

Lytron, Modular Cooling System

Model: MCS7353G1



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Introduction

Receiving your New Modular Cooling System

Inspect your new MCS immediately upon receiving it. If the unit shows shipping damage, contact the transportation company and file a freight damage claim. Retain all cartons and packing material until the unit is operated and found to be in good condition. Your MCS has been fully tested at the Lytron factory with clean water. Although the system has been drained, some residual fluid may remain. This will not hinder the performance of the MCS.

About the Warranty

All units returned for warranty claims must have an RMA (Return Material Authorization) number on the outside of the container. Call Lytron Customer Service at (781) 933-7300 for an RMA number. Refer to the end of manual for the MCS warranty. Units should be drained of all fluids and packaged in its original packaging.

Customer Service Support

Lytron is committed to servicing the customer, both during and after the sale. If you have any questions concerning the operation of your unit, contact our Application Engineering Department at (781) 933-7300. To facilitate your call, please have the **model number** and **serial number** of the unit (located on the rear of the unit) for the Lytron Applications Engineer.

Service Hotline

Lytron has a 24-hour per day, 7 day per week service hotline to help you with questions on the startup and operation of your MCS7353G1. **(We recommend you review the troubleshooting guide on page 13 before calling our service hotline.)** Lytron service can be reached by dialing (781) 933-7300. To facilitate your call please have the **model number** and **serial number** (located on rear of the unit) of the unit for the Lytron Service Technician.

Safety Precautions

This system is designed to provide fluid cooling only as specified in this manual. If you use this system in a manner other than as specified, the safety protection of the system may be impaired.

Warnings are posted throughout the manual. Read and follow these important instructions. Failure to observe these instructions or use the MCS other than as specified may impair safety protection, void the warranty, and can result in permanent damage to the unit, significant property damage, personal injury and/or death.

Make sure you read, understand, and follow all instructions and safety precautions listed in this manual before operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, please contact our Applications Engineering Department at (781) 933-7300.

1. Do not operate the unit without fluid in the reservoir.
2. Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.
3. The unit must be plugged into a properly grounded power source.
4. Do not connect the Coolant In or Coolant Out to your building water supply or any pressurized source.
5. Do not use or maintain the unit outdoors. These units were not designed to withstand outdoor weather conditions.
6. Performance of installation, operation or maintenance procedures other than those described in this manual may result in a hazardous situation and may void the Lytron warranty.
7. Transport the unit with care. Sudden jolts or drops can damage the unit.
8. Observe all warning labels. Never remove warning labels.
9. Do not operate damaged or leaking equipment.
10. Always turn the unit "OFF" and disconnect the power cord from the power source before performing any service, maintenance procedures or before moving the unit.
11. Do not operate equipment with damaged power cords.
12. A qualified technician should perform service and repairs.

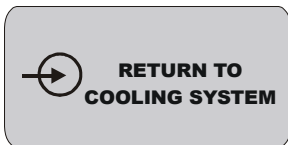
Labels and Silkscreen Marking



- This label tells maintenance personnel and users to consult the technical manual for more information.



- Disconnect power warning.



- Identifies the port where heated fluid returning from the customer's machine is connected.



- Identifies the connection where chilled fluid is supplied to the user's machine.



- Positive earth (ground) terminal.



- The Product ID Label identifies the model number, serial number, electrical information, and pump type.

General Information

Product Specifications		
Cooling Capacity	Watts	6,000
	Btu/Hr	20,500
Case Dimensions	Width	22" (559mm)
	Depth	28" (711mm)
	Height	32" (813mm)
Fluid Connections	Inlet (Barb)	1"
	Outlet (Barb)	1"
Reservoir Capacity	Gallons (liters)	5.2 (20.0)
Electrical Requirements	Volts, frequency	208 VAC, 3 phase, 50/60 Hz

Cooling System Description

The MCS7353G1 is a liquid-to-air type cooling system designed to pump ambient temperature liquid from the MCS's reservoir tank through the end user's heat source, through the MCS's radiator, and back to the reservoir tank (see Figure 2 for internal plumbing schematic). The external plumbing and the heat source are provided by the end. A typical cooling loop can be seen in Figure 1.

