 BTU/hr
Nominal Evaporator Flow ² GPM (US)	11.7
Fan	1 HP
Condenser Discharge Air Flow	3,500 CFM
Reservoir Tank Capacity	16 gallons
Dimensions (D x W x H)	54 x 34.5 x 67 inches
Shipping Weight	990 Lb. (449 Kg)
Voltage ±10% 200-240V, 3 phase, 50/60Hz 380-440V, 3 phase, 50Hz 460-480V, 3 phase, 60Hz 575-600V, 3 phase, 60Hz	Nominal Rated Amps 30 A 20 A 15 A 12 A

1. Capacity based on 95°F (35°C) entering air and 120°F (49°C) condensing temperature. Leaving water 50°F (10°C). Allowance made for heat gain from pump.
2. Flow rate based on 2.4 GPM (US) per ton (0.54m³/hr/ton)

Section 4 – Installation and Startup

4.1 Site Requirements

4.1.1 Ambient Temperature and Relative Humidity

The Chiller is designed for indoor installation in ambient temperatures between 14° and 104°F (-10° to 40°C); relative humidity should be between 20% and 80% (non-condensing).

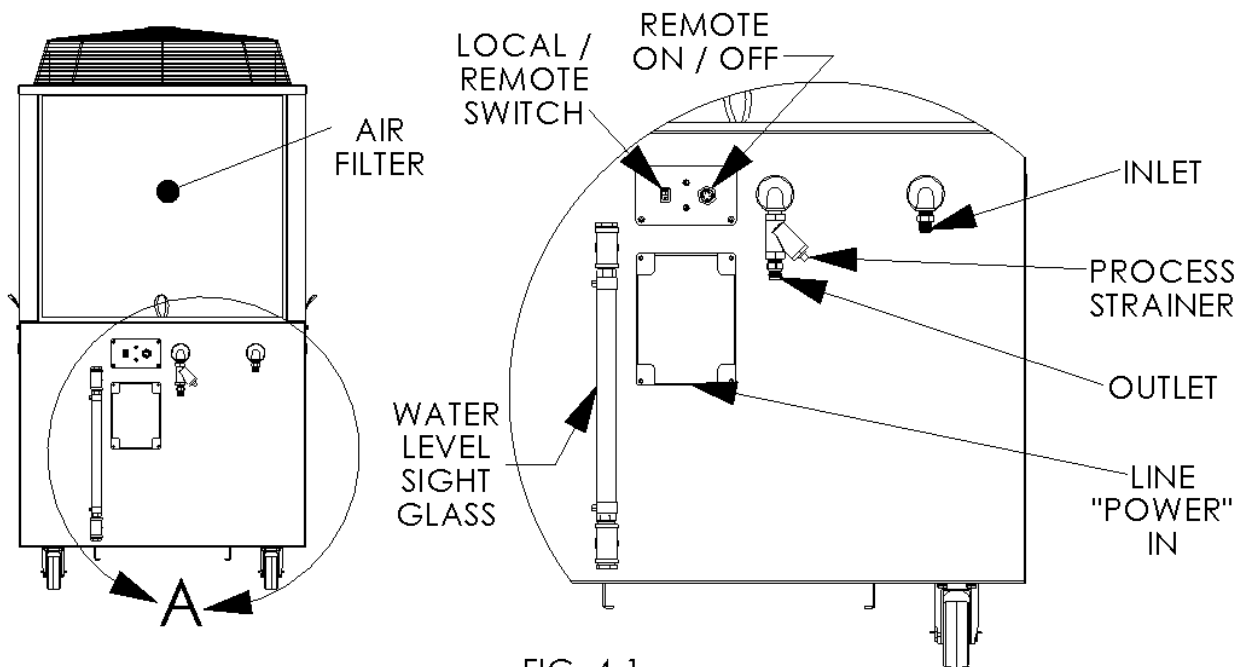
4.1.2 Location

The Chiller should be installed on a level surface capable of supporting 990 pounds (449 kg) or more and should be located as close to possible to the process requiring cooling. It should not be installed closer than 4 feet (1.4 meters) to a heat generating source, such as heating pipes, boilers, etc.). If possible, it should be located near a suitable drain to prevent flooding in the event of leaks.

For ease of final positioning and maneuverability, the Chiller is supplied with four heavy-duty locking casters. Use fork lift if moving more than 20 feet.

4.1.3 Clearance

At least 18 to 24 inches (45.7 to 61 cm) of clearance should be allowed on the front, sides, and rear of the Chiller for access to connections and components. Chillers require at least 4 feet (1.4 meters) of overhead clearance to dissipate the exhaust from the Chiller's top-mounted fan.



4.2 Plumbing

See Figure 4-1

4.2.1 Process Piping

The Chiller incorporates two 1/2" MPT x 3/4"- 16 male 37° flare, #8 JIC fittings on the rear of the enclosure for the process inlet and outlet connections.

To maintain a safe workplace and to avoid leaks, special care should be taken when choosing hoses and connections for the Chiller.

- Pressure Ratings — Hoses should be able to withstand a minimum of 250 PSI.
- Flexible Tubing — Avoid tubing that will expand and take up fluid volume when operating at the desired pressure.

4.2.2 Reservoir Vent

A 3/4 inch female NPT connection is provided at top of sight glass for the reservoir vent line. This vent is intended to prevent siphoning and/or overflows in the event of a problem with process liquid circulation. The vent pipe should extend to a height at least 6 to 12 inches (15.2 to 30.5 cm) above the process equipment. If desired you may fill the chiller through vent fitting providing the reservoir cap is off to let air escape.

4.2.3 Reservoir Drain

A 3/4 inch female NPT connection is provided at bottom of sight glass for the reservoir's gravity drain. It should be piped to a drain or receptacle positioned lower than the bottom of the reservoir. If a receptacle is used, be sure is of sufficient volume to hold all the water in the reservoir, process, and process lines.

4.3 Reservoir Low Level Float Switch Alarm

This is designed to alert you when the fluid level in the Chiller's reservoir drops too low

4.4 Fan

The Chiller's fan may be allowed to exhaust freely into the area in which the unit is located or may be vented to an exhaust duct of the appropriate size. If it is connected to an exhaust duct, the duct work should incorporate an auxiliary blower to prevent back pressure from impacting fan operation.

4.5 Electrical Power



All electrical connections should be made by a qualified, licensed electrician. Proper building codes and safety regulations should be followed.

4.5.1 Electrical Phase Requirements

The Chiller is designed with a junction box on the rear of the unit to connect the electrical power supply conduit. See Figure 4-1.



Make sure that the power supply to the Chiller is the same voltage, frequency, and phase as indicated on the identification label.

Be sure to connect the wires in the proper phase sequence. i.e.: L1, L2 and L3. Provide suitable conduit strain relief and grounding.

Your chiller is equipped with a phase monitor. It is located inside the controls enclosure. It will prevent startup if phase connection is incorrect. It will also turn the chiller off in the event of a loss of one phase. It will also prevent chiller operation if the voltage mismatch between any two phases is greater than 8%.



IMPORTANT: Do not turn Controller power On until the Chiller reservoir has been filled. When Controller power is turned On, both pumps automatically begin pumping. If the reservoir has not been filled, the pumps will be damaged.

4.5.2 Remote On / Off

This allows the user to turn the Chiller on and off using a 24 VDC input to turn unit on and removal or loss of 24 VDC will turn the unit off and "EC" (External control) will be displayed in the "Temperature Display". A mating plug for connector on rear panel has been shipped with manual. A 3 conductor, 22 AWG Cable (Consolidated PN: 5401-CL, Multi-Conductor Cable or equivalent) to be supplied by user. Connect terminals "1" and "2" to user supplied source of 24VDC. See Figure 4-1 and A.2 Wiring Diagram.

4.6 Startup

IMPORTANT: Be sure to turn main power Off before filling the reservoir.

