Lydall

Manufacturers of Affinity™ Chillers

affinity chiller.
model RW A-005T-CE01CBD3
Part # 900-34785-000,
Serial # 102699,
Type R-134A.

Pump Motors for affinity:
Marthon carbonator:
5KH32FN5598X (original affinity)
5KH33GNA444X (in NesLabs)
5KH32GNB811X (cheap version)

Chiller Part # 34785

Affinity now part of
Aavid thermal
division of Boyd Corp

San jose, CA
1(408)522-8730

Lydell Model RW A-005T-CE01CBD3
SN 102 699

Geroge Melero
Off: 510-249-9100

Lydall Industrial Thermal Solutions Inc.
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Telephone: (Sales) 603-539-3600, (Service) 603-539-5005, Fax: 603-539-8484
www.lydallaffinity.com

AFFINITY™ R-SERIES CHILLER

User Manual D10731

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Introduction

Lydall Affinity

Congratulations on your purchase of an Affinity™ product.

I want to personally welcome you to the Lydall larger family. In October of 2001, Lydall purchased Affinity Industries, in an effort to expand capability as a Total Thermal Solutions Provider. Affinity's chillers and heat exchangers complement Lydall's existing wide array of Passive Thermal Solutions, augmenting Lydall's engineered thermal solutions for use in appliance, cryogenic, building products, and automotive markets. Our group is market driven as a formidable thermal solution manufacturer.

Lydall, Inc. is a New York Stock Exchange listed company (NYSE: LDL) headquartered in Manchester, CT. Our company, with ten operations in the United States, France, one in Germany, and Sales/Service Offices in Japan and Singapore, is recognized for working with customers to satisfy their unique thermal solution needs, and for delivering high quality, innovative products, and exceptional service.

Affinity™ products are high-precision specialty temperature-controlled equipment. The following product manual is designed to help you realize the full value of your purchase.

We highly recommend that you read this manual in its entirety. The manual will assist your company with the installation, operation, and routine maintenance of your Affinity™ product. Please keep this manual readily accessible to operation and service personnel to ensure you get the most out of our product.

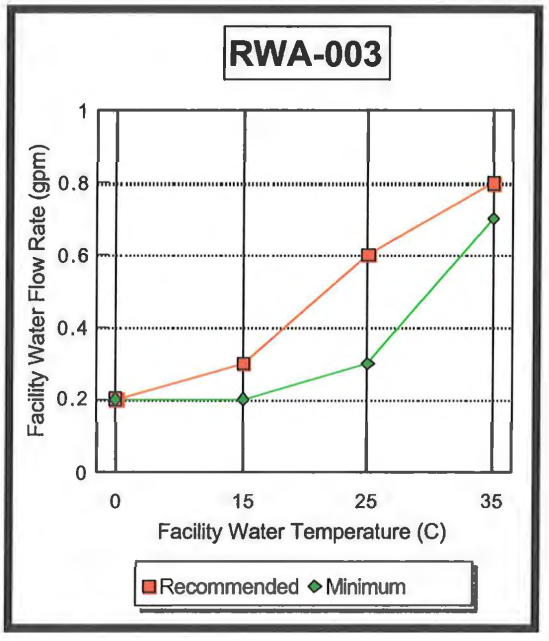
If you have any questions about this model, or have other thermal solution needs, do not hesitate to call our Sales department (603-539-3600) or the 24/7 Service department (603-539-5005).

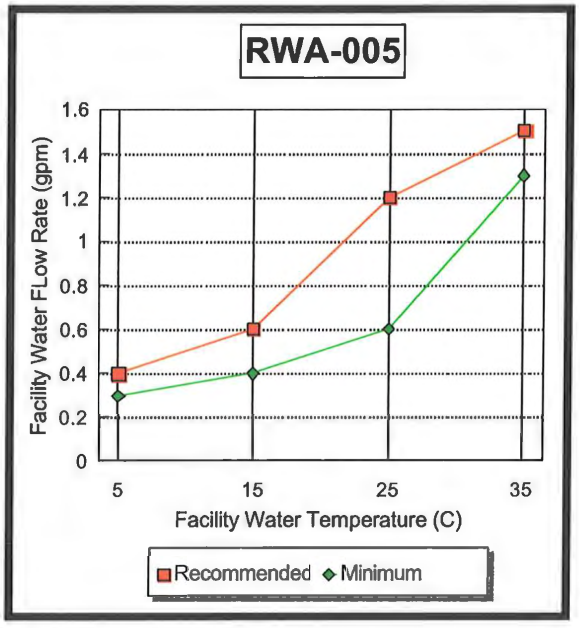
Thank you for your confidence in our ability to meet and/or exceed your needs and expectations.

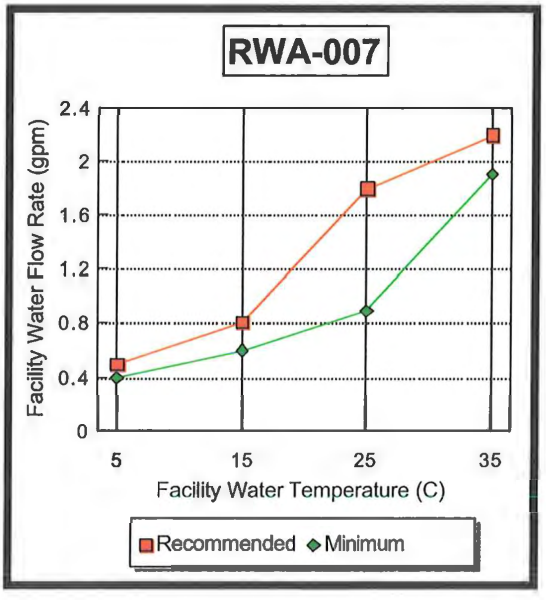
Sincerely,

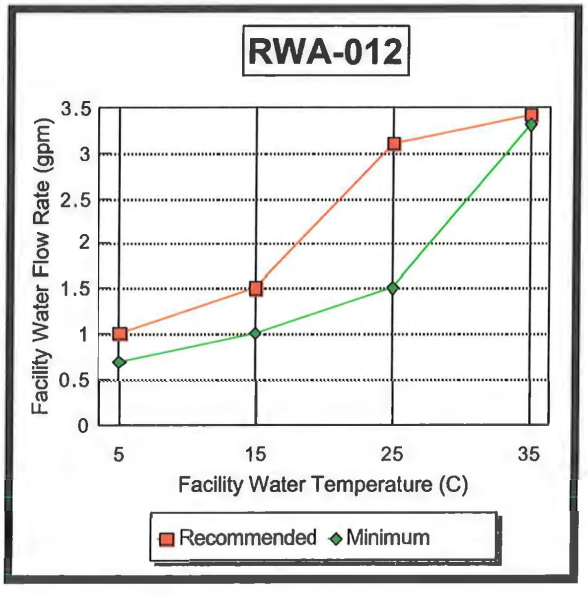
John Tattersall
Group Vice President
Lydall Industrial Thermal Solutions, Inc.

