

McQuay Airmatic Air Cooled Chiller 175 Ton

Mfg: McQuay

Model: ALR175C

Stock No. 175.ACEU37

Serial No. 5ZM8178401

McQuay Airmatic Air Cooled Chiller 175 Ton, 1995 model, Model ALR175C, S/N 5ZM8178401. Barrel information: year 1994, Model E1610, S/N 52M0003700, 6-½ in. outlet on barrel. (4) Compressors, 50 hp, 83 rla, 535 lra, 460 volt, 60 hz, 3 phase. Overall dimensions 7ft. 5 in. x 22 ft. 6 in. x 7 ft.

Compressors run hours:

1 - 15,107 hours, 15,258 starts

2 - 8,596 hours, 11,849 starts

3 - 1,924 hours, 6,149 starts

4 - 356 hours, 2,141 starts





INTRODUCTION

This manual covers only the mechanical aspects of ALR chillers equipped with the MicroTech reciprocating chiller control. All of the operating, safety control, and installation requirements of the MicroTech control are covered in the separate installation and maintenance bulletin IM 493, which must be consulted before startup and operation is attempted.

GENERAL DESCRIPTION

McQuay type ALR SEASONPAK air cooled water chillers are complete, self-contained automatic refrigerating units that include the latest in engineered components arranged to provide a compact and efficient unit. Each unit is completely assembled and factory wired before evacuation, charging and testing, and comes complete and ready for installation. Each unit consists of twin air cooled condensers with integral sub-cooler sections, multiple accessible hermetic compressors, replaceable tube dual circuit shell-and-tube evaporator, and complete refrigerant piping. Liquid line components that are included are manual liquid line shutoff valves, charging valves, filter-driers, liquid line solenoid valves, sightglass/moisture indicators, and double diaphragm hydraulic element thermal

expansion valves. Other features include compressor crank-case heaters, an evaporator heater for chilled water freeze protection, recycling pumpdown during "on" or "off" seasons, compressor lead-lag switch to alternate the compressor starting sequence, and sequenced starting of compressors.

The electrical control center includes all safety and operating controls necessary for dependable automatic operation. Condenser fan motors are fused in all three conductor legs and started by their own three-pole contactors. Compressors are not fused but may be protected by optional circuit breakers, or by the field installed fused disconnect for protection.

NOMENCLATURE



INSPECTION

When the equipment is received, all items should be carefully checked against the bill of lading to insure a complete shipment. All units should be carefully inspected for damage upon arrival. All shipping damage should be reported to the carrier and a claim should be filed. The unit serial plate should

be checked before unloading the unit to be sure that it agrees with the power supply available. Physical damage to unit after acceptance is not the responsibility of SnyderGeneral Corp.

NOTE: Unit shipping and operating weights are available in the physical data tables 4 and 5, pages 9 and 10.

INSTALLATION

NOTE: Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

CAUTION: Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

HANDLING

Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base, and block the pushing vehicle away from the unit to prevent damage to the sheetmetal cabinet and end frame (see Figure 1).

Never allow any part of the unit to fall during unloading or

moving as this may result in serious damage.

To lift the unit, 2" diameter lifting holes are provided in the base of the unit. Spreader bars and cables should be arranged to prevent damage to the condenser coils or unit cabinet (see Figure 2).

Figure 1. Suggested Pushing Arrangement

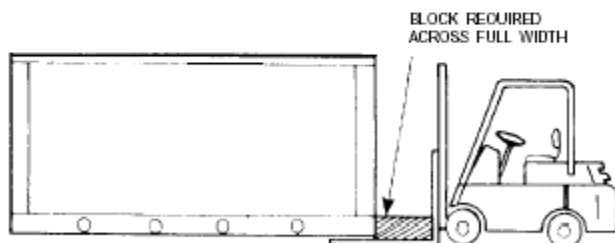
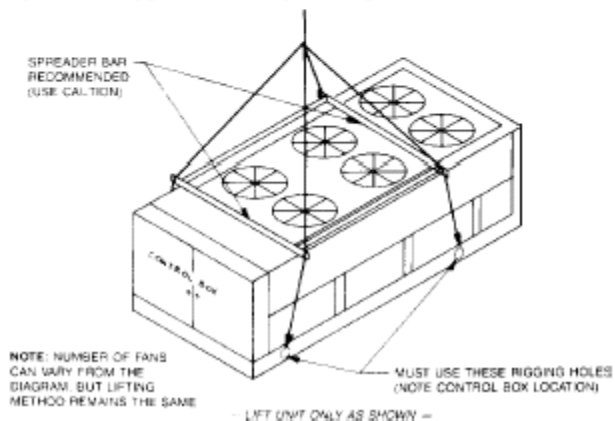


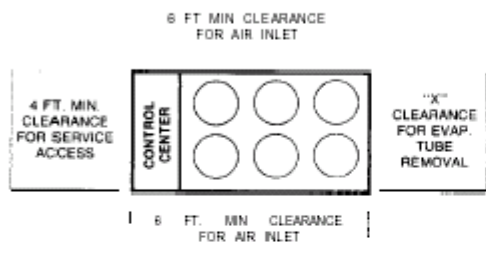
Figure 2. Suggested Lifting Arrangement



LOCATION

Care should be taken in the location of the unit to provide proper airflow to the condenser, minimizing effects on condensing pressure.

Figure 3. Clearance Requirements



Due to the vertical condenser design of the ALR-105 thru 195 chillers, it is recommended that the unit is oriented so that prevailing winds blow parallel to the unit length, thus minimizing the effects on condensing pressure. If it is not practical to orient the unit in this manner, a wind deflector should be constructed.

Minimizing clearances as shown in Figure 3 will prevent most discharge air recirculation to the condenser which will have a significant effect on unit performance.

ALR UNIT SIZE	"X" DIMENSION
ALR-040C thru 095C	8 Ft. Minimum
ALR-105C thru 195C	10 Ft. Minimum

NOTES:

1. Minimum clearance between units is 12 feet.
2. Units must not be installed in a pit that is deeper than the height of the unit.
3. Minimum clearance on each side is 12 feet when installed in a pit.

SERVICE ACCESS

Each end of the unit must be accessible after installation for periodic service work. Compressors, filter-driers, and manual liquid line shutoff valves are accessible on each side of the unit adjacent to the control box. High pressure, low pressure, and motor protector controls are on the compressor. Freeze-stats and cooler barrel thermostat are near the cooler. Most other operational, safety and starting controls are located

in the unit control box.

On all ALR units the condenser fans and motors can be removed from the top of the unit. A complete fan/motor assembly should be removed for service.

CAUTION: Disconnect all power to the unit while servicing condenser fan motors.

VIBRATION ISOLATORS

Vibration isolators are recommended for all roof mounted installations or wherever vibration transmission is a consideration. Table 1 lists spring isolators for all ALR unit sizes. Figure 4 shows isolator locations in relation to the unit control center. Figure 5 gives dimensions that are required to secure each

McQuay isolator selection to the mounting surface. Table 3 shows the isolator loads at each location shown in Figure 4, and the maximum loads for each McQuay selection are shown in Table 2.

