UNIT INFORMATION

LCX SERIES
7.5 to 12.5 ton

100150

Service Literature

LCX092 through 150 with R454B

The LCX 7.5, 8.5, 10 and 12.5 ton (092, 102, 120, 150) packaged cooling units are available in standard cooling efficiency. Optional auxiliary electric heat is field-installed in LCX units. Electric heat operates in single or multiple stages depending on the kW input size. 7.5kW through 60kW heat sections are available for the LCX packaged cooling units.

All LCX units come standard with a lightweight, all-aluminum condenser coil. Hot gas by-pass (reheat) is an option for standard efficiency LCX units with fin tube coils.

All LCX units are designed to accept any of several different energy management thermostat control systems with minimum field wiring. Factory- or field-provided control options connect to the unit with jack plugs. When ”plugged in” the controls become an integral part of the unit wiring.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

False ceilings or drop ceiling may be used as a return air plenum only if the unit being installed has a Refrigerant Detection System installed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out with work in confined spaces being avoided.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

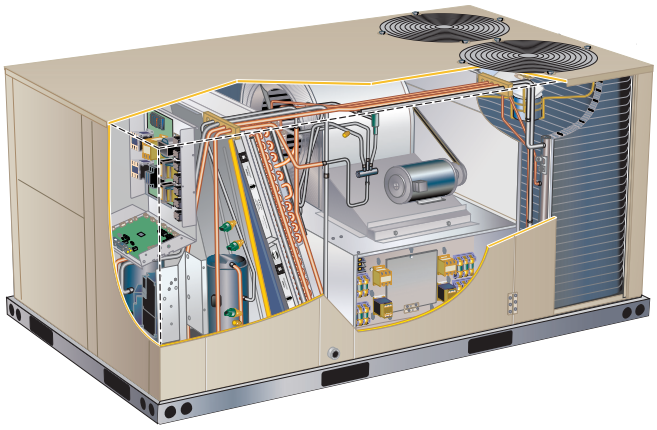
⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.



⚠ WARNING

If this appliance is conditioning a space with an area smaller than TA min or stored in a space with an area smaller than A min as defined by this instruction, then that space must be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (e.g. an operating electric heater or similar hot surface). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest system.

⚠ WARNING

Auxiliary devices which may be potential ignition sources shall not be installed in the duct work. Examples of potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching components.

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⚠ WARNING

To prevent serious injury or death:

1- Lock-out/tag-out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.

3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

⚠ WARNING

Only Manufacturer approved auxiliary devices are permitted to be installed in this unit.

⚠ CAUTION

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier.

⚠ WARNING

• This appliance must be installed in accordance with local and national wiring regulations.

• If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

⚠ CAUTION

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction

⚠ CAUTION

Children should be supervised not to play with the appliance.

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ CAUTION

Leak Detection System installed. Unit must be powered except for service.

⚠ WARNING

Ducts connected to an appliance shall not contain a potential ignition source.

⚠ IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ IMPORTANT

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

⚠ CAUTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

A2L Refrigerant Considerations

Ensure that the work area is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects, taking into account the effects of aging or continual vibration from sources such as compressors or fans.

Under no circumstances shall potential sources of ignition be used when searching for or detecting refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practices be followed since flammability is a consideration. The following procedure shall be adhered to:

-Safely remove refrigerant following local and national regulations.

-Evacuate the circuit.

-Purge the circuit with inert gas.

-Evacuate.

-Purge the circuit with inert gas.

-Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

OPTIONS / ACCESSORIES

Item Description		Order Number	Size 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	X	X	X	X
	Copper	**76W27**	X	X	X	X
Drain Pan Overflow Switch		**21Z07**	X	X	X	X
Low Ambient Kit (0°F)		**37P82**	X	X	X	X
BLOWER - SUPPLY AIR						
Blower Motors	Belt Drive - 2 HP	Factory	O	O	O	O
	Belt Drive - 3 HP	Factory	O	O	O	O
	Belt Drive - 5 HP	Factory	O	O	O	O
Drive Kits	Kit #1 590-890 rpm	Factory	O	O	O	O
See Blower Data Tables for selection	Kit #2 800-1105 rpm	Factory	O	O	O	O
	Kit #3 795-1195 rpm	Factory	O	O	O	O
	Kit #4 730-970 rpm	Factory	O	O	O	O
	Kit #5 940-1200 rpm	Factory	O	O	O	O
	Kit #6 1015-1300 rpm	Factory	O	O	O	O
	Kit #10 900-1135 rpm	Factory	O	O	O	O
	Kit #11 1050-1335 rpm	Factory	O	O	O	O
CABINET						
Combination Coil/Hail Guards		**24M51**	OX	OX		
		24C85			OX	OX
Hinged Access Panels		Factory	O	O	O	O
Horizontal Discharge Kit		**51W25**	X	X	X	X
Return Air Adaptor Plate (for same size LC/LG/LH and TC/TG/TH unit replacement)		**54W96**	X	X	X	X
CONTROLS						
BACnet® MS/TP Module		**38B35**	X	X	X	X
Dirty Filter Switch		**53W67**	X	X	X	X
Smoke Detector - Supply or Return (Power board and one sensor)		**31A68**	X	X	X	X
Smoke Detector - Supply and Return (Power board and two sensors)		**31A69**	X	X	X	X

NOTE - Order numbers shown are for ordering field installed accessories.
OX - Configure To Order (Factory Installed) or Field Installed
O = Configure To Order (Factory Installed)
X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Order Number	Size 092	102	120	150
INDOOR AIR QUALITY						
Air Filters						
Healthy Climate® High Efficiency Air Filters 20 x 25 x 2 (Order 4 per unit)	MERV 8	**50W61**	X	X	X	X
	MERV 13	**52W41**	X	X	X	X
	MERV 16	**21U41**	X	X	X	X
Replaceable Media Filter With Metal Mesh Frame (includes non-pleated filter media) (Order 4 per unit)	20 x 25 x 2	**Y3063**	X	X	X	X
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**23V86**	X	X	X	X
Sensor - Black plastic case, LCD display, rated for plenum mounting		**87N52**	X	X	X	X
Sensor - Black plastic case, no display, rated for plenum mounting		**23V87**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**23Y47**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**77N39**)		**90N43**	X	X	X	X
Needlepoint Bipolar Ionization (NPBI)						
Needlepoint Bipolar Ionization (NPBI) Kit		**21U36**	X	X	X	X
UVC Germicidal Lamps						
[1] Healthy Climate® UVC Light Kit (110/230V-1ph)		**21A93**	X	X	X	X
Step-Down Transformers	460V primary, 230V secondary	**10H20**	X	X	X	X
	575V primary, 230V secondary	**10H21**	X	X	X	X
HUMIDITROL® DEHUMIDIFICATION REHEAT OPTION						
Humiditrol® Dehumidification Option		Factory	O	O	O	O
ELECTRICAL						
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O
Disconnect Switch - See Electrical/Electric Heat tables for selection	80 amp	**54W56**	OX	OX	OX	OX
	150 amp	**54W57**	OX	OX	OX	OX
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX
	[2] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X	X
	[2] 20 amp non-powered, field-wired (575V)	Factory	O	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	X	X
ELECTRIC HEAT						
7.5 kW	208/240V-3ph	**30V21**	X	X		
	460V-3ph	**30V22**	X	X		
	575V-3ph	**30V23**	X	X		
15 kW	208/240V-3ph	**30V27**	X	X	X	X
	460V-3ph	**30V28**	X	X	X	X
	575V-3ph	**30V29**	X	X	X	X
22.5 kW	208/240V-3ph	**30V33**	X	X	X	X
	460V-3ph	**30V34**	X	X	X	X
	575V-3ph	**30V35**	X	X	X	X
30 kW	208/240V-3ph	**30V39**	X	X	X	X
	460V-3ph	**30V40**	X	X	X	X
	575V-3ph	**30V41**	X	X	X	X
45 kW	208/240V-3ph	**30V45**	X	X	X	X
	460V-3ph	**30V46**	X	X	X	X
	575V-3ph	**30V47**	X	X	X	X
60 kW	208/240V-3ph	**30V51**			X	X
	460V-3ph	**30V52**			X	X
	575V-3ph	**30V53**			X	X

[1] Lamps operate on 110-230V single-phase power supply. Step-down transformer may be ordered separately for 460V and 575V units. Alternately, 110V power supply may be used to directly power the UVC ballast(s).

[2] Canada requires a minimum 20 amp circuit. Select 20 amp, non-powered, field wired GFI.

NOTE - Order numbers shown are for ordering field installed accessories.

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OPTIONS / ACCESSORIES

Item Description		Order Number	Size 092	102	120	150
ECONOMIZER						
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer (Downflow or Horizontal) Includes Economizer Dampers with Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood Downflow Applications - Use furnished Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood Horizontal Applications - Use furnished Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood - Order Horizontal Discharge Kit separately Horizontal Applications (reduced height) - Order Horizontal Low Profile Barometric Relief Dampers with Exhaust Hood and Horizontal Discharge Kit (**51W25**) separately		**20U80**	OX	OX	OX	OX
Horizontal Low Profile Barometric Relief Dampers						
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood		**53K04**	X	X	X	X
Economizer Controls						
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	X	X	X	X
Sensible Control	Sensor is Furnished	Factory	O	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX	OX
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized		**14G28**	X	X	X	X
Manual		**14G29**	X	X	X	X
POWER EXHAUST						
Standard Static	208/230V-3ph	**53W44**	X	X	X	X
	460V-3ph	**53W45**	X	X	X	X
	575V-3ph	**53W46**	X	X	X	X
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**11F54**	X	X	X	X
14 in. height		**11F55**	X	X	X	X
18 in. height		**11F56**	X	X	X	X
24 in. height		**11F57**	X	X	X	X
Adjustable Pitch Curb						
14 in. height		**54W50**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	**13K61**	X			
	RTD11-135S	**13K62**		X	X	
	RTD11-185S	**13K63**				X
Flush - Order one	FD11-95S	**13K56**	X			
	FD11-135S	**13K57**		X	X	
	FD11-185S	**13K58**				X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X			
	C1DIFF31B-1	**12X66**		X	X	
	C1DIFF32B-1	**12X67**				X

NOTE - Order numbers shown are for ordering field installed accessories.

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SPECIFICATIONS

Model			LCX092S5M	LCX102S5M	LCX120S5M	LCX150S5M
Nominal Tonnage			7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
Efficiency Type			Standard	Standard	Standard	Standard
Blower Type			MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume
Cooling Performance	Gross Cooling Capacity - Btuh		89,900	101,000	119,000	143,000
	[1] Net Cooling Capacity - Btuh		88,000	99,000	116,000	138,000
	[1] AHRI Rated Air Flow - cfm		2700	3100	3200	4100
	[1] IEER (Btuh/Watt)		14.8	14.8	14.8	14.2
	[1] EER (Btuh/Watt)		11.2	11.2	11.2	11
	Total Unit Power - kW		7.9	8.8	10.4	12.5
Sound Rating Number	dBA		88	88	90	90
Refrigerant Charge	Refrigerant Type		R-454B	R-454B	R-454B	R-454B
	Without Reheat Option	Circuit 1	3 lbs. 9 oz.	4 lbs. 5 oz.	3 lbs. 12 oz.	5 lbs. 2 oz.
		Circuit 2	3 lbs. 1 oz.	3 lbs. 0 oz.	4 lbs. 5 oz.	5 lbs. 15 oz.
	With Reheat Option	Circuit 1	4 lbs. 8 oz.	4 lbs. 7 oz.	5 lbs. 6 oz.	5 lbs. 3 oz.
		Circuit 2	2 lbs. 14 oz.	3 lbs. 1 oz.	4 lbs. 14 oz.	5 lbs. 13 oz.
Electric Heat Available - See page 12			7.5,15,22.5,30 & 45 KW			15, 22.5,30, 45 & 60 KW
Compressor Type (number)			Two-Stage Scroll (1), Single-Stage Scroll (1)			
Outdoor Coil	Net face area - ft.[2]		20.9	20.9	28.0	27.5
	Rows		1	1	1	1
	Fins - in.		23	23	23	20
Outdoor Coil Fans	Motor HP (number and type)		1/3 (2 PSC)	1/3 (2 PSC)	1/2 (2 PSC)	1/2 (2 PSC)
	Rpm		1075	1075	1075	1075
	Watts		740	740	1050	1050
	Diameter (Number) - in.		(2) 24	(2) 24	(2) 24	(2) 24
	Blades		3	3	3	3
	Total Air volume - cfm		8800	8800	9700	9700
Indoor Coil	Net face area - ft.[2]		13.54	13.54	13.54	13.54
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Rows		3	3	4	4
	Fins - in.		14	14	14	14
	Condensate drain size (NPT) - in.		(1) 1			
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removable power element			
[2] **Indoor Blower and Drive Selection**	Nominal motor HP		2, 3, 5			
	Maximum usable motor HP (US)		2.3, 3.45, 5.75			
	Motor - Drive kit number		2 HP Kit 1 590-890 rpm Kit 2 800-1105 rpm Kit 3 795-1195 rpm 3 HP Kit 4 730-970 rpm Kit 5 940-1200 rpm Kit 6 1015-1300 rpm 5 HP Kit 10 900-1135 rpm Kit 11 1050-1335 rpm			
	Wheel (Number) diameter x width - in.		(1) 15 X 15			
Filters	Type of filter		MERV 4, Disposable			
	Number and size - in.		(4) 20 x 25 x 2			
Line voltage data (Volts-Phase-Hz)			208/230-3-60 460-3-60 575-3-60			

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[2] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Motor service factor limit - 1.0.

LCX092S5M AND LCX102S5M - BASE UNIT

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.

2 − Any factory installed options air resistance (heat section, economizer, etc.)

3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 10 for blower motors and drives.

See page 10 for wet coil and option/accessory air resistance data.

Minimum Air Volume Required For Use With Optional Electric Heat (Maximum Static Pressure - 2.0 in. w.g.)

7.5 kW, 15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm; 60 kW - 4000 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	593	0.11	636	0.07	682	0.10	731	0.22	784	0.60	840	0.96	898	1.26	948	1.38	996	1.47	1045	1.57	1092	1.71	1140	1.92	1188	2.32
2250	604	0.15	645	0.11	690	0.15	739	0.39	790	0.74	846	1.08	901	1.34	953	1.48	1002	1.57	1052	1.70	1100	1.86	1149	2.09	1197	2.42
2500	615	0.19	655	0.15	699	0.20	747	0.55	797	0.89	851	1.20	906	1.44	959	1.58	1009	1.68	1059	1.83	1108	2.01	1158	2.26	1206	2.52
2750	626	0.23	666	0.19	709	0.37	755	0.71	805	1.03	858	1.32	912	1.55	966	1.70	1017	1.81	1067	1.97	1117	2.17	1166	2.44	1215	2.71
3000	637	0.27	677	0.24	719	0.55	764	0.87	813	1.18	866	1.45	920	1.67	975	1.82	1026	1.96	1076	2.13	1126	2.35	1176	2.63	1225	2.92
3250	650	0.31	688	0.43	730	0.73	775	1.04	823	1.34	875	1.60	930	1.81	985	1.97	1036	2.12	1086	2.31	1136	2.54	1186	2.83	1235	3.13
3500	663	0.35	700	0.63	741	0.92	786	1.22	834	1.50	886	1.76	942	1.96	997	2.14	1048	2.31	1097	2.51	1147	2.75	1196	3.04	1245	3.35
3750	676	0.57	714	0.84	754	1.12	798	1.41	846	1.68	899	1.93	956	2.14	1010	2.32	1060	2.51	1109	2.72	1158	2.98	1207	3.27	1255	3.58
4000	691	0.79	728	1.05	768	1.33	812	1.61	860	1.88	914	2.12	971	2.34	1023	2.53	1072	2.73	1121	2.95	1169	3.22	1218	3.51	1266	3.83
4250	706	1.03	743	1.28	783	1.55	827	1.82	876	2.09	931	2.33	987	2.55	1037	2.76	1085	2.97	1133	3.20	1181	3.47	1229	3.76	1277	4.08
4500	722	1.27	759	1.52	799	1.78	844	2.05	894	2.31	949	2.56	1003	2.79	1052	3.00	1098	3.22	1145	3.46	1193	3.73	1241	4.03	1289	4.34
4750	739	1.53	776	1.77	817	2.03	862	2.30	913	2.56	968	2.81	1020	3.04	1066	3.27	1112	3.49	1158	3.74	1205	4.01	1253	4.30	1301	4.61
5000	757	1.79	794	2.04	835	2.30	882	2.56	934	2.83	988	3.08	1036	3.32	1081	3.55	1125	3.78	1171	4.02	1218	4.29	1265	4.59	1312	4.89

LCX120S5M AND LCX150S5M - BASE UNIT

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.

2 − Any factory installed options air resistance (heat section, economizer, etc.)

3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 10 for blower motors and drives.

See page 10 for wet coil and option/accessory air resistance data.

Minimum Air Volume Required For Use With Optional Electric Heat (Maximum Static Pressure - 2.0 in. w.g.)