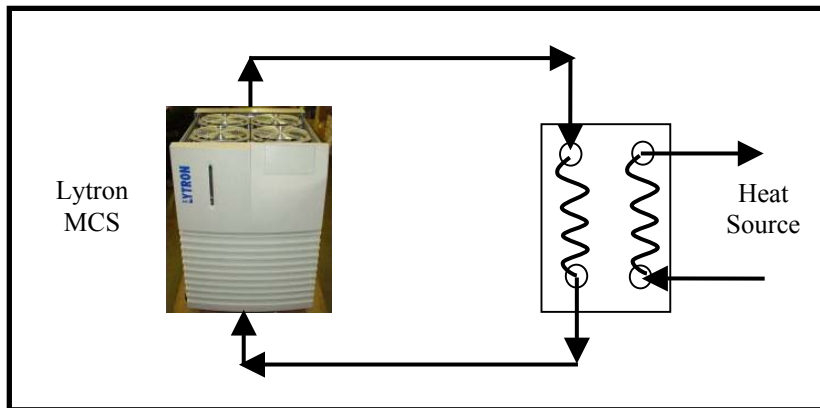


Figure 1

Installation and Operational Instructions

This system is designed to provide fluid cooling only as specified in this manual. If used in manner other than as specified, the safety protection of the system may be impaired. Warnings are posted throughout the manual. Read and follow these important instructions. Failure to observe these instructions or use other than specified may impair safety protection and can result in permanent damage to the unit, significant property damage, or personal injury or death. Make sure you read and understand all instructions and safety precautions listed in this manual before operating your unit.

STEP 1: REMOVE FROM SHIPPING CONTAINER

Using the finger-grips on each side of the system cover, lift the MCS Cooling System straight up and out of the shipping container. Remove any protective Styrofoam or cardboard.

STEP 2: COOLANT LINE INSTALLATION

Selecting and Locating Hoses

- The coolant ports are located on the rear of the system and are labeled as previously shown.
- To minimize the pressure loss in the coolant lines, use the largest practical diameter tubing.
- To minimize heat gain, all lines should be as short as possible. Keep them away from heat sources such as radiators and hot water pipes. Lines that cannot be routed away from heat sources should be protected with thermal insulation, preferably at least 1/2" (12.7mm).
- Flexible tubing should be of heavy wall or reinforced construction. All tubing should be rated to withstand 125 psig at 186°F (86°C). Make sure all tubing connections are secured and leak-tight. Also, whenever possible use opaque lines to prevent algae growth during prolonged non-operating periods.

Connecting Plumbing

To connect the fluid lines to the chiller and user equipment follow these steps:

- Remove the plastic caps covering the supply and return ports on the rear panel of the unit.
- Attach coolant lines to the supply and return ports on the rear panel.

SUPPLY TO EQUIPMENT	Provides coolant to the user's equipment.
RETURN TO COOLING SYSTEM	Connects to the outlet of the user's equipment.

STEP 3: COOLING AIRFLOW INSTRUCTIONS

Avoid potential airflow obstructions to the MCS Cooling System. Make sure that there are no obstructions to air flow from under the enclosure openings for at least 6 inches along both sides, back and front of the unit. At least 4 feet above unit should be unobstructed.

STEP 4: INITIAL FILLING OF RESERVOIR

Fill the reservoir with coolant to the FULL mark on the label on the front of the reservoir. The label can be seen by removing the lower front panel of the system.

STEP 5: CONNECTING ELECTRICAL POWER

Refer to the General Requirements section and to the product ID label on the rear of the LCS for the specific electrical requirements of your unit. To safely operate the MCS, use an SJT cord set and connectors that are compatible with the local power grid and the power requirements. The MCS should use SJT 3 conductor 12 AWG minimum power cord. Connect power cord from power source and proper ground to incoming power terminal block per Figure 3.

Notes:

1. Neutral should not be connected directly to ground.
2. It is recommended that a main power switch be installed to control 3-phase main power.



IF PUMP AND FAN MOTORS START, IMMEDIATELY DISCONNECT POWER.

Recheck to make sure the power has not yet been energized. **RUNNING THE SYSTEM DRY FOR EVEN A SHORT TIME WILL DAMAGE THE PUMP.** Now repeat the previous step until the power plug has been connected, without either the pump or fan motor running.

STEP 6: PRIMING PUMP

It is now safe to apply power and to quickly "jog" the pump "ON-and-OFF". The fan will also turn "on-and-off" simultaneously. This is normal. We are now "priming" the pump. Continue to do this several times, while watching the coolant level indicator on the front panel until the coolant level in the reservoir has dropped down to the ADD mark on the front panel. Now turn off the system.

STEP 7: TOP OFF SYSTEM

Again add water to the reservoir to the FULL mark on the front panel.

Now repeat this "jogging" and refilling process until the system is totally full and coolant begins to return back into the reservoir. This will be confirmed when the decrease in coolant level begins to slow down. The coolant level will eventually become stable when all the liquid passages have become full, and as much coolant is being pumped out of the reservoir as is being returned to it.

The reason for the slow filling procedure is to slowly push the air out of the passages, back into the reservoir and out the filler opening. The slower the better, so that air won't become "entrained", recirculating with the coolant and causing it to become "frothy".

STEP 8: "DRAIN-DOWN"

After the level has become stable (while still continuously jogging on and off), turn the pump off and observe the coolant level. If the level remains the same, all is well. However, if the level slowly begins to rise, it means coolant at a higher level is draining back down into the reservoir.