Table 1. Vibration Isolators (Spring)

ALR UNIT SIZE	ISOLATOR LOCATIONS					
	1	2	3	4	5	6
WITHOUT HEAT RECOVERY CONDENSERS						
040C	CP1-28	CP1-28	CP1-28	CP1-28	CP1-28	CP1-28
050C	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31
060C	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31
065C	CP1-32	CP1-32	CP1-32	CP1-32	CP1-32	CP1-32
075C	CP1-32	CP1-32	CP1-32	CP1-32	CP1-32	CP1-32
085C	CP2-27	CP2-27	CP2-26	CP2-27	CP2-27	CP2-26
095C	CP2-27	CP2-27	CP2-27	CP2-27	CP2-27	CP2-27
105C	CP2-28	CP2-28	CP2-31	CP2-28	CP2-28	CP2-31
115C	CP2-28	CP2-28	CP2-31	CP2-28	CP2-28	CP2-31
125C	CP2-31	CP2-31	CP2-31	CP2-31	CP2-31	CP2-31
145C	CP2-31	CP2-31	CP2-31	CP2-31	CP2-31	CP2-31
155C	CP2-31	CP2-31	CP2-32	CP2-31	CP2-31	CP2-32
175C	CP2-32	CP2-32	CP2-32	CP2-32	CP2-32	CP2-32
195C	CP2-32	CP2-32	CP2-32	CP2-32	CP2-32	CP2-32
WITH HEAT RECOVERY CONDENSER						
040C	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31	CP1-31
050C	CP2-27	CP1-31	CP2-27	CP2-26	CP2-26	CP2-26
060C	CP2-27	CP2-27	CP2-28	CP2-32	CP2-32	CP2-27
065C	CP2-28	CP2-28	CP2-28	CP2-27	CP2-27	CP2-27
075C	CP2-28	CP2-28	CP2-28	CP2-27	CP2-27	CP2-27
085C	CP2-28	CP2-28	CP2-28	CP2-27	CP2-27	CP2-27
095C	CP2-31	CP2-31	CP2-31	CP2-28	CP2-28	CP2-28
105C	CP4-26	CP4-26	CP4-27	CP4-28	CP4-28	CP4-26
115C	CP4-26	CP4-26	CP4-26	CP4-28	CP4-32	CP4-27
125C	CP2-32	CP2-32	CP2-27	CP2-26	CP2-26	CP2-26
145C	CP2-32	CP2-32	CP2-27	CP2-26	CP2-26	CP2-32
155C	CP2-32	CP2-32	CP2-28	CP2-26	CP2-26	CP2-27
175C	CP4-28	CP4-28	CP4-28	CP4-32	CP4-27	CP4-27
195C	CP4-28	CP4-28	CP4-28	CP4-27	CP4-27	CP4-27

Table 2. Spring Flex Isolators

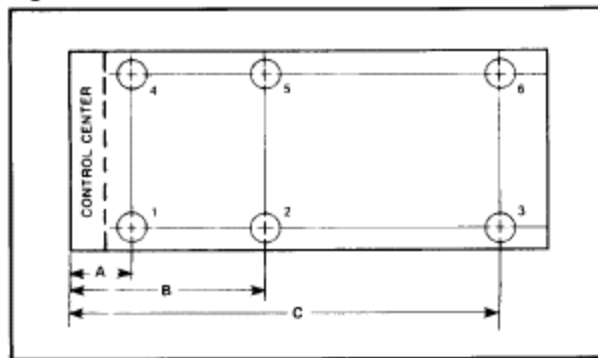
TYPE	COLOR	McQUAY PART NO.	MAX. LOAD EACH (LBS.)
CP1-25	RED	477927A-25	450
CP1-26	PURPLE	477927A-26	600
CP1-27	ORANGE	477927A-27	750
CP1-28	GREEN	477927A-28	900
CP1-31	WHITE	477927A-31	1100
CP1-32	GRAY	477927A-32	1300
CP2-25	RED	477929A-25	900
CP2-26	PURPLE	477929A-26	1200
CP2-27	ORANGE	477929A-27	1500
CP2-28	GREEN	477929A-28	1800
CP2-31	GRAY	477929A-31	2200
CP2-32	WHITE	477929A-32	2600
CP4-26	PURPLE	580513A-26	2400
CP4-27	ORANGE	580513A-27	3000
CP4-28	GREEN	580513A-28	3600
CP4-31	GRAY	580513A-31	4400
CP4-32	WHITE	580513A-32	5200

Table 3. Isolator Loads

ALR UNIT SIZE	ISOLATOR LOADS AT EACH MOUNTING LOCATION (LBS.)					
	1	2	3	4	5	6
WITHOUT HEAT RECOVERY CONDENSERS						
040C	677	677	677	677	677	677
050C	775	769	755	775	769	755
060C	810	804	789	810	804	789
065C	953	924	823	953	924	823
075C	1020	989	882	1020	989	882
085C	1086	1088	874	1086	1088	874
095C	1184	1136	967	1184	1136	967
105C	1184	1190	1483	1184	1140	1483
115C	1313	1329	1693	1313	1329	1693
125C	1367	1447	1727	1367	1447	1727
145C	1374	1461	1762	1374	1461	1762
155C	1552	1584	2005	1552	1584	2005
175C	2014	1931	1773	2014	1931	1773
195C	2076	1974	1779	2076	1974	1779
WITH HEAT RECOVERY CONDENSER						
040C	733	747	776	753	768	800
050C	916	965	1080	760	801	896
060C	1004	1016	1253	807	827	1010
065C	1244	1234	1200	1024	1016	988
075C	1294	1284	1249	1066	1058	1029
085C	1391	1357	1236	1156	1127	1027
095C	1537	1523	1472	1226	1214	1173
105C	1585	1625	2105	1278	1273	1688
115C	1739	1781	2303	1426	1419	1879
125C	1821	1895	2312	1450	1617	1864
145C	1835	1925	2373	1476	1598	1923
155C	2098	2035	2710	1679	1711	2196
175C	2357	2452	2633	1874	2155	2141
195C	2422	2496	2636	2014	2057	2192