15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm; 60 kW - 4000 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	497	0.25	558	0.44	624	0.6	694	0.74	764	0.85	830	0.99	889	1.16	943	1.34	994	1.52	1045	1.71	1096	1.89	1146	2.08	1197	2.27
2250	511	0.34	573	0.52	638	0.68	708	0.82	776	0.94	839	1.09	896	1.26	948	1.45	998	1.64	1048	1.83	1098	2.01	1149	2.2	1200	2.4
2500	527	0.44	589	0.62	654	0.78	723	0.91	789	1.05	850	1.21	904	1.39	955	1.58	1003	1.77	1052	1.96	1101	2.14	1152	2.33	1203	2.53
2750	545	0.55	606	0.72	672	0.88	740	1.03	804	1.17	861	1.34	914	1.53	962	1.72	1010	1.92	1057	2.10	1105	2.29	1154	2.47	1206	2.68
3000	564	0.66	626	0.84	692	1.01	759	1.16	819	1.32	874	1.49	924	1.68	971	1.88	1017	2.08	1063	2.26	1110	2.44	1158	2.63	1208	2.83
3250	585	0.79	648	0.98	714	1.14	778	1.31	836	1.48	887	1.66	935	1.86	981	2.06	1026	2.26	1071	2.45	1117	2.63	1163	2.80	1213	3.00
3500	607	0.93	672	1.13	737	1.31	798	1.48	852	1.66	901	1.85	948	2.05	993	2.26	1037	2.46	1081	2.65	1125	2.83	1171	3.01	1221	3.21
3750	632	1.10	698	1.31	762	1.50	819	1.67	869	1.86	915	2.05	961	2.25	1005	2.47	1049	2.68	1092	2.88	1136	3.05	1181	3.24	1231	3.45
4000	660	1.30	726	1.52	787	1.70	838	1.87	885	2.06	930	2.26	974	2.48	1018	2.71	1062	2.93	1105	3.12	1149	3.30	1194	3.49	1245	3.72
4250	691	1.53	755	1.75	810	1.91	857	2.07	901	2.27	945	2.50	990	2.74	1034	2.98	1077	3.20	1120	3.39	1163	3.58	1210	3.79	1262	4.03
4500	724	1.78	783	1.98	831	2.12	874	2.28	917	2.50	962	2.75	1006	3.02	1051	3.27	1094	3.49	1137	3.70	1181	3.89	1228	4.11	1281	4.38
4750	757	2.05	809	2.20	851	2.33	891	2.51	935	2.76	980	3.05	1025	3.33	1070	3.59	1113	3.82	1156	4.03	1201	4.24	1249	4.47	1303	4.75
5000	787	2.31	831	2.43	870	2.57	910	2.78	954	3.06	1000	3.38	1046	3.68	1091	3.95	1135	4.19	1178	4.40	1224	4.62	1272	4.86	1325	5.13
5250	814	2.55	852	2.66	889	2.83	930	3.09	975	3.41	1023	3.76	1070	4.08	1115	4.35	1159	4.59	1203	4.81	1248	5.03	1297	5.27	- - -	- - -
5500	835	2.78	871	2.91	909	3.13	952	3.44	999	3.81	1049	4.18	1096	4.51	1142	4.79	1186	5.03	1229	5.24	1275	5.46	1324	5.69	- - -	- - -
5750	854	3.01	890	3.19	930	3.48	977	3.86	1027	4.27	1078	4.66	1126	4.99	1171	5.26	1214	5.49	1258	5.70	- - -	- - -	- - -	- - -	- - -	- - -
6000	871	3.26	910	3.53	955	3.90	1006	4.34	1060	4.80	1111	5.19	1158	5.51	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
6250	890	3.57	934	3.94	985	4.41	1041	4.91	1096	5.38	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal HP	Maximum HP	Drive Kit Number	RPM Range
2	2.3	1	590 - 890
2	2.3	2	800 - 1105
2	2.3	3	795 - 1195
3	3.45	4	730 - 970
3	3.45	5	940 - 1200
3	3.45	6	1015 - 1300
5	5.75	10	900 - 1135
5	5.75	11	1050 - 1335

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Motor service factor limit - 1.0.

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3175
0.05	2955
0.10	2685
0.15	2410
0.20	2165
0.25	1920
0.30	1420
0.35	1200

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Humiditrol® Reheat Coil	Filters			Return Air Adaptor Plate
	092, 102	120, 150				MERV 8	MERV 13	MERV 16	
1750	0.04	0.04	0.03	0.05	0.02	0.01	0.03	0.06	0.00
2000	0.05	0.05	0.03	0.06	0.02	0.01	0.03	0.08	0.00
2250	0.06	0.06	0.04	0.08	0.02	0.01	0.04	0.09	0.00
2500	0.07	0.07	0.04	0.11	0.03	0.01	0.05	0.10	0.00
2750	0.08	0.08	0.05	0.12	0.03	0.02	0.05	0.11	0.00
3000	0.10	0.09	0.06	0.13	0.03	0.02	0.06	0.12	0.02
3250	0.11	0.10	0.06	0.15	0.04	0.02	0.06	0.13	0.02
3500	0.12	0.11	0.09	0.15	0.04	0.03	0.07	0.15	0.04
3750	0.14	0.13	0.09	0.15	0.05	0.03	0.08	0.16	0.07
4000	0.15	0.14	0.09	0.19	0.05	0.04	0.08	0.17	0.09
4250	0.17	0.15	0.13	0.19	0.06	0.04	0.09	0.19	0.11
4500	0.19	0.17	0.14	0.22	0.07	0.04	0.09	0.20	0.12
4750	0.20	0.18	0.17	0.25	0.07	0.05	0.10	0.21	0.16
5000	0.22	0.20	0.20	0.29	0.08	0.06	0.10	0.23	0.18
5250	0.24	0.22	0.22	0.32	0.08	0.06	0.11	0.24	0.19
5500	0.25	0.23	0.25	0.34	0.09	0.07	0.12	0.25	0.22
5750	0.27	0.25	0.31	0.45	0.10	0.07	0.12	0.27	0.25
6000	0.29	0.27	0.33	0.52	0.10	0.08	0.13	0.28	0.27

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

Size	RTD11 Step-Down Diffuser				FD11 Flush Diffuser
	Air Volume cfm	2 Ends Open	1 Side, 2 Ends Open	All Ends & Sides Open	
092	2400	0.21	0.18	0.15	0.14
	2600	0.24	0.21	0.18	0.17
	2800	0.27	0.24	0.21	0.20
	3000	0.32	0.29	0.25	0.25
	3200	0.41	0.37	0.32	0.31
	3400	0.50	0.45	0.39	0.37
	3600	0.61	0.54	0.48	0.44
	3800	0.73	0.63	0.57	0.51
102 & 120	3600	0.36	0.28	0.23	0.15
	3800	0.40	0.32	0.26	0.18
	4000	0.44	0.36	0.29	0.21
	4200	0.49	0.40	0.33	0.24
	4400	0.54	0.44	0.37	0.27
	4600	0.60	0.49	0.42	0.31
	4800	0.65	0.53	0.46	0.35
	5000	0.69	0.58	0.50	0.39
	5200	0.75	0.62	0.54	0.43
150	4200	0.22	0.19	0.16	0.10
	4400	0.28	0.24	0.20	0.12
	4600	0.34	0.29	0.24	0.15
	4800	0.40	0.34	0.29	0.19
	5000	0.46	0.39	0.34	0.23
	5200	0.52	0.44	0.39	0.27
	5400	0.58	0.49	0.43	0.31
	5600	0.64	0.54	0.47	0.35
	5800	0.70	0.59	0.51	0.39

CEILING DIFFUSER AIR THROW DATA

Size	Air Volume	[1] Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
092	2600	24 - 29	19 - 24
	2800	25 - 30	20 - 28
	3000	27 - 33	21 - 29
	3200	28 - 35	22 - 29
	3400	30 - 37	22 - 30
102, 120	3600	25 - 33	22 - 29
	3800	27 - 35	22 - 30
	4000	29- 37	24 - 33
	4200	32 - 40	26 - 35
	4400	34 - 42	28 - 37
150	5600	39 - 49	28 - 37
	5800	42 - 51	29 - 38
	6000	44 - 54	40 - 50
	6200	45 - 55	42 - 51
	6400	46 - 55	43 - 52
	6600	47 - 56	45 - 56

[1] Throw is the horizontal or vertical distance an air stream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 50 ft. per minute. Four sides open.

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

Model			LCX092S5								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		12.4			6.5			4.8		
	Locked Rotor Amps		93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps		12.8			5.1			4.5		
	Locked Rotor Amps		97.5			44.3			27.1		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		2.4			1.3			1		
	Total		4.8			2.6			2		
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor	HP		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	50	60	25	25	30	20	20	25
	With (1) 0.33 HP Power Exhaust		50	50	60	25	25	30	20	20	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only		41	44	51	20	21	24	16	17	19
	With (1) 0.33 HP Power Exhaust		44	47	54	21	22	26	17	18	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	50	60	60	60	60	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	41	41	44	44	51	51	20	21	24	16	17	19
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	60	60	60	70	70	70	30	35	35	25	25	30
		22.5 kW	80	90	80	90	90	100	40	45	45	35	35	40
		30 kW	100	110	100	110	110	125	60	60	60	45	45	45
		45 kW	150	150	150	175	150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	44	44	47	47	54	54	21	22	26	17	18	20
		15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**
	15 kW	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W56**	**54W56**

Disconnects - 54W56 - 80A
54W57 - 150A

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

Model			LCX102S5								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		12.4			6.5			4.8		
	Locked Rotor Amps		93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps		12.2			6.4			5.1		
	Locked Rotor Amps		120.4			50			41		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		2.4			1.3			1		
	Total		4.8			2.6			2		
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor	HP		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	50	60	25	25	30	20	20	25
	With (1) 0.33 HP Power Exhaust		50	50	60	25	25	30	20	20	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only		40	44	51	21	22	25	16	18	20
	With (1) 0.33 HP Power Exhaust		43	46	53	22	24	27	17	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	50	60	60	60	60	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	40	40	44	44	51	51	21	22	25	16	18	20
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	60	60	60	70	70	70	30	35	35	25	25	30
		22.5 kW	80	90	80	90	90	100	40	45	45	35	35	40
		30 kW	100	110	100	110	110	125	60	60	60	45	45	45
		45 kW	150	150	150	175	150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	43	43	46	46	53	53	22	24	27	17	19	21
		15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**
	15 kW	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W56**	**54W56**

Disconnects - 54W56 - 80A
54W57 - 150A

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

Model			LCX120S5								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		12.4			6.5			4.8		
	Locked Rotor Amps		93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps		16			7.1			6.4		
	Locked Rotor Amps		156.4			69			47.8		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		3			1.5			1.2		
	Total		6			3			2.4		
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor	HP		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		60	60	70	25	30	30	20	25	25
	With (1) 0.33 HP Power Exhaust		60	60	70	30	30	30	25	25	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only		46	49	56	22	24	27	18	20	22
	With (1) 0.33 HP Power Exhaust		49	52	58	24	25	28	19	21	23

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	60	60	60	60	70	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	60	60	60	70	70	70	30	35	35	25	25	30
		22.5 kW	80	90	80	90	90	100	40	45	45	35	35	40
		30 kW	100	110	100	110	110	125	60	60	60	45	45	45
		45 kW	150	150	150	175	150	175	80	80	80	60	70	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W56**	**54W56**
	60 kW	**Not Available**	**54W56**	**54W56**

Disconnects - 54W56 - 80A
54W57 - 150A

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

Model			LCX150S5								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		19.2			9.1			6.2		
	Locked Rotor Amps		162.3			70.8			58.2		
Compressor 2 (Non-Inverter)	Rated Load Amps		22.4			9.1			7.2		
	Locked Rotor Amps		166.2			74.6			54		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		3			1.5			1.2		
	Total		6			3			2.4		
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor	HP		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		80	80	90	35	35	40	25	25	30
	With (1) 0.33 HP Power Exhaust		80	80	90	35	35	40	25	25	30
[3] Minimum Circuit Ampacity (MCA)	Unit Only		61	64	70	27	29	32	21	22	24
	With (1) 0.33 HP Power Exhaust		64	67	73	29	30	33	22	23	25

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	80	80	80	80	90	90	35	35	40	25	25	30
		22.5 kW	80	80	80	90	90	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	61	61	64	64	70	70	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	80	80	80	80	90	90	35	35	40	25	25	30
		22.5 kW	80	90	80	90	90	100	40	45	45	35	35	40
		30 kW	100	110	100	110	110	125	60	60	60	45	45	45
		45 kW	150	150	150	175	150	175	80	80	80	60	70	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	64	64	67	67	73	73	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**54W56**	**54W56**
	45 kW	**Not Available**	**54W56**	**54W56**
	60 kW	**Not Available**	**54W56**	**54W56**

Disconnects - 54W56 - 80A

54W57 - 150A

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRIC HEAT CAPACITIES

Volts Input	7.5 kW			15 kW			22.5 kW			30 kW			45 kW			60 kW		
	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages
208	5.6	19,100	1	11.3	38,600	1	16.9	57,700	2	22.5	76,800	2	33.8	115,300	2	45.0	153,600	2
220	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
230	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
240	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
440	6.9	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
460	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
480	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
550	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
575	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
600	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2

FIELD WIRING NOTES

- For use with copper wiring only
- Field wiring not furnished
- All wiring must conform to NEC or CEC and local electrical codes
- For specific wiring information, please refer to the installation instructions

Minimum R454B Space and CFM Requirements

Minimum Airflow		
Unit	Q_{min}(CFM)	Q_{min}(m^3h)
LCX092	94	160
LCX102	114	194
LCX120	114	194
LCX150	157	267
LCX092 w/ Humiditrol	119	202
LCX102 w/ Humiditrol	117	199
LCX120 w/ Humiditrol	142	241
LCX150 w/ Humiditrol	154	261

[1] ***NOTE -*** *The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).*

Minimum Room Area of Conditioned Space		
Unit	TA_{min}(ft^2)	TA_{min}(m^2)
LCX092	53	4.8
LCX102	64	5.9
LCX120	64	5.9
LCX150	87	8.1
LCX092 w/ Humiditrol	66	6.1
LCX102 w/ Humiditrol	66	6.0
LCX120 w/ Humiditrol	79	7.3
LCX150 w/ Humiditrol	86	7.9

[2] ***NOTE -*** *The minimum room area of conditioned space is the smallest area the unit can service.*

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
LCX092 STG 1	3.56	1.62
LCX092 STG 2	3.06	1.39
LCX102 STG 1	4.31	1.96
LCX102 STG 2	3.00	1.36
LCX120 STG 1	3.75	1.70
LCX120 STG 2	4.31	1.96
LCX150 STG 1	5.13	2.32
LCX150 STG 2	5.94	2.69
LCX092 w/ Humiditrol STG 1	4.50	2.04
LCX092 w/ Humiditrol STG 2	2.88	1.30
LCX102 w/ Humiditrol STG 1	4.44	2.01
LCX102 w/ Humiditrol STG 2	3.06	1.39
LCX120 w/ Humiditrol STG 1	5.38	2.44
LCX120 w/ Humiditrol STG 2	4.88	2.21
LCX150 w/ Humiditrol STG 1	5.19	2.35
LCX150 w/ Humiditrol STG 2	5.81	2.64

Altitude Adjustment Factor									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

[3] ***NOTE -*** *Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an LCX092 at 1000 ft. above see level, multiply 94 by 1.05 to get 98.7 CFM as the new Q_{min}.*

LCX Parts Arrangement

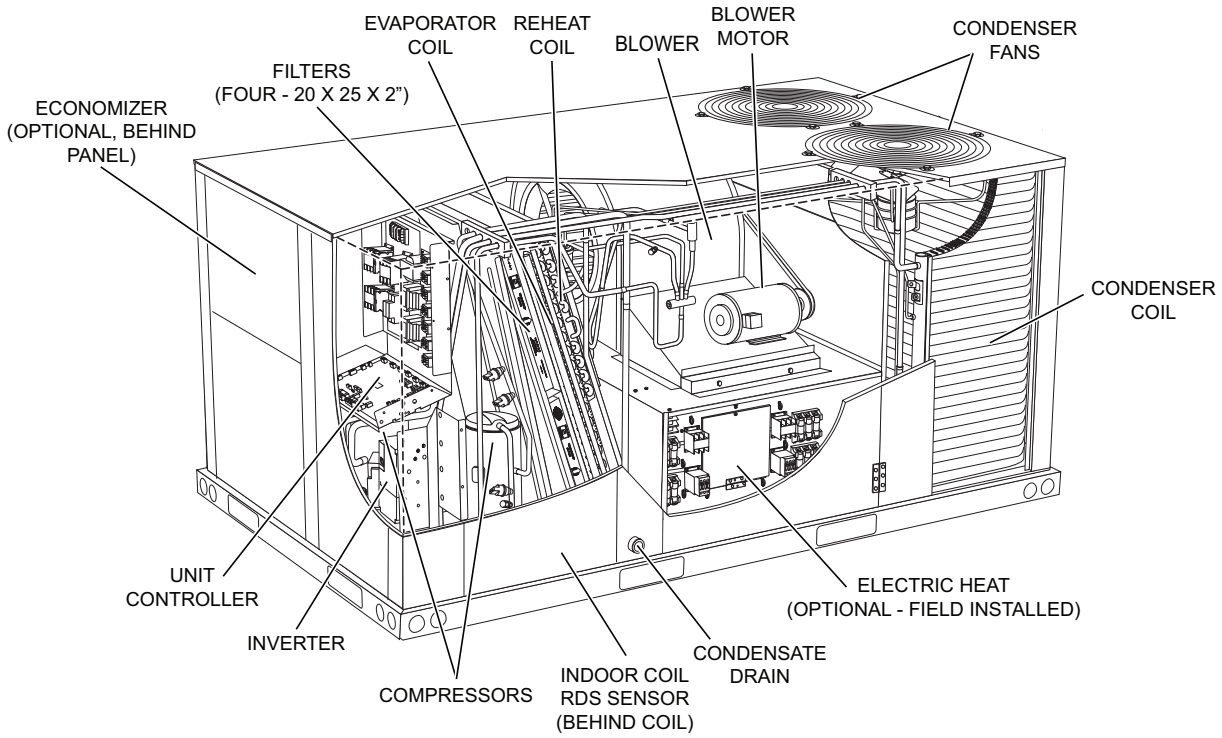
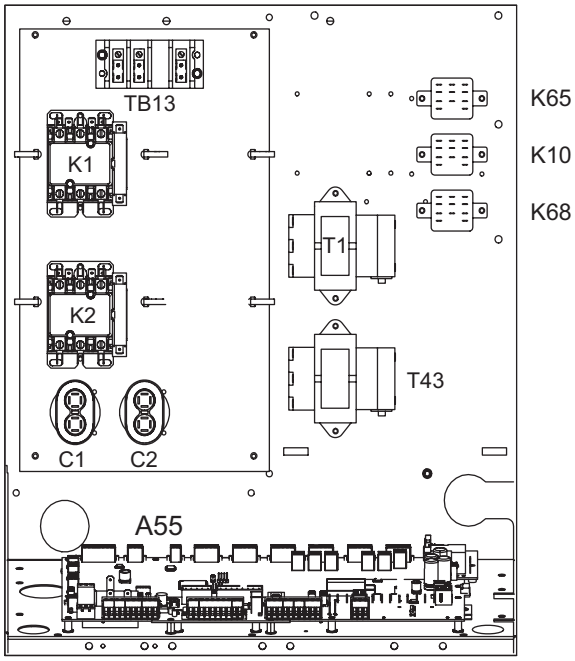


FIGURE 1

LCX Control Box Y, G, J Volt Units



CONTROL AREA

FIGURE 2

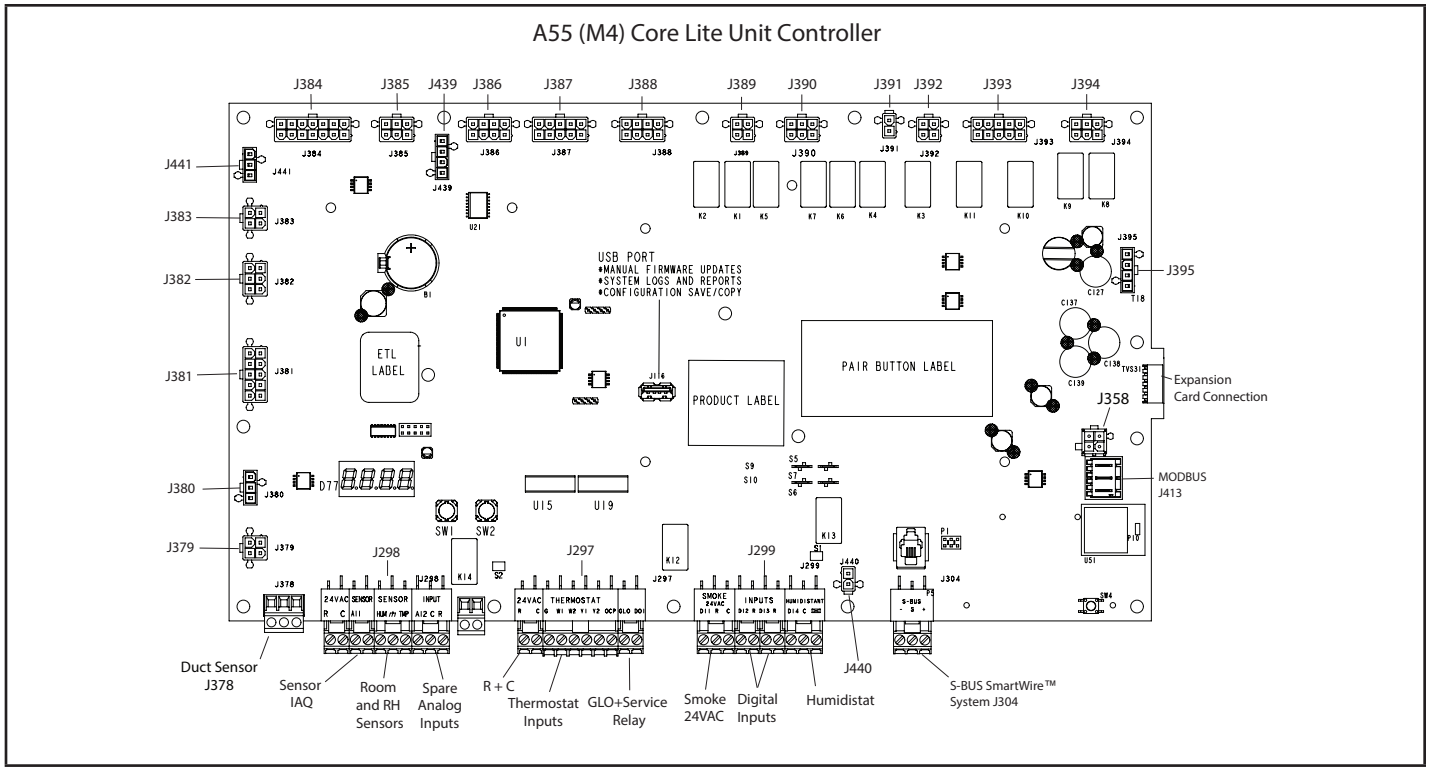


FIGURE 5

I-UNIT COMPONENTS

All 7.5 through 12.5 ton (26.3 through 44 kW) units are configure to order units (CTO). The LCX unit components are shown in figure 1. All units come standard with removable unit panels. All L1, L2 and L3 wiring is color-coded; L1 is red, L2 is yellow and L3 is blue.

ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

A-Control Box Components

LCX control box components are shown in FIGURE 2. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48

All units may be equipped with an optional disconnect switch S48. S48 is a toggle switch, which can be used by the service technician to disconnect power to the unit.

2-Control Transformer T1

All use a single line voltage to 24VAC transformer installed in the control box. The transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in FIGURE 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

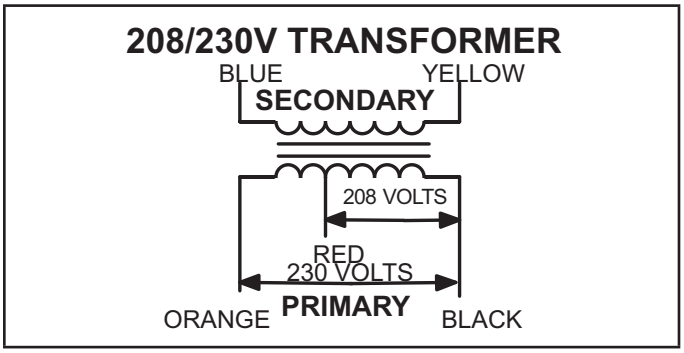


FIGURE 3

3-Condenser Fan Capacitors C1 & C2

Fan capacitors C1 and C2 are used to assist in the start up of condenser fans B4 and B5. Ratings will be on side of capacitor or outdoor fan motor nameplate.

4-Compressor Contactor K1 & K2

All compressor contactors are three-pole-double-break contactors with 24VAC coils. K1 and K2 energize compressors B1 and B2 in response to thermostat demand. See FIGURE 4.

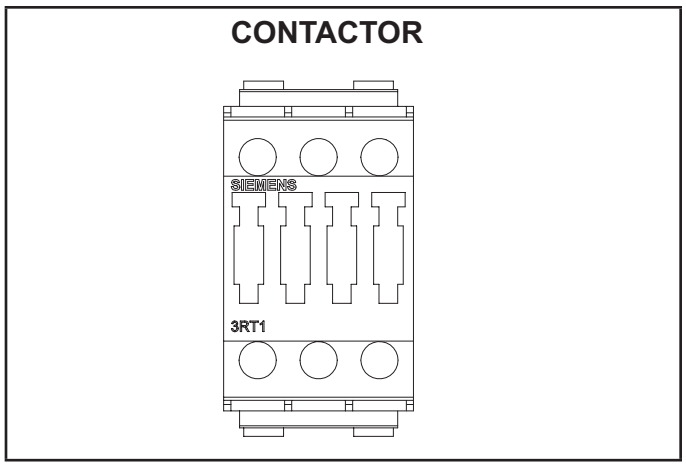


FIGURE 4

5-Condenser Fan Relay K10, K68

Outdoor fan relays K10 and K68 are DPDT relays with a 24VAC coil. In standard and high efficiency units, K10 and K68 energize condenser fans B4 and B5.

6-Power Exhaust Relay K65 (PED units - Optionally Field Installed)

Power exhaust relay K65 is a DPDT relay with a 24VAC coil. K65 is used in all units equipped with the optional power exhaust dampers. K65 is energized by the economizer enthalpy control A6, after the economizer dampers reach 50% open (adjustable) When K65 closes, exhaust fan B10 is energized.

7-Relative Humidity Sensor A91 - Optional

The indoor relative humidity sensor (A91) is an analog sensor with a 0-10VDC output over a relative humidity range of 0-100% relative humidity. The sensor is powered with 24VAC.

8-Control Transformer T43

T43 is a single line voltage to 24VAC and ties into T1. See unit diagram. T43 is mounted in the control box. The transformer supplies power to control circuits (through T1). The 208/230 (Y) voltage transformers use primary voltage taps as shown in FIGURE 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

9-Variable Frequency Drive A96

Staged-Blower units are equipped with a VFD which alters the supply power frequency and voltage to the blower motor. Blower speed is staged depending on the compressor stages, heating demand, ventilation demand, or smoke alarm. The amount of airflow for each stage is preset from the factory. Airflow can be adjusted by changing ECTO parameters in the A55 Unit Controller. The VFD is assembled on the control board.

10-Terminal Block TB13

TB13 terminal block distributes line voltage power to the line voltage items in the unit.

11-Unit Controller A55

The Unit Controller provides all unit control functions, unit status information, unit diagnostics, programmable parameters and USB verification and profile sharing. Refer to the Unit Controller guide provided with the unit. Thermostat wires are connected to J297 on the Unit Controller. See FIGURE 5 for A55 board components.

12-Enthalpy Sensor - Optional

The optional enthalpy sensors (A7 and A63) used with the economizer have an output of 4-20mA. The sensor is powered with 18VAC provided by M4 unit control.

13-Room Sensors

Room sensor (A2) is a two-wire thermistor with 1k series resistor. See TABLE 1.

14-Carbon Dioxide Sensor

The indoor carbon dioxide sensor (A63) is an analog sensor with a 0-10VDC output over a carbon dioxide range of 0-2000 ppm as shown in the following table. The sensor is powered with 24VAC. See TABLE 2.

TABLE 1

Two-Wire Thermistor

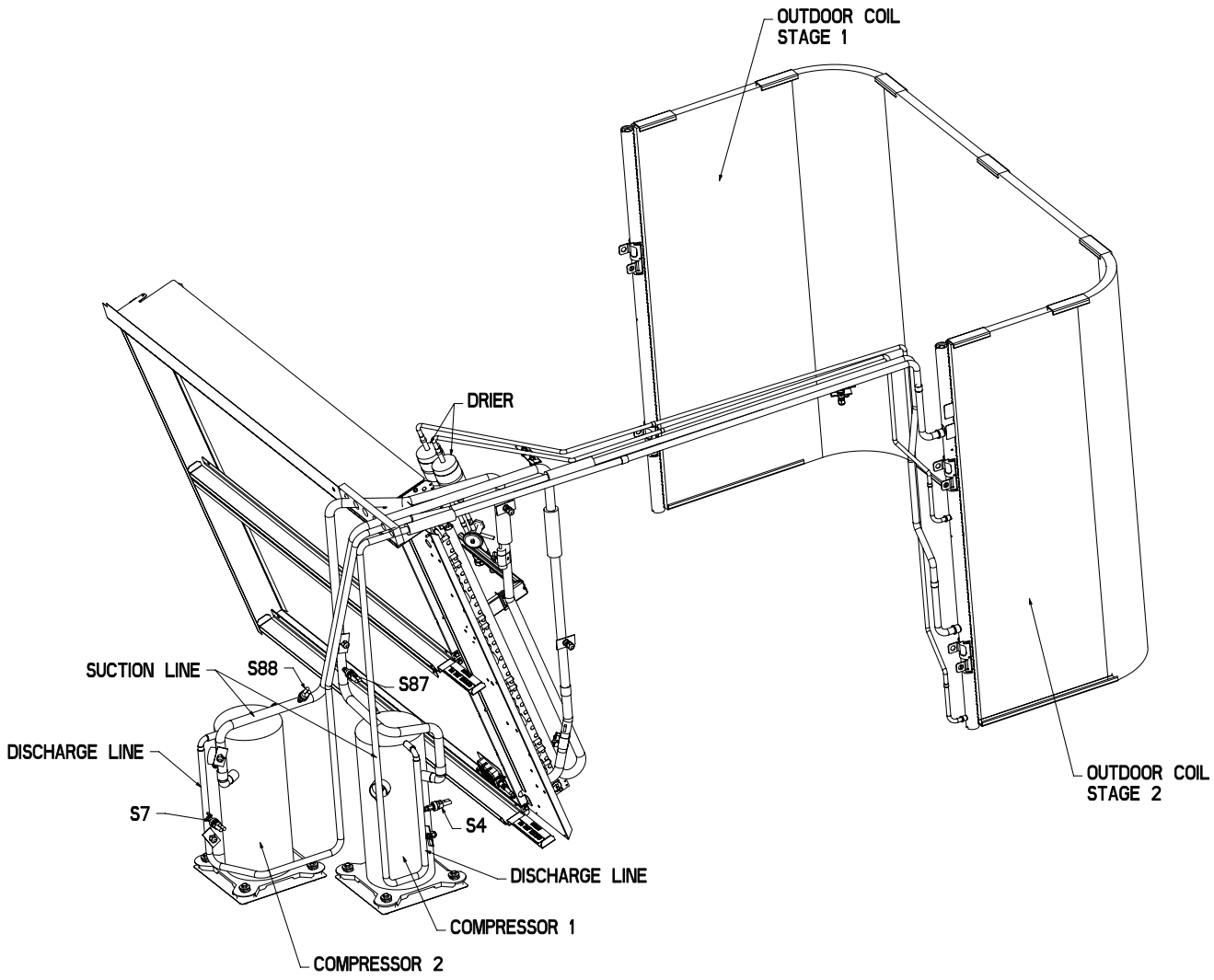
Temp. °F (°C)	Resistance +/-2%	Temperature °F (°C)	Resistance +/-2%	Temp. °F (°C)	Resistance +/-2%
40 (4.4)	27,102	60 (15.6)	16,313	80 (26.7)	10,299
45 (7.2)	23,764	65 (18.3)	14,474	85 (29.4)	9,249
50 (10)	20,898	70 (21.1)	12,882	90 (32.2)	8,529
55 (12.8)	18,433	75 (23.9)	11,498		

TABLE 2

Carbon Dioxide Range

Carbon Dioxide PPM	DC Voltage	Carbon Dioxide PPM	DC Voltage	Carbon Dioxide PPM	DC Voltage	Carbon Dioxide PPM	DC Voltage
0	0	600	3	1200	6	1800	9
200	1	800	4	1400	7	2000	10
400	2	1000	5	1600	8		

Plumbing and Refrigerant Circuit Detail



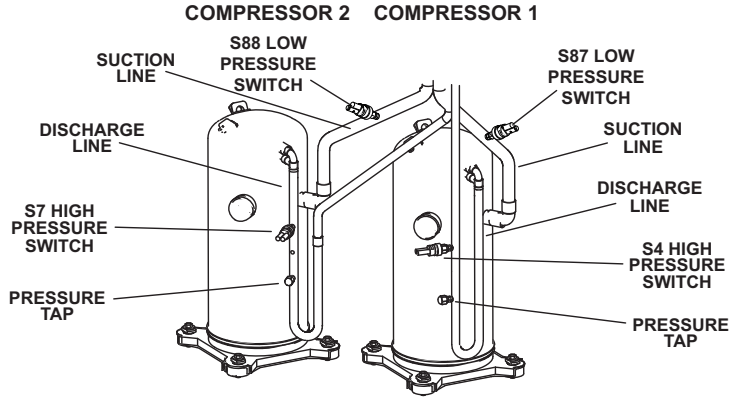


FIGURE 6

LCX WITH OPTIONAL REHEAT
LCX092 - 150 Shown

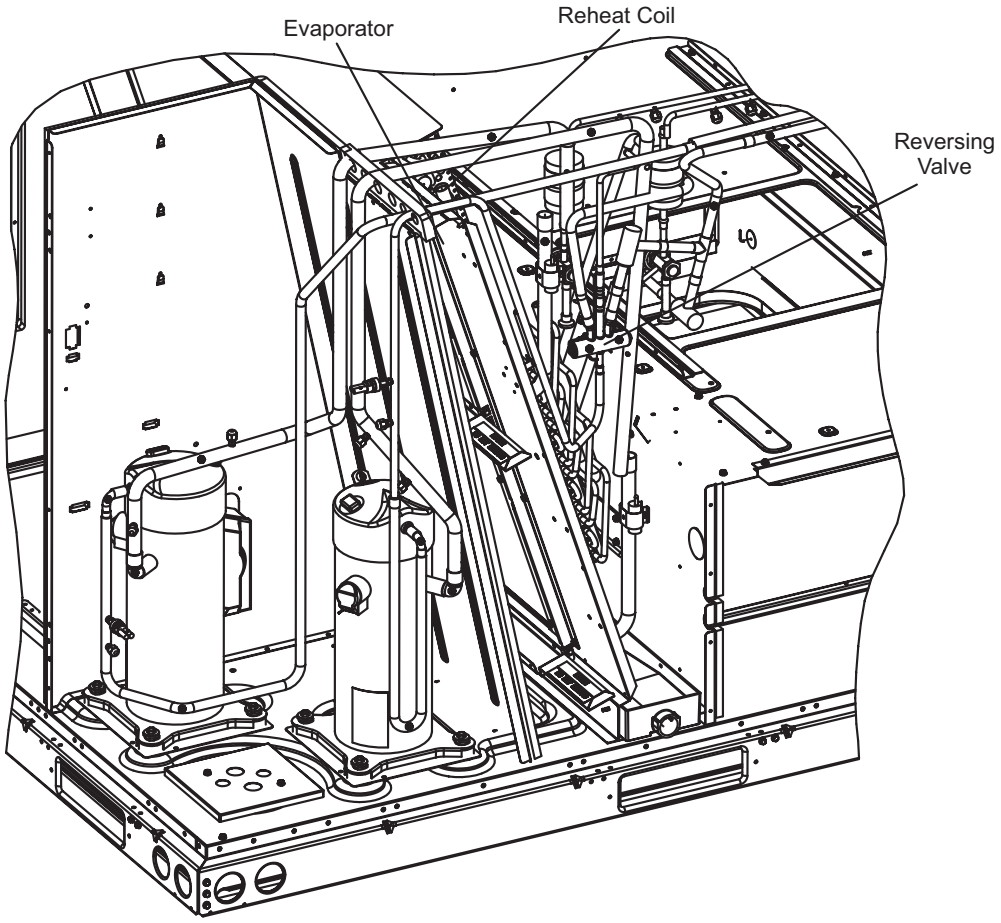


FIGURE 7

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See FIGURE 6 and FIGURE 7. Two draw-through-type condenser fans are used in LCX units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory or field installed economizer. Each evaporator uses a thermostatic expansion valve as the primary refrigerant metering device.

LCX150 Evaporators use a thermostatic expansion valve as primary refrigerant metering device. LCX092/102/120 use thermostatic expansion valve on stage one and orifices on stage 2. The evaporators are slab-type and are stacked.

In all units each compressor is protected by S87 and S88 low pressure switches and S4 and S7 high pressure switches (on each evaporator). All compressors are protected by a crankcase heater.

1-Compressors B1 and B2

Units are equipped with two scroll compressors and two independent cooling circuits. B1 is a 2-stage compressor, with L34 switching between part load and full load, B2 is a single stage compressor. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective coverover terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Each compressor is energized by a corresponding compressor contactor.

NOTE-*Refer to the wiring diagram section for specific unit operation.*

If Interlink compressor replacement is necessary, call 1-800-453-6669.

⚠ IMPORTANT

Some scroll compressors have an internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system rises above 40 psig. DO NOT REPLACE COMPRESSOR.

2-Low Pressure Switch S87, S88

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line. S87 (compressor one) and S88 (compressor two) are wired to A55 Unit Controller. A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter during first thermostat demand, before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control. When suction pressure drops to 40 ± 5 psig (276 ± 34 kPa), (indicating low pressure), the switch opens and the compressor(s) is(are) de-energized. The switch automatically resets when pressure in the suction line rises to 90 ± 5 psig (620 ± 34 kPa) due to many causes such as refrigerant being added.

3-High Pressure Switches S4 and S7

The high pressure switch is a manual reset SPST N.C. switch which opens on a pressure rise.

S4 (first circuit) and S7 (second circuit) are located in the compressor discharge line and are wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 12 psig (4413 ± 138 kPa) (indicating a problem in the system), the switch opens and the respective compressor is de-energized (the economizer can continue to operate).

4-Temperature Sensors

The return air (RT16) and discharge air (RT6) duct probes and the outdoor air (RT17) are all two wire thermistors. The resistance vs. temperature table is shown below in TABLE 4.

5-Temperature Sensors RT46 and RT47

Units are equipped with two factory-installed thermistors (RT46 and RT47) located on different points on the refrigerant circuit.

The thermistors provide the Unit Controller with constant temperature readings of two specific locations on the refrigeration circuit. These temperatures are used as feedback in certain modes of unit operation. In addition, the Unit Controller uses these temperatures to initiate alarms such as loss of condenser or evaporator airflow and loss of charge.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See TABLE 3 for proper locations.