In this event, turn the pump back on again to return the tank to a steady level. Raise the MCS to a higher position, to see if this will temporarily correct the problem.

This "drain-down" problem can be permanently corrected by (1) either installing a shutoff valve in the return line (either manual or automatic); or (2) by using a non-vented cap on the reservoir (during shutdown only).

STEP 9: "ON-LINE"

Your MCS Cooling System is now ready for full-time use. It has been designed for reliable service on a CONTINUOUS OPERATIONAL DUTY CYCLE.

System Maintenance Service

(A) Scheduled Maintenance

Routine system maintenance should be very minimal once the MCS Cooling System has been initially installed, filled, primed and is up and running. Maintenance instructions for changing and maintaining coolant level not covered in the installation and operating instructions will be covered here under **SYSTEM MAINTENANCE**.

Operating experience with each unique equipment installation will dictate reasonable frequency of system inspections and/or scheduled maintenance. Suggested guidelines are presented under the following Sections (B), (C) and (E).

(B) Weekly Inspections

Noise Level: Any abnormal sound or substantial increase in noise level since the last weekly inspection may indicate an impending pump, fan or line blockage problem, which should be further investigated.

Leakage: The weekly visual check does not require removal of the top cover. However, observation of coolant on the floor surface, coming out from under the system, calls for a further check for possible new leaks.

Coolant Level: Any significant drop in the coolant level on the front panel since the previous weekly check should be investigated further. If there is no visual system leak, then the loss may be due to leakage elsewhere in the equipment. See Section (D) for instructions on "topping up" the reservoir.

Pump and Fan Assemblies: With upwards of 10,000 hours continuous duty life expectancy on the pump and 20,000 hours on the fan, both of these components should check OK, on a week-after-week basis.

(C) Coolant Life

Periodically inspect the coolant inside the reservoir. If the coolant appears dirty, flush the reservoir and replace coolant.

(D) Maintaining Coolant Level

If any of the previous observations require coolant level to be brought back up to normal, procedure is as follows:

- Remove top cover and right panel (from front of system); remove cap from reservoir.
- Add coolant into the reservoir, up to the FULL mark on the front panel.

(E) Changing Coolant

Disconnect Main Power: Disconnect main power to assure there is no live voltage on the unit while changing coolant.

Remove System Cover: Remove top cover and side panels.

Drain Coolant from System: The system is best drained using a wet-vac. First vacuum all of the water out of the tank. Once the tank has been emptied, disconnect the supply and return lines one at a time and using the wet-vac to vacuum water out of the lines.

Reconnect Hoses: Reconnect system coolant supply and return hoses, making sure the hose clamps are on tight. Also check any other equipment lines that may have been disconnected for draining.

Reconnect Power Plug: Plug should be reapplied with electrical power to the plug OFF.

****CAUTION****

PUMP WILL BE DAMAGED IF RUN DRY. If pump starts, quickly check to make sure system power to the unit is OFF (fan not running), before proceeding. Also check level switch for "hang-up".

Coolant Refill: Now perform Steps 4, 6 & 7 of the previous Installation and Operational Instructions for initial refilling procedure.

Restart Cooling System: After the coolant level has become stable for several minutes and has been topped off again to the FULL mark, the system can now be turned on again to full operation.

Replace System Cover: Before replacing the system cover, carefully recheck a final time for any new leaks.

Reposition system cover and side panels previously removed.

(F) Operating Conditions

Temperature Range: 60-80°F (15.6-26.7°C), ≤80% RH non-condensing.

Location: Building interior only, machinery or storage room.

(G) Storage Conditions (Dry)

Temperature Range: 5-40°C, ≤90% RH non-condensing.

Location: Building interior only, machinery or storage room.

(H) Special Shipping Instructions

Shipping conditions *are not* a controlled environment; temperatures during winter months may well be much lower than the operation and storage conditions as specified. To prevent freeze-up during shipment, the following observations and special instructions should be noted.

From the Factory: The MCS cooling system is shipped dry from the factory.

After Initial Filling: For any subsequent shipments anytime after the unit has once been filled for operations, the following applies:

- Drain the Cooling System using normal draining procedures found in Maintenance Section (E). The system reservoir will be drained empty during this procedure.