NA - Not Available

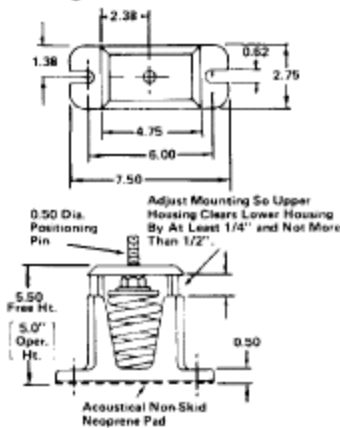
Figure 4. Isolator Locations



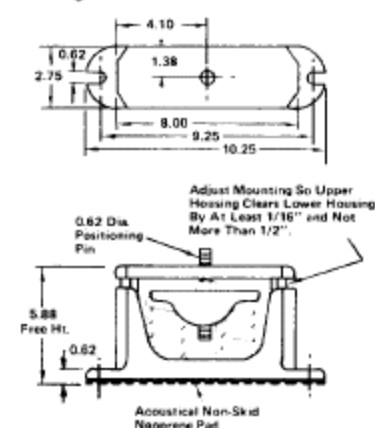
ALR UNIT SIZE	VIBRATION MOUNT LOCATION DIMENSIONS (INCHES)		
	A	B	C
040C	13	43	109
050C	13	58	162
060C	13	58	162
065C	13	58	215
075C	13	58	215
085C	13	58	215
095C	13	58	215
105C	13	58	215
115C	13	58	215
125C	13	58	215
145C	13	58	215
155C	13	58	215
175C	13	58	250
195C	13	58	250

Figure 5. Spring Isolators

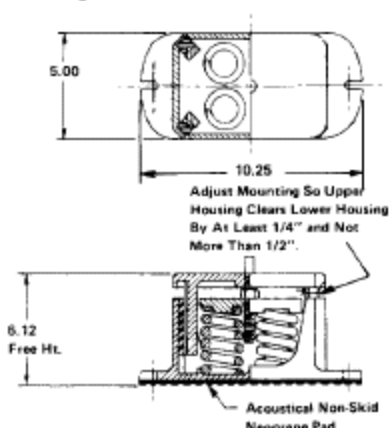
Ordering No. 477927A-25 thru 477927A-32



Ordering No. 477929A-25 thru 477929A-32



Ordering No. 580513A-26 thru 580513A-32



WATER PIPING

Due to the variety of piping practices, it is advisable to follow the recommendations of local authorities. They can supply the installer with the proper building and safety codes required for a safe and proper installation.

Basically, the piping should be designed with a minimum number of bends and changes in elevation to keep system cost down and performance up. It should contain:

1. Vibration eliminators to reduce vibration and noise transmission to the building.

2. Shutoff valves to isolate the unit from the piping system during unit servicing.
3. Manual or automatic air vent valves at the high points of the system.
4. Some means of maintaining adequate system water pressure (e.g., expansion tank or regulating valve).
5. Temperature and pressure indicators located at the unit to aid in unit servicing.
6. A strainer or some means of removing foreign matter from the water before it enters the pump. It should be placed

far enough upstream to prevent cavitation at the pump inlet (consult pump manufacturer for recommendations). The use of a strainer will prolong pump life and thus keep system performance up.

- The shell-and-tube cooler has a thermostat and heating cable to prevent freeze-up down to -20° F. It is suggested that the heating cable be wired to a separate 110V supply circuit, but it is factory wired to the control circuit. Any water piping to the unit must also be protected to prevent freezing.

CAUTION: If a separate disconnect is used for the 110V

supply to the cooler heating cable, it should be clearly marked so that it is not accidentally shut off during cold seasons.

Prior to insulating the piping and filling the system, a preliminary leak check should be made.

Piping insulation should include a vapor barrier to prevent moisture condensation and possible damage to the building structure. It is important to have the vapor barrier on the outside of the insulation to prevent condensation within the insulation on the cold surface of the pipe.

WATER COOLED CONDENSER FREEZE PROTECTION

CAUTION: Condenser freeze protection is not provided with heat recovery units.

If freeze protection is required, it can be accomplished in one of the following ways:

1. Wrap condenser and condenser water piping with heat tape and insulate.

2. Circulate warm water through condenser during freeze conditions.
3. Use an ethylene glycol solution in the condenser circuit.

CHILLED WATER SENSOR

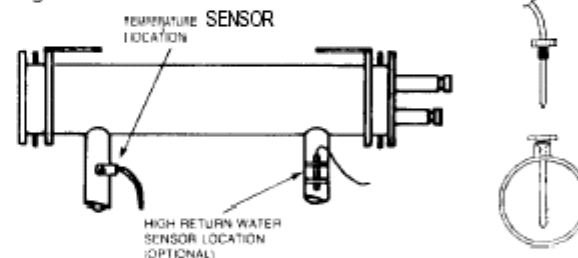
On units ALR-040C thru 195C, the chilled water sensor is factory installed in the leaving water connection on the evaporator. For detailed specifications regarding the chilled water sensor or any other sensors/transducers, refer to IM 493. Care should be taken not to damage the sensor cable or lead wires when working around the unit. It is also advisable to check the lead wire before running the unit to be sure that it is firmly anchored and not rubbing on the frame from the well for servicing, care should be taken as not to wipe off the heat conducting compound supplied in the well.

NOTE: See IM 493 for additional thermostat information.

CAUTION: The thermostat bulb should not be exposed to water temperatures above 125° F since this will damage the control.

VENDOR MODEL NO.	IM BULLETIN NUMBER	SENSOR LOCATION	
		RETURN	LEAVING
Barber Coleman CP8161	348	X	
Honeywell W7100G	385		X
MicroTech, Control Manual	493		X
MicroTech, Unit Manual	508		X

Figure 6.



FLOW SWITCH

A WATER FLOW SWITCH MUST BE MOUNTED in either the entering or leaving water line to insure that there will be adequate water flow and cooling load to the evaporator before the unit can start. This will safeguard against slugging the compressors on startup. It also serves to shut down the unit in the event that water flow is interrupted to guard against evaporator freeze-up.

A flow switch is available under ordering number

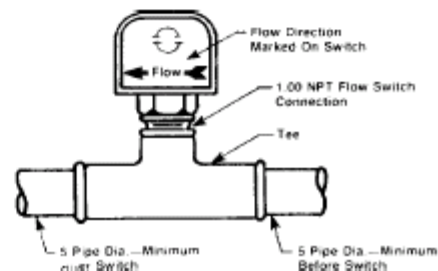
860-175033B-00. It is a "paddle" type switch and adaptable to any pipe size from 1" to 6" nominal. Certain minimum flow rates are required to close the switch and are listed in Table 3. Installation should be as shown in Figure 7.

The flow switch should be wired per actual unit wiring diagram found on the inside of the unit control panel or refer to IM 493.

Table 3. Flow Switch Minimum Flow Rates

NOMINAL PIPE SIZE (INCHES)	MINIMUM REQUIRED FLOW TO ACTIVATE SWITCH (GPM)
1	6.99
1¼	9.80
1½	12.70
2	18.80
2½	24.30
3	30.00
4	39.70
5	58.70
6	79.20

Figure 7.



WATER CONNECTIONS

Water piping to the cooler can be brought up from the bottom of the unit or through the side between the vertical supports. The optional heat recovery condensers can be piped up from the bottom or the end of the unit. Figures 8 and 9 give the necessary dimensions and locations for all piping connections.

REFRIGERANT CHARGE

All units are designed for use with Refrigerant 22 and are shipped with an operating charge. The operating charge for

NOTE: ON UNIT SIZES 175C AND 19X, THERE IS A DIAGONAL BRACE OFF OF A VERTICAL SUPPORT WHICH WILL INTERFERE WITH THE WATER CONNECTION IF BROUGHT IN FROM THE SIDE. THIS BRACE CAN BE REMOVED, BUT ONLY AFTER THE UNIT IS IN PLACE.

each unit is shown in the Physical Data tables on pages 9 and 10.