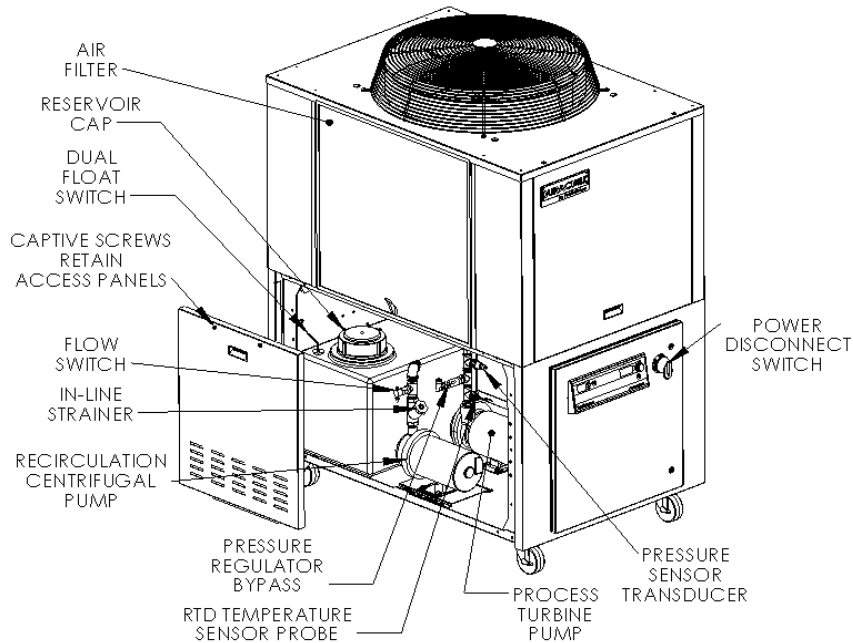



FIG. 4-2


4.6.1 Process Coolant

Use only **Hypertherm Premixed Coolant** = Part No.: **028872**

69.9% Distilled Water, 30% Polypropylene Glycol, 0.1% Benzotriazole

Provides freeze protection to -12°C (10°F).

	Do not use flammable fluids as a fire hazard may result.
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	WARNING: Coolant freeze protection must be 14°C (25°F) below the lowest possible display temperature. The lowest possible display temperature is equal to the process setpoint minus the Lower Band "Lb" setting.
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If additional freeze protection is required, use 100% glycol to achieve required mixture.

Hypertherm 100% Glycol = Part No.: 028873

Filling the Reservoir

See Figure 4-2.


Remove the panel from the rear left side of the enclosure. It is held in place with 1/4-20 Philips head captive screws.


Remove the filler cap from the reservoir and fill it to a level approximately 2 inches (5.1 cm) from the top of the reservoir. Do not replace the cap at this time.

4.6.2 Starting Process Fluid Flow

Turn main power On.

NOTE: When the Power Switch/Disconnect is placed in the On position, five decimal points (.....) will appear on the Controller's LED displays. This signifies that the Controller is in "standby" and ready for power up.

	WARNING: The first time the chiller is operated it should be run 12 hours in the standby mode. The compressor crankcase heater will boil off any refrigerant absorbed in the compressor oil.
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	IMPORTANT: Do not turn Controller power On until the Chiller reservoir has been filled. When Controller power is turned "On", both pumps automatically begin pumping. If the reservoir has not been filled, the pumps will be damaged.
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Press the Controller's "POWER" button. The system startup sequence will begin and proceed as follows:

- The pump will turn on.
 - NOTE:** On initial startup and after long periods of inactivity, run the unit for 10 seconds, shut off unit and restart 3 times to remove any air in the lines.
- The current set point temperature will briefly appear on the "Temperature Display". After a short time delay or upon pressing the knob the actual temperature reading will appear. The right decimal point on the "Temperature Display" will flash while the set point value is displayed.
- The system will then go through a short initialization sequence.
- Once the initialization has been completed, the compressor will turn on. When the pressure in the discharge line reaches 400 PSI, the fan will turn on.
- The Controller will display the actual process fluid temperature. The appropriate "degrees" LED will be lit continuously (Centigrade "C" or Fahrenheit "F").

Check the fluid level in the reservoir. The liquid level should drop as fluid flows to the process. Slowly add fluid to the reservoir until the level in the reservoir stops going down. This means that the system is filled and any entrained air purged. Replace the reservoir cap and securely tighten.

Check for leaks in the process lines and at the process line connections.

4.6.3 Adjusting the Set Point

NOTE: The factory default set point temperature is 15°C (59°F).

Press the Select/Set Knob on the front panel. The current set point temperature will be displayed and the decimal point at the bottom right of the display will flash, indicating the temperature can be changed.

Rotate the Select/Set Knob until the desired set point temperature is displayed. The setting is accepted after either pressing the Select/Set Knob a second time or will be accepted automatically after a few seconds of inactivity.

4.6.4 Selecting Celsius or Fahrenheit / Reset Factory Default Values

The chiller as supplied will read in °C.

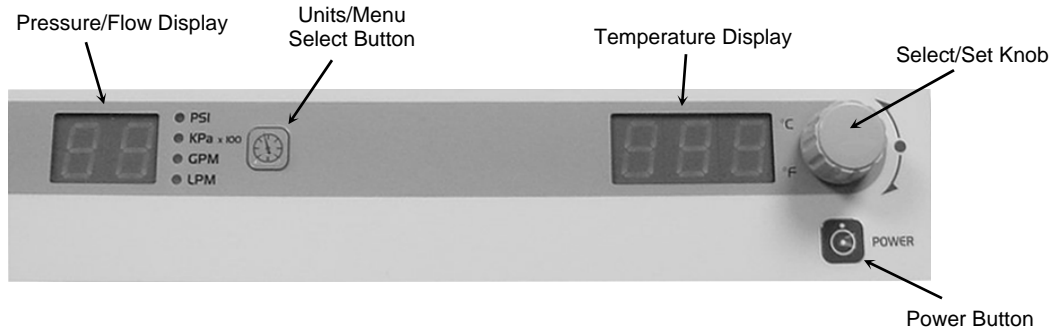
The LED's adjacent to the Temperature Display indicate the unit of measure (°C or °F). To change from °C to °F or vice versa, proceed as follows:

To change to °F — Place the main Disconnect Switch on the front of the chiller in the "Off" position. Press and hold the Units/Menu Select Button while returning the Disconnect Switch to the "On" position.

To change to °C — Place the main Disconnect Switch on the front of the chiller in the "Off" position. Press and hold the Power Button on the front panel while returning the Disconnect Switch to the "On" position.

IMPORTANT: All user settings, calibration offset, return to the original factory default values when the unit in which temperature is displayed is changed. The Chiller's temperature set point and various alarm settings should be reset to the desired values.

Section 5 – Normal Operation



5.1

Power On

When the “Power Disconnect Switch” is placed in the “On” position, the Controller goes into a “standby” mode. Five decimal points (.....) will appear on the Controller’s displays.

IMPORTANT: Do not turn Controller power on until the Chiller reservoir has been filled. When Controller power is turned on, both pumps automatically begin pumping. If the reservoir has not been filled, the pumps will be damaged.

Press the Controller’s On button. The system startup sequence will begin and proceed as follows:

1. Both pumps will turn on.
2. The current set point temperature will briefly appear on the display followed by the actual temperature reading. The “°F” LED will flash while the set point value is displayed.
3. The system will then go through an initialization sequence.
4. Once the initialization has been completed, the compressor will turn on. When the pressure in the discharge line reaches 400 PSI, the fan will turn on.
5. The Controller will display the actual process fluid temperature. The appropriate “degrees” LED will be lit continuously.

NOTE: Once installed, leave in standby mode to keep compressor oil active.

Controller Display / Menu Structure

To access the user menu press and hold the Units/Menu Select button until “HL” appears. Press and release the Units/Menu Select button to scroll through the menu items.