****CAUTION****

**THE UNIT MUST BE COMPLETELY DRAINED AND DRY TO PREVENT
FREEZING DURING LOW TEMPERATURE SHIPPING.**

Trouble Shooting Guide

Problem	Possible Cause	Recommended Remedy
Unit does not start or shuts off shortly after starting.	No power to the unit	Make sure the unit is plugged in. Verify power to the unit.
	Low Voltage.	Have a qualified electrician check the electrical service to the unit. Check the voltage on the power source. Make sure it is within the rated voltage of the unit $\pm 10\%$.
Fans are noisy	Power is supplied to system out of phase.	Check phase monitoring relay to see if red light is illuminated. If so, reverse two of the three incoming power lines and recheck phase monitoring relay to ensure red light is no longer illuminated.
Fans are noisy Noisy Pump Motor	Dust in fan	Shut down unit. Remove obstruction.
	Pump shaft seal damage	Replace pump.
Pump motor overheats	Excessive pressure drop	Use either larger hoses or a shorter line length to reduce the pressure drop to equipment to be cooled.
	Improper voltage to the system.	Verify and correct the voltage to the unit.
Low coolant flow	Obstruction in pump head.	Shut down unit, clear obstructions and restart unit.
	Low coolant level or no coolant in the reservoir.	Check for leaks. Repair any leaks and fill reservoir.
	Restriction in coolant lines external to the unit.	Eliminate restrictions in the lines. Open any valves.
	Pump overload has tripped.	Turn unit off. Wait for overload to cool. It will reset on its own in 30 minutes or less.
	Leaks in external piping.	Repair leaks.
Supply pressure is too high	Pressure drop through system is too large.	Reduce line length or increase line diameter.
	Gate valve is not open enough.	Adjust gate valve until desired pressure is achieved.
Diminished system performance	Fan obstruction	Remove obstruction. Ref. Step 3 in Installation Instructions.
	All 4 fans are not operating.	Replace faulty fan.
	Pump is not delivering adequate flow. To check the pump's performance, close the flow control valve on the pump discharge port and verify that the pressure gauge reads a minimum of 53 psig for 60 Hz or 36 psig for 50 Hz.	Replace pump.

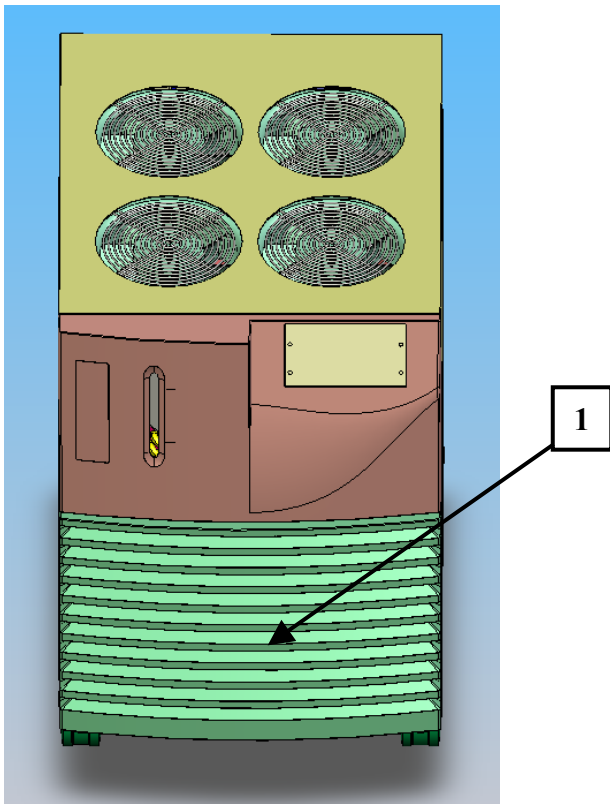
Service Assistance

If, after following these trouble shooting steps, your unit fails to operate properly, contact Lytron for assistance.

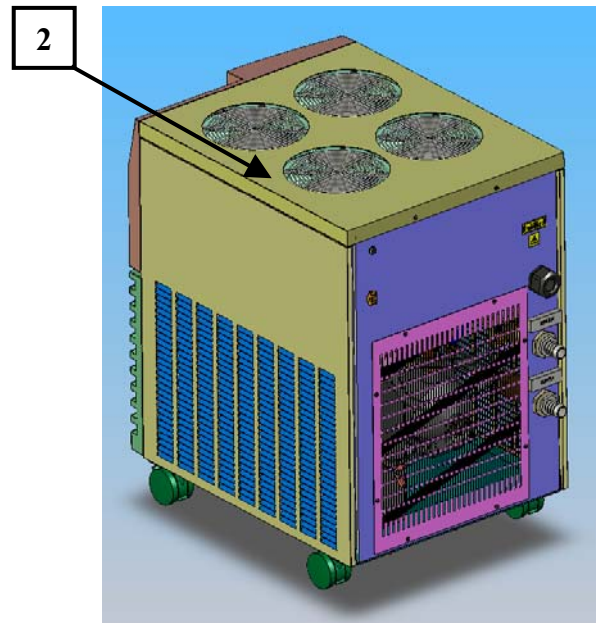
Replacement Parts

Available replacement parts are as follows:

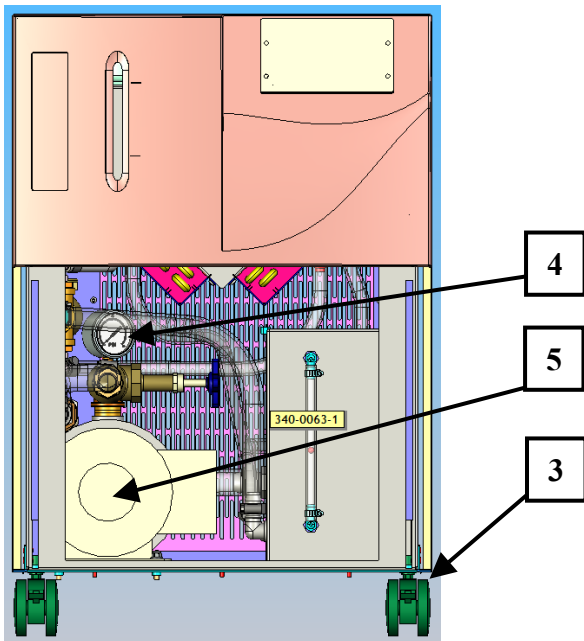
ITEM #	PART DESCRIPTION	LYTRON P/N
1	Front Panel, lower	340-0017
2	Top Cover	330-1848
3	Caster w/brake	531-0017
4	Pressure Gauge 0-60 PSI	440-0199-01
5	Pump/Motor Unit	410-0453
6	Flow Switch, 5 GPM	230-1144
7	Valve – Flow Control	410-0281
8	Level Switch	230-0892
9	Heat Exchanger, Right (viewed from front)	6320G31-01
10	Heat Exchanger, Left (viewed from front)	6320G31-02
11	Fan	102105-01
12	Finger guard	102106
13	Relay DPDT 240V - P&B #T92P11A22-240	101903-04
14	Circuit Breaker 5A, 1 Pole - Schurter# T11-311-5	230-1149
15	Motor Starter – Fuji # BM3RSB-6P3	230-1139
16	Relay, Reverse phase, 208/240V SPDT - IAS# PLS240A	230-1142