TABLE 3

THERMISTOR LOCATION

Unit	Sensor	Figure
LCX 092-120 Indoor Coil	RT46, 47	FIGURE 8
LCX 150 Indoor Coil	RT46, 47	FIGURE 9

TABLE 4

Resistance vs. Temperature

Temp. °F (°C)	Resistance +/-2%	Temperature °F (°C)	Resistance +/-2%	Temp. °F (°C)	Resistance +/-2%
-40 (-40)	335,671	40 (4.4)	26,106	90 (32.2)	7,332
-20 (-28.9)	164,959	50 (10)	19,904	100 (37.8)	5,826
0 (-17.8)	85,323	60 (15.6)	15,313	120 (48.9)	3,756
20 (-6.7)	46,218	70 (21.1)	11,884	130 (54.4)	3,047
30 (-1.1)	34,566	80 (26.7)	9,298		

LGX/LCX 092, 102, 120
EVAPORATOR COIL
RT46, RT47

NOTES:
1. RT46 SENSOR, STAGE 1 DISTRIBUTOR TUBE, ANY TUBE BEFORE THE BLACK DISTRIBUTOR SLEEVE.
2. RT47 SENSOR, STAGE 2 DISTRIBUTOR TUBE, ANY TUBE BEFORE THE BLACK DISTRIBUTOR SLEEVE
3. USE WIRE TIE (ITEM 25) TO SECURE WIRE TO COPPER TUBE FOR STRAIN RELIEF.
4. ATTACH SENSORS SO WIRES ARE ORIENTED IN DOWNWARDS DIRECTION AS SHOWN.

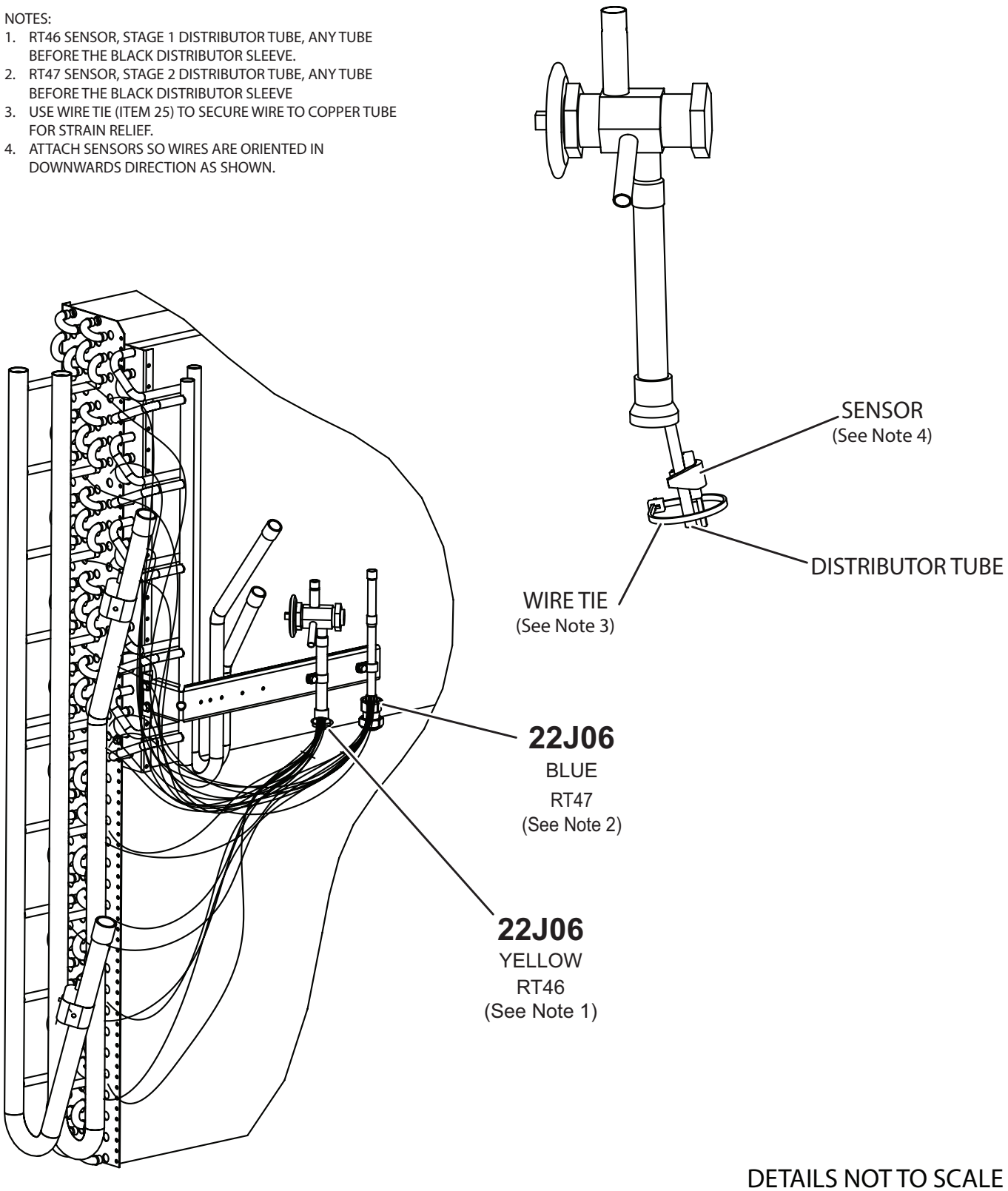
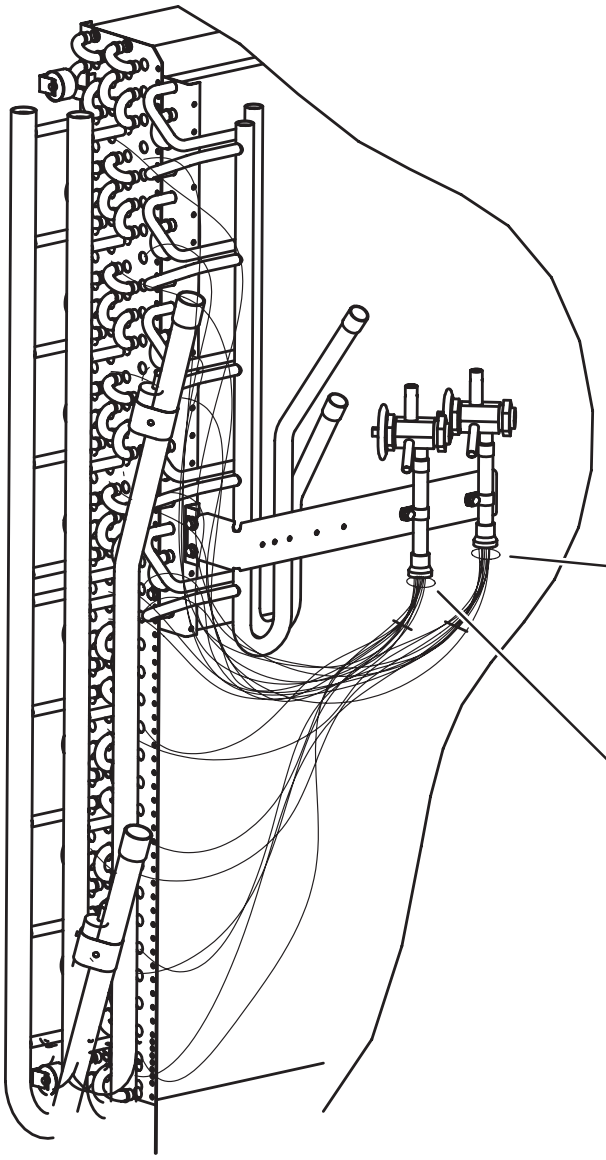
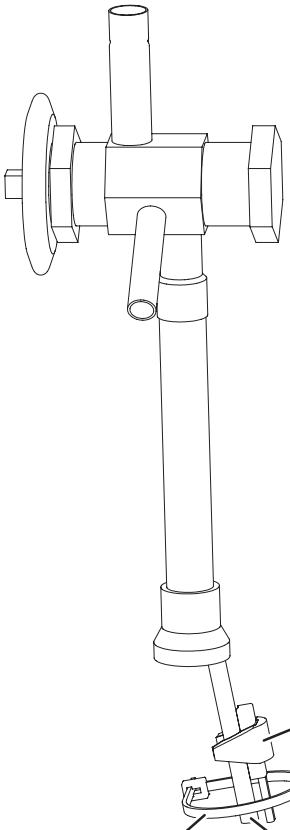


FIGURE 8

LGX/LCX 150
EVAPORATOR COIL
RT46, RT47

NOTES:
1. RT46 SENSOR, STAGE 1 DISTRIBUTOR TUBE, ANY TUBE BEFORE THE BLACK DISTRIBUTOR SLEEVE.
2. RT47 SENSOR, STAGE 2 DISTRIBUTOR TUBE, ANY TUBE BEFORE THE BLACK DISTRIBUTOR SLEEVE
3. USE WIRE TIE (ITEM 20) TO SECURE WIRE TO COPPER TUBE FOR STRAIN RELIEF.
4. ATTACH SENSORS SO WIRES ARE ORIENTED IN DOWNWARDS DIRECTION AS SHOWN.





SENSOR
(See Note 4)

WIRE TIE
(See Note 3)

DISTRIBUTOR TUBE

22J06
BLUE
RT47
(See Note 2)

22J06
YELLOW
RT46
(See Note 1)

DETAILS NOT TO SCALE

FIGURE 9

6-RDS Sensors

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources. In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see FIGURE 10. For a list of sensor alarms see TABLE 5

TABLE 5 - RDS Alarms

Alarm	Alarm description	RDS Sensor Location
257	Refrigerant leak sensor fault in the Indoor section (sensor #1)	Indoor compartment
258	Refrigerant leak sensor fault in the control panel/compressor section (sensor #2)	"Control/Compressor or Compressor compartment"

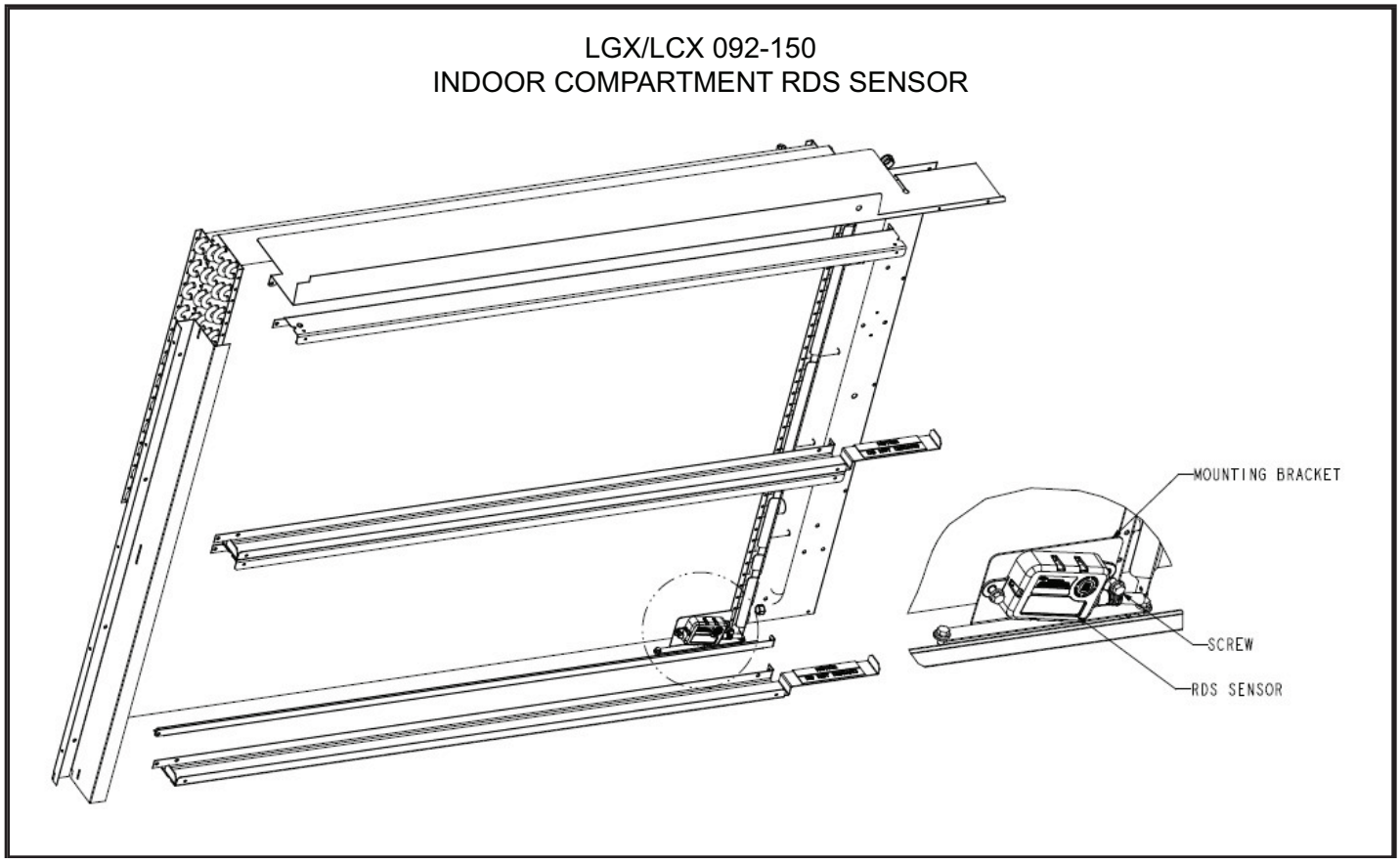


FIGURE 10

7-Low Ambient Kit (field installed)

The Low ambient kit is field installed. This kit has a head pressure controller. This kit allows mechanical cooling operation by maintaining liquid pressures at low outdoor temperatures, by stopping or slowing the outdoor fans.

Liquid line pressure switches (A188 & A189) will de-energize condenser fans below 355 psig, preventing low ambient operation. Liquid line pressure transducers are installed to convert the pressure to an analog signal which is sent to the head pressure controller (A190). The head pressure controller provides a variable output which slows condenser fan operation at lower ambient temperatures (A190 terminal M to K10 & K68 normally open contacts). Lower fan speeds increase the liquid line pressure, allowing operation above 355 psig.

8-Crankcase Heaters HR1, HR2

All LCX units use insertion-type heaters. Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor manufacturer.

9- Filter Drier

Units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each condenser coil. The drier removes contaminants and moisture from the system.

10- Condenser Fans B4, B5

See SPECIFICATIONS tables at the front of this manual for specifications of condenser fans used in all units. All condenser fans used have single-phase motors. The fan assembly may be removed for servicing and cleaning.

C-Blower Compartment

NOTE - *Units equipped a Variable Frequency Drive (VFD) are designed to operate on balanced, three-phase power. Operating units on unbalanced three-phase power will reduce the reliability of all electrical components in the unit. Unbalanced power is a result of the power delivery system supplied by the local utility company. Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. If unbalanced three-phase power is supplied; the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance. Refer to the installation instructions for additional information and available replacements.*

The blower compartment in all units is located between the evaporator coil and the condenser coil section. The blower assembly is accessed by disconnecting the blower motor .See *Blower Access* in the Operation/ Adjustment section.

1-Blower Wheels

All units have one 15 in. x 15 in. (381 mm x 381 mm) blower wheel.

2-Indoor Blower Motor B3

All units use three-phase single-speed blower motors. CFM adjustments are made by adjusting the motor pulley (sheave). Motors are equipped with sealed ball bearings. All motor specifications are listed in the SPECIFICATIONS(table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit.

Operation and Adjustments

A-Three Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1 - Observe suction and discharge pressures and blower rotation on unit start-up.

If pressure differential is not observed or blower rotation is not correct:

2 - Suction pressure must drop, discharge pressure must rise, and blower rotation must match rotation marking.

3 - Disconnect all remote electrical power supplies.

4 - Reverse any two field-installed wires connected to the line side of K3, TB2 or F4. Do not reverse wires at blower contactor or compressors.

5 - Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

Supply Air Inverter Units - Units are equipped with a phase monitor located in the control compartment. The phase monitor will detect the phasing of incoming power.

If the incoming power is out of phase or if any of the three phases are lost, the indicating LED on the phase monitor will turn red and the unit will not start. In normal operation with correct incoming power phasing, the LED will be green.

B-Blower Operation

Refer to the Unit Controller Setup Guide to energize blower. Use this mobile service app menu:

SERVICE > TEST > BLOWER

Instructions provided with the thermostat may also be used to initiate blower only (G) demand. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

Blower operation is manually set at the thermostat subbase fan switch. With fan switch in ON position, blowers will operate continuously.

With fan switch in AUTO position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in OFF position.

C-Blower Access

The blower assembly is secured to a sliding frame which allows the blower motor to be pulled out of the unit. See FIGURE 11.

6 - Loosen the reusable wire tie which secures the blower wiring to the blower motor mounting plate.

7 - Remove and retain screws on either side of sliding frame. Pull frame toward outside of unit.

8 - Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower motor base using the wire tie.

9 - Replace retained screws on either side of the sliding frame.