Facility Water Requirements









The model number on the serial tag will indicate which graph references this unit.
25psi Minimum Facility Water Pressure Differential
50psi Maximum Facility Water Pressure Differential
75psi Maximum Facility Water Inlet Pressure
Operating with Minimum Facility Water Flow reduces system efficiency

Equipment Precautions

Failure to adhere to these precautions will void the warranty and may damage the chiller.

1. The chiller has been shipped without coolant. Do not run it without connecting the coolant lines and keeping them filled with the appropriate coolant. Never run the pump without prime because it will be quickly damaged without liquid. Keep the fluid in the reservoir at a satisfactory level to avoid damage to the pump and other components.

2. Never use coolants which are incompatible with the components in the chiller's coolant loop. Some coolants may not damage the coolant loop components yet may significantly derate the chiller's cooling capacity. **Never use automotive antifreeze or other antifreeze containing silicates because they will cause the pump seals to fail.** Check with Lydall if there are questions about the coolant.

3. Maximum storage temperature for the unit is 52°C (125°F).

4. Heat generated by motors and electrical components must be dissipated. Allow sufficient clearance around the unit to dissipate this heat.

5. This chiller is designed for indoor use only. If the chiller has been exposed to temperatures below 7°C, allow 24 hours at ambient temperatures above 7°C to warm the oil in the compressor as well as the refrigerant before starting.

6. If this unit contains refrigerant, there is an oxygen depletion risk that should be considered. It must be placed in a room with adequate volume based on the amount of refrigerant in the unit. If additional refrigeration equipment is in the room, additional space must be provided. In the **Placement** section, under **Installation**, refer to the **Warning: Oxygen Depletion Risk** for more details.

7. This chiller exhausts the heat it extracts to Facility Water. The Facility Water should never exceed 30°C (86°F). The Facility Water flow will be controlled by the water valve at Lydall's condenser. See the Facility Water Requirements section of this manual for the exact flow and pressure necessary for this unit.

8. A water-cooled unit should never be run without the Facility Water connected and flowing. The unit will quickly sustain damage without Facility Water. This damage is excluded from warranty.

9. Routinely inspect the pump inlet strainer located in the reservoir for debris. Turn off the chiller, then remove the strainer and clean as required to permit free flow of coolant. Prevent foreign debris from entering the coolant line while the strainer is removed. Hint: A plastic sandwich bag may be used to wrap the strainer to contain most of the debris. Failure to keep the strainer clean will reduce the coolant flow and may damage the pump.

10. Regularly clean the screen in the assembly at the chiller's inlet for Facility Water. To clean, turn the chiller off, close off the supply of Facility Water to the chiller and remove the screen. Clean as needed and reinstall.

Equipment Precautions

11. Do not operate damaged or leaking equipment.

12. Do not operate the chiller at coolant temperatures above or below the values it was specified to deliver.

13. Do not run the chiller with cooling loads that exceed its factory rated cooling capacity.

14. The chiller must not be transported unless suitably protected. Original factory packaging in good condition or equivalent is required. Request air-ride trucks if transporting over land.

15. The chiller should be thoroughly drained and the coolant lines blown dry with low pressure compressed air before shipping or storing.

16. Modifying the chiller without express written consent from Lydall will void the warranty.

Safety Precautions

1. Heed all warning labels. Do not remove.

2. Do not operate the chiller with the bonnet removed. The bonnet protects personnel from rotating parts and hot surfaces and also protects the chiller's components.

3. Connect the chiller to a properly fused disconnect box in compliance with the National Electric Code (NFPA-70) as well as state and local codes for American usage, or local and national codes for European usage. Maximum fuses must not exceed the maximum rating found on the serial tag on the electrical box. The voltage, phase, and frequency of the power source must also match the requirements specified on the serial tag. **To reduce the risk of electric shock:**
   - Disconnect electrical power before opening the electrical box, except for the checking of the phase reverse relay or phase monitor if included with this unit (phase reverse relays or phase monitors will never be included in single phase units). Power must be applied in order for the phase reverse relay or phase monitor to indicate phase sequence.
   - Do not operate with electrical box door open.
   - Refer servicing of electrical box components to qualified/certified personnel.
   - Do not operate equipment with damaged electrical power cords.
   - Turn off the unit and disconnect electrical power before servicing or moving.
   - Properly ground the unit.

4. Coolant lines, filters, and other components which connect to the chiller must be capable of withstanding the maximum pressure that the pump in the chiller can deliver at the maximum expected temperature.

5. The coolant loop has not been designed for potable water applications. Do not use the chiller for potable water. Never hook the water lines of a water-cooled unit to a potable water source or immerse a hose connected to a potable water source in the reservoir without providing back flow protection. A loss of pressure in the water source could lead to a back flow of the fluid in the unit, resulting in a possible contamination of the potable water source.

6. Vapors of some alcohol based antifreezes as well as other coolants may cause explosion if exposed to flame or spark.

7. Certain antifreezes may be poisonous if ingested.

Installation

Transporting

An Affinity™ chiller rolls easily on four swivel casters. The brakes must be off on the two locking casters when moving the unit. Roll the chiller gently to its operating location. The cushioned casters will help to dampen shock. Lock the casters when the unit is in place. If a forklift will be used to carry the chiller, proceed slowly and carefully to avoid jarring the unit. Insert the forks carefully to prevent damage to the casters.

If the chiller will be shipped, protect it from shock and vibration or the warranty will be void. The chiller must not be transported unless suitably protected. Original factory packaging in good condition or equivalent is required. Request air-ride trucks when transporting over land.