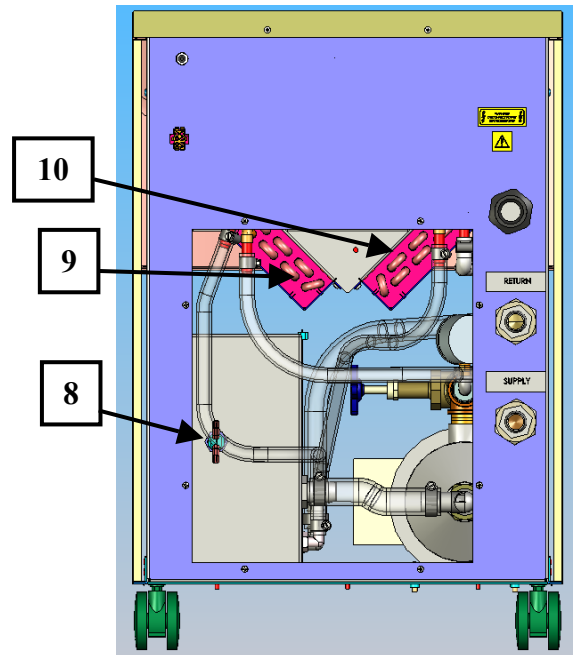
Front Panel, Lower



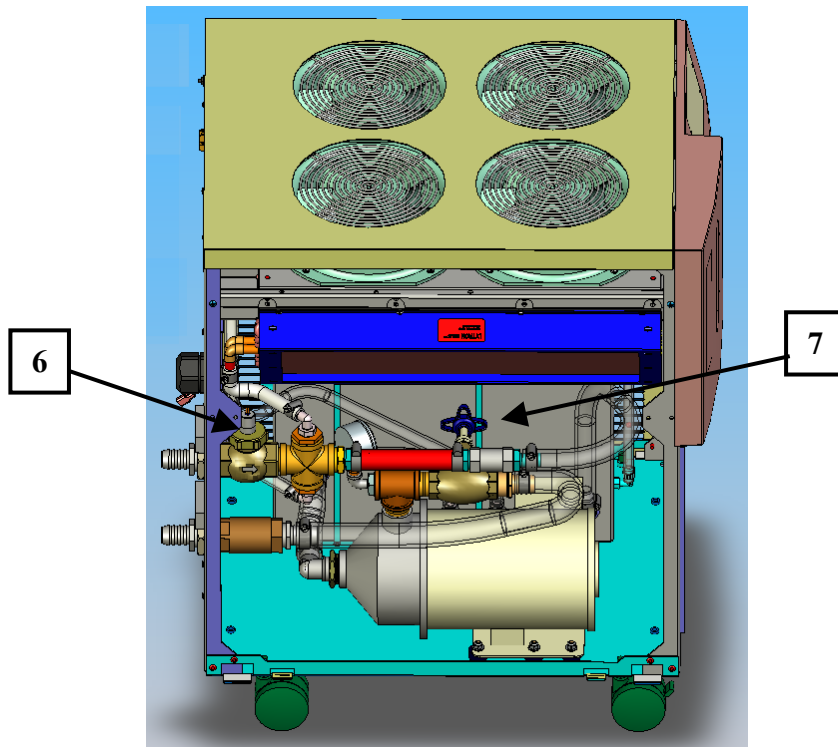
Top Cover



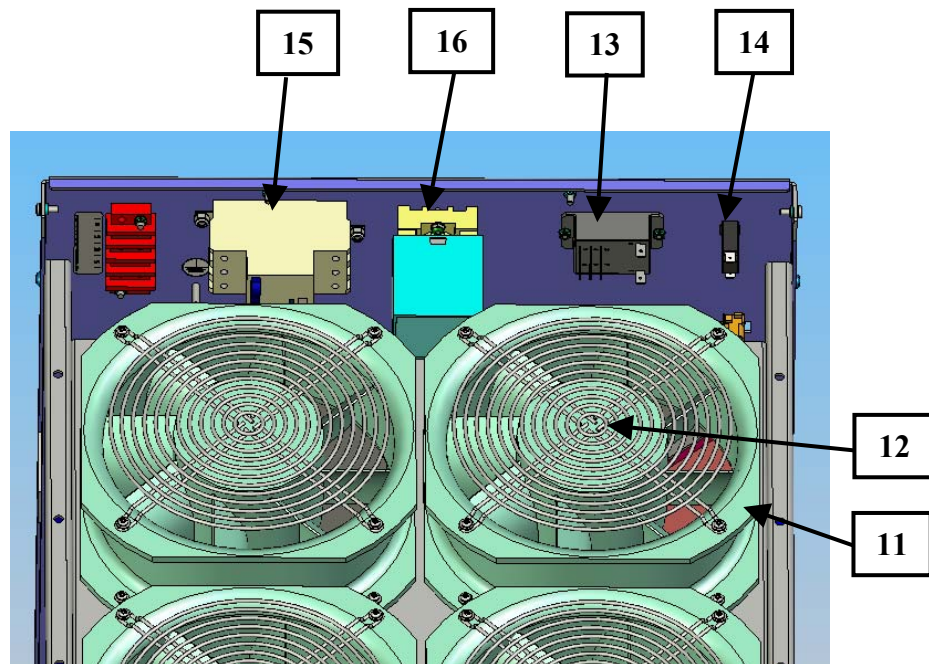
Casters, Pressure Gauge, & Pump



Level Switch & Heat Exchangers



Flow Switch & Flow Control Valve



Fans, Finger Guard, Relay, Circuit Breaker, Motor Starter, & Phase Reverse

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PLUMBING DIAGRAM
MCS7353G1

REVISIONS		CADRA		
ZONE	TR	DESCRIPTION	DATE	DES
A	ISSUED		3-16-05	JJS

QTY	PART OR IDENT NO.	DESCRIPTION	ITEM NO.
		UNLESS OTHERWISE SPECIFIED	
		ANGULAR DIMENSIONS .45°	
		SURFACE FINISH Ra (3.2 μm)	
		BREAK EDGES .010 (1.25 mm) MAX.	
		REMOVE ALL BURRS	
		TOLERANCE ON DECIMALS	
		INCH .1 .015 .005	
		(mm) .1 .015 .005	
	MCS7353G1	THIRD ANGLE PROJECTION	
	NEXT ASSY	USED ON	
	APPLICATION		

LIST OF MATERIALS OR PARTS LIST		DATE	
DRAWN	J. SEARS	3-16-05	
CHECKED	A. LUPIEN	3-16-05	
APPROVED	A. LUPIEN	3-16-05	
APPROVED			
APPROVED			
DO NOT SCALE THIS DRAWING			
MATERIAL		SIZE	FSCM NO.
FINISH		C 11245	840-0087
DIMENSIONS AND TOLERANCING ARE PER ANSI STD Y14.5		SCALE: NONE	WT.