Menu Item	Description	Choices / Ranges / Comments	Default Setting
HL	High Temperature Limit Alarm Set Point	-15° to 45°C (5° to 113°F)	35°C (95°F)
LL	Low Temperature Limit Alarm Set Point	-20°C to +27°C / -4° to 80°F	4°C (39°F)
HA	Front Panel High Ambient Temperature Alarm Set Point	+30° to 75°C. Always displayed and set in °C.	45°C
FP w/PSI LED lit	Maximum Fluid Pressure Alarm Set Point	10 to 250 PSI	250 PSI
FP w/KPa LED lit	Maximum Fluid Pressure Alarm Set Point	0.68 to 17 (x 100) kPa	17 (x 100) kPa
FL w/GPM LED lit	Minimum Flow Rate Alarm Set Point	NA	0.0 GPM
FL w/LPM LED lit	Minimum Flow Rate Alarm Set Point	NA	0.0 LPM
Lb	Lower Temperature Band	1.0 to 5.0°C. Always displayed and set in °C	5.0°C
Ub	Upper Temperature Band	1.0 to 5.0°C. Always displayed and set in °C	5.0°C
c1	Calibration Offset Temp 1	±2.9°C. Always displayed and set in °C. Special access procedure required. See Section 5.13.	0.0°C
c2	Calibration Offset Temp 2	NA	0.0°C
c3	Calibration Offset Temp 3	NA	0.0°C
Cd	Compressor Delay	10 – 300 seconds	20 sec.
Fc	Flow Calibration	NA	Factory Set
dS	Coolant Density	NA	8.35
Sh	Coolant Specific Heat	NA	1.00
PC	Communications Baud Rate	NA	9600
LA	Low Ambient Alarm Setpoint	1 to 7°C. Always displayed and set in °C	2°C
Pd	Password	0 to 999 (for service use only)	0
td	HGB Valve Delay	0 to 999 (for service use only)	2

NOTE: See Section 5.14 for Alarm and Error messages.

5.3 Controller Display / Menu Navigation

Actual Fluid Temperature — Fluid temperature leaving the chiller is displayed on the right hand LED display.

Pressure and Flow Rate -- The pump pressure and flow rate are displayed on the left hand LED display. Press and release the Units/Menu Select button to choose the measurement to be displayed. Flow meter is not fitted on this model. Scrolling down this menu shows “**A_t**” ambient temperature in control compartment and “**P₂**” Remote temperature (not fitted on the model.)

Set Point Temperature — The set point temperature can be checked at any time by pressing the Select/Set knob.

Operational Setup Menus and Values — Operational Setup Menus are accessed by pressing and holding the Units/Menu Select button until “**HL**” is displayed. Continued pressing of the Units/Menu Select button will scroll through the menu.

Menu parameters are changed by turning the Select/Set knob. Displayed values can be accepted by pressing either the Select /Set knob or simply allowing a few seconds to pass without any keypad activity.

NOTE: After a few seconds of keypad inactivity, the Controller automatically returns to the normal operating display.

5.4 Checking / Adjusting the Set Point

NOTE: The factory default set point temperature is 15°C (59°F).

Press the Select/Set Knob on the front panel. The current set point temperature will be displayed and the decimal point at the bottom right of the display will flash, indicating the temperature can be changed.

Rotate the Select/Set Knob until the desired set point temperature is displayed. The setting is accepted after either pressing the Select/Set Knob a second time or will be accepted automatically after a few seconds of inactivity.

5.5 Selecting Celsius or Fahrenheit (°C or °F)

The LED's adjacent to the Temperature Display indicate the unit of measure (°C or °F). To change from °C to °F or vice versa, proceed as follows:

To change to °F — Place the main Disconnect Switch on the front of the chiller in the “Off” position. Press and hold the Units/Menu Select Button while returning the Disconnect Switch to the “On” position.

To change to °C — Place the main Disconnect Switch on the front of the chiller in the “Off” position. Press and hold the Power Button on the front panel while returning the Disconnect Switch to the “On” position.

IMPORTANT: All user settings, except calibration offset, return to the original factory defaults when the unit in which temperature is displayed is changed. The Chiller's temperature set point and various alarm settings should be reset to the desired values.

5.6 Pressure Display – 0 to 247 psi; 0 to 1700 kPa

Psi – Pressure will display from 0 to 99 psi. Above 99 a decimal point will appear between the digits. This means drop the decimal and add 100 to the reading. For example; 1.2 = 112 psi, 7.4 = 174 psi. Above 199 psi display will read __.

kPa x 100 – Pressure will display from 0 to 1700 kPa.

5.7 High Temperature Limit (HL)

This menu item serves two functions. First, it establishes the maximum allowable set point temperature and thus helps prevent an operator from inadvertently setting the temperature set point above a pre-established temperature. Secondly, it serves as a high temperature alarm, automatically activating both audio and visual alarm indicators when the measured fluid temperature reaches the HL setting. The compressor, heater, fan, and pump will also turn off.

To change the high temperature limit value, rotate the Select/Set Knob until the desired value is displayed on the temperature display.



5.8 Low Temperature Limit (LL)

This menu item also serves a dual function. First, it establishes the minimum allowable set point temperature and thus helps prevent an operator from inadvertently setting the temperature set point below a pre-established temperature. Secondly, it serves as a low temperature alarm, automatically activating both audio and visual alarm indicators when the measured fluid temperature drops to the LL setting. The compressor, heater, fan, and pump will also turn off.

To change the low temperature limit value, rotate the Select/Set Knob until the desired value is displayed on the temperature display.



NOTE: See Section 4.6.1 for freeze protection requirements.

5.9 High Ambient Temperature Limit (HA)

This menu item protects the Chiller from overheating due to a high ambient temperature. Should the ambient temperature rise above the limit value, the audio and visual alarms will activate and the compressor, heater, fan, and pump will turn off.

To change the high ambient temperature limit value, rotate the Select/Set Knob until the desired value is displayed on the temperature readout.

NOTE: This value is always displayed and set in °C.



5.10 Lower Temperature Band (Compressor Turn Off)

This menu item provides access to the Lower control band value. This is the amount below set point that the process temperature can drop before the compressor turns off. It is useful at heat loads less than 30% of full capacity. The highest setting of 5.0°C will give longest compressor life.



NOTE: See Section 4.6.1 for freeze protection requirements.

5.11 Upper Temperature Band (Compressor Turn On)

This menu item provides access to the Upper control band value. This is the amount above set point that the process temperature can raise before the compressor turns on. It is useful at heat loads less than 30% of full capacity. The highest setting of 5.0°C will give longest compressor life.

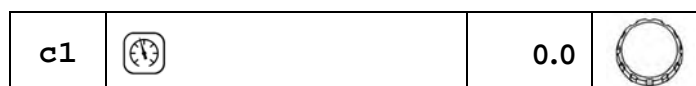


5.12 Temperature Calibration Offset (c1)

This menu item allows you to adjust the Chiller's displayed temperature reading to match that of a traceable standard. It allows you to offset the displayed temperature value by as much as $\pm 1.9^\circ\text{C}$.

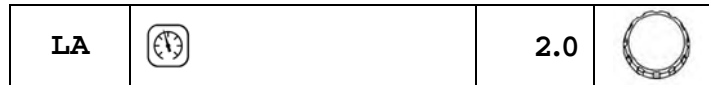
NOTE: Calibration offset values are always set and displayed in °C. To prevent the operator from accidentally changing the calibration offset, a special sequence of keystrokes is required to access this function.

1. Press and hold the Units/Menu Button until **HL** appears on the display.
2. Press and release the Units/Menu Button until **ub** appears on the display.
3. Press and hold the Units/Menu Button.
4. While holding the Units/Menu Button, press and release the Select/Set Knob.
5. When **cal** appears on the temperature readout, release the Units/Menu Button. The current calibration offset value will appear on the temperature readout. Notice that the display will alternate between the offset value and the calibrated temperature.
6. Rotate the Select/Set Knob until the desired calibration offset is displayed. Press the Select/Set Knob or simply allow the display to time out to accept the displayed value.



5.13 Low Ambient Temperature Alarm Setting (LA)

This menu item allows you to set the ambient temperature at which the chiller will alarm and turn off. This serves to protect the chiller from short cycling at low ambient temperatures. This value is always displayed and set in °C.



5.14 Controller Operating, Alarm, and Error Messages

When certain conditions are detected, a message code flashes on the display and the local audio alarm sounds. Depending on the nature of the condition, power to various systems components, such as the compressor, heater, fan, and pump, is removed. When condition is rectified, push front panel Power button or turn circuit breaker off then on to clear the fault or error.