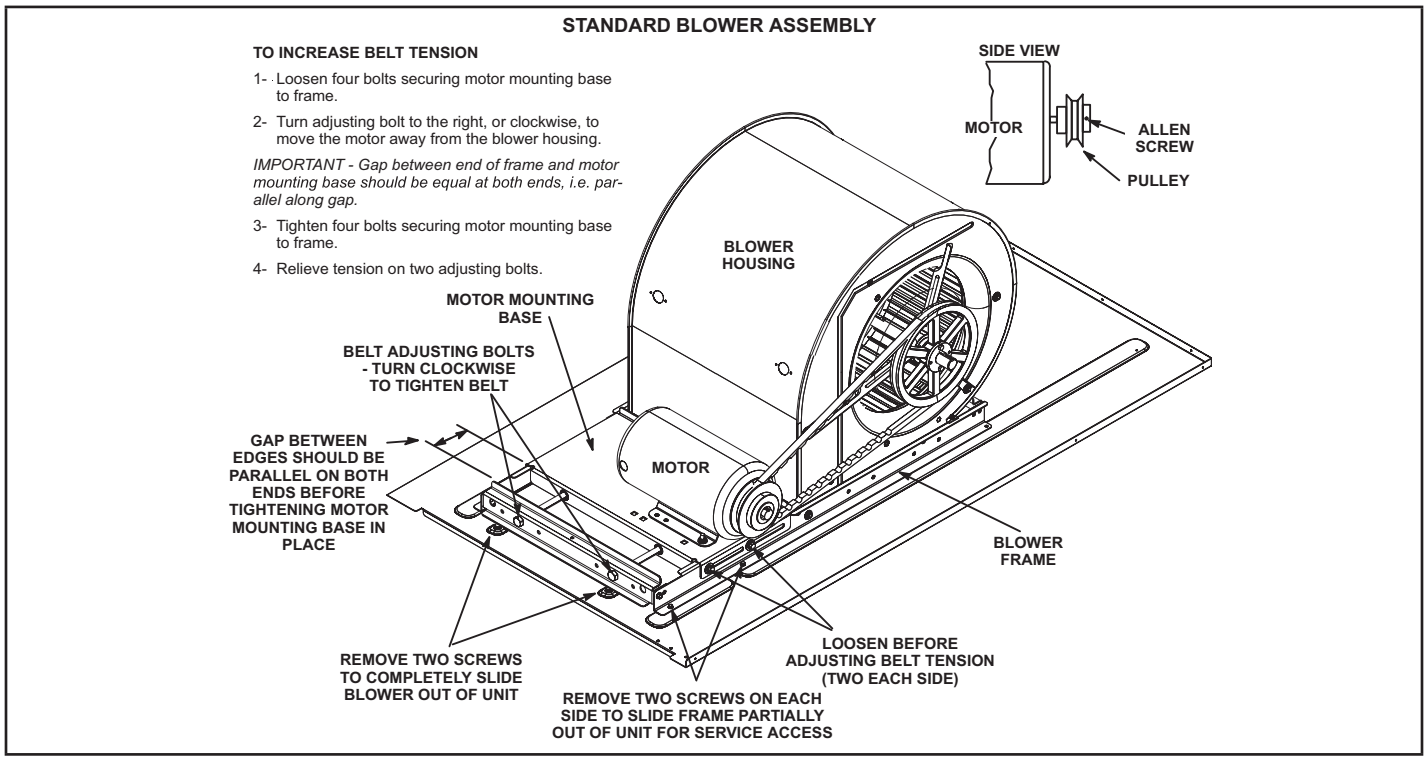


FIGURE 11

D-Determining Unit CFM

IMPORTANT - *Units equipped with an inverter are factoryset to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Use the following procedure to adjust motor pulley to deliver the full load cooling or heating CFM. See Inverter Start-Up section to set blower CFM for all modes once the motor pulley is set.*

1 - The following measurements must be made with a dry indoor coil. Run blower without a cooling demand. Measure the indoor blower shaft RPM. Air filters must be in place when measurements are taken.

2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 12.

Note - *Static pressure readings can vary if not taken where shown.*

3 - Refer to BLOWER DATA (table of contents) and use static pressure and RPM readings to determine unit CFM.

4 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 11. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 6.

TABLE 6

MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Minimum Turns Open	Maximum Turns Open
A Section	0	5
B Section	1*	6

*No minimum number of turns open when B belt is used on pulleys 6" O.D. or larger.

E-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat in the pulley grooves. Make sure blower and motor pulleys are aligned as shown in FIGURE 13.

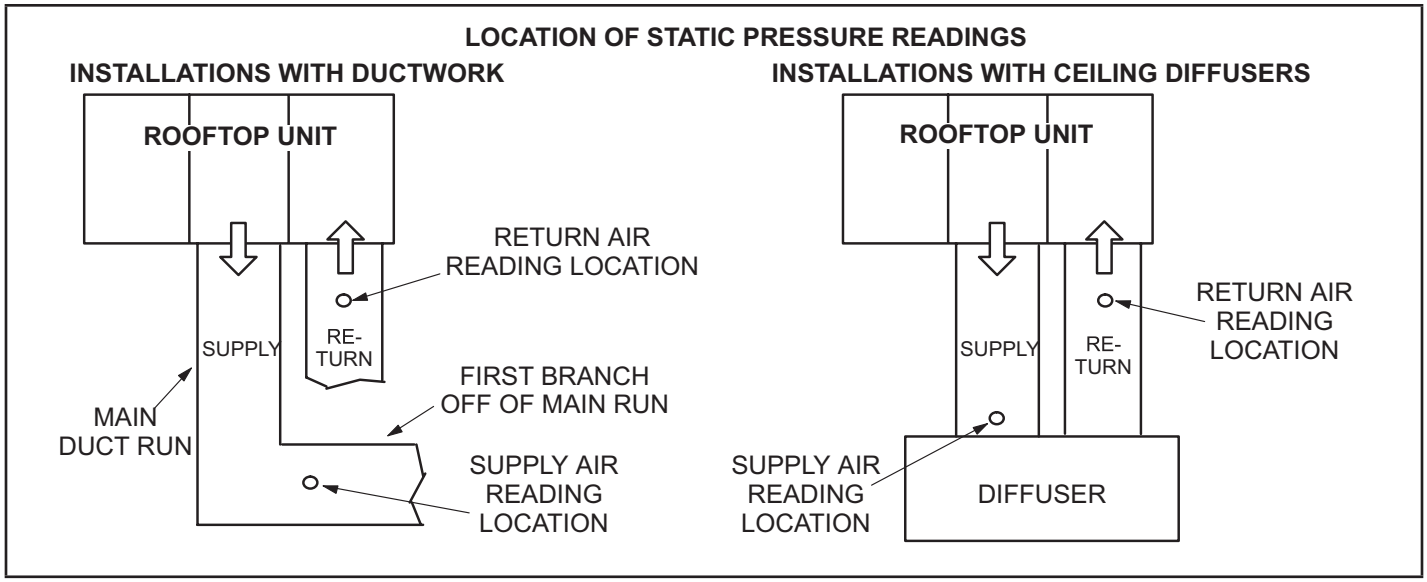


FIGURE 12

1 - Loosen four bolts securing motor base to mounting frame. See FIGURE 11.

2 - *To increase belt tension -*

Turn both adjusting bolts to the right, or clockwise, to move the motor outward and tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -

Turn the adjusting bolts to the left, or counterclockwise to loosen belt tension.

IMPORTANT - *Align top edges of blower motor base and mounting frame base parallel before tightening two bolts on the other side of base. Motor shaft and blower shaft must be parallel.*

3 - Tighten two bolts on each side of the motor mounting base. This secures the mounting base to the frame.

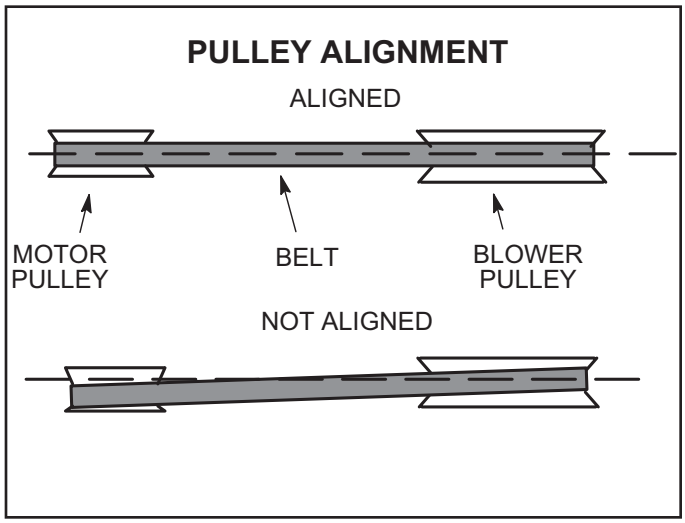


FIGURE 13

F-Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

1 - Measure span length X. See FIGURE 14.

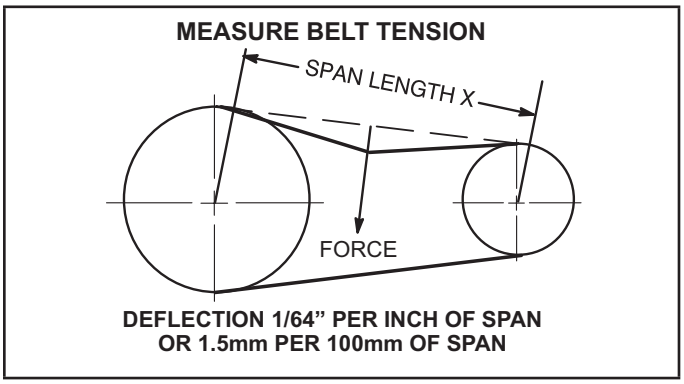


FIGURE 14

2 - Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length.

Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3 - Measure belt deflection force. For a new 2 and 3hp belt, the deflection force should be 5.0-7.0 lbs. (35-48kPa). For a new 5hp belt, the deflection force should be 7-10lbs. (48-69kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

G-Field-Furnished Blower Drives

See BLOWER DATA for field-furnished blower drives to determine BHP and RPM required. Reference TABLE 7 for drive component manufacturer's numbers

TABLE 7
MANUFACTURER'S NUMBERS

DRIVE NO.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELT	
	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.
1	1VP34x7/8	31K6901	AK61x1	100244-20	AX54	100245-25
2	1VP40x7/8	79J0301	AK59x1	31K6801	AX55	100245-26
3	1VP34x7/8	31K6901	AK46x1	100244-17	AX52	100245-33
4	1VP44x7/8	53J9601	AK74x1	100244-21	AX58	100245-34
5	1VP50x7/8	98J0001	AK69x1	37L4701	AX58	100245-34
6	1VP50x7/8	98J0001	AK64x1	12L2501	AX57	100245-28
10	1VP50x1-1/8	P-8-1977	BK77x1	49K4001	BX59	59A5001
11	1VP60x1-1/8	41C1301	BK77x1	49K4001	BX61	93J9801

D-Optional Electric Heat Components (Optionally Field Installed)

See ELECTRICAL / ELECTRIC HEAT DATA and ELECTRIC HEAT CAPACITIES (table of contents) for electric heat match-ups and electrical ratings. Electric heat is shown in FIGURE 6. All electric heat sections consist of electric heating elements exposed directly to the air stream.

1-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil and are energized by the A55 Unit Controller. Contactors energize the first and only stage of heating elements.

2-High Temperature Limits S15 (Primary)

S15 is a SPST normally closed auto-reset thermostat located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactor K15 is deenergized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. For EHA102/150 units, the electric heat section thermostat is factory set to open at 170F $\pm$ 5F (76C $\pm$ 2.8C) on a temperature rise and automatically reset at 130F $\pm$ 6F (54.4C $\pm$ 3.3C) on a temperature fall. For EHA100 units, the electric heat section thermostat is factory set to open at 160F $\pm$ 5F (71.0C $\pm$ 2.8C) on a temperature rise and automatically reset at 120F $\pm$ 6F (49.0C $\pm$ 3.3C) on a temperature fall. The thermostat is not adjustable.

3-High Temperature Limit S20, S157, S158, S159, S160 & S161 (Secondary)

Limits are SPST normally closed manual-reset thermostat like the primary temperature limit, S20 is wired in series with the first stage contactor coil (K15) and second stage contactor coil (K16). When S20 opens, contactors (K15, K16) are de-energized. When the contactors are de-energized, first stage and all subsequent stages of heat are de-energized. The thermostat is factory set to open at 220F $\pm$ 6F (104C $\pm$ 3.3C) on a temperature rise and can be manually reset when temperature falls below 160F (71.0C).

4-Terminal Strip TB2

Terminal strip TB2 is used for single point power installations only. TB2 distributes L1, L2 and L3 power to TB3. Units with multi-point power connections will not use TB2.

5-Terminal Strip TB3

Electric heat line voltage connections are made to terminal strip TB3 located in the upper left corner of the electric heat vestibule. TB3 distributes power to the electric heat components.

6-Heating Elements HE1 through HE6

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. Three elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a “Delta” arrangement. Elements in 460 and 575V units are connected in “Wye” arrangement. Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses.

7-Fuses F3, F42

Fuses F3 and F42 are housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. FIGURE 16 and TABLE 8 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F42 - 1, 2.

8-Unit Fuse Block F4

Three line voltage fuses F4 provide short circuit and ground fault protection to all cooling components in the LCX units with electric heat. The fuses are rated in accordance with the amperage of the cooling components.

TABLE 8

ELECTRIC HEAT SECTION FUSE RATING					
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**			
		F3-1	**F3-2**	**F42-1**	**F42-2**
EHO075-1, 7.5	208/230		25 Amp 250V		
	460		15 Amp 600V		
	575		10 Amp 600V		
EHO150-1, 15	208/230		50 Amp 250V		
	460		25 Amp 600V		
	575		20 Amp 600V		
EHO225-1, 22.5	208/230	50 Amp 250V		25 Amp 250V	
	460	25 Amp 600V		15 Amp 600V	
	575	20 Amp 600V		10 Amp 600V	
EHO300-1, 30	208/230	50 Amp 250V		50 Amp 250V	
	460	25 Amp 600V		25 Amp 600V	
	575	20 Amp 600V		20 Amp 600V	
EHO450-1, 45	208/230	50 Amp 250V		60 Amp 250V	60 Amp 250V
	460	25 Amp 600V		50 Amp 600V	
	575	20 Amp 600V		40 Amp 600V	
EHO600-1, 60	208/230	60 Amp 250V	60 Amp 250V	60 Amp 250V	60 Amp 250V
	460	50 Amp 600V		50 Amp 600V	
	575	40 Amp 600V		40 Amp 600V	

EHA 7.5, 15, 22.5, 30, 45, 60KW
ELECTRIC HEAT SECTION PARTS ARRANGEMENT

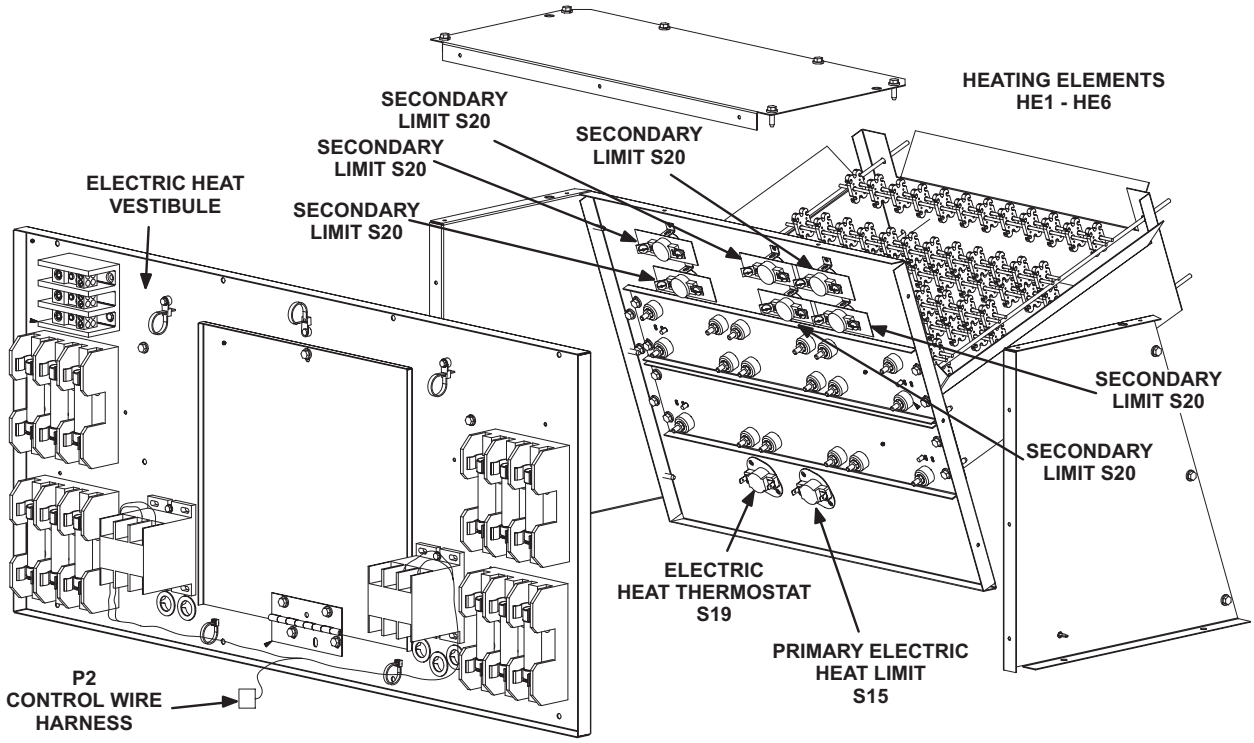


FIGURE 15

ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

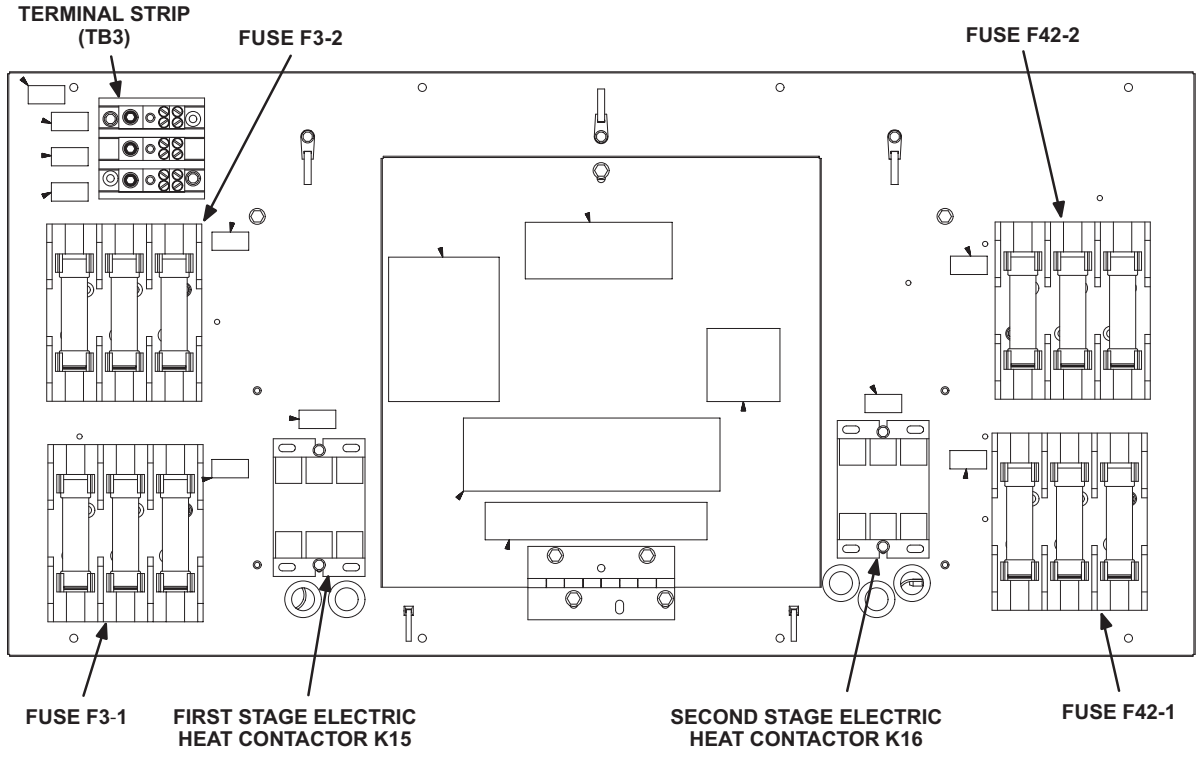


FIGURE 16

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame.