Drain all coolant lines and blow them dry with low pressure air before transporting or storing the unit. Lydall will not accept any unit containing measurable amounts of fluid. Fluid left in the unit during shipping may damage components within the unit. Such damage is not covered by warranty.

Placement

Select a level location near the application, free from dripping or spraying moisture and excessive dust. Keep the coolant lines short to allow the pump to provide maximum pressure and flow to the application. If the chiller will be placed more than 25 feet from the application, call Lydall to discuss placement and how it might affect performance.

Units with non-pressurized reservoirs should never be installed more than 25 feet below the process or overflow may occur. Distances may vary slightly due to elevations above sea level. Call Lydall service (603-539-5005) for more information.

WARNING: Oxygen Depletion Risk
In the event of a refrigerant leak, refrigerant gas may displace oxygen that could result in suffocation and death. Never place the chiller in a room that is smaller than the minimum room volume requirement as defined below. If the room is ventilated, the air distribution system must be analyzed to determine the worst case distribution of leaked refrigerant. A leak detector alarm device is always required in a ventilated room that does not meet the minimum room volume given below. Assure adequate and sufficient room volume and ventilation before placing a chiller that contains refrigerant in a room. Contact Lydall at 1-603-539-5005 if you have any concerns or questions.

Pounds of refrigerant charge can be read directly from the nameplate on your chiller. Remember to include in your calculation any refrigerant that may be stored in any other containers.

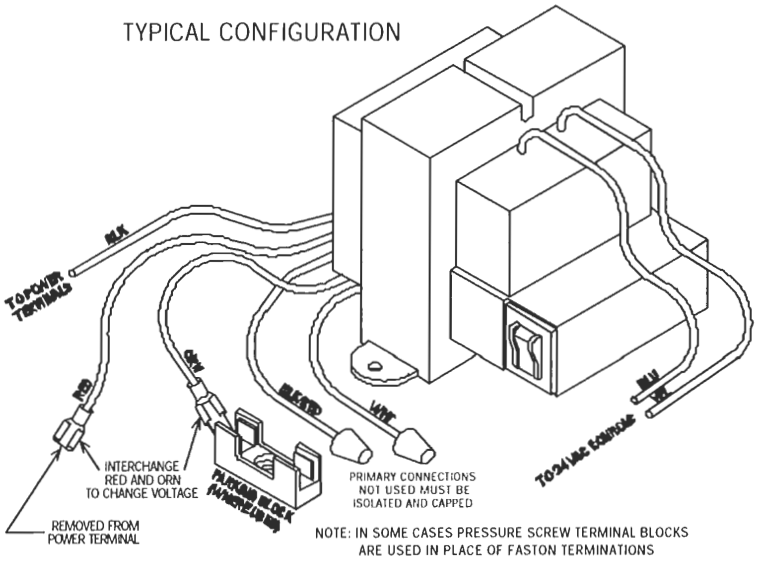
Minimum Room Volume = Pounds of refrigerant x 110 cubic feet
Example: Two chillers are placed in a room, each containing 6 pounds of refrigerant. The minimum room volume shall be 12 x 110 cubic feet, or 1,320 cubic feet.

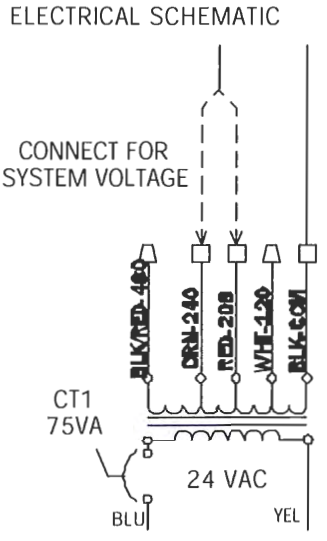
Installation

Electrical Requirements

Connect the chiller to a properly fused disconnect box in compliance with National Electric Code (NFPA-70) as well as state and local codes for American usage, or national and local codes for European usage. Maximum fuse sizes in the disconnect box must not exceed the maximum ratings specified on the serial tag of the chiller (found on the electrical box). The voltage, phase, and frequency of the power source must also match the requirements specified on the serial tag.

Note: Affinity™ models that can operate at either 208-230 Volts 60 Hertz or 200 Volts 50 Hertz have been set at the factory for 200-220 volt operation. If the operating voltage will be greater than 220 Volts, a qualified electrician should remove the red wire from the contactor and replace it with the orange wire taken from the dummy fuse block. Attach the red wire to the dummy fuse block (see diagram below). All voltages may not be compatible with this unit. See the unit's serial tag for the proper voltage range.





Warning: To reduce the risk of electric shock, do NOT remove cover from the electrical box. It contains exposed high voltage wires. Refer servicing to qualified personnel. Disconnect power to the chiller before servicing

Installing the External Strainer Accessory

The strainer accessory comes with extra fittings to allow arrangement in different configurations. Any combinations of these fittings is acceptable. Lydall recommends that the strainer be installed on the Facility Water inlet port.

Installation

The strainer requires a regular maintenance schedule. Frequency will be based on the application and the cleanliness of the fluid, which can vary greatly. Failure to regularly check the strainer may result in poor performance and/or unit failure.

Priming the Pump and Connecting the Coolant Loop

DO NOT RUN THE PUMP DRY. If the pump does not establish prime, the pump shaft seal may overheat and be damaged in less than a minute. Use the following instructions when filling and assembling the coolant lines to prevent damage to the pump shaft seal.

1. Close the reservoir drain.

2. Fully open the flow control valve (if included).

3. Have extra coolant to add as the pump primes and the coolant loop fills.

4. Fill the reservoir with coolant. Do not fill above the height of the coolant loop connection fittings or fluid may leak out.

5. Connect the coolant lines from the application to the FPT (female pipe thread) fittings near the top of the chiller as follows. Do not over tighten the insert and do not use a sealant that will lock the male threads to the female threads.
   a. Connect the coolant line coming back from the application to the RETURN fitting.
   b. Connect the coolant line going to the application to the SUPPLY fitting.