GLYCOL SOLUTIONS

The system glycol capacity, glycol solution flow rate in gpm, and pressure drop through the cooler may be calculated using the following formulas and table.

1. CAPACITY — Capacity is reduced from that with plain water. To find the reduced value multiply the chiller's water system tonnage by the capacity correction factor C to find the chiller's capacity in the glycol system.
2. GPM — To determine gpm (or ΔT) knowing ΔT (or gpm) and tons:

$$\text{Glycol gpm} = \frac{24 \times \text{Tons (Glycol)}}{A T} \times C \text{ (from table)}$$

3. PRESSURE DROP — To determine glycol pressure drop through the cooler, enter the water pressure drop graph on page 8 at the glycol gpm. Multiply the water pressure drop found there by P to obtain corrected glycol pressure drop.
4. To determine glycol system kw, multiply the water system kw by factor K.

Test coolant with a clean, accurate glycol solution hydrometer (similar to that found in service stations) to determine freezing point. The obtain percent glycol from the freezing point table below.

PERCENT E.G.	FREEZING POINT	C	K	G	P
0	32°F	1.000	1.000	1.00	1.00
10	24°F	0.990	0.994	1.01	1.06
20	15°F	0.981	0.988	1.04	1.12
30	4°F	0.974	0.984	1.08	1.18
40	-12°F	0.968	0.981	1.13	1.24
50	-33°F	0.964	0.980	1.20	1.30

Condenser — The use of a glycol solution in the heat recovery condensers will not affect heat recovery capacity.

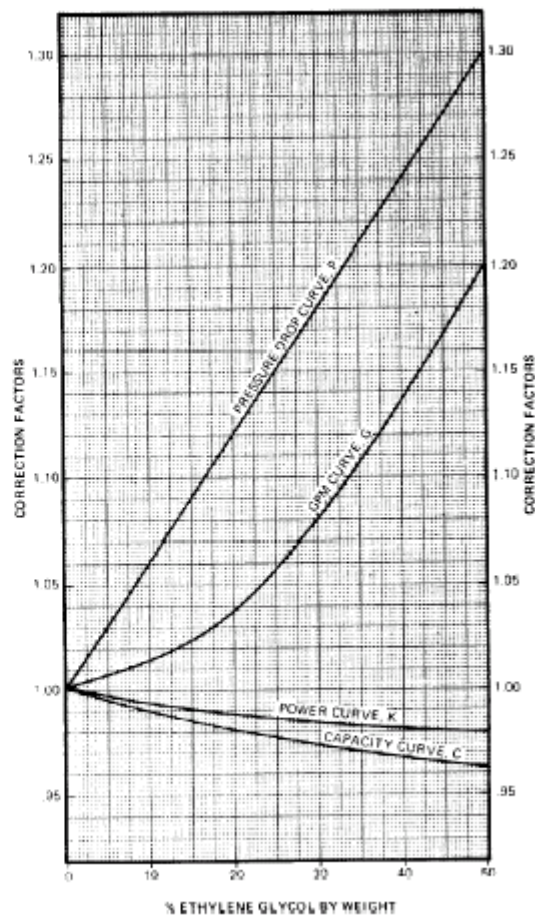
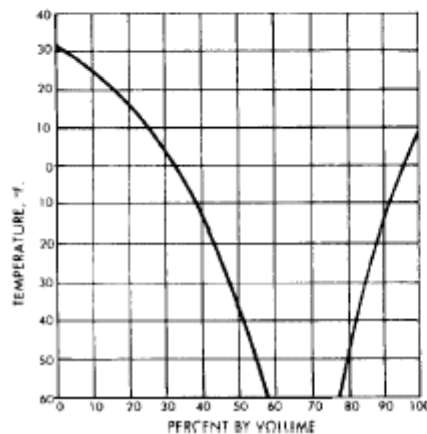
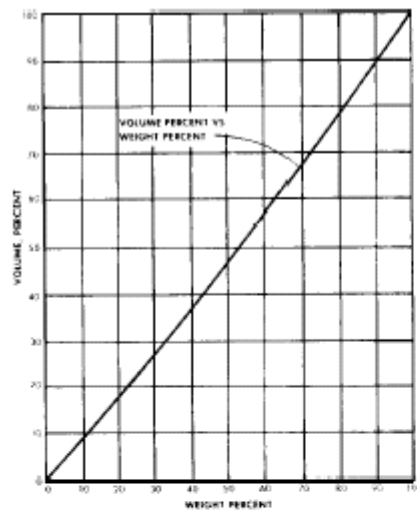