III-STARTUP - OPERATION

Refer to startup directions and to the unit wiring diagram when servicing. See unit nameplate for minimum circuit ampacity and maximum fuse size.

A-Preliminary and Seasonal Checks

1 - Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2 - Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit control box cover.

3 - Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4 - Check voltage at the disconnect switch (if applicable) or TB2. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5 - Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6 - Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B - Cooling Start Up (See FIGURE 17)

⚠ IMPORTANT

If unit is equipped with a crankcase heater. Make sure heater is energized 24 hours before unit start- up to prevent compressor damage as a result of slugging.

Supply Air Inverter Units - Refer to the Inverter Start-Up section for further instruction on blower control.

Compressor 1 is a two-stage compressor. Compressor 2 is a single-stage compressor.

Initiate first, second or third stage cooling demands according to instructions provided with thermostat or from the mobile service app at the following path:

RTU MENU > SERVICE > COMPONENT TEST > COOLING > COOLING STAGE 1/2/3

With 2-stage cooling thermostat, the first-stage thermostat demand will energize compressor 1 Full Load.

Second-stage thermostat demand will energize compressor 2.

With 3-stage cooling thermostat, the first-stage thermostat demand will energize compressor 1 Part Load.

Second-stage thermostat demand will energize compressor 2.

Third-stage thermostat demand will energize compressor 1 Full Load and Compressor 2.

Units contain two refrigerant circuits or stages.

Each refrigerant circuit is separately charged with refrigerant. See unit rating plate for correct amount of charge.

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1 - Observe suction and discharge pressures and blower rotation on unit start-up

If pressure differential is not observed or blower rotation is not correct:

2 - Suction pressure must drop, discharge pressure must rise, and blower rotation must match rotation marking.

3 - Disconnect all remote electrical power supplies.

4 - Reverse any two field-installed wires connected to the line side of TB2 or F4. Do not reverse wires at VFD or compressors.

5 - Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

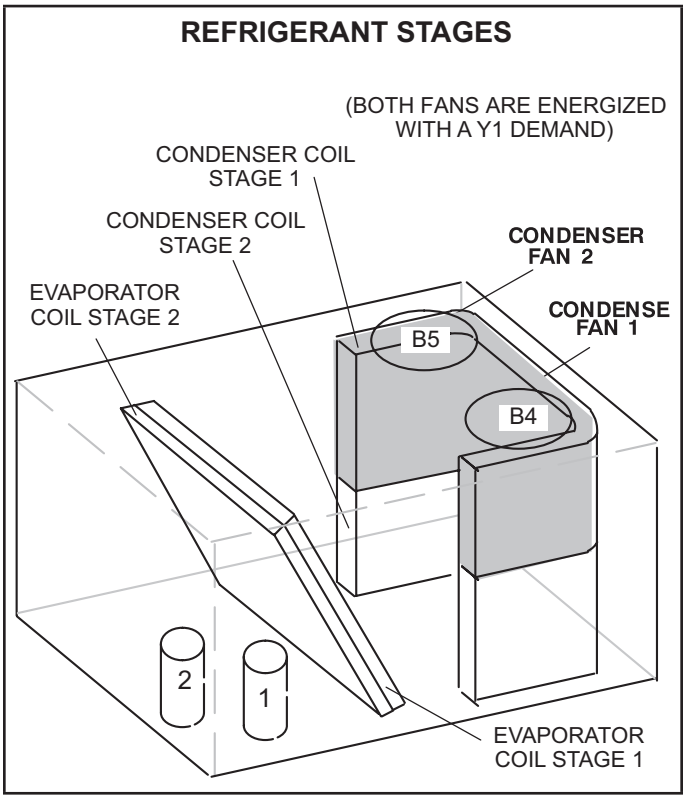


FIGURE 17

C-Safety or Emergency Shutdown

Turn off power to unit.

IV-CHARGING

A-All Aluminum Outdoor Coil

Units charged with R454B refrigerant operate at lower pressures than R410A. The expansion valve and liquid line dryer provided with the unit are approved for use with R454B.

R454B refrigerant is stored in a gray cylinder.

⚠ CAUTION

Mineral oils are not compatible with R454B. If oil must be added, it must be a polyolester oil.

Manifold gauge sets used with systems charged with R454B refrigerant must be capable of handling various system operating pressures. The gauges should be rated for use with pressures of 0-800 on the high side and a low side of 30" vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

Refrigerant Charge R-454B		
Unit	M_c(lbs)	M_c(kg)
LCX092 STG 1	3.56	1.62
LCX092 STG 2	3.06	1.39
LCX102 STG 1	4.31	1.96
LCX102 STG 2	3.00	1.36
LCX120 STG 1	3.75	1.70
LCX120 STG 2	4.31	1.96
LCX150 STG 1	5.13	2.32
LCX150 STG 2	5.94	2.69
LCX092 W/ Humidtrol STG 1	4.50	2.04
LCX092 W/ Humidtrol STG 2	2.88	1.30
LCX102 W/ Humidtrol STG 1	4.44	2.01
LCX102 W/ Humidtrol STG 2	3.06	1.39
LCX120 W/ Humidtrol STG 1	5.38	2.44
LCX120 W/ Humidtrol STG 2	4.88	2.21
LCX150 W/ Humidtrol STG 1	5.19	2.35
LCX150 W/ Humidtrol STG 2	5.81	2.64

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the unit is earth grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, that it has been properly maintained, and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

B-Refrigerant Charge and Check - All-Aluminum Coil

LCX 092, 102, 120, 150

WARNING - Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

NOTE - *System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge* **must** *be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

1 - Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.

Mobile service app:

RTU MENU > COMPONENT TEST > COOLING > COOLING STAGE 3”

2 - Check each system separately with all stages operating. Compare the normal operating pressures (see TABLE 9 through TABLE 16) to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

NOTE - *Pressures are listed for sea level applications.*

4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.

6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 - Example LCX 092S No Reheat Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 106°F. For a measured liquid temperature of 112°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 9 581309-01

LCX 092S No Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	93	225	96	261	99	301	101	346	103	396	105	450
	100	227	103	263	106	304	108	349	111	398	113	453
	113	233	117	270	120	311	124	356	127	406	130	460
	127	242	131	279	136	320	140	366	144	416	148	471
Circuit 2	110	226	114	261	117	300	121	343	123	390	126	440
	116	229	120	265	124	304	128	347	131	394	135	444
	126	236	132	272	137	312	142	355	146	403	151	453
	136	245	143	281	149	321	155	365	161	412	166	463

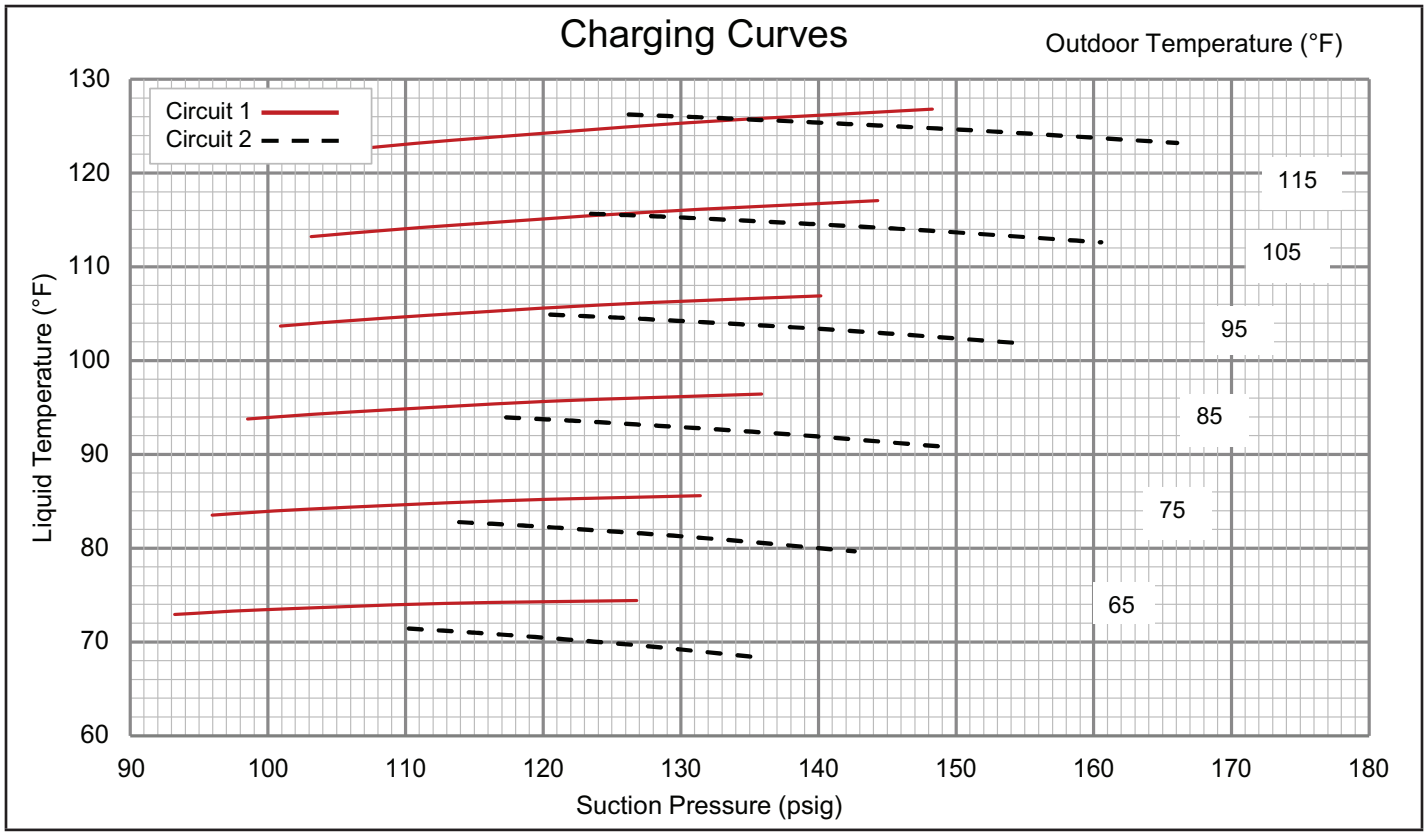


TABLE 10 581348-01

LCX 092S Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	94	233	96	270	98	313	100	364	101	422	103	488
	101	235	103	271	105	313	107	363	110	420	111	484
	115	245	118	277	121	317	124	365	127	420	130	482
	131	260	135	290	139	328	143	373	146	425	149	485
Circuit 2	111	226	114	261	117	301	120	344	123	391	125	443
	116	230	120	265	124	305	127	348	131	396	134	447
	127	239	132	274	137	314	141	358	146	406	150	458
	137	249	144	285	150	326	155	370	161	418	166	470

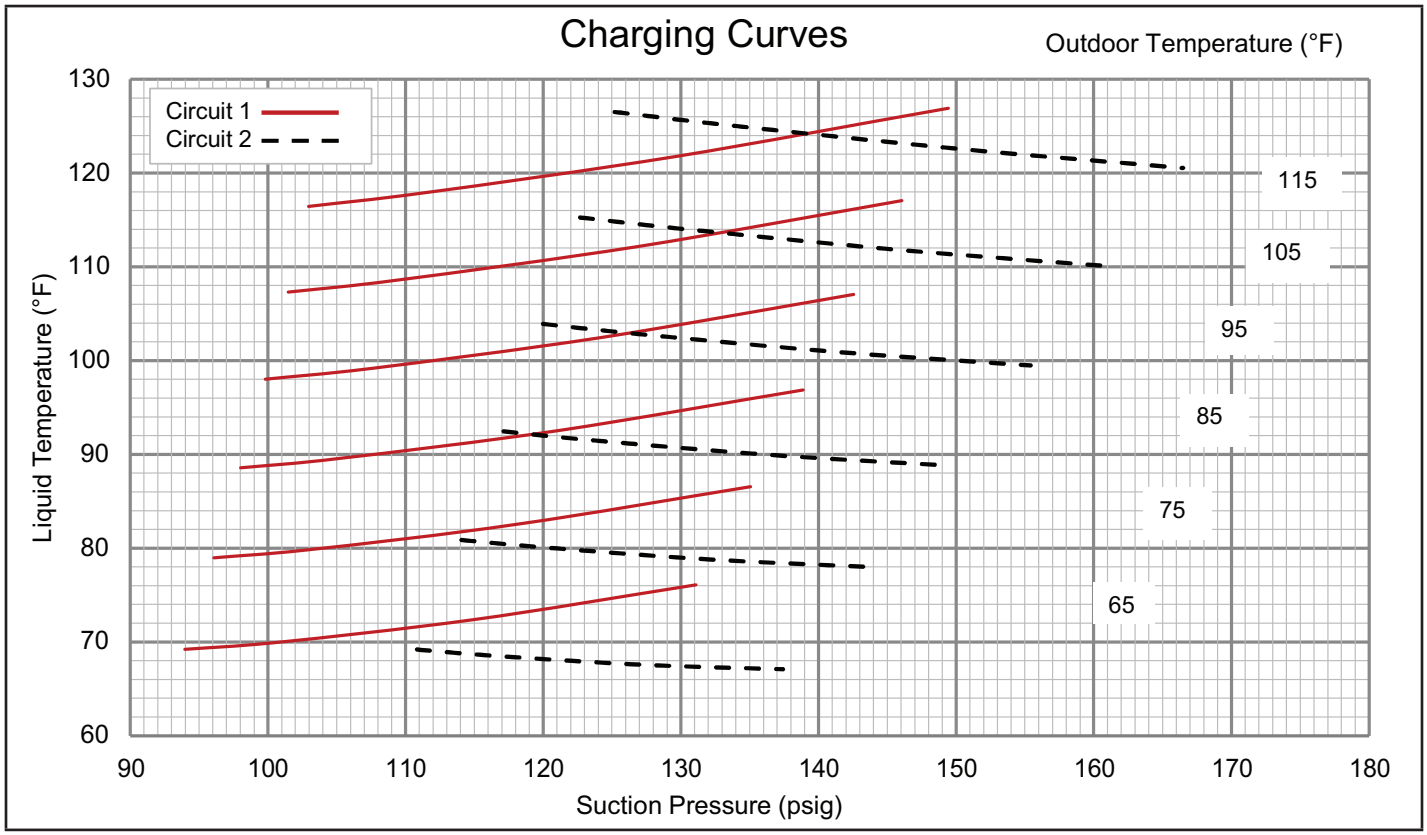


TABLE 11 581310-01

LCX 102S No Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	100	219	101	260	103	308	104	361	106	421	108	487
	106	225	107	265	109	311	111	363	114	422	116	487
	119	238	121	275	124	318	127	367	130	423	133	485
	133	251	137	285	140	325	144	372	148	424	152	483
Circuit 2	107	244	110	282	113	324	116	370	119	419	121	472
	112	248	116	286	120	328	123	374	126	423	129	476
	123	255	128	293	133	336	137	382	141	431	145	485
	135	262	141	301	146	343	152	390	157	440	162	493

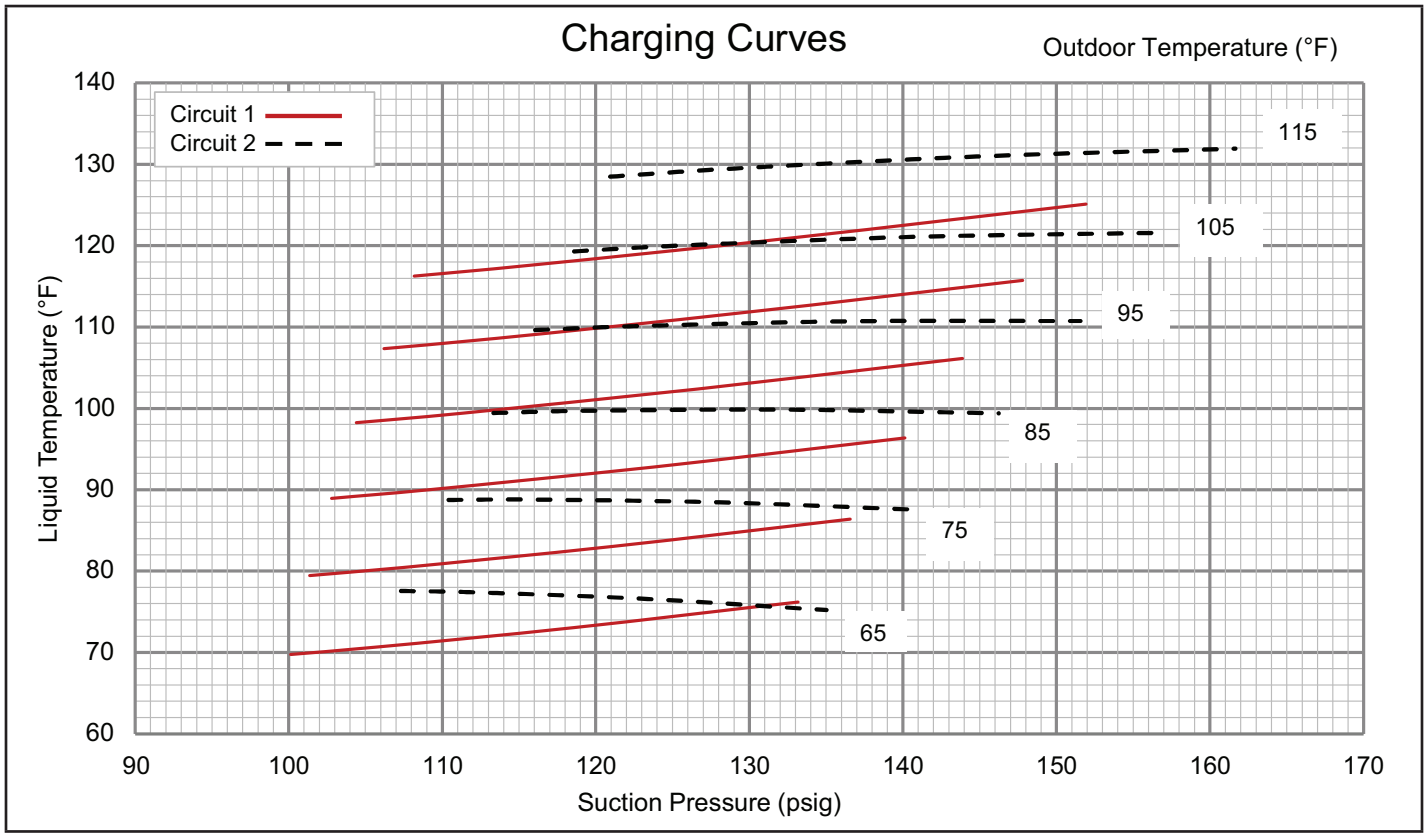


TABLE 12 581349-01

LCX 102S Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	96	234	99	271	100	317	102	372	103	436	104	509
	103	236	106	270	108	314	110	367	111	430	112	501
	118	246	121	277	124	317	127	366	129	424	131	491
	135	266	139	293	143	329	146	374	150	428	152	492
Circuit 2	109	250	112	288	114	330	116	375	119	425	121	479
	115	254	118	292	121	334	124	380	127	430	130	485
	128	262	132	301	136	344	140	391	144	442	148	497
	141	270	146	310	151	354	156	402	161	454	167	510