RETURN **SUPPLY**

6. When the previous steps are complete, turn the chiller on by placing the ON/OFF/SET switch in the ON position. Immediately check for flow. If within five seconds no turbulence is visible in the reservoir or the supply pressure gauge shows no pressure reading, shut the chiller off by placing the ON/OFF/SET switch in the OFF position. If flow is established, continue filling until the reservoir low level alarm shuts off. Do not allow the reservoir to overflow.

7. If the pump does not establish prime, disconnect the SUPPLY coolant line to vent any trapped air, reconnect the line, and repeat step 6.

8. If the pump still does not prime, use the following steps:
   a. Disconnect both coolant lines (have a container handy to catch any overflow from the RETURN fitting).
   b. Force coolant into the SUPPLY fitting. The fluid will force the air out of the lines in the chiller and out of the pump head, causing it to escape into the reservoir. If tap water will be the source of coolant, simply connect the tap water line to the SUPPLY fitting and turn on the tap. If a source of coolant other than tap water will be used, elevate the coolant a few feet above the chiller, connect to the SUPPLY fitting, and let gravity force the air out into the reservoir. Remember to have a container handy to catch any overflow from the RETURN fitting.
   c. Reconnect the coolant lines and repeat step 6. Stop filling when the reservoir is full to within a few inches of the top. Do not allow the reservoir to overflow.

A stainless steel mesh strainer attaches to the pump suction port near the bottom of the reservoir. It can easily be removed for cleaning. First turn the pump off, then pull off the strainer, rinse it clean, and push it back on. To protect the pump, routinely inspect the strainer to be sure it is clean and properly attached. Hint: If the strainer is coated with debris, wrap it with a plastic sandwich bag before pulling it off to prevent most of the debris from escaping into the reservoir.

Cooling a Water-Cooled Condenser

Never hook a water-cooled unit to a potable water supply without providing back flow protection. A pressure drop in the water supply could cause back flow, resulting in the possible contamination of the potable water supply. Water-cooled chillers require Facility Water to cool the condenser during operation. The amount of flow is controlled automatically by a valve Lydall installs on the condenser. See the Facility Water Requirements section of this manual for the specific flow, temperature and pressure needed for this unit. Failure to connect Facility Water to the unit and supply the correct amount of flow may severely damage the unit in an extremely short period of time.

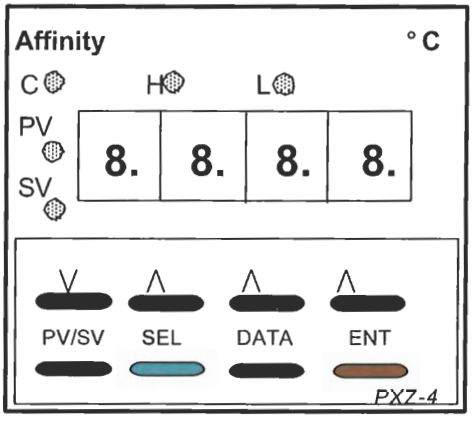
Connect the Facility Water Supply to the WATER IN fitting at the bottom of the chiller; and connect the Facility Water Return to the WATER OUT fitting. Use connecting lines of the size indicated on the coolant diagram (inside diameter) to reduce pressure loss.

Note: The coolant lines of all water-cooled chillers have been blown dry with low pressure air before shipping to protect the units from freezing and subsequent damage. This may cause the condenser to be dry which, in turn, could result in failure to start upon initial start-up (there could be no water in the condenser to absorb the heat). This is easily corrected by pressing the high pressure reset switch a few times to initiate flow through the Facility Water side of the chiller.

Operation

Using the Controller

This Affinity™ chiller comes standard with a FUJI 1/16 DIN temperature controller. This controller is a programmable microprocessor, which offers many more features than are necessary to master at this point. If more than the basic instructions provided in this manual will be needed, consult the FUJI Instruction Manual or call Lydall service (603-539-5005) for technical assistance.



Place the ON/OFF/SET switch on the control box (if included with this chiller) or the chiller's control panel near the Fuji controller in the SET position. SET activates the control display but does not turn on the refrigeration and pump systems of the chiller. Four dots will appear on the display, then in 3-4 seconds the temperature of the coolant will appear plus an indicator light next to PV. Indicator lights next to C, H, or L may also appear. The function of these lights will be discussed later in the section on **Safety Alarms**.

Press PV/SV until the indicator light appears next to SV to display the Set-Value temperature. The Set-Value temperature can be changed to any temperature within the range programmed for this Affinity™ model. Note: Pressing PV/SV allows toggling the indicator light between PV, the actual process coolant temperature, and SV, the Set-Value temperature.

Changing the Set-Value Temperature

Change the Set-Value temperature by pressing PV/SV until the indicator light appears next to SV. Then directly under the digit in the display to be changed, press (∧) and the digit will start blinking. To increase the digit value, press (∧) under the blinking digit as many times as necessary. To decrease the digit value, press (∨) at the left side of the controller. Press (∧) under the next digit value to be changed and repeat the process. When all the digits are set to the desired value and with one digit still blinking, press the red (ENT) key at the far right of the controller to enter the new Set-Value temperature.

Operation

A display of letters or numbers which do not indicate temperature may appear. SEL or DATA was probably inadvertently depressed. The FUJI Instruction Manual explains the use of SEL and DATA functions which are used solely in setting the basic program of the microprocessor. Press PV/SV to return to either the PV or SV display.

The controller comes pre-programmed according to the Affinity™ model selected. If the additional features programmed into the controller will be needed, consult the FUJI Instruction Manual, or call Lydall service for technical assistance. The highest and lowest SV programmed into the controller depends upon the model selected.

Caution: Never program in a Set-Value temperature of more than 32°C (90°F) unless this Affinity™ model is specially modified to operate at higher coolant temperatures. Never program in a Set-Value temperature of less than 5°C (40°F) unless a suitable antifreeze is used as coolant, **AND** the chiller is set to operate at below freezing temperatures.

Turn the whole system on by placing the ON/OFF/SET switch in the ON position. The Set-Value temperature can be changed with the switch in either the ON or SET position.

Air bubbles will be visible rising in the reservoir as the pump forces air out of the coolant loop. After the air has been purged from the coolant loop, a steady turbulence may be seen in the reservoir. This turbulence mixes the coolant to deliver more precise temperature stability in the coolant supply than the controller indicates.