Message Code	Description	Action Required
EC	External remote control active, Chiller in standby.	Normal – Unit idle until remotely activated. (To operate locally press switch on rear panel to “Local” position.)
EFL	Low Water Level	Fluid level in reservoir below upper float switch (7 gallons low) An alarm will sound until attended to. Fill to within 2 inches of top.
EF2	Water Level / Flow Alarm	Warning Alarm — Either of 2 conditions.. 1. Fluid level below lower float switch (level 9 gallons low. Fill to within 2 inches of top. 2. Insufficient flow to heat exchanger. An alarm will sound and after a delay, unit will shut down. Troubleshoot recirculation pump.
EHA	Front panel high ambient temperature warning.	Warning - The ambient temperature is higher than the set ambient limit. Lower ambient temperature or raise temperature limit.
EHL	High temperature set point warning	Warning — The temperature set point is higher than the high temperature limit value. If not corrected, the high temperature limit alarm will be activated when fluid temperature rises above established the HL value. Lower temperature set point or increase high temperature limit value.
ELA	Front panel low ambient temperature warning.	Warning – The ambient temperature is lower than the set ambient limit. Raise ambient temperature or low temperature limit.
ELL	Low temperature set point warning	Warning — The temperature set point is lower than the low temperature limit value. If not corrected, the low temperature limit alarm will be activated when fluid temperature falls below the established LL value. Increase temperature set point or decrease low temperature limit value.
LLO	Local Lockout	Normal — Indicates that Local Lockout feature (see Section 5.18) is enabled. Appears momentarily when Select/Set Knob is pressed to view/change set point value.
CAn	Cancel Local Lockout	Normal — Indicates the Local Lockout feature (see Section 5.18) has been disabled. Appears momentarily when Local Lockout status is changed from enabled (LLO) to disabled.

Note: When the following faults occur, “FE” will be displayed on the left display and the error code will appear on the right display

F_t appears on the left hand display

01	Factory Reserved	None.
02	Low limit temperature alarm	Alarm — Process fluid temperature has dropped to low temperature limit value. Compressor, heater, fan, and pump turned off. Increase heat load on Chiller or decrease low temperature limit value.
03	High limit temperature alarm	Alarm — Process fluid temperature has reached high temperature limit value. Compressor, heater, fan, and pump turned off. Decrease heat load on Chiller or increase high temperature limit value.
04	Over-temperature protection alarm (Select models only)	Alarm — Process fluid temperature is above Chiller's factory set high temperature safety cutoff. Power to condenser, heater, and fan turned off; pump remains on. Lower process temperature.
05	Low liquid level alarm (Select models only)	Delayed Alarm — Activated when the liquid level in the reservoir falls below an acceptable level for 30 seconds or longer. Compressor, heater, fan, and pump turned off. Add fluid to reservoir.
06	High bath temperature alarm (Select models only)	Alarm — Fluid temperature has exceeded 82°C (180°F). Compressor, heater, fan, and pump turned off. Lower fluid temperature.
07	Low flow alarm	Alarm — Flow rate has dropped below minimum flow rate setting. Power to compressor, heater, fan, and pump turned off. Note: Disabled during first 2 minutes of operation. Correct cause of low flow rate or decrease minimum flow rate setting.
08	High pressure alarm	Delayed Alarm — Activated when fluid outlet pressure has exceeded high-pressure limit value for 30 seconds. Compressor, heater, fan, and pump turned off. Decrease outlet pressure by removing blockage or increase high-pressure temperature limit value.
09	Internal software fault	Fault — Power to compressor, heater, fan, and pump turned off. Reset default values; see Section 4.6.4.
10	Triac fault	Fault — Power to compressor, heater, fan, and pump turned off. See Section 7.5 – Troubleshooting.
11	Internal probe (P1) fault	Fault — Faulty internal temperature probe. Power to compressor, heater, fan, and pump turned off. See Section 7.6 – Troubleshooting.
12	Water inlet probe (P2) fault	Fault — Faulty water inlet temperature probe. Power to compressor, heater, fan, and pump turned off. Contact supplier.
13	Communications fault	Fault — Internal electronics failure. Power to compressor, heater, fan, and pump turned off. Contact supplier.
14	ADC fault, internal probe	Fault — ADC for internal probe faulty. Power to compressor, heater, fan, and pump turned off. Contact supplier.
15	ADC fault, external probe	Fault — ADC for external probe faulty. Power to compressor, heater, fan, and pump turned off. Contact supplier.
16	Front panel high ambient temperature alarm	Alarm — Ambient temperature at front panel is higher than high ambient temperature limit. Compressor, heater, fan, and pump turned off. Occurs when ambient temperature exceeds the set ambient limit by 5°C or more. Lower temperature in area in which Chiller is located or increase high ambient temperature limit value. Temperature limit is adjustable.
17	Rear panel high ambient temperature alarm (select models only)	Alarm — Ambient temperature at rear panel is higher than high ambient temperature limit. Compressor, heater, fan, and pump turned off. Occurs when the ambient temperature exceeds the ambient limit. Lower temperature in area in which Chiller is located or increase high ambient temperature limit value. Temperature limit is not adjustable.
18	Ambient temperature probe (P3) fault	Fault — Faulty internal temperature probe. Power to compressor, heater, fan, and pump turned off. Replace ambient tracking probe or operate Chiller using internal temperature probe. Contact supplier if problem persists.
19	Pump overload (DAP1) fault	Fault — Power to compressor, heater, fan, and pump turned off. See Section 7.7 – Troubleshooting.
20	Compressor overload (DAF2) fault	Fault — Power to compressor, heater, fan, and pump turned off. See Section 7.9 – Troubleshooting.
21	Fan overload (DAF1) fault	Fault — Power to compressor, heater, fan, and pump turned off. See Section 7.8 – Troubleshooting.

5.15 Dual Float Switch

If fluid level should fall below the upper float switch (7 gallons low) the right hand display will alternately show “EFL” and fluid temperature, Audible alarm will intermittently sound. This will continue indefinitely until attended to.

If fluid level should fall below the lower float switch (9 gallons low) the right hand display will alternately show “EF2” and fluid temperature, Audible alarm will intermittently sound and after a delay the unit will turn off.

5.16 Loss of Power

In the event that power is lost while the Chiller is operating, the unit will automatically begin operating when power is restored.

If the unit was in the Standby mode when power was lost, it will power up in the Standby mode.

5.17 High Pressure Bypass Setting

Your chiller incorporates an automatic safety to maintain outlet pressure below a valve-regulated pressure.

5.18 Enabling/Disabling the Local Lockout

This feature is used to prevent unauthorized or accidental changes to the set point and other operational values. When enabled, the set point and other values can be displayed, but not changed.

To enable the Local Lockout, press and hold the Select/Set Knob until “LLO” is displayed (approximately 5 seconds). Once enabled, “LLO” will appear briefly whenever the Select/Set Knob is pressed to display the set point.

To disable the Local Lockout, press and hold the Select/Set Knob until “CAn” is momentarily displayed (about 5 seconds). This will change the status from enabled to disabled.

5.19 Automatic Restart from Alarm Mode

This chiller is equipped with an automatic restart feature to avoid false alarms. If any alarm condition is detected the chiller will turn off, wait 30 seconds and then turn on.

This is to avoid nuisance trips due to temporary flow obstructions, temperature swings or electrical line noise.

Three restart attempts will be made. If the alarm condition continues to exist then an alarm will sound and the chiller will remain off until the problem is corrected.

5.20 Fuse Bits

This menu item allows you to select logic levels for these optional features.

- Remote dry contact on / off
- Remote 24 V on / off
- Reservoir Float Switch

To set fuse bits turn power off. While pressing knob and power button at the same time turn power switch on. Left display will show “Fb” and right hand display will show “h” followed by two digits, you may set by turning the knob. Press and release knob or wait and menu will time out with new setting.