Table 5. Physical Data ALR-105C thru 195C

DATA	ALR MODEL NUMBER													
	105C		115C		125C		145C		155C		175C		195C	
	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2	Ckt. 1	Ckt. 2
BASIC DATA														
UNIT CAPACITY @ ARI CONDITIONS, TONS (1)	102.7		113.2		122.3		137.9		153.3		167.3		187.9	
NUMBER OF REFRIGERANT CIRCUITS	2		2		2		2		2		2		2	
UNIT OPERATING CHARGE, LBS. R-22	56.1	56.1	70.2	70.2	70.4	70.4	73.2	73.2	88.5	88.5	96.5	96.5	98.8	98.8
CABINET DIMENSIONS, LxWxH, INCHES	229x83x59		229x83x92		229x83x92		229x83x92		229x83x92		263x83x92		263x83x92	
UNIT OPERATING WEIGHT, LBS.	7713		8668		8978		9087		10,153		11,436		11,658	
UNIT SHIPPING WEIGHT, LBS.	7369		8350		8659		8786		9705		11,016		11,277	
ADD'L WEIGHT IF COPPER FINNED COILS, LBS.	1103		1236		1388		1388		2080		2429		2429	
COMPRESSORS — COPELAMETIC FULLY ACCESSIBLE, SEMI-HERMETIC														
NOMINAL HORSEPOWER	35-25	35-25	35-25	35-35	35-35	35-35	40-40	40-40	50-40	50-40	50-50	50-50	60-60	60-60
NUMBER OF CYLINDERS PER COMPRESSOR	6-4	6-4	6-4	6-6	6-6	6-6	6-6	6-6	8-6	8-6	8-8	8-8	8-8	8-8
CYLINDER BORE, INCHES	2.6875	2.6875	2.6875	2.6875	2.6875	2.6875	2.9375	2.9375	Note 5	Note 5	2.6875	2.6875	2.9375	2.9375
CYLINDER STROKE, INCHES	2.1875	2.1875	2.1875	2.1875	2.1875	2.1875	2.1875	2.1875	Note 5	Note 5	2.3438	2.3438	2.3438	2.3438
OIL CHARGE PER COMPRESSOR	160-136	160-136	160-136	160-160	160-160	160-160	242-242	242-242	242-242	280-240	260-240	260-260	260-260	260-260
CAPACITY REDUCTION STEPS — PERCENT OF COMPRESSOR DISPLACEMENT														
STANDARD STAGING	0-30-60-80-100		0-27-55-73-100 or 0-27-55-82-100		0-25-50-75-100		0-17-33-42- 50-75-100		0-20-41-48- 54-77-100		0-19-37-44- 50-75-100		0-19-37-44- 50-75-100	
OPTIONAL STAGING	0-20-40-50- 60-80-100		0-18-36-45- 55-73-100 or 1-18-36-45- 55-82-100		0-17-33-42- 50-75-100		0-17-33-42- 50-67-83 92-100		0-20-41-47- 54-63-71 86-100		0-19-37-44- 50-62-75- 87-100		0-19-37-44- 50-62-75- 87-100	
CONDENSERS — HIGH EFFICIENCY FIN AND TUBE TYPE WITH INTEGRAL SUBCOOLER														
COIL FACE AREA, SQUARE FEET	57.8	57.8	115.6	115.6	115.6	115.6	115.6	115.6	115.6	115.6	135.0	135.0	135.0	135.0
FINNED HEIGHT x FINNED LENGTH, Inches	40x208	40x208	80x208	80x208	80x208	80x208	80x208	80x208	80x208	80x208	80x243	80x243	80x243	80x243
FINS PER INCH x ROWS DEEP	12x3	12x3	12x2	16x2	16x2	16x2	16x2	16x2	16x3	16x3	16x3	16x3	16x3	16x3
CONDENSER FANS — DIRECT DRIVE PROPELLER TYPE														
NUMBER OF FANS — FAN DIAMETER, INCHES	10 — 26		10 — 26		12 — 26		12 — 26		12 — 26		14 — 26		14 — 26	
NUMBER OF MOTORS — HORSEPOWER	10 — 1.0		10 — 1.0		12 — 1.0		12 — 1.0		12 — 1.0		14 — 1.0		14 — 1.0	
FAN AND MOTOR RPM	1100		1100		1100		1100		1100		1100		1100	
FAN TIP SPEED, FPM	7760		7760		7760		7760		7760		7760		7760	
TOTAL UNIT AIRFLOW, CFM	62,000		76,500		87,480		87,480		81,960		95,620		95,620	
DIRECT EXPANSION EVAPORATOR — BAFFLED SHELL AND THRU-TUBE														
SHELL DIAMETER, INCHES — TUBE LENGTH, FEET	14 — 10		14 — 10		14 — 10		14 — 10		16 — 10		16 — 10		16 — 10	
WATER VOLUME, GALLONS	41.3		38.2		38.2		36.1		53.7		50.3		45.6	
MAXIMUM WATER PRESSURE, PSIG (NOTE 3)	175		175		175		175		175		175		175	
HEAT RECOVERY CONDENSERS — WATER COOLED, SHELL AND TUBE TYPE														
TOTAL UNIT OPERATING CHARGE, LBS. R-22	214.5	214.5	248.3	248.3	248.5	248.5	247.2	247.2	295.4	295.4	323.4	323.4	325.8	325.8
ADD'N TO STD. UNIT SHIPPING WEIGHT, LBS.	844	844	863	863	863	863	884	884	966	966	986	986	986	986
ADD'N TO STD. UNIT OPERATING WEIGHT, LBS.	921	921	940	940	940	940	970	970	1068	1068	1088	1088	1088	1088
SHELL DIAMETER x TUBE LENGTH, INCHES	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120	10x120
WATER VOLUME, GALLONS	9.2	9.2	9.2	9.2	9.2	9.2	10.3	10.3	12.2	12.2	12.2	12.2	12.2	12.2
MAXIMUM WATER PRESSURE, PSIG (NOTE 3)	250		250		250		250		250		250		250	

NOTES:

- (1) Nominal capacity based on 95°F ambient air and 54°F/44°F water range.
- (2) On an ALR-040C, a heat recovery condenser is not available on just Circuit 1. For heat recovery condensers on both circuits, add 470 lbs. to the shipping weight and 519 lbs. to the operating weight.
- (3) If higher pressures are required, consult your local McQuay representative.
- (4) Cylinder bore for 50 hp: 2.6875; for 40 hp: 2.9375 (inches).
Cylinder stroke for 50 hp: 2.3438; for 40 hp: 2.1875 (inches).

Figure 9. ALR Dimensional Drawings – 115C Thru 195C
FOR FAN ARRANGEMENTS, SEE FIGURE 10, PAGE 15.