Safety Alarms

The "LOW LEVEL" indicator light and the corresponding audible alarm actuate when the coolant level in the reservoir is low and needs to be replenished. This indicator light does not actuate with the ON/OFF/SET switch in the SET position.

The "FAULT" light comes on if too little coolant is circulating through the heat exchanger. The "FAULT" light comes on momentarily upon start-up until the pump establishes sufficient flow. The "FAULT" indicator does not actuate with the ON/OFF/SET switch in the SET position.

If the "FAULT" light remains on for more than a few seconds, the chiller should be turned off and the reason for loss of circulation determined and corrected.

Caution: Although the "FAULT" light alerts the operator that no coolant is flowing, the operator must not assume proper circulation through equipment external to the chiller if the light does not appear. A bypass system built into the chiller to protect the pump may satisfy circulation requirements within the chiller even though flow outside the chiller is blocked. For example, turning the flow control valve on the chiller to no external flow does not actuate the light; similarly, a wheel of a forklift truck standing on an external cooling line, thus stopping the flow to the application, will not actuate the fault light.

Operation

The FUJI controller on this chiller has HIGH and LOW TEMPERATURE ALARM LIGHTS: H and L appear just under the Affinity™ logo at the top of the controller. At the factory, a technician has programmed the alarm light to come on under H if the circulating coolant is above the temperature that this chiller has been set to deliver. The alarm light under L is programmed to come on if the circulating coolant is below the temperature the chiller has been set to deliver. Consult the factory if it is necessary to operate above or below these limits.

The light on the FUJI controller next to C, when lit, indicates that the refrigerant solenoid valve is open to allow refrigerant to flow to the heat exchanger. If the light is on most of the time, most of the capacity of the chiller is in use. If the light is on infrequently, much less than the full capacity of the chiller is being used.

Preventive Maintenance

A stainless steel mesh strainer attaches to the pump suction port near the bottom of the reservoir. It can easily be removed for cleaning. First turn the pump off, then pull off the strainer, rinse it clean, and push it back on. To protect the pump, routinely inspect the strainer to be sure it is clean and properly attached. Hint: If the strainer is coated with debris, wrap it with a plastic sandwich bag before pulling it off to prevent most of the debris from escaping into the reservoir. The frequency of checking and cleaning this strainer will depend on the cleanliness of the process and the fluid.

The Facility Water strainer requires a regular maintenance schedule. Frequency will be based on the application and the cleanliness of the fluid, which can vary greatly. Failure to regularly check the strainer may result in poor performance and/or unit failure.

Check the strainers a week or two after starting the unit, then develop your own schedule for checking and cleaning the strainers based on experience.

Decommissioning

Decontamination procedures are not required or applicable as there are no hazardous materials used within this unit. The refrigerant used in this unit is environmentally friendly (a non-ozone depleting HFC) and poses no hazard to the environment. However, the refrigerant must be recovered by a qualified refrigeration service technician in accordance with all applicable laws. When decommissioning, remove all fluids by opening all drains and placing the fluid in appropriate containers. After all flow has ceased, purge the lines with low pressure air.

The unit is comprised of metals that may be recycled. The significant metals which make up the unit are as follows:

- Cold-rolled steel
- Stainless steel
- Copper

There are no significant amounts of plastics or other materials incorporated into this unit. Recycle metals appropriately.

Trouble Shooting Guide

Problem	Possible Cause	Possible Remedy
Unit does not start	No power to unit, breaker tripped	Verify supply power is on, close breaker after correcting fault
	Low voltage	Check electrical service to unit
	High pressure cut-out tripped	Will automatically reset after correcting fault
	Loose wire	Check wiring after disconnecting power
	Defective contactor or coil	Repair or replace contactor or coil
	Loss of refrigerant	Repair leak, recharge with type and amount of refrigerant specified on serial tag
	Compressor damaged	Replace - Call Lydall
Unit does not cool	Compressor internal thermostat tripped	Allow time for compressor to cool to automatically reset
	Compressor damaged	Replace compressor - Call Lydall
	Facility Water control valve set too low	Reset Facility Water control valve
	Facility Water too warm	Provide cooler Facility Water
	Evaporator damaged	Call Lydall
	Microprocessor failure	Replace microprocessor
	Cooling load exceeds capacity of unit	Reduce cooling load
	Microprocessor programmed incorrectly	Reprogram microprocessor - Call Lydall
	Loss of refrigerant	Locate and repair leak, recharge with type and amount of refrigerant specified on serial tag

Problem	Possible Cause	Possible Remedy
Unit does not cool (continued)	Refrigeration solenoid coil failure	Replace solenoid coil
	Solid State Relay failure	Replace Solid State Relay
	Solenoid valve stuck shut	Repair or replace solenoid valve
	Defective refrigeration low pressure cut-out	Repair or replace refrigeration low pressure cut-out
	Malfunctioning thermal expansion valve	Replace thermal expansion valve
	Pump damaged, loss of flow	Replace pump
	Hot gas bypass valve setting too high	Call Lydall
	Hot gas bypass valve stuck open	Repair or replace valve
Pump leaks	Faulty pump casing	Replace pump assembly
	Shaft seal damaged	Replace shaft seal
	Pump housing O-Ring damaged	Remove pump and rebuild
	Improper fluid	Call Lydall
Noisy compressor	Flooding of refrigerant into crankcase	Warm crankcase if unit has been off for a long period or has been left in a cool ambient for more than a few hours
	Worn compressor	Replace compressor - Call Lydall
	Refrigeration high pressure cut-out set too high	Adjust setting
	Refrigeration low pressure cut-out set too low	Adjust setting

Problem	Possible Cause	Possible Remedy
Excessive noise on Start-Up	Low voltage	Check electrical service
	Wrong voltage taps used on transformer	Connect to proper taps
	Contactor or coil failure	Replace contactor or coil
Pump motor overheats	Improper voltage supplied	Correct voltage
Level light remains on	Low coolant level in reservoir	Check for leaks, then fill reservoir
	Reservoir level switch float stuck	Clean reservoir and level switch
	Time delay relay malfunction (when used)	Replace time delay relay
	Level switch failure	Replace level switch
Level light does not work	Time delay relay has not timed out (when used)	Wait for time delay to time out
	Lamp burned out	Replace lamp
	Level switch failure	Replace level switch
Low coolant flow	Pump suction strainer clogged	Remove strainer, clean and reinstall or replace
	Flow control valve not fully open	Open flow control valve
	Pressure relief valve set too low (unless not adjustable)	Adjust pressure relief valve to specification
	Low coolant level in reservoir	Fill reservoir to proper level
	Restriction in coolant lines external to chiller	Eliminate restrictions in coolant lines external to chiller
	Frozen evaporator	Call Lydall
	Flow switch clogged	Disassemble flow switch, clean and reinstall or replace