LOGIC STATE	h00	h01	h02	h03	h04	h05	h06
DRY CONTACT	URNS UNIT OFF	URNS UNIT ON	DISABLED	NOT USED	URNS UNIT OFF	URNS UNIT ON	DISABLED
DRY CONTACT	URNS UNIT ON	URNS UNIT OFF			URNS UNIT ON	URNS UNIT OFF	
24 VOLTS	URNS UNIT OFF	DISABLED	URNS UNIT ON		URNS UNIT OFF	DISABLED	URNS UNIT ON
0 VOLTS	URNS UNIT ON		URNS UNIT OFF		URNS UNIT ON		URNS UNIT OFF
FLOAT SWITCH	LEVEL OK	LEVEL OK	LEVEL OK		LEVEL LOW	LEVEL LOW	LEVEL LOW
FLOAT SWITCH	LEVEL LOW	LEVEL LOW	LEVEL LOW		LEVEL OK	LEVEL OK	LEVEL OK

Section 6 – Routine Maintenance

6.1 Recommended Routine Maintenance Schedule

Routine Maintenance Procedure	Frequency ¹
Inspect and clean inline strainer	Weekly for the first month of operation; every three months ¹ thereafter.
Check reservoir coolant level	Weekly
Check coolant freeze protection	Monthly
Inspect and clean air filters	Weekly for the first month of operation; monthly ¹ thereafter.
1. Minimum maintenance frequency. Your plant condition may require more frequent inspection and cleaning.	

6.2 Routine Maintenance Procedures

6.2.1 Inline Strainers

The Chiller's Inline Strainers should be inspected and cleaned weekly for the first month of operation. Once you are certain that all debris that may have been generated or dislodged has been filtered from the coolant, strainer inspection and cleaning can be performed less frequently.

1. Turn main Chiller power Off .
2. Using the Drain connection on the rear of the Chiller, remove a sufficient volume of coolant to bring the coolant level below the level of the Inline Strainer..
3. Remove the Chiller's left rear side panel. One Inline Strainer is located just above the recirculation pump.
4. Using an adjustable wrench or the proper size hex head socket, loosen and remove the Inline Strainer drain cap. NOTE: There will be some residual coolant within the fitting housing the strainer which will drain out when the cap is removed. Remove the strainer from the cap (or fitting) and clean off all trapped debris. Either water or high pressure air can be used to remove the accumulated material.
5. Insert the strainer into the cap and reinstall in the fitting. Be sure to adequately tighten strainer cap.
6. Repeat for Inline Strainer located at outlet on rear of unit.
7. Replace drained coolant.
8. Restore power and turn Chiller On.
9. Check for leaks.
10. Replace Chiller side panel.

6.2.2 Reservoir Coolant Level

The reservoir coolant level should be checked on a weekly basis and replenished as required. A proper fill level is approximately 2 inches (5.1cm) below the top of the reservoir. If fluid replacement is required, slowly add coolant to the reservoir until the proper fill level is achieved.

6.2.3 Coolant Freeze Protection

For operation of unit at lower temperatures, the level of coolant freeze protection must be 14° C (25° F) below the operating temperature. Operation at minimum of 0° C requires a freeze point not more than -14°C (6.8° F).

6.2.4 Air Filters


Chillers incorporate three high-efficiency, reusable air filters. These should be inspected weekly during the first month of operation to determine how frequently cleaning is necessary. Chillers located in dusty environments will require more frequent filter cleaning.

IMPORTANT: Do not allow the air filters to become caked with dust. This significantly reduces air flow and can compromise cooling efficiency. It can also lead to filter breakthrough, allowing dust to get into the condenser coils.

The Chiller's air filters are removed and cleaned as follows:

1. Grasp the strap at the bottom center of the filter and gently lift up and away from the Chiller housing.
2. Using a water or high pressure air stream directed through the back of the air filter (the downstream side), rinse/blow accumulated dust from the filter. Allow the filter to dry, as required.
3. Replace the filter by positioning the top edge of filter in the upper channel of the Chiller housing and then gently lifting on the bottom strap while pushing the bottom edge of the filter toward the housing.

Section 7 – Troubleshooting

	WARNING: Refer servicing to qualified service personnel. When power is on, dangerous voltages exist within chassis components. Use extreme care when measuring voltages on live circuits.
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- 7.1 Unit Will Not Operate (no cooling or pumping)
- Check that the power cord is plugged in to an operating electrical outlet.
 - Check that the Circuit Breaker/Power Switch is ON.
 - Check that the front panel Power Switch is ON.
- 7.2 No Pumping
- Check the fluid level in the whole system to make sure the pump is receiving fluid.
 - Check if the pump motor is operating.
 - Check for blockage within the circulating system.
- 7.3 Insufficient Pumping
- Check for low line voltage.
 - Check for too small of a hose diameter.
 - Check for too high of a fluid viscosity.
 - Check for restrictions in the connecting tubing.
- 7.4 No Cooling or Insufficient Cooling
- Check for low or high line voltage.
 - Check for blocked airflow through air filters.
 - Check ambient air temperature. High air temperature may cause the refrigeration compressor to temporarily shut down.
 - Check for excessive heat being transferred to the cooling fluid liquid as this may exceed the cooling capacity of the refrigeration system.
- 7.5 Triac Failure “Ft 10”
- Triac fault message appears on the display, indicating that the triac has failed or the line supply voltage has a source of extreme interference from other equipment. Plug the unit into another power source. If it still displays triac failure, a triac or triac driver needs replacement.
- 7.6 Internal Probe Failure “Ft 11”
- The Internal Probe failure message appears on the display, indicating that the internal probe has failed or there is a problem with the circuitry reading the probe signal. Contact supplier.
- 7.7 Pump Overload Fault “Ft 19”
- Check fuses located inside front electrical box.
 - Check pump overload relay. There is a reset button located in the upper right corner of the overload relay and the tripping value is adjustable.
 - If alarm persists, contact supplier.
- 7.8 Fan Overload Fault “Ft 21”
- Check fuses located inside front electrical box.
 - Check fan overload relay. There is a reset button located in the upper right corner of the overload relay and the tripping value is adjustable. If alarm persists, contact supplier.

7.9

Compressor Overload "Ft 20"

Resetting the High Refrigerant Pressure Safety Cutout

An excessive ambient and/or process heat load can cause the Chiller's high refrigerant pressure safety cutout to activate, removing power from the compressor and fan. The safety is factory-set to activate at a refrigerant pressure of 630 PSI.

To reset the high refrigerant pressure safety cutout switch, proceed as follows:

1. Correct the condition causing the excessive head load.
2. Turn power to the Chiller OFF.
3. Remove the Chiller's right front side panel.
4. Locate the high refrigerant pressure safety cutout switch. It is located near the compressor discharge and has a blue housing with red reset button.
5. Press the reset button on the top of the switch. There should be a tactile and/or audible click as it resets.

NOTE: Allow sufficient time (approximately 15 minutes) for the pressure in the refrigeration system to decrease below 630 PSI before resetting the safety switch. If the reset action seems "soft" or the Chiller will not resume operation on power up, it's likely that the refrigerant pressure is still above the 630 PSI cutout value.