All Dimensions in Inches

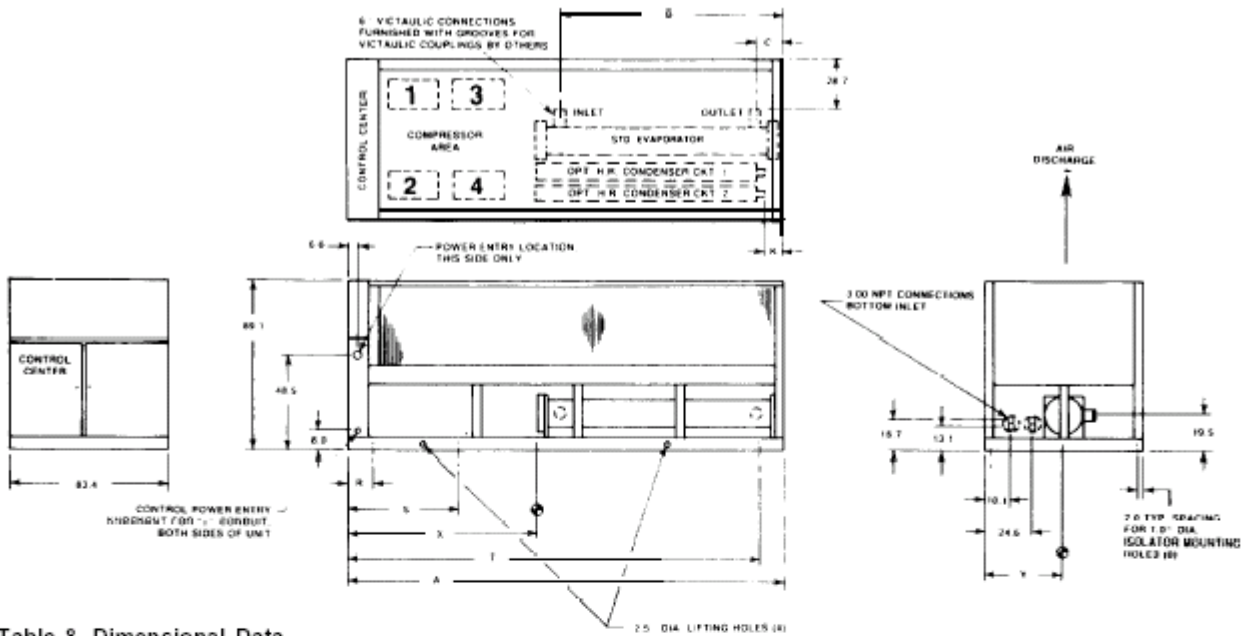


Table 8. Dimensional Data

ALR MODEL	LENGTH A	EVAPORATOR WATER CONN. (1)		K	CENTER OF GRAVITY				ISOLATOR LOCATIONS		
		B	C		STD. UNIT		OPT. H ₂ O COND. (2)		R	S	T
					X	Y	X	Y			
115C	228.7	117.6	13.8	0.0	109.5	41.7	118.2	37.4	13.0	58.0	215.0
125C	228.7	117.6	13.8	0.0	104.3	41.7	116.4	37.5	13.0	58.0	215.0
145C	228.7	117.6	13.8	0.0	104.9	41.7	117.1	37.4	13.0	58.0	215.0
155C	228.7	118.5	12.9	0.0	105.2	41.7	117.7	37.5	13.0	58.0	215.0
175C	263.4	153.2	47.6	32.4	114.2	41.7	123.9	37.8	13.0	95.0	249.7
195C	263.4	153.2	47.6	32.4	113.1	41.7	122.8	37.9	13.0	95.0	249.7

(1) EVAPORATOR CONNECTIONS: All connections NPS steel pipe. Connections are furnished with grooves for victaulic couplings by others.
 (2) Includes both circuits.
 (3) For unit sizes 175C and 195C, see note on water connections. Page 7

FIELD WIRING

Wiring must comply with all applicable codes and ordinances. Warranty is voided if wiring is not in accordance with specifications. An open fuse indicates a short, ground, or overload. Before replacing a fuse or restarting a compressor or fan motor, the trouble must be found and corrected.

Copper wire is required for all power lead terminations at the unit while either aluminum or copper can be used for all other wiring.

ALR units may be ordered with internal power wiring for either single or multiple point power connection. If single point power connection is ordered, a single large power terminal block is provided and wiring within the unit is sized in accordance with the National Electrical Code. A single field supplied disconnect is required. An optional factory mounted transformer may be provided.

If multiple point power wiring is ordered, three power connections, one per compressor circuit plus one for condenser fans and control circuit, are required and wiring within the unit is sized in accordance with the National Electrical Code. Separate field supplied disconnects are required for each of the three circuits. A single power block is provided for all of the condenser fans and the optional 115V control transformer.

It may be desirable to have the unit cooler heater on a separate disconnect switch from the main unit power supply so that the unit may be shut down without defeating the freeze protection provided by the cooler heater.

CAUTION: Internal power wiring to the compressors for the single point versus the multiple point option are different. It is imperative that the proper field wiring be installed according to the way the unit is built.

CANADIAN CSA LISTING

Canadian units which are CSA listed and are equipped for multiple point power connections have a sticker (see figure below) next to the wiring diagram in the control box. This notifies the installer that local authorities may require the unit to be connected to a single electrical power source. Check with local authorities for requirements.

NOTICE

Although this unit may be provided with options requiring more than one source of electrical supply, some electrical inspection authorities may require this unit to be connected to a single external electrical supply.

Form No. 478148B-01-0

Table 9. Wire Sizing Ampacities

ALR MODEL	3 PH, 60 HZ ELEC. POWER POWER SUPPLY ①	WIRE SIZE AMPS ②				POWER ENTRY HUB	
		SINGLE POINT POWER SUPPLY ③	MULTIPLE POINT POWER SUPPLY ④			QUANTITY & DIAMETER ⑤	
			Elec. Ckt. 1 Fans & Controls	Elec. Ckt. 2 Compr. Ckt. 1	Elec. Ckt. 3 Compr. Ckt. 2	SINGLE POINT POWER SUPPLY	MULT. POINT POWER SUPPLY
040C	208	184	25.6	79	96	(1) 2"	(1) 2"
	230	184	25.6	79	96	(1) 2"	(1) 2"
	460 ③	93	12.8	39	49	(1) 1½"	(1) 1½"
	575	76	12.7	33	39	(1) 1"	(1) 1¼"
050C	208	234	25.6	96	133	(1) 2½"	(1) 2½"
	230	234	25.6	96	133	(1) 2½"	(1) 2½"
	460 ③	118	12.8	49	66	(1) 1½"	(1) 1½"
	575	92	12.7	39	45	(1) 1¼"	(1) 1¼"
060C	208	278	33.6	133	140	(1) 2½"	(1) 3"
	230	278	33.6	133	140	(1) 2½"	(1) 3"
	460 ③	140	16.8	66	70	(1) 1½"	(1) 2"
	575	108	16.7	45	56	(1) 1¼"	(1) 1½"
065C	208	292	41.6	140	140	(1) 2½"	(1) 3"
	230	292	41.6	140	140	(1) 2½"	(1) 3"
	460 ③	147	20.8	70	70	(1) 1½"	(1) 2"
	575	121	21.5	56	56	(1) 1½"	(1) 2"
075C	208	384	41.6	191	191	(1) 3"	(1) 4"
	230	355	41.6	175	175	(1) 3"	(1) 4"
	460 ③	180	20.8	89	89	(1) 2"	(1) 2"
	575	142	21.5	68	68	(1) 1½"	(1) 2"
085C	208	412	41.6	206	206	(1) 4"	(1) 4"
	230	412	41.6	206	206	(1) 4"	(1) 4"
	460 ③	207	20.8	104	104	(1) 2½"	(1) 2½"
	575	169	21.5	83	83	(1) 1½"	(1) 2½"
095C	208	501	49.6	251	251	(1) 4"	(2) 2½", (1) 1"
	230	501	49.6	251	251	(1) 4"	(2) 2½", (1) 1"
	460 ③	249	24.8	125	125	(1) 2½"	(1) 3"
	575	205	26.8	100	100	(1) 2½"	(1) 2½"
105C	208	455	50.6	217	217	(1) 4"	(2) 2", (1) 1"
	230	455	50.6	217	217	(1) 4"	(2) 2", (1) 1"
	460 ③	229	25.3	109	109	(1) 2½"	(1) 2½"
	575	189	26.3	87	87	(1) 2"	(1) 2½"
115C	208	490	50.6	217	252	(1) 4"	(1) 1" (1) 2" (1) 2½"
	230	490	50.6	217	252	(1) 4"	(1) 1" (1) 2" (1) 2½"
	460 ③	246	25.3	109	126	(1) 2½"	(1) 2½"
	575	203	26.3	87	101	(1) 2"	(1) 2½"
125C	208	533	58.6	252	252	(1) 4"	(1) 1" (2) 2½"
	230	533	58.6	252	252	(1) 4"	(1) 1" (2) 2½"
	460 ③	267	29.3	126	126	(1) 2½"	(1) 3"
	575	222	30.7	101	101	(1) 2½"	(1) 2½"
145C	208	708	58.6	344	344	(2) 3"	(1) 1" (2) 3"
	230	652	58.6	315	315	(2) 3"	(1) 1" (2) 3"
	460 ③	331	29.3	160	160	(1) 3"	(1) 3"
	575	260	30.7	122	122	(1) 2½"	(1) 2½"
155C	208	735	58.6	359	359	(2) 3"	(1) 1" (2) 3"
	230	709	58.6	346	346	(2) 3"	(1) 1" (2) 3"
	460 ③	358	29.3	175	175	(1) 3"	(1) 4"
	575	286	30.7	136	136	(1) 2½"	(1) 3"
175C	208	767	66.6	371	371	(2) 3"	(1) 1" (2) 3"
	230	767	66.6	371	371	(2) 3"	(1) 1" (2) 3"
	460 ③	385	33.3	187	187	(1) 3"	(1) 4"
	575	314	35.6	149	149	(1) 3"	(1) 3½"
195C	208	926	66.6	452	452	(2) 4"	(1) 1" (2) 4"
	230	926	66.6	452	452	(2) 4"	(1) 1" (2) 4"
	460 ③	455	33.3	225	225	(1) 4"	(1) 4"
	575	373	35.6	180	180	(1) 3"	(1) 4"