Problem	Possible Cause	Possible Remedy
Fault light remains on	Low coolant flow	See Problem: Low coolant flow
	No coolant flow	See Problem; No coolant flow
	Flow switch stuck	Disassemble flow switch, clean and reinstall or replace
No coolant flow	Pump not primed	Prime pump
	Pump suction strainer clogged	Remove and clean strainer, then reinstall
	No coolant in reservoir	Check for leaks, then fill reservoir
	Pump overload tripped	Wait 5 minutes for overload to reset
	Pump motor shaft bound to seal	Replace pump or renew seal
	Pump housing improperly torqued	Remove pump, torque to specification, test, and reinstall
	Damaged pump	Replace pump
	Frozen evaporator	Call Lydall
	Clogged line or closed valve in external piping	Check external piping for dirt or closed valve
	Leak(s) in external piping	Check for leaks and repair as needed
Chiller shuts down during operation	Refrigeration high pressure cut-out set too low	Adjust and reset refrigeration high pressure cut-out
	Refrigeration low pressure cut-out set too high	Adjust and reset refrigeration low pressure cut-out
	Excess refrigerant charge	Remove excess refrigerant and recharge to specifications on serial tag

Problem	Possible Cause	Possible Remedy
Chiller shuts down during operation (continued)	Pump thermal overload setting too low	Adjust and reset thermal overload relay to specifications, replace if faulty
	Facility Water too warm	Provide cooler Facility Water
	Pump overload tripped	Determine reason for trip, if pump is damaged, repair or replace
	Low voltage	Check electrical service to chiller
Temperature display reads incorrectly	Loose wire	Check wiring after disconnecting power
	Broken RTD	Replace RTD
	Microprocessor failure	Replace microprocessor
Chiller cools well below the desired Set-Point	Microprocessor programmed incorrectly	Reprogram microprocessor - Call Lydall
	Malfunctioning solenoid valve	Repair or replace solenoid valve
	Solid State Relay failure	Replace Solid State Relay
	Microprocessor failure	Replace microprocessor
Too much recirculating pressure to process	Flow control valve set too high	Throttle flow control valve
	Pressure relief valve set too high (unless not adjustable)	Adjust pressure relief valve
Compressor turns on and off automatically	Discharge pressure too high	Check Facility Water for blockage
	Condenser fan(s) not on	Check motor(s) and wiring
	Refrigeration high pressure cut-out set to automatic	Check settings

Problem	Possible Cause	Possible Remedy
Compressor does not run	Compressor internal thermostat tripped	Allow time for compressor to cool and automatically reset
	Motor burned out	Replace - Call Lydall
Microprocessor does not work	5 second delay has not timed out	Wait at least 5 seconds after turning on
	Microprocessor programmed incorrectly	Reprogram microprocessor - Call Lydall
	Microprocessor failure	Replace microprocessor

Warranty

The Lydall Limited Warranty

Twelve-Month Warranty
Parts and Labor

Lydall Industrial Thermal Solutions Inc. warrants this product to the original Owner for a period of twelve (12) months from the date of shipment. Lydall will repair, or, at its discretion, replace any part found to contain a manufacturing defect in material or workmanship, without charge to the Owner, for twelve months from date of shipment. Shipping costs will be excluded from warranty. Service labor will be at no charge during the warranty period as long as the labor is supplied at the Lydall plant in Ossipee, New Hampshire, or by a Lydall approved service provider. Replacement or repaired parts will be warranted only for the un-expired portion of the original Warranty. To obtain prompt warranty service, contact Lydall, PO Box 1000, Ossipee, New Hampshire, 03864, USA.

Before returning any equipment to Lydall for repair, it is necessary to contact the Lydall Service Department for a Return Material Authorization number and an authorized service depot location where the repairs will be completed.

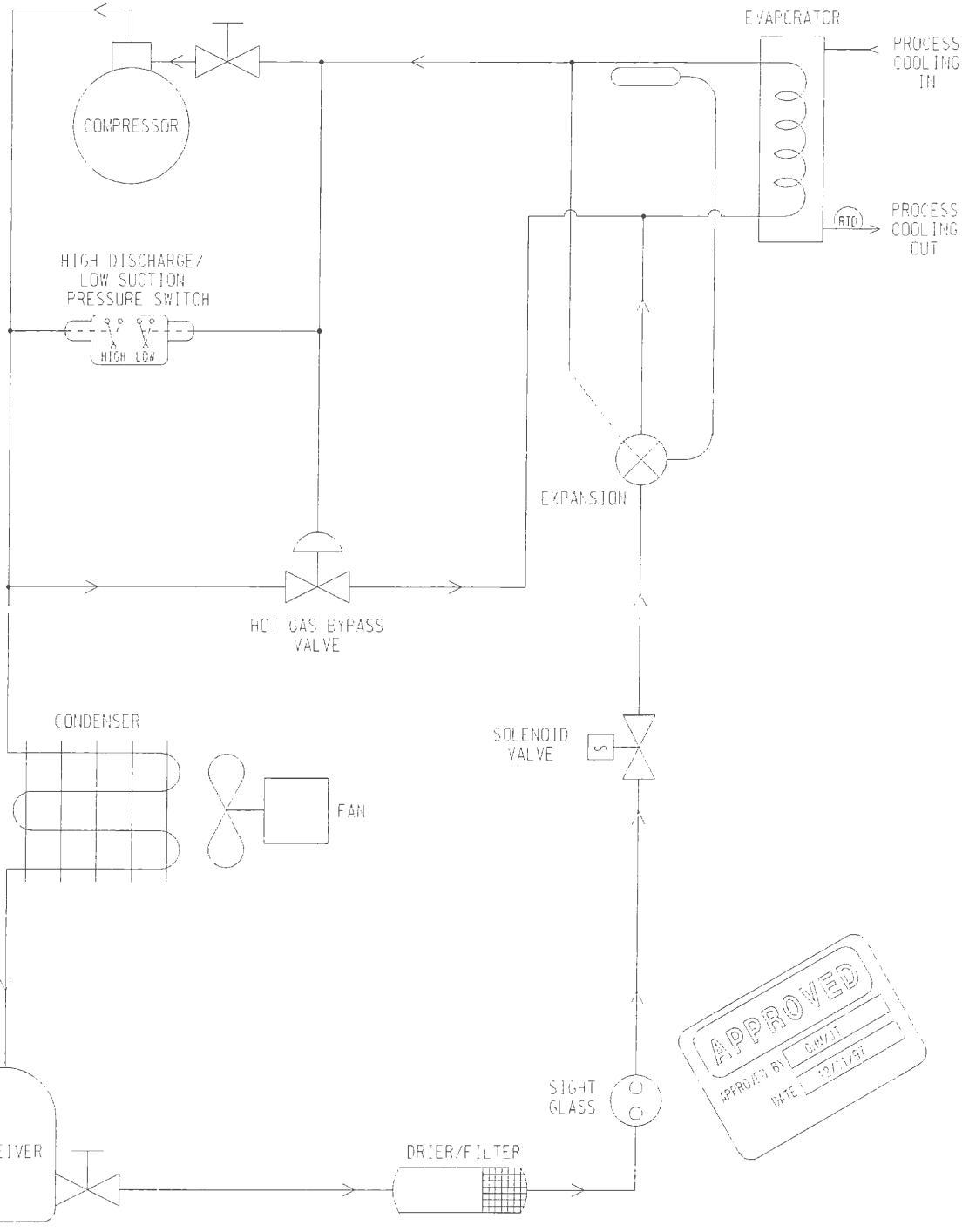
This Warranty does not cover the following: Damage or failure of any part caused by accident, customer shipping, storage, misuse, customer modification, fire, flood, Acts of God, or resulting from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided in the User Manual. As noted in the User Manual, any modification of the unit without expressed written consent from Lydall will void the warranty.