6. Replace the side panel.
7. Turn power to the Chiller back ON and resume normal operation.

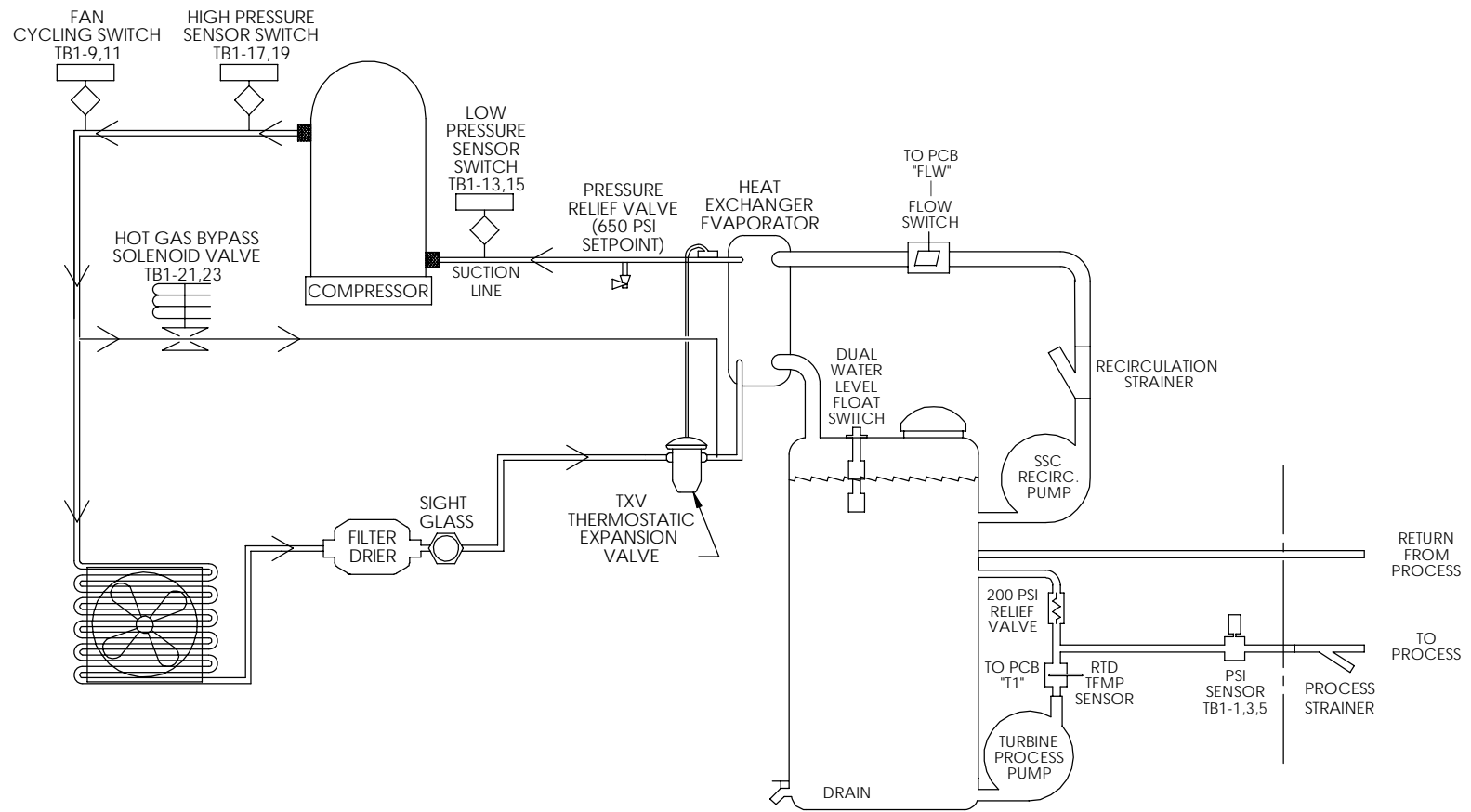
NOTE: There is also a Low Refrigerant Pressure Safety Cutout in series with the High Pressure Cutout. This cutout will reset by itself once the pressure rises above its trigger point. If this safety continues to cutout contact a HVAC technician to troubleshoot the refrigeration system.

Section 8 – Service and Technical Support

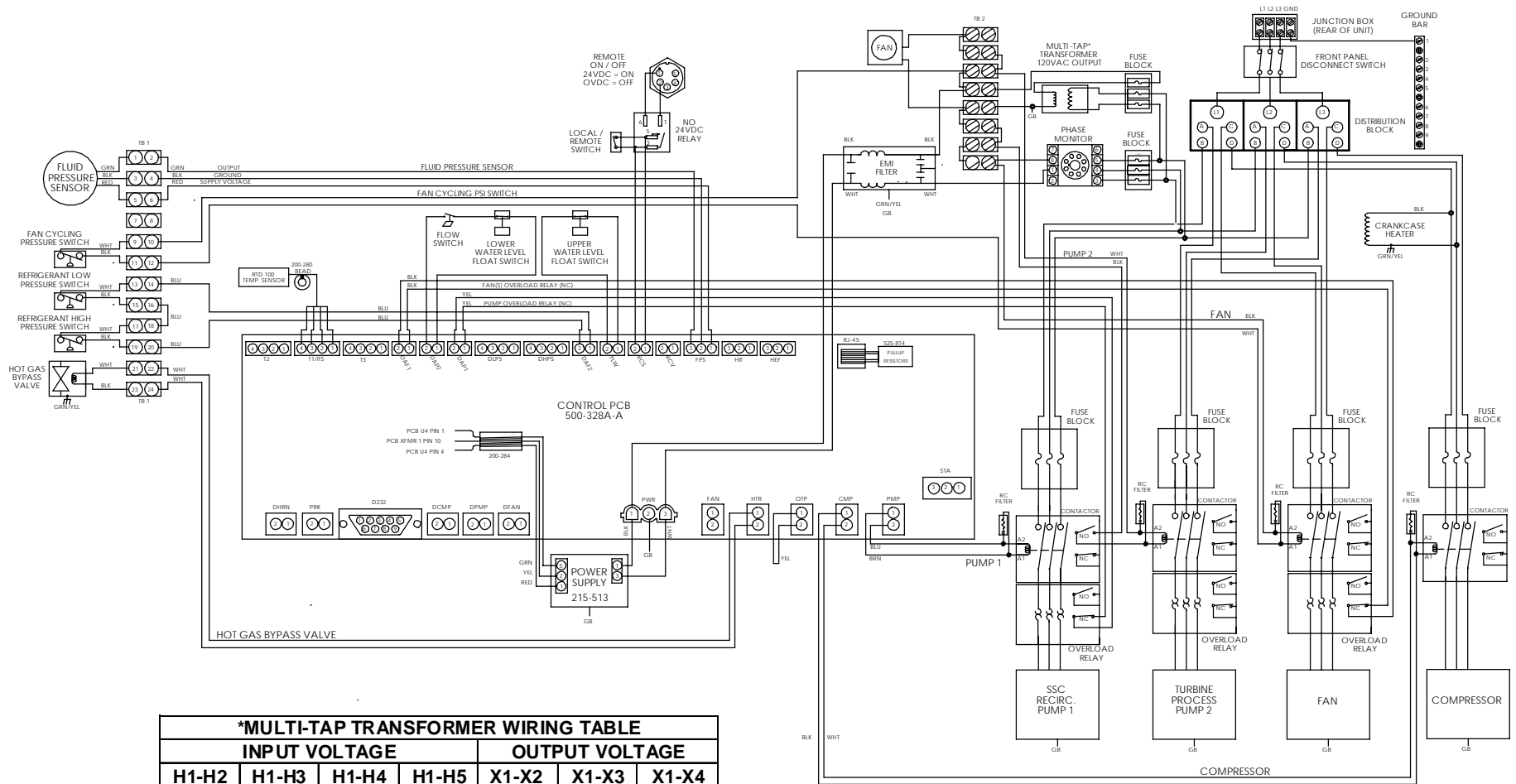
If you have followed the troubleshooting steps outlined in Section 7 and your Chiller still fails to operate properly, contact the supplier from whom the unit was purchased. Have the following information available for the customer service person:

- Model, Serial Number, and Voltage (from side panel label)
- Date of purchase and purchase order number
- Supplier's order number or invoice number
- A summary of the problem