NOTES:

- ① ALLOWABLE VOLTAGE LIMITS:
Unit Nameplate 208V/60Hz/3PH: 187V to 253V (except ALR-075C: 180V to 220V)
Unit Nameplate 230V/60Hz/3PH: 187V to 253V (except ALR-075C: 207V to 253V)
Unit Nameplate 460V/60Hz/3PH: 414V to 506V
Unit Nameplate 575V/60Hz/3PH: 517V to 633V
Unit Nameplate 380V/50Hz/3PH: 342V to 418V
- ② Compressor RLA values are for wire sizing purposes only and do not reflect normal operating current draw. If unit is equipped with SPEEDTROL motors, the first motor on each refrigerant circuit is a 230V single phase, 1 hp motor, with an RLA of 5.6 amps.
- ③ Compressor LRA for part winding start are for the first winding. If the unit is equipped with SPEEDTROL motors, the first motor on each refrigerant circuit is a 230V single phase, 1 hp motor, with an LRA of 14.5 amps.
- ④ Unit wire size amps are equal to 125% of the largest compressor-motor RLA plus 100% of RLA of all other loads in the circuit including control transformer. Wire size amps for separate 115V control circuit power is 10 amps for ALR-040C thru ALR-095C and 12 amps for ALR-105C thru ALR-195C.
- ⑤ Quantity and size of power entry hub(s) provided with unit.
- ⑥ Single point power supply requires a single fused disconnect to supply electrical power to the unit.
- ⑦ Multiple point power supply requires three independent power circuits with separate fused disconnects.
- ⑧ Data also applies to 380/50Hz/3Ph units.

Table 10. Compressor and Condenser Fan Motors

ALR MODEL	3 PH, 60 HZ ELEC. POWER SUPPLY ①	RATED LOAD AMPS ②		LOCKED ROTOR AMPS ③		
		FANS	COMPRESSORS	FANS (EACH)	COMPRESSORS	
					AL START	PW START
040C	208	(4) 4.0	(1) 63, (1) 77	17.0	(1) 308, (1) 428	(1) 188, (1) 250
	230	(4) 4.0	(1) 63, (1) 77	17.0	(1) 308, (1) 428	(1) 188, (1) 250
	460 ③	(4) 2.0	(1) 31, (1) 39	9.9	(1) 154, (1) 214	(1) 84, (1) 117
	575	(4) 2.2	(1) 26, (1) 31	10.3	(1) 135, (1) 172	(1) 81, (1) 103
050C	208	(4) 4.0	(1) 77, (1) 106	17.0	(1) 428, (1) 470	(1) 250, (1) 292
	230	(4) 4.0	(1) 77, (1) 106	17.0	(1) 428, (1) 470	(1) 250, (1) 292
	460 ②	(4) 2.0	(1) 39, (1) 53	9.9	(1) 214, (1) 235	(1) 117, (1) 141
	575	(4) 2.2	(1) 31, (1) 36	10.3	(1) 172, (1) 217	(1) 103, (1) 130
060C	208	(6) 4.0	(1) 106, (1) 112	17.0	(1) 470, (1) 565	(1) 292, (1) 340
	230	(6) 4.0	(1) 106, (1) 112	17.0	(1) 470, (1) 565	(1) 292, (1) 340
	460 ③	(6) 2.0	(1) 53, (1) 56	9.9	(1) 235, (1) 283	(1) 141, (1) 156
	575	(6) 2.2	(1) 36, (1) 45	10.3	(1) 217, (1) 230	(1) 130, (1) 138
065C	208	(8) 4.0	(2) 112	17.0	(2) 565	(2) 340
	230	(8) 4.0	(2) 112	17.0	(2) 565	(2) 340
	460 ③	(8) 2.0	(2) 56	9.9	(2) 283	(2) 156
	575	(8) 2.2	(2) 45	10.3	(2) 230	(2) 138
075C	208	(8) 4.0	(2) 153	17.0	(2) 660	(2) 400
	230	(8) 4.0	(2) 140	17.0	(2) 594	(2) 340
	460 ②	(8) 2.0	(2) 71	9.9	(2) 297	(2) 170
	575	(8) 2.2	(2) 54	10.3	(2) 235	(2) 135
085C	208	(8) 4.0	(2) 165	17.0	(2) 1070	(2) 654
	230	(8) 4.0	(2) 165	17.0	(2) 1070	(2) 654
	460 ③	(8) 2.0	(2) 83	9.9	(2) 510	(2) 330
	575	(8) 1.6	(2) 66	7.9	(2) 405	(2) 262
095C	208	(10) 4.0	(2) 201	17.0	(2) 1070	(2) 654
	230	(10) 4.0	(2) 201	17.0	(2) 1070	(2) 654
	460 ③	(10) 2.0	(2) 100	9.9	(2) 510	(2) 330
	575	(10) 1.6	(2) 80	7.9	(2) 405	(2) 262
105C	208	(10) 4.0	(2) 112, (2) 77	17.0	(2) 565, (2) 428	(2) 340, (2) 250
	230	(10) 4.0	(2) 112, (2) 77	17.0	(2) 565, (2) 428	(2) 340, (2) 250
	460 ②	(10) 2.0	(2) 56, (2) 39	9.9	(2) 283, (2) 214	(2) 156, (2) 117
	575	(10) 2.2	(2) 45, (2) 31	10.3	(2) 230, (2) 172	(2) 138, (2) 103
115C	208	(10) 4.0	(3) 112, (1) 77	17.0	(3) 565, (1) 428	(3) 340, (1) 250
	230	(10) 4.0	(3) 112, (1) 77	17.0	(3) 565, (1) 428	(3) 340, (1) 250
	460 ⑧	(10) 2.0	(3) 56, (1) 39	9.9	(3) 283, (1) 214	(3) 156, (1) 117
	575	(10) 2.2	(3) 45, (1) 31	10.3	(3) 230, (1) 172	(3) 138, (1) 103
125C	208	(12) 4.0	(4) 112	17.0	(4) 565	(4) 340
	230	(12) 4.0	(4) 112	17.0	(4) 565	(4) 340
	460 ⑧	(12) 2.0	(4) 56	9.9	(4) 283	(4) 156
	575	(12) 2.2	(4) 45	10.3	(4) 230	(4) 138
145C	208	(12) 4.0	(4) 153	17.0	(4) 660	(4) 400
	230	(12) 4.0	(3) 140	17.0	(4) 594	(4) 340
	460 ⑧	(12) 2.0	(4) 71	9.9	(4) 297	(4) 170
	575	(12) 2.2	(4) 54	10.3	(4) 235	(4) 135
155C	208	(12) 4.0	(2) 165, (2) 153	17.0	(2) 1070, (2) 660	(2) 654, (2) 400
	230	(12) 4.0	(2) 165, (2) 140	17.0	(2) 1070, (2) 594	(2) 654, (2) 340
	460 ⑧	(12) 2.0	(2) 83, (2) 71	9.9	(2) 510, (2) 297	(2) 330, (2) 170
	575	(12) 2.2	(2) 66, (2) 54	7.9	(2) 405, (2) 235	(2) 262, (2) 135
175C	208	(14) 4.0	(4) 165	17.0	(4) 1070	(4) 654
	230	(14) 4.0	(4) 165	17.0	(4) 1070	(4) 654
	460 ⑧	(14) 2.0	(4) 83	9.9	(4) 510	(4) 330
	575	(14) 2.2	(4) 66	7.9	(4) 405	(4) 262
195C	208	(14) 4.0	(4) 201	17.0	(4) 1070	(4) 654
	230	(14) 4.0	(4) 201	17.0	(4) 1070	(4) 654
	460 ⑧	(14) 2.0	(4) 100	9.9	(4) 510	(4) 330
	575	(14) 2.2	(4) 80	7.9	(4) 405	(4) 262