In no event shall Lydall be liable for any repairs or service or any consequence of any repair or service that are not performed in strict accordance with all applicable city, county, state, and federal laws.

Further limitations and exclusions: This Warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. In no event shall Lydall be liable for any consequential or incidental damages that the Owner may incur resulting from purchase or use of this Lydall product. The buyer's sole and exclusive remedy and the liability limit of Lydall, for any loss whatever, shall not exceed the purchase price paid by the purchaser for the Lydall product on which a claim is made.

Lydall Industrial Thermal Solutions Inc.
Post Office Box 1000
775 Route 16
Ossipee, NH 03864 USA
Telephone: 603-539-3600 (Sales), 603-539-5005 (Service), Fax: 603-539-8484

LTR	REVISION	DATE	BY
A	CREATED CAD DRAWING	12/15/97	LHM



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DRAWING NO. 21319	SHEET: 1 OF 1	PRINT SIZE: B	

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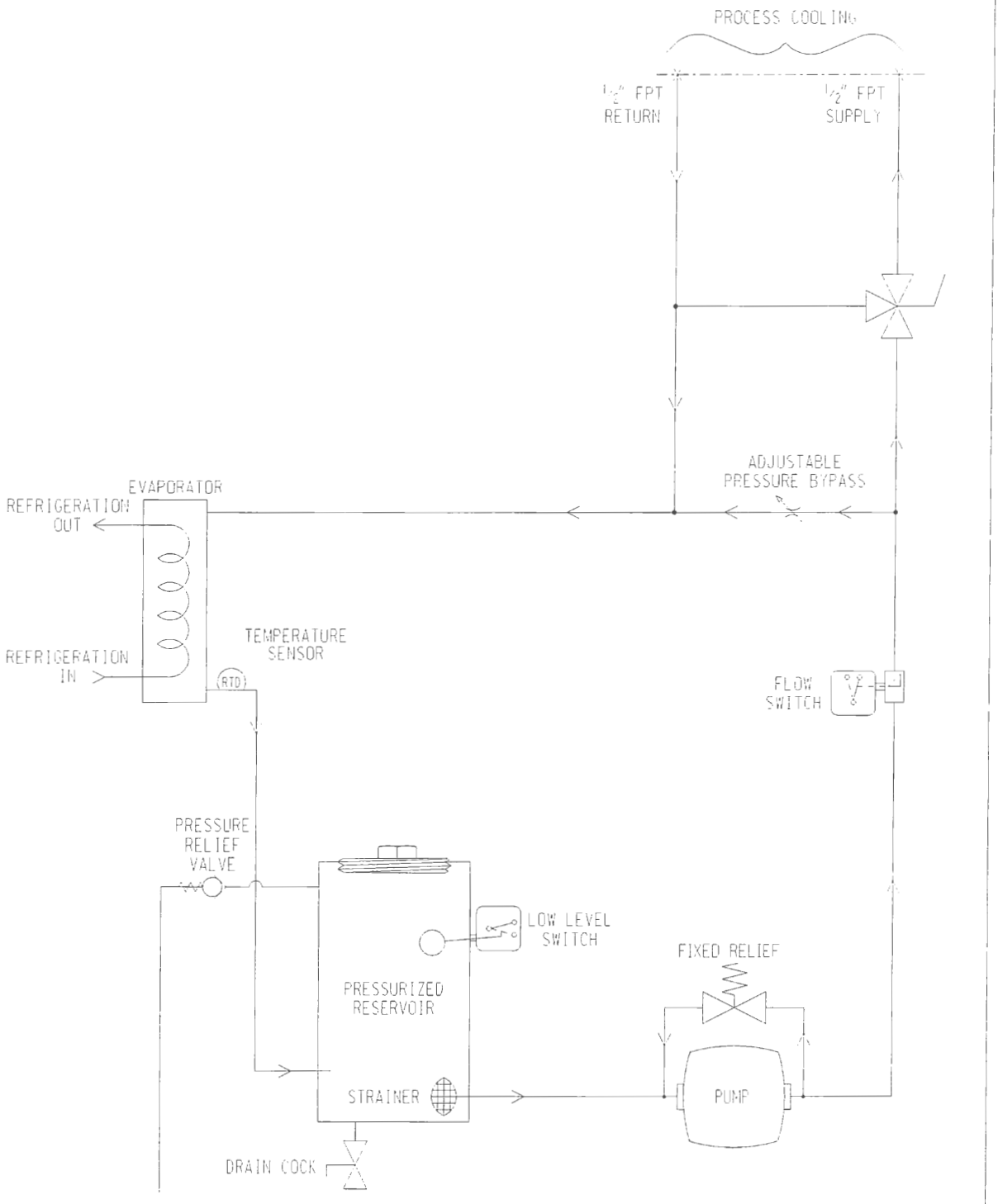
LYDALL
INDUSTRIAL THERMAL SOLUTIONS
OSSIPEE OPERATION
175 ROUTE 16, P.O. BOX 1033, OSSIPEE, NH 03864
Tel: (603) 539-5005, Fax: (603) 539-2186