A.1 Flow Diagram



A.2 **Wiring Diagram**



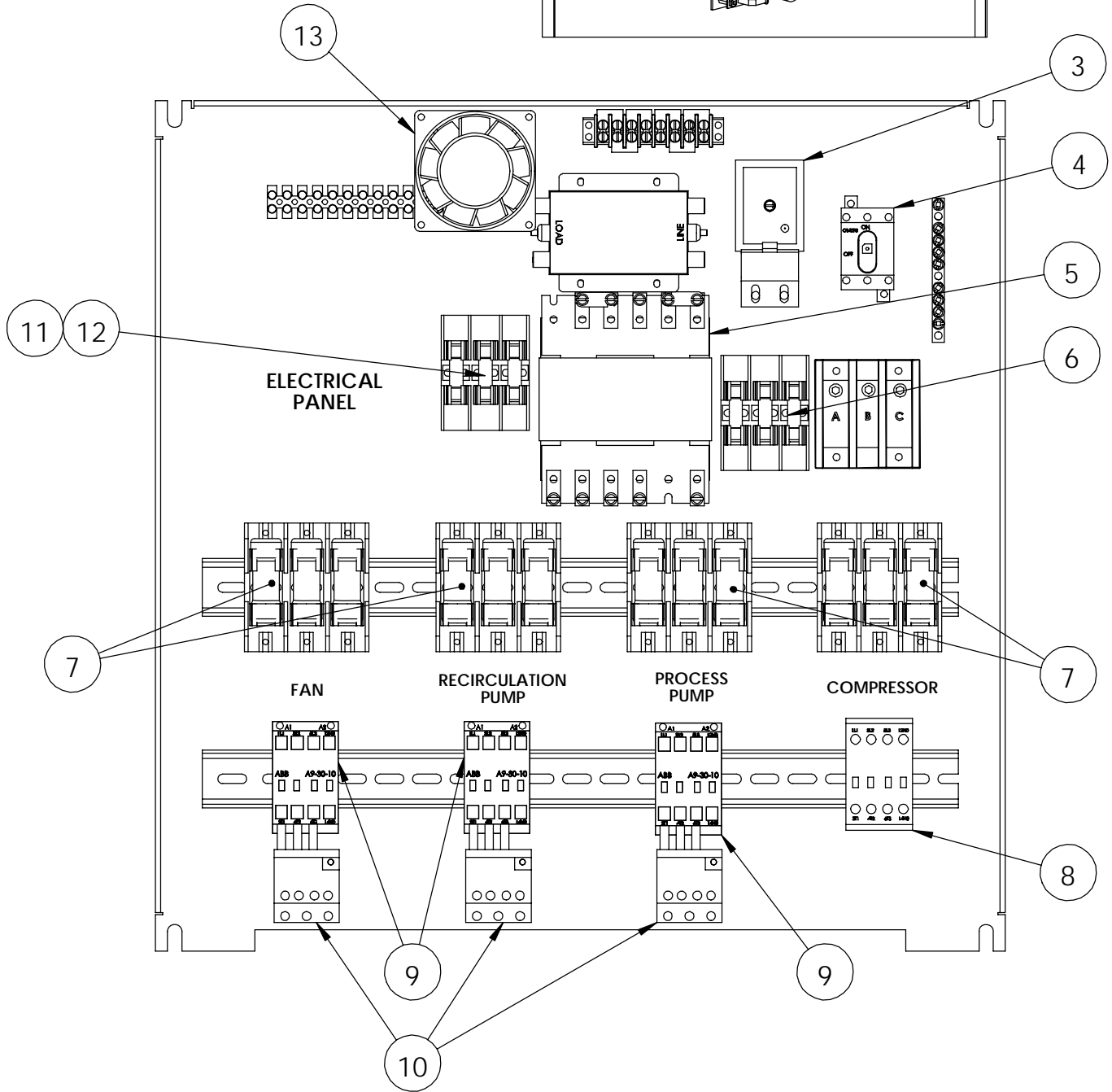
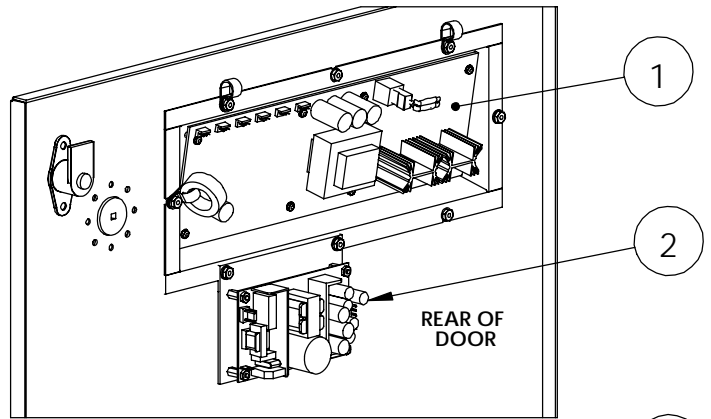
***MULTI-TAP TRANSFORMER WIRING TABLE**

INPUT VOLTAGE				OUTPUT VOLTAGE		
H1-H2	H1-H3	H1-H4	H1-H5	X1-X2	X1-X3	X1-X4
208			500	85	100	110
220	380	440	550	91	110	120
230	400	460	575	95	115	125
240	416	480	600	99	120	130