REFER TO PAGE 13 FOR ELECTRICAL DATA NOTES

EVAPORATOR FREEZE PROTECTION

All heat exchangers come equipped with thermostatically controlled heat tape. When power is applied to terminals 13 and 16, the heat tape will provide freeze protection down to -20°F. However, this should not be the only method of freeze protection. Two or more of the following must be part of system design:

1. By continuous circulation of water through the piping and the heat exchanger.
2. By the inclusion of glycol solution in the chilled water circuit.

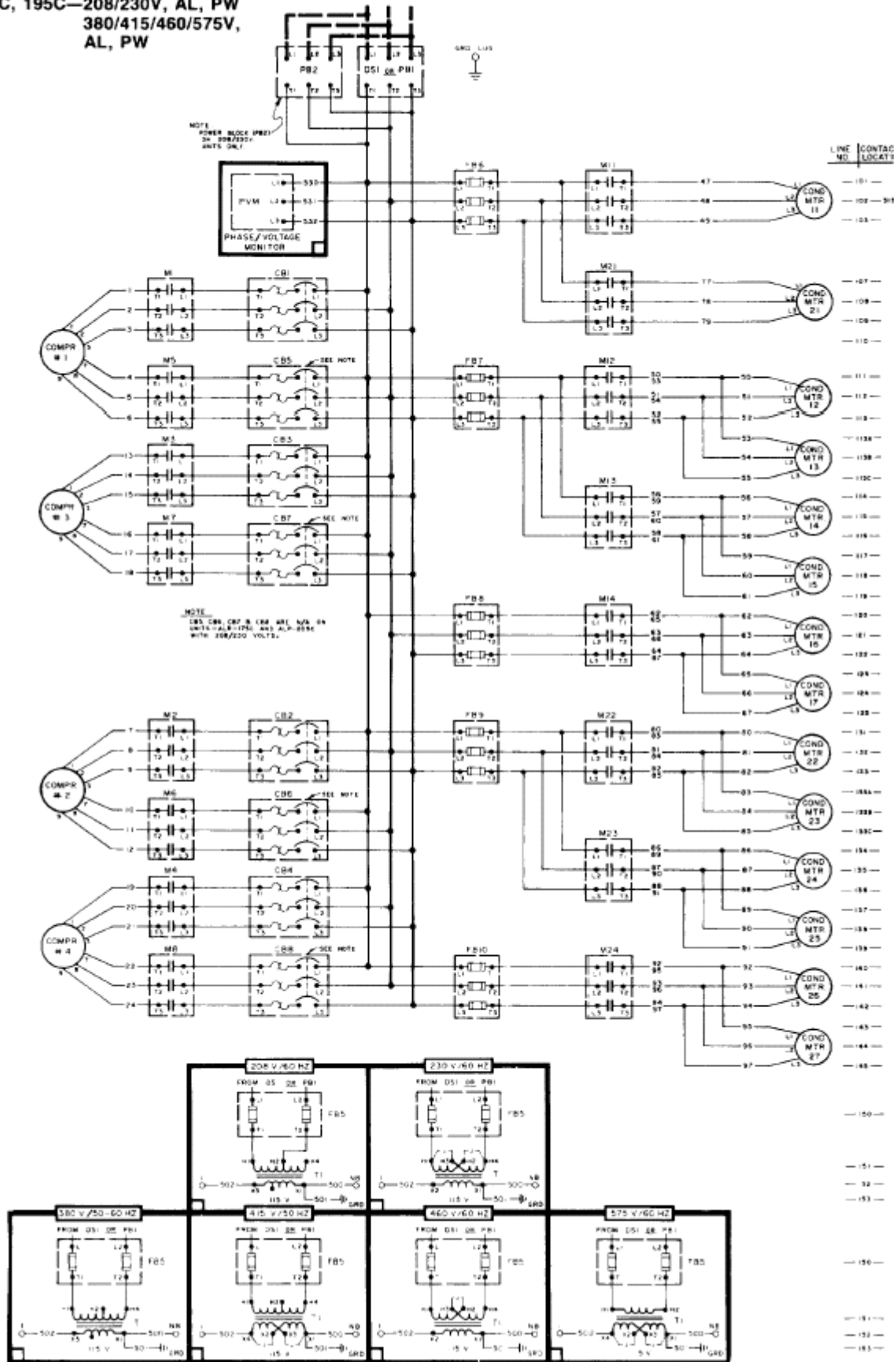
3. By the addition of heat and insulation to the exposed piping and heat exchanger.
4. By draining and flushing the chiller vessel with glycol during subfreezing weather.

It is the responsibility of the installing contractor and/or on-site maintenance personnel to insure that this additional protection is provided. Routine checks should be made to insure adequate freeze protection is maintained.

Failure to do so may result in damage to unit components that will not be considered a warranty failure.

SINGLE POINT, WITHOUT SPEEDTROL

**ALR-175C, 195C—208/230V, AL, PW
380/415/460/575V,
AL, PW**



SINGLE POINT, WITH SPEEDTROL

**ALR-175C, 195C—208/230V, AL, PW
380/415/460/575V,
AL, PW**