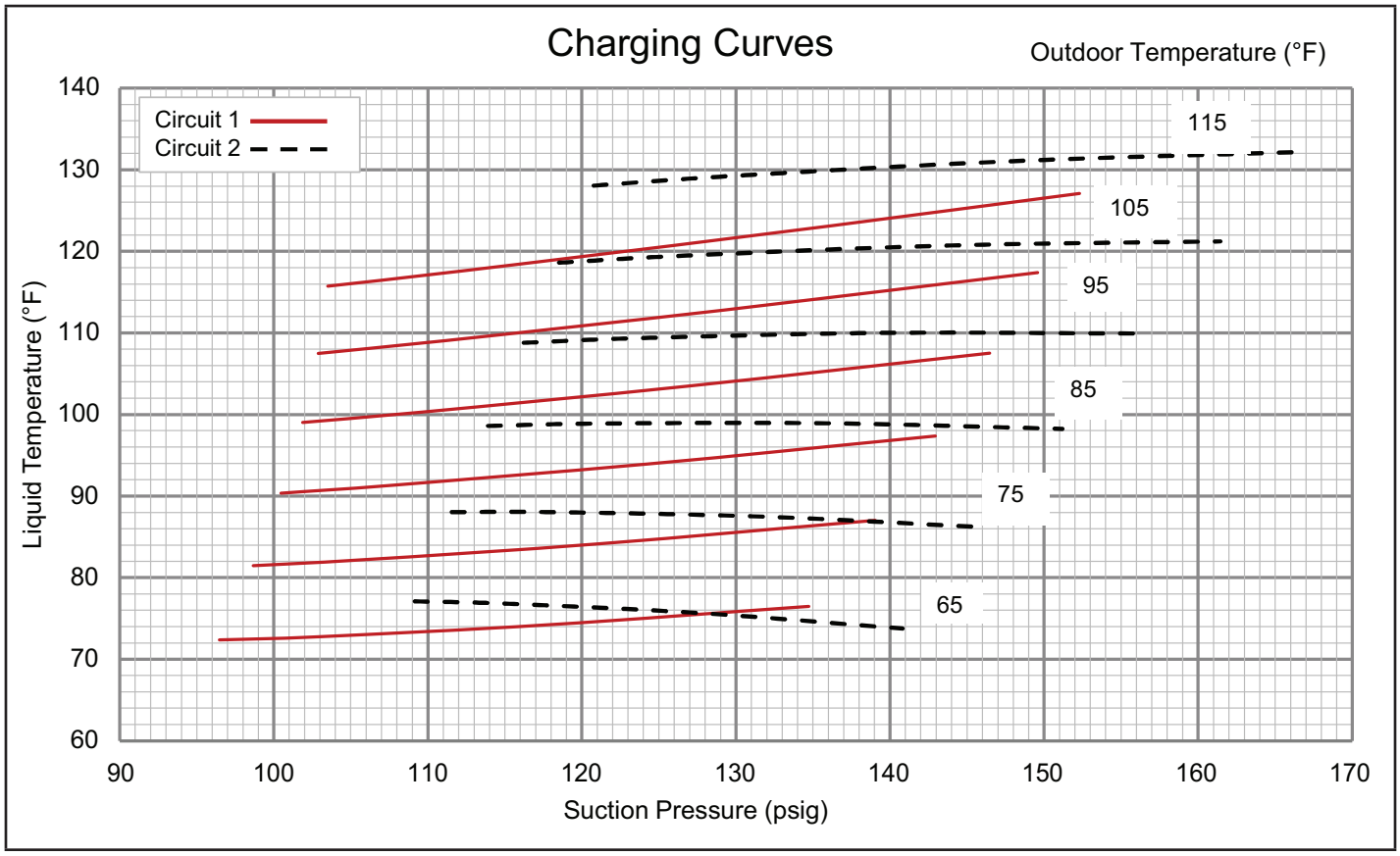


TABLE 13 581311-01

LCX 120S No Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	94	226	95	263	97	306	99	356	102	413	104	476
	101	227	103	263	105	306	108	355	110	411	113	473
	117	235	119	270	122	311	125	358	128	412	131	472
	134	250	137	283	140	322	143	368	147	420	150	479
Circuit 2	109	242	112	279	115	320	118	366	121	417	123	472
	116	251	119	286	122	327	126	372	129	422	132	477
	129	272	133	306	138	345	142	389	146	437	149	490
	143	299	149	331	154	369	158	411	163	458	168	509

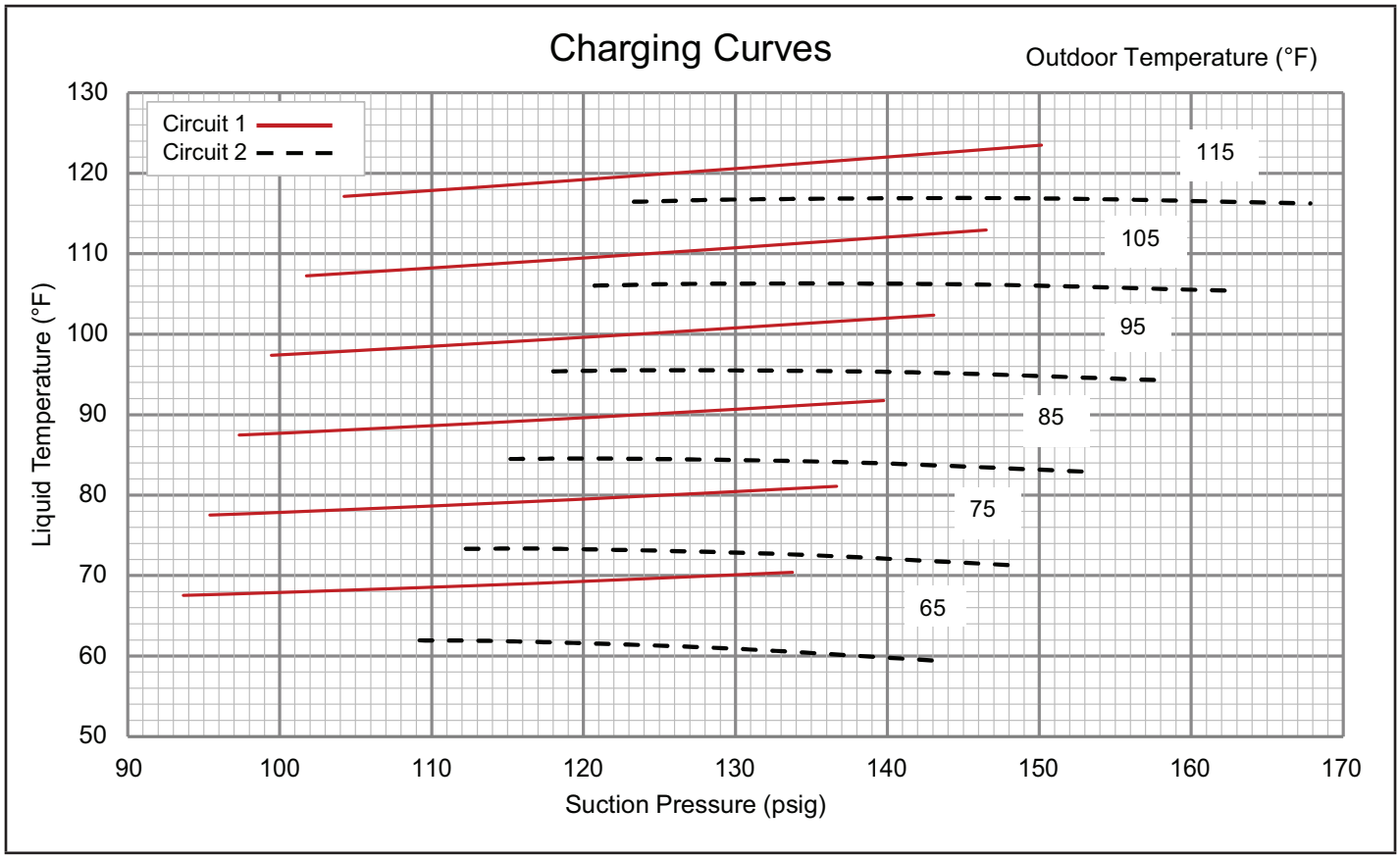


TABLE 14 581350-01

LCX 120S Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	93	236	96	276	98	321	100	374	102	432	104	497
	101	237	103	275	106	319	108	369	110	426	113	489
	117	246	120	280	122	321	125	368	128	421	131	481
	133	263	136	294	139	332	143	375	146	425	149	482
Circuit 2	110	247	113	283	116	324	118	369	121	418	123	472
	116	255	120	291	123	331	126	375	129	423	132	476
	131	277	135	311	139	349	142	392	146	438	149	489
	145	306	150	338	154	375	159	416	163	461	167	510

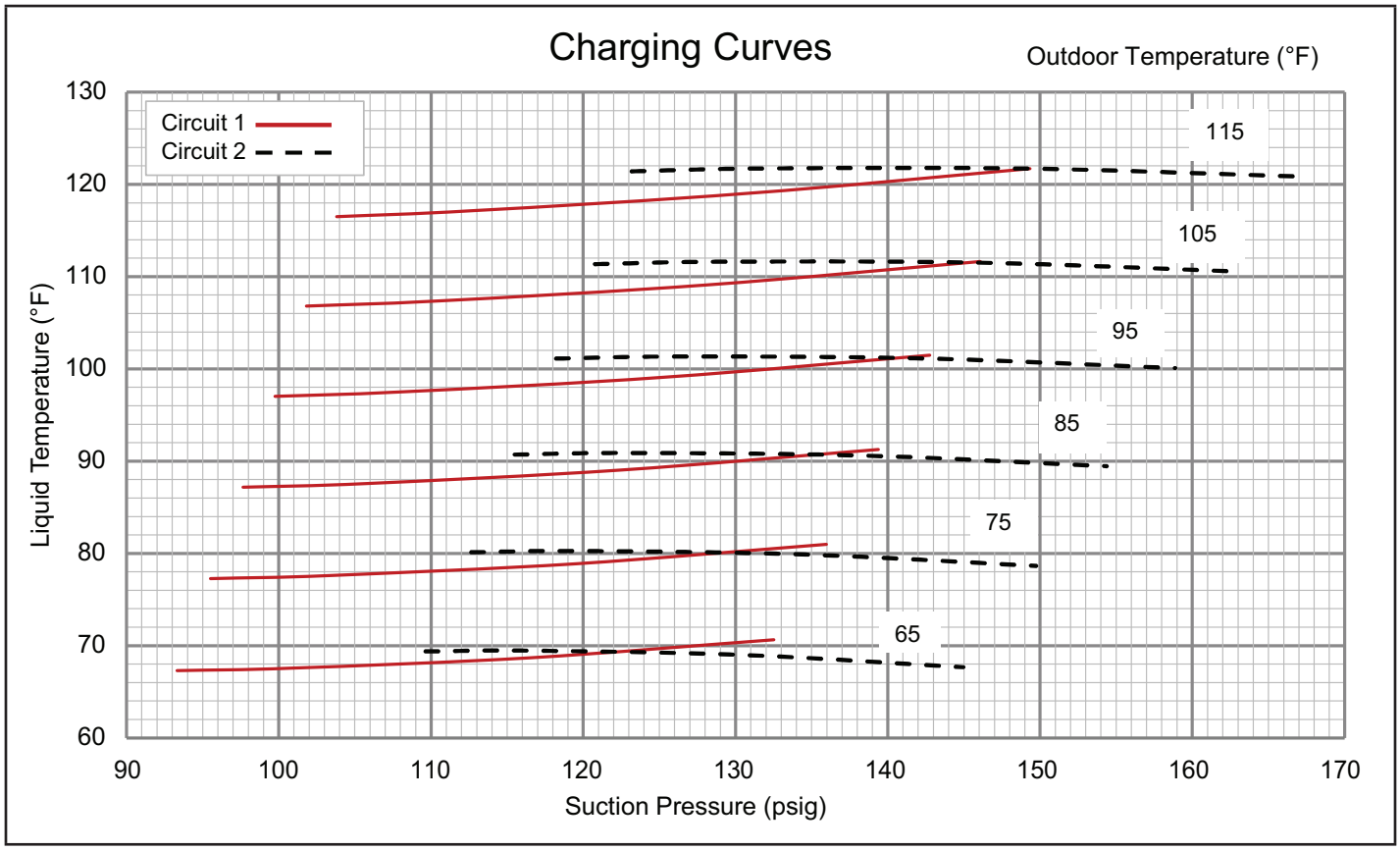


TABLE 15 581312-01

LCX 150S No Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	93	227	95	267	98	310	100	358	102	410	103	466
	100	230	102	269	105	313	107	360	109	412	111	467
	115	237	118	276	121	319	124	366	127	417	129	472
	133	247	136	285	140	327	143	373	146	424	149	478
Circuit 2	109	252	111	292	113	336	115	383	116	435	118	491
	115	257	118	296	121	340	123	387	125	439	127	494
	129	268	133	307	137	350	140	397	143	448	146	503
	143	281	148	320	153	363	157	409	161	460	165	515

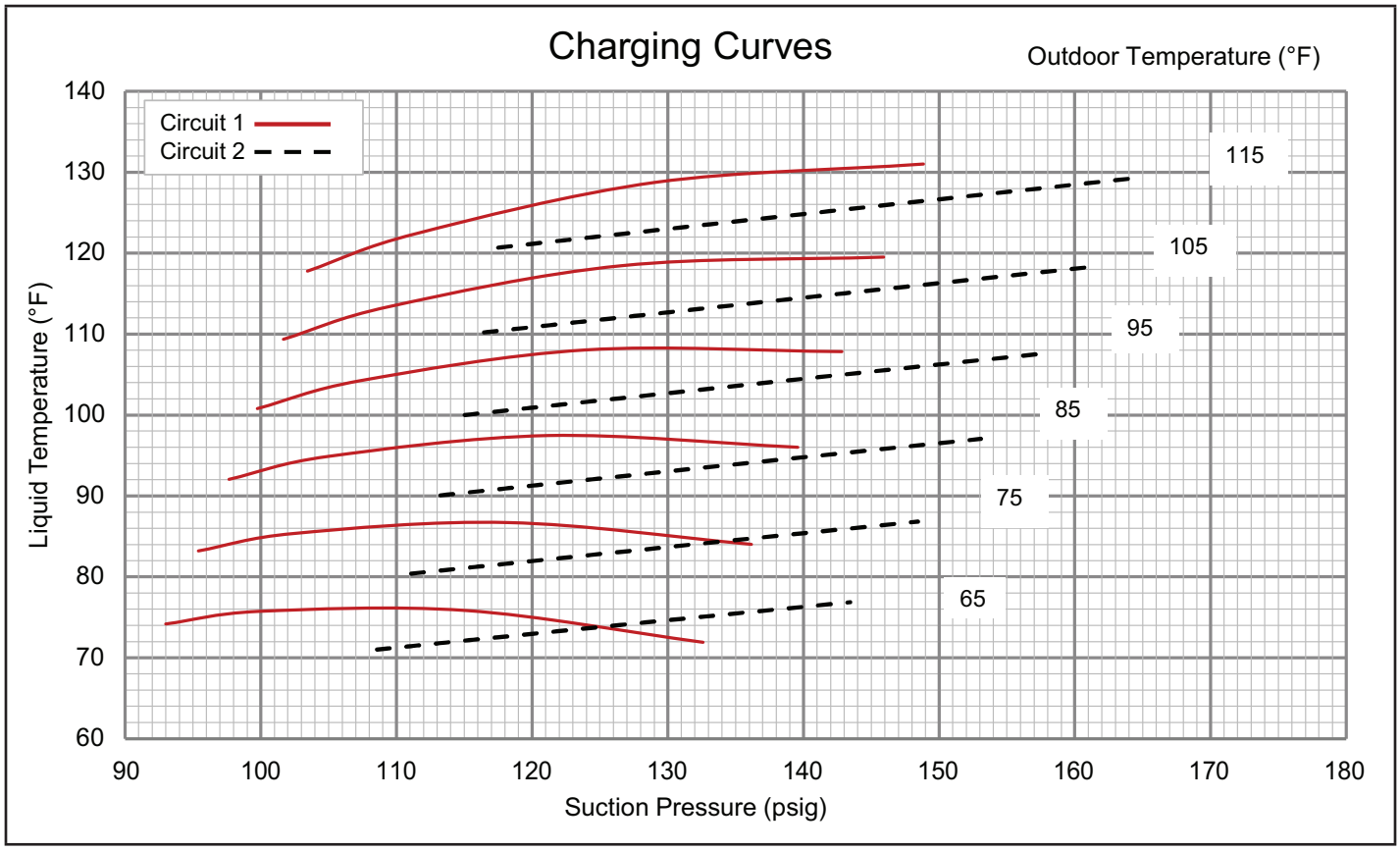
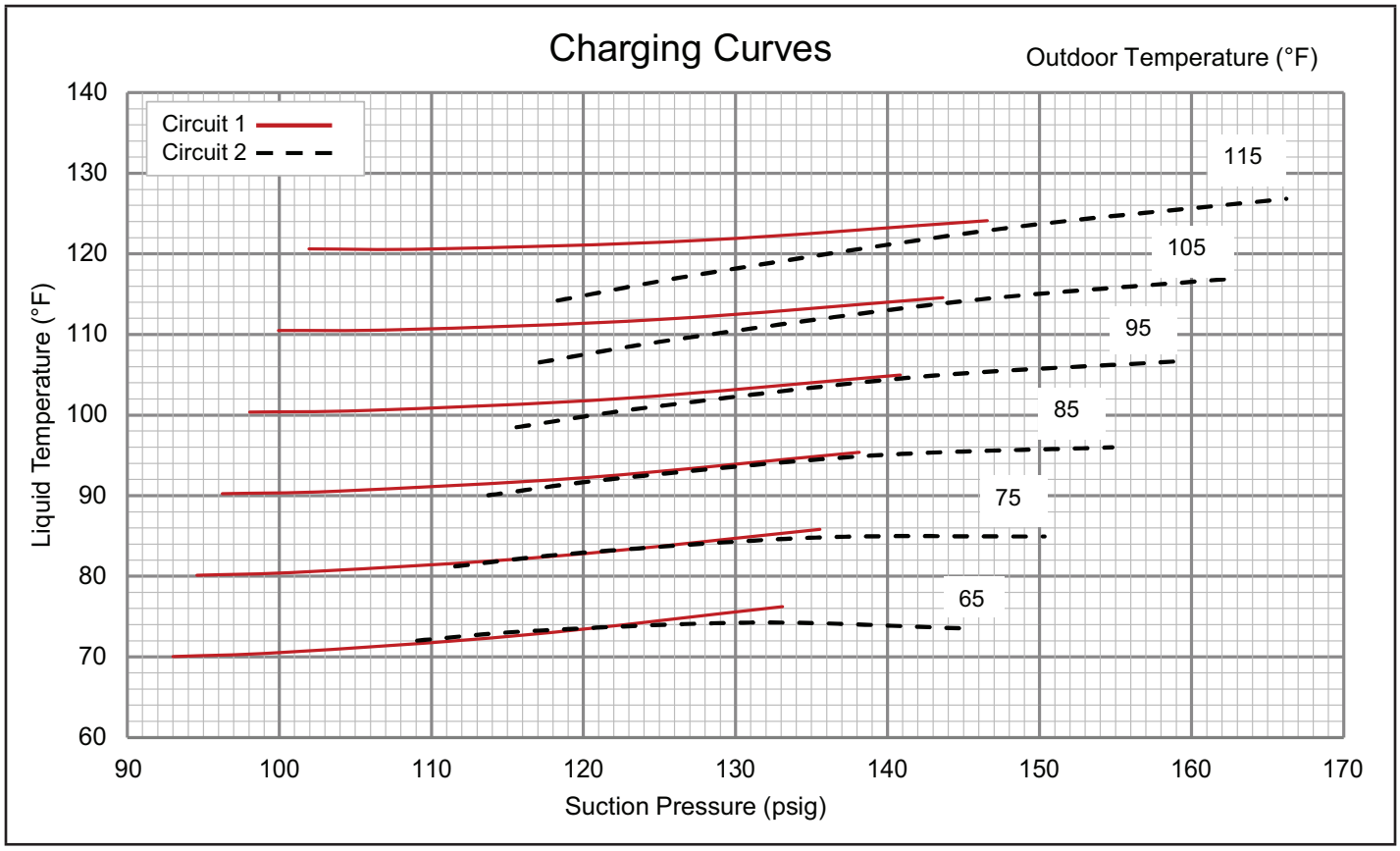


TABLE 16 581351-01

LCX 150S Reheat Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	93	238	95	275	96	316	98	363	100	415	102	473
	100	243	102	280	104	321	106	368	108	420	110	477
	116	253	118	289	120	330	123	377	125	429	128	486
	133	263	136	299	138	340	141	386	144	438	147	495
Circuit 2	109	254	112	292	114	335	116	382	117	432	118	487
	117	258	120	297	122	339	125	386	127	436	128	491
	131	269	135	308	139	350	142	397	145	447	148	502
	146	284	150	322	155	365	159	411	163	461	166	516



V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

LCX units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See section IV- CHARGING.