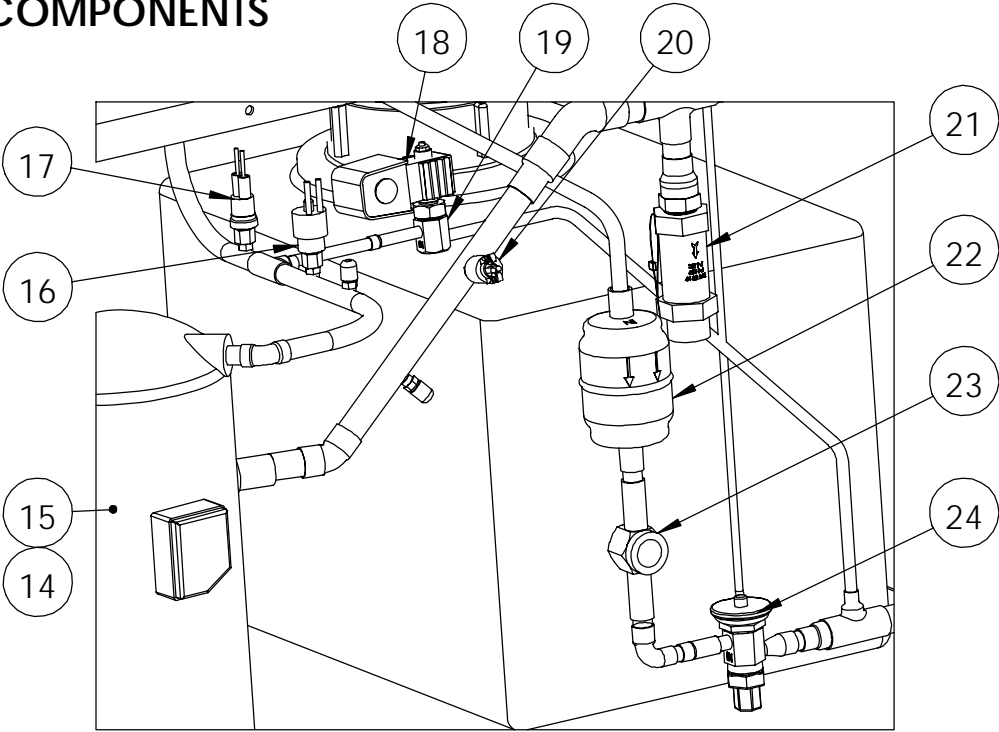
A.3 **Parts Replacement**

Item No.	Description	Part No.	PolyScience Part No	DA504HY	DA506HY	DA508HY	DA509HY
1	PCB, CONTROL	040289	500-367	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	PCB, POWER SUPPLY	040290	215-513	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	PHASE MONITOR, 240VAC	040291	215-511	<input checked="" type="checkbox"/>			
	PHASE MONITOR, 380VAC	040292	215-351		<input checked="" type="checkbox"/>		
	PHASE MONITOR, 480VAC	040293	215-512			<input checked="" type="checkbox"/>	
	PHASE MONITOR, 600VAC	040294	215-602				<input checked="" type="checkbox"/>
4	DISCONNECT SWITCH	040268	215-629	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	TRANSFORMER,250VA,MULTI-TAP,1.1AMPS	040320	215-645	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	FUSE, PHASE MON., KLK, 1.0 AMP	040280	200-447	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	FUSE, JTD1ID, 1.0 AMP	040272	200-368				<input checked="" type="checkbox"/>
	FUSE, JTD15ID, 15.0 AMP	040273	200-358		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FUSE, JTD2.5ID, 2.5 AMP	040274	200-374				<input checked="" type="checkbox"/>
	FUSE, JTD3.5ID, 3.5 AMP	040275	200-376		<input checked="" type="checkbox"/>		
	FUSE, JTD30ID, 30.0 AMP	040276	200-388	<input checked="" type="checkbox"/>			
	FUSE, JTD4ID, 4.0 AMP	040277	200-378	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	FUSE, JTD5ID, 5.0 AMP	040278	200-380	<input checked="" type="checkbox"/>			
8	FUSE, JTD6ID, 6.0 AMP	040279	200-382	<input checked="" type="checkbox"/>			
	CONTACTOR, ABB, A12-30-10-84 (COMPRESSOR)	040265	200-422		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	CONTACTOR, ABB, A26-30-10-84 (COMPRESSOR)	040266	215-424	<input checked="" type="checkbox"/>			
9	CONTACTOR, ABB, A9-30-10-84 (FAN-PUMP)	040267	200-421	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	OVERLOAD RELAY, 1.7-2.4 AMP	040286	200-414	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
	OVERLOAD RELAY, 2.2-3.1 AMP	040287	200-458		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	OVERLOAD RELAY, 2.8-4.0 AMP	040288	200-429	<input checked="" type="checkbox"/>			
11	FUSE, XFMR, KLDR, 1.4 AMP	040281	200-407	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	FUSE, XFMR, MIDGET, 3.5 AMP	040282	200-405	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	FAN, AXIAL, 115V, 32CFM, CTL. COMPARTMENT	040270	215-509	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	HEATER, COMPRESSOR BAND, 240V,70W	040317	215-721	<input checked="" type="checkbox"/>			
	HEATER, COMPRESSOR BAND, 480V,70W	040318	215-722		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	HEATER, COMPRESSOR BAND, 575V,70W	040319	215-723				<input checked="" type="checkbox"/>
15	COMPRESSOR, 200-230V,50/60HZ	040312	750-833	<input checked="" type="checkbox"/>			
	COMPRESSOR, 380-460V,50/60HZ	040313	750-813		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	COMPRESSOR, 575V, 60HZ	040314	750-832				<input checked="" type="checkbox"/>
16	SWITCH, HIGH PRESSURE CUTOUT, 630 PSI	040308	235-071	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
17	SWITCH, FAN CYCLING 300/400 PSI	040310	215-726	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
18	COIL, HOT GAS BYPASS	040306	750-216	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
19	SOLENOID VALVE, HOT GAS BYPASS	040305	750-222	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
20	SWITCH, LOW PRESSURE CUTOUT, 15/30 PSI	040309	215-436	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
21	VALVE, SAFETY RELIEF, 650PSI	040307	750-815	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
22	FILTER DRYER	040303	750-229	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
23	SIGHT GLASS	040323	750-230	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
24	EXPANSION VALVE, REFRIGERANT (TXV)	040304	750-814	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
25	DUAL FLOAT SWITCH, RSVR. LEVEL	040269	235-064	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
26	FLOW SWITCH, RECIRC. PUMP	040271	235-052	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
27	PUMP, RECIRCULATION, 1/2HP, SS CENTRIFUGAL 200-240/380-460V,3PH,50/60HZ	040298	505-175	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	PUMP, RECIRCULATION, 1/2HP, SS CENTRIFUGAL 575-600V,3PH,60HZ	040299	505-177				<input checked="" type="checkbox"/>
28	PUMP, PROCESS, 1HP TURBINE 200-240/380-460V,3PH,50-60HZ	040296	505-174	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	PUMP, PROCESS, 1HP TURBINE 575-600V,3PH,60HZ	040297	505-178				<input checked="" type="checkbox"/>
29	SENSOR, TEMP. PROBE, PLATINUM RTD	040300	200-450	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
30	PRESSURE RELIEF VALVE, 200 PSI	040295	776-090	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
31	SENSOR, WATER PRESSURE TRANSDUCER	040301	750-757	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
32	HEAT EXCHANGER, BRAZED PLATE, EVAPORATOR	040315	750-214	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
33	HEAT EXCHANGER, CONDENSER COIL	040316	750-262	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
34	MOTOR, FAN, 200-240/380-460V, 1140RPM	040284	215-435	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	MOTOR, FAN, 575-600V, 1140RPM	040285	215-603				<input checked="" type="checkbox"/>
35	AIR FILTER	040311	750-264	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
36	"Y" STRAINER, RECIRCULATION, 3/4"	040321	400-710	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
37	"Y" STRAINER, RECIRCULATION, 1/2"	040322	775-174	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

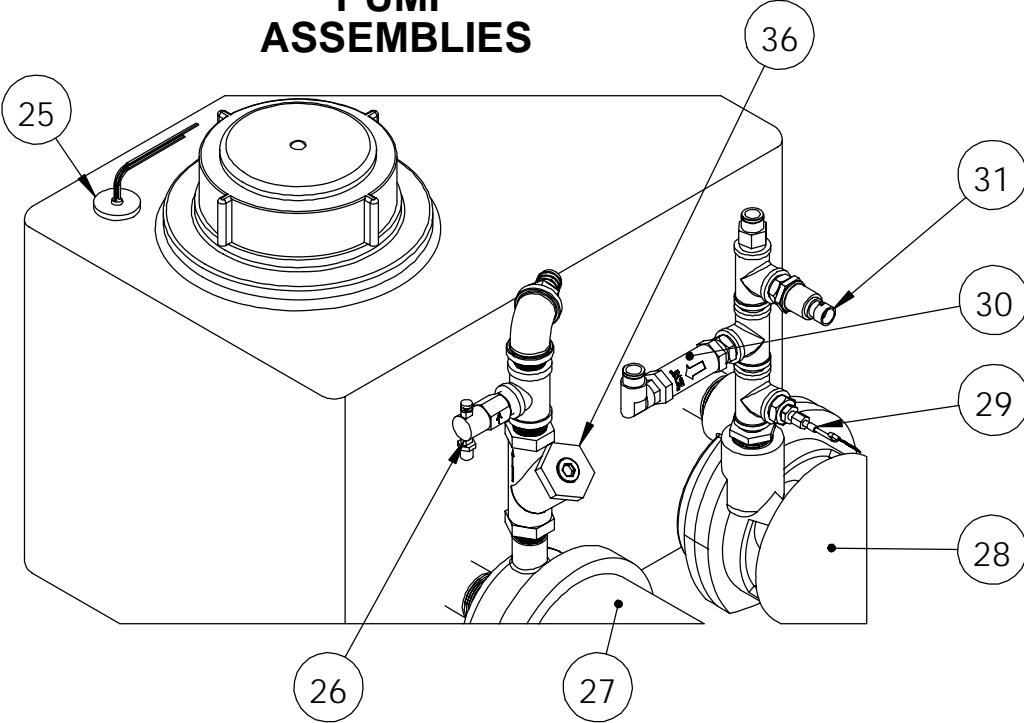
Electrical Box



REFRIGERTION COMPONENTS



PUMP ASSEMBLIES





Certificate of Compliance

Certificate: 2302161

Master Contract: 155859

Project: 2302161

Date Issued: 2010/05/14

Issued to: Polyscience

Division of Preston Industries, Inc
6600 W Touhy Ave
P.O. Box 48312
Niles, IL 60714
USA
Attention: Steve Rundle

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Peter Wong

Issued by: Peter Wong

PRODUCTS

CLASS 8721 85 - ELECTRICAL EQUIPMENT FOR LABORATORY USE - Certified to US Standards

CLASS 8721 05 - LABORATORY EQUIPMENT - Electrical

DuraChill™, P/N: DA504; DA506; DA508; DA509.

APPLICABLE REQUIREMENTS


CAN/CSA-C22.2 No. 61010-1-04 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

CAN/CSA-C22.2 No.61010-010-04 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use—Part 2-010: Particular Requirements for Laboratory Equipment for the Heating of Materials.

UL Std. No. 61010-1 (2nd Edition) - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

EC Declaration of Conformity



The Products herewith complies with the requirements, as stated below, in accordance to the EC Low Voltage Directive 2006/95/EC and EC Electromagnetic Compatibility Directive 2004/108/EC, and carries the  marking accordingly.

We herewith declare: PolyScience
Division of Preston Industries, Inc.
6600 West Touhy Avenue
P.O. Box 48312
Niles, Illinois 60714, USA

That the following equipment complies with the essential requirements in respect to safety and health, in accordance to the EC Directives based on its design and type, as brought into circulation by us. In case of alteration of the equipment, not agreed upon by us, this will lose its validity.

Product Description: DURACHILL

Models : DA504, DA506, DA508, DA509

Applicable Directives and Harmonized Standards: Low Voltage Directive 2006/95/EC & Electromagnetic Compatibility 2004/108/EC and relevant transpositions into national law of the member states, including, but not limited to the following Harmonized Standards:

EN 61010-1: 2001
IEC 61010-2-10 : 2005
IEC 61326-1:2005

Testing Bodies: CSA International (Certification & Testing Division)

Signature on Behalf of Manufacturer or Authorized Representative:

A handwritten signature in blue ink, appearing to read "Wayne W. Walter".

Wayne W. Walter

Date of Validity: March 22, 2010

Title of Signatory: General Manager