Manual # 820-0192, Rev. C, 09/25/07

Electrical Schematic

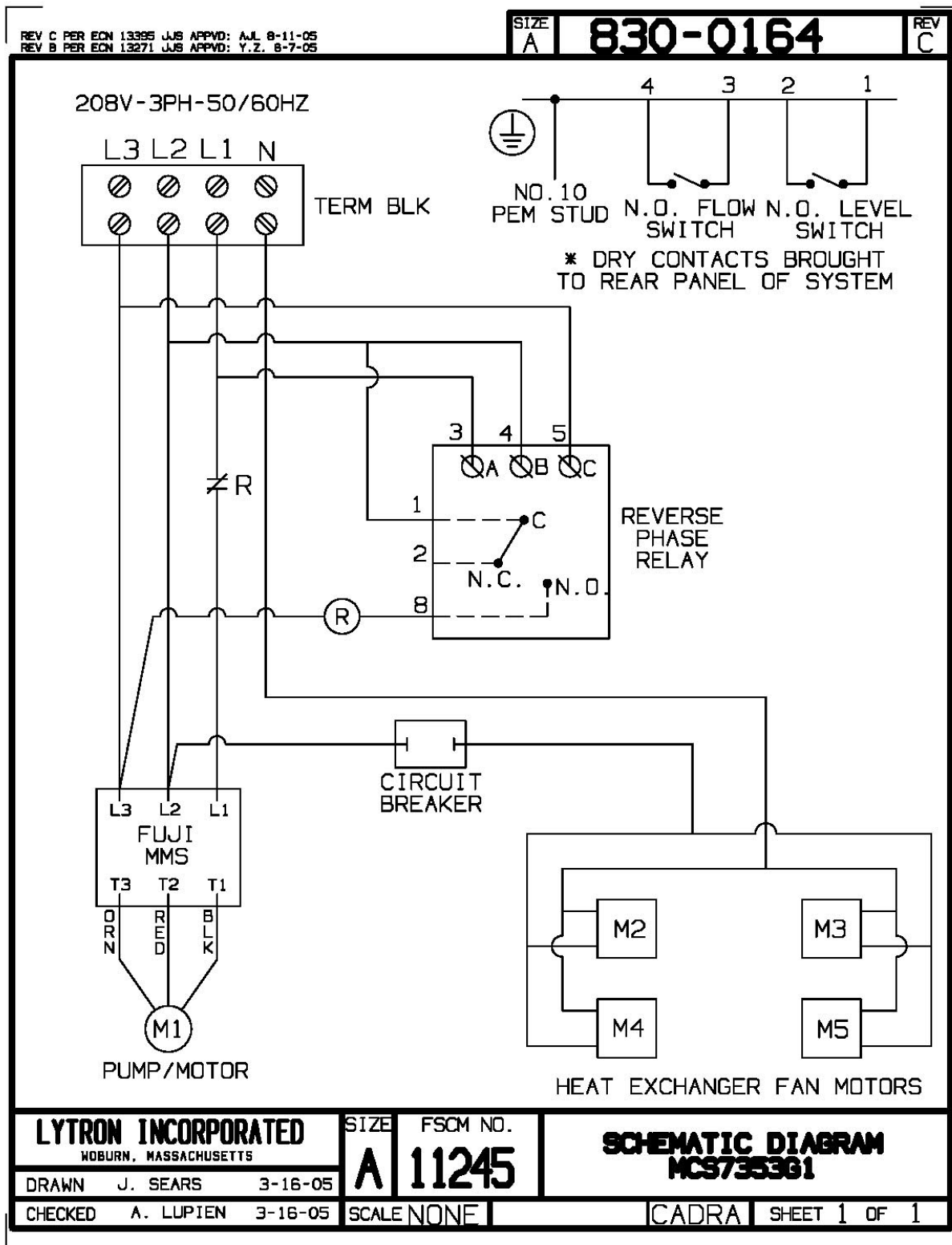


Figure 3

Lytron Cooling Systems Service Policy

Lytron's cooling systems are the product of over 40 years of thermal engineering and manufacturing experience. We designed them to provide superior reliability, easy maintenance and worry-free operation. However, occasionally a system may need repair. To ensure your process is back up and running quickly, Lytron has implemented the following cooling system service policy.

Lytron's Standard Warranty

Lytron's warranty is set forth at the end of the cooling system manual sent with each product.

Diagnostic Consultation:

At no cost, Lytron will attempt to diagnose the problem over the phone. Our service department can be reached by calling 781-933-7305 and following the menu. Service technicians are available 24 hours/7 days for consultation. Lytron strongly encourages customers to take advantage of this service before returning a cooling system to Lytron for evaluation. Often a problem with a system can be fixed quickly in-house or is an application problem. By working with Lytron's service department to troubleshoot a cooling system, you do not have the downtime and expense associated with returning the system to our factory.

Phone diagnosis can be difficult and may actually be a trial and error process. Lytron will not assume any liability for misdiagnosis when diagnosing over the phone.

Warranty and Non-warranty Returns:

To return a cooling system, a Lytron Return Material Authorization (RMA) number must be obtained from Lytron's service department, which can be reached by calling 781-933-7305 and following the menu. Prior to calling, the system part number, serial number, and a detailed description of the problem must be recorded, as this information is required to assign an RMA number. A Purchase Order, (PO), is also required for the evaluation and repair charges if Lytron determines the system is not defective as defined by the warranty (see below for more details). The RMA number should be indicated on the outside packaging of the returned unit. Systems must be returned clean, dry, and free from chemicals to Lytron's factory, shipping costs prepaid. Lytron is not responsible for any damage incurred in the return shipment.