NOTE - *When unit is properly charged, discharge line pressures should approximate those in TABLE 9 through TABLE 16.*

VI-MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ IMPORTANT

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠ WARNING

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants

Prior to beginning work on systems containing refigerant to ensure the risk of ignition is minimized:

- All work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Where electrical components are being changed, service technicians shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flameable refrigerants as applicable:

1 - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

2 - The ventilation machinery and outlets are operating adequately and are not obstructed.

3 - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

4 - Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.

5 - Refrigerating pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.For systems containing refigerant all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the

equipment, so all parties are advised.

NOTE - *Sealed electrical components shall be replaced, not repaired.*

NOTE - *Intrinsically safe components must be replaced, not repaired.*

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

  a. Safely remove refrigerant following local and national regulations,

  b. Evacuate the circuit,

  c. Purge the circuit with inert gas,

  d. Evacuate,

  e. Purge with inert gas,

  f. Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

A-Filters

Units are equipped with six 20 X 25 X 2” filters. Filters should be checked and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. See FIGURE 18.

NOTE - *Filters must be U.L.C. certified or equivalent for use in Canada.*

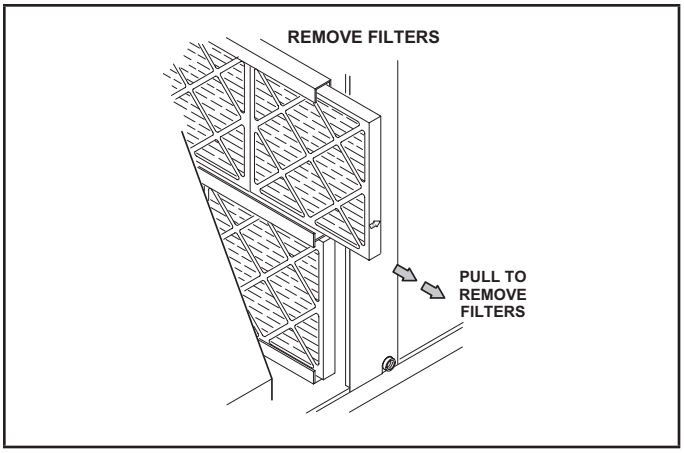


FIGURE 18

B-Lubrication

All motors are lubricated at the factory. No further lubrication is required.

C-Evaporator Coil

Inspect and clean coil at beginning of each cooling season. Clean using mild detergent or commercial coil cleaner. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.

D-Condenser Coil

Clean condenser coil annually with water and inspect monthly during the cooling season.

Clean the coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45° angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between the fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage.

E-Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

F-Electrical

1 - Check all wiring for loose connections.

2 - Check for correct voltage at unit (unit operating).

3 - Check amp-draw on both condenser fan motor and blower motor.

Fan Motor Rating Plate ____ Actual _____

Indoor Blower Motor Rating Plate____ Actual____

VII-OPTIONAL ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be installed to the LCX units.

A-Drain Pan Overflow Switch S149 (optional)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.C. overflow switch is connected to the M4 Unit Controller (A55) through J387. When the switch opens, the Unit Controller will shut off the unit. After a five-minute time out, the Unit Controller will verify the overflow switch position and restart the unit (if the switch has closed). The Unit Controller has a three-strike counter before the unit locks out. This means the Unit Controller will allow the overflow switch to open three times per thermostat demand. If the unit locks out, a reset of the Unit Controller is required after the switch has closed to restore unit operation.

B-C1CURB Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LCX units are not installed on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be installed level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled C1CURB mounting frame is shown in FIGURE 19. Refer to the roof mounting frame installation instructions for details of proper assembly and installation. The roof mounting frame MUST be squared to the roof and level before installation. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 20. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

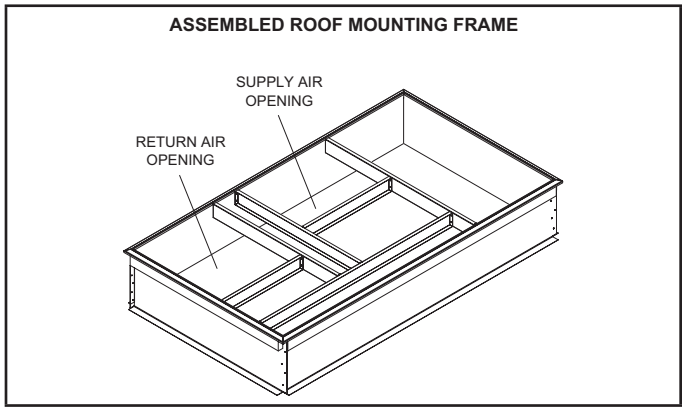


FIGURE 19

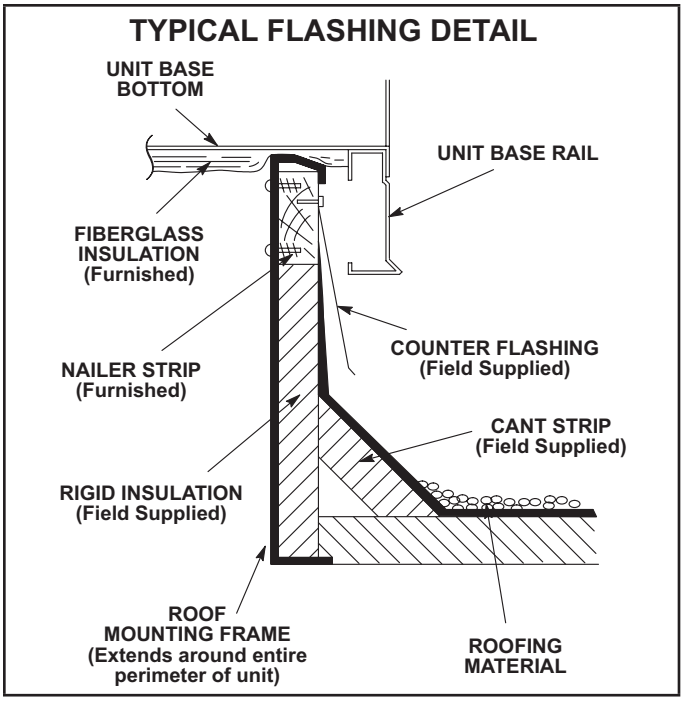


FIGURE 20

C-Transitions

Optional supply/return transition C1DIFF30B-1, C1DIFF31B-1 and C1DIFF32B-1 are available for use with the LCX 7.5 through 12.5 ton units, utilizing optional C1CURB roof mounting frames. Transition must be installed in the C1CURB mounting frame before setting the unit on the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures

D-Supply and Return Diffusers

Optional flush-mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all LCX units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

E-Outdoor Air Dampers C1DAMP20B-1 and C1DAMP10B-2

Optional manual and motorized outdoor air dampers (FIGURE 23) provide up to 25 percent fresh air for return. Motorized damper opens to minimum position simultaneously with the blower during the occupied period and remains closed during the unoccupied period. Manual damper assembly is set at installation and remains in that position. Set damper minimum position in the same manner a seconomizer minimum position. Adjust motorized damper position using the thumbwheel on the damper motor. See FIGURE 24. Manual damper fresh air intake percentage can be determined in the same manner.

F-Economizer (All Units) - Field or Factory Installed

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See FIGURE 22. The economizer uses outdoor air for free cooling when outdoor temperature and/or humidity is suitable. The economizer is controlled by the A55 Unit Controller.

Free Cooling Mode

The Unit Controller will allow free cooling in one of five modes. Each mode uses different combinations of sensors to determine outdoor air suitability. See TABLE 17 for modes. Temperature offset is the default free cooling mode.

NOTE - *All free cooling modes of operation will modulate dampers to 55F (13C) supply / discharge air.*

Unit Controller Settings

On early versions, switches are located on the Unit Controller to adjust settings. On newer versions, the display and keypad on the Unit Controller are used to navigate through menus to adjust settings. Some versions require a configuration ID be entered to enable the economizer. Refer to economizer installation instructions

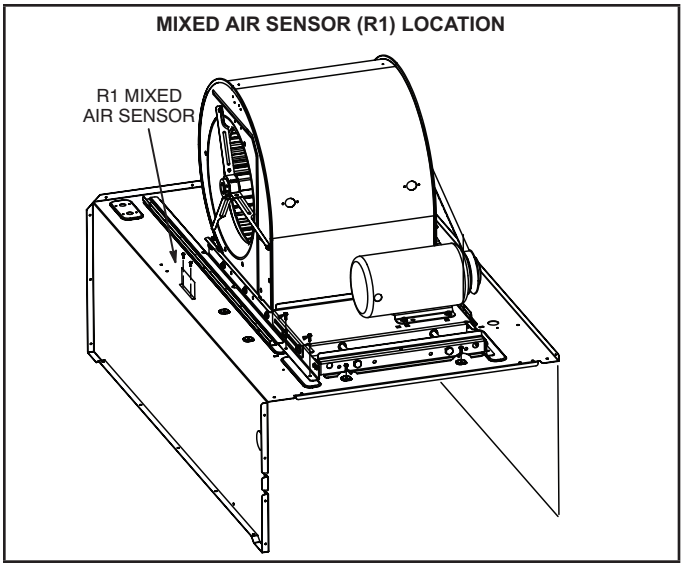


FIGURE 21

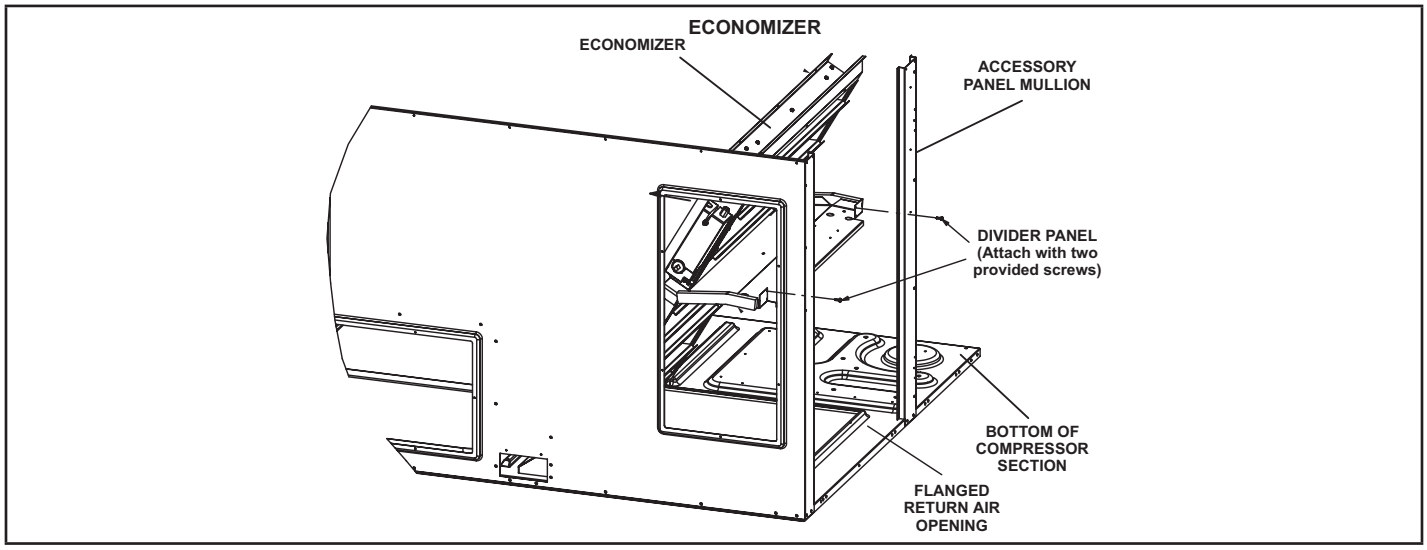


FIGURE 22

TABLE 17

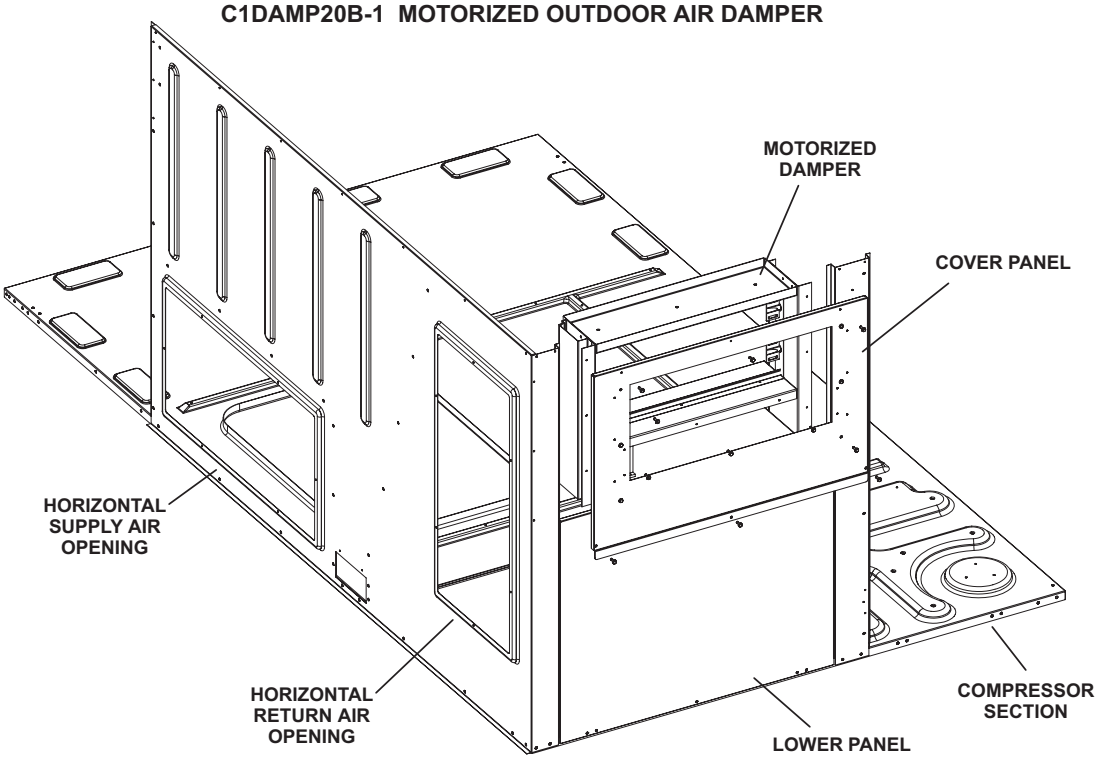
ECONOMIZER MODES AND SETPOINT

Free Cooling Mode	Free Cooling Set Point	Field Provided Sensors	Dampers will modulate to 55°F (default, parameter 159) discharge air (RT6) when outdoor air is suitable:	Input Ranges
TEMP	OFFSET	None Needed	Outdoor air temperature (RT17) is less than return air temperature (RT16) by at least the OFFSET value (10°F default; parameter 161).	0-40°F
TEMP	OAT STPT	None Needed	Outdoor air temperature (RT17) is less than the OAT STPT value (75°F default; parameter 160).	41-75°F
Remote	Remote	Energy Management System**	Either of the TEMP modes can be used when a network OAS signal is provided by an energy management or building control system, via BACnet, LonTalk, or L Connection. The network can command OAS, NOT OAS, or AUTO. AUTO returns to local control of OAS, which is the selected TEMP mode.	NA
ENTH	DIFF OFFSET	(Two) C7400	Outdoor air enthalpy* (A7) is less than return air enthalpy (A62) by at least the OFFSET value (1mA = 2°F default; parameter 163).	0mA-4mA
ENTH	ODE STPT	C7400	Outdoor air enthalpy (A7) is less than free cooling setpoint (12mA = 75°F default, parameter 162).	12-19mA
GLOBAL	GLOBAL	24VAC Input Signal	Global input is energized by (P297-9). This setting is also used for outdoor air damper applications. Global input also brings on the blower. (This mode is NOT used when OAS signal is provided via network connection. GLO is only used when a 24VAC signal is used to energize the P297-9 GLO input.)	NA

*Enthalpy includes effects of both temperature and humidity.

**Energy management systems may require additional field-provided sensors; refer to manufacturer's instructions.

C1DAMP20B-1 MOTORIZED OUTDOOR AIR DAMPER



C1DAMP10B-2 MANUAL OUTDOOR AIR DAMPER