LTR	REVISIONS	DATE	BY
A	CREATED CAD DRAWING	6/26/03	GHM



APPROVED
DATE 6/26/03
INITIALS GHM/SM

TITLE: DCS R08 ER-PSPF3B-A PVC -	DRWN BY: GHM	DATE: 6/26/03	
	SHEET: 1 OF 1	FORMAT SIZE: B	
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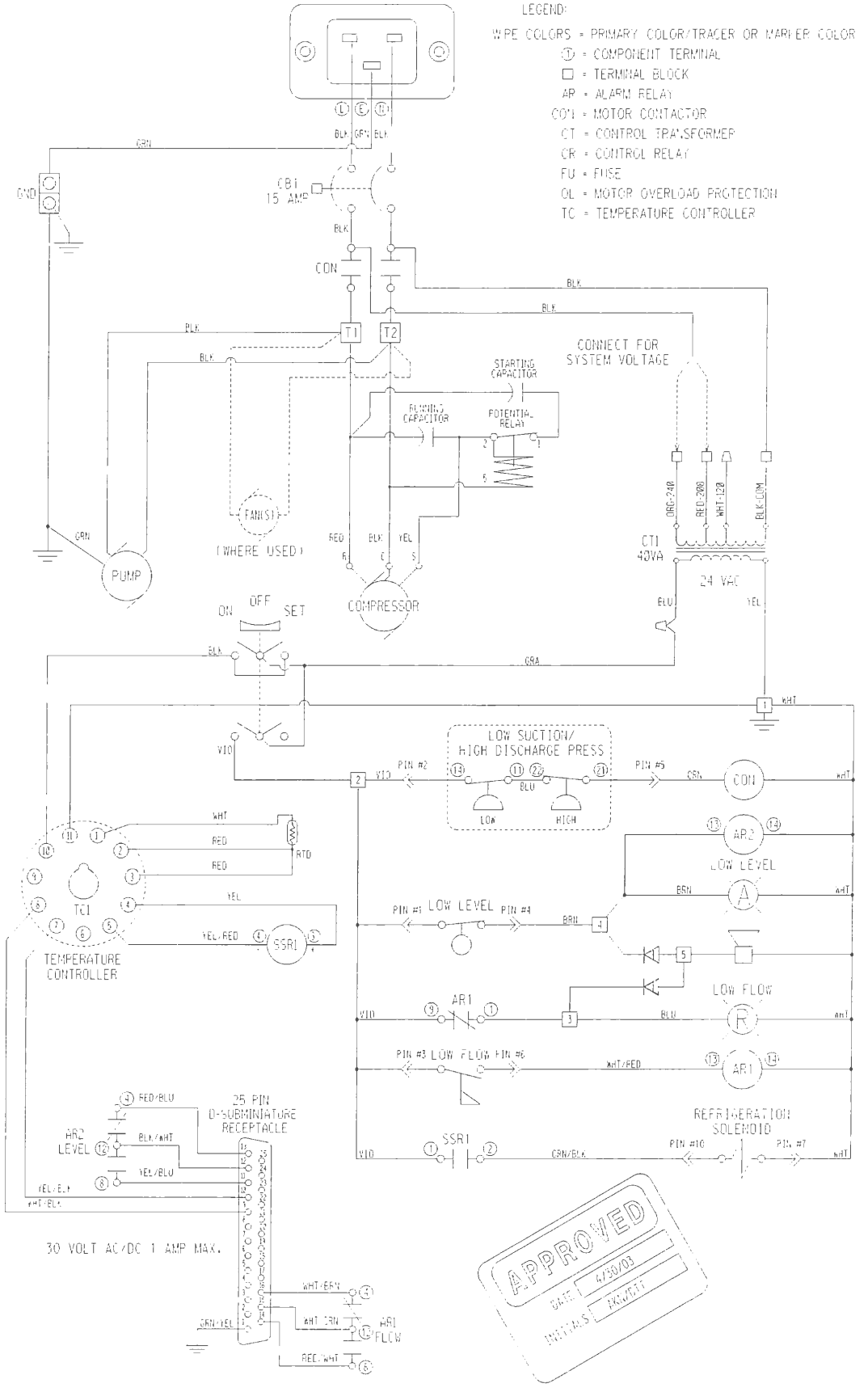
INDUSTRIAL THERMAL SOLUTIONS
OSSIPEE OPERATION
775 ROUTE 16, P.O. BOX 1003, OSSIPEE, NH 03864
TEL: (603) 539-5069, FAX: (603) 539-2148

LTR	REVISION	DATE	BY
A	XXX	XX/XX/XX	XXX

208-230 VOLT, SINGLE PHASE, 60 Hz.
200 VOLT, SINGLE PHASE, 50 Hz.

LEGEND:

WIRE COLORS = PRIMARY COLOR/TRACER OR MARKER COLOR
① = COMPONENT TERMINAL
□ = TERMINAL BLOCK
AR = ALARM RELAY
CON = MOTOR CONTACTOR
CT = CONTROL TRANSFORMER
CR = CONTROL RELAY
FU = FUSE
OL = MOTOR OVERLOAD PROTECTION
TC = TEMPERATURE CONTROLLER



APPROVED
DATE 4/30/03
INITIALS PKW/DTT

TITLE: DES R TB 15 FL 1P 25P F/T L	DRWN BY: DTT	DATE: 4/30/03	
DRAWING NO. D7978R	SHEETS: 1 OF 1	REVISION SIZE: B	

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