Lytron ordinarily will evaluate the unit within 2 or 3 business days of receipt. Lytron will use reasonable effort to repair the unit promptly, in most cases within one week of receiving all the required parts.

If upon examination Lytron determines the system is not defective as defined by the warranty, an evaluation fee of \$375 to \$595, depending upon the system type will be charged. The evaluation fee will be charged regardless of disposition (i.e.: scrap).

In order to expedite the repair process for both warranty and non-warranty repair returns, a PO is required with recommended limits that will be determined when calling for the RMA. The amount suggested will cover the evaluation fee and most repair charges for non-warranty repairs. Lytron will proceed with the repair unless the total charges (evaluation and repair) exceed the amount of the PO. If this is the case, Lytron will provide a quote before proceeding with the repair. Repairs determined to be covered under warranty will not have any charges posted against the PO.

Debit memos should not be issued for warranty and non-warranty repairs unless the unit is returned as a result of an out-of-box (new) failure.

Lytron will warranty the repair for one year from the repair date under the terms of our standard warranty or for the balance of the original warranty, whichever is longer.

Return Shipments:

Lytron's warranty covers payment for standard, ground return shipment of warranted repairs. The incremental difference for expedited return shipments, if requested, are the responsibility of the customer. After non-warranty repair, Lytron will ship the system back using the customer's preferred shipping method.

Field Service/Installation Charges

Where available, Lytron can arrange field service for cooling system installation or repair. Under no circumstances does Lytron's warranty cover on-site service. All on-site service must be arranged through Lytron's service department. The charges for this service are as follows:

- \$250 administrative fee
- plus \$100/hr for on-site services provided*
- plus any related travel charges
- plus parts not covered under warranty.

* The hourly labor rate may vary depending upon city. Contact Lytron's service department for current rates in effect at the time.

All requests for On-Site Services require a PO or credit card in the amount of \$800 before services will be scheduled.

When using Lytron-arranged, on-site service, Lytron warrants the replacement parts and repair labor for 90 days from the repair date under the terms of our standard warranty or for the balance of the original warranty, whichever is longer. If non-authorized labor repairs the system or installs replacement parts, Lytron does not warranty the parts or work and this action potentially voids any remaining warranty.

Lytron is expanding its worldwide service presence. Please contact the Service Department for the latest areas where on site service is available.

Replacement Parts:

Replacement parts can be ordered using a credit card or purchase order. Parts being returned from systems under warranty should be returned using a Lytron issued RMA number. If the parts are found to be defective and the claim is within the warranty period, credit will be issued for the price of the parts and one-way ground shipping charges. If the parts are not defective or indicate end user damage, no credit will be issued. Lytron will not cover the incremental cost of air shipment of replacement parts, regardless of warranty status.

In-stock parts normally will be shipped the next business day; non-stocked parts will be shipped as quickly as reasonably possible.

This policy is subject to change. Please check with Lytron's service department for the current policy.

Form F4.3.25 Rev D, 7/21/04

Lytron MCS7353G1 Standard Warranty

Lytron agrees that the apparatus manufactured by it will be free from defects in materials and workmanship for the warranty period under normal use and service and when properly installed. The warranty period for the MCS7353G1 is two years from date of shipment of such apparatus to the original purchaser, maintenance items excluded, and one year from date of shipment of such apparatus to the original purchaser for all other products Lytron sells. Lytron's obligation under this agreement is limited solely to repair or replacement, at its option, at its factories, of any part or parts thereof, returned to Lytron with transportation charges prepaid, which examination shall disclose to Lytron's satisfaction to have been defective. THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. LYTRON'S OBLIGATION UNDER THIS WARRANTY IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE COMPONENT PARTS AND LYTRON DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION. LYTRON ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO LOSS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR REVENUE, LOSS OF THE UNIT, LOSS OF TIME, OR INCONVENIENCE. Lytron's liability does not include any labor charges for replacement of parts, adjustments, repairs, or any other work done outside its factories and its liability does not include any resulting damage to persons, property, equipment, goods or merchandise arising out of any defect in or failure of its apparatus. Lytron's obligation to repair or replace shall not apply to any apparatus which shall have been repaired or altered outside of its factory in any way, or which has been subject to negligence, to misuse, or to pressures in excess of stated limits. On parts not of Lytron's manufacture, such as motors, controls, etc., Lytron extends only those warranties given to Lytron, Inc. to the extent Lytron can do so. Lytron's agreement hereunder runs only to the immediate purchaser from Lytron, Inc. and does not extend, expressly or by implication, to any other person.

Form F4.3.18 Rev E June 6, 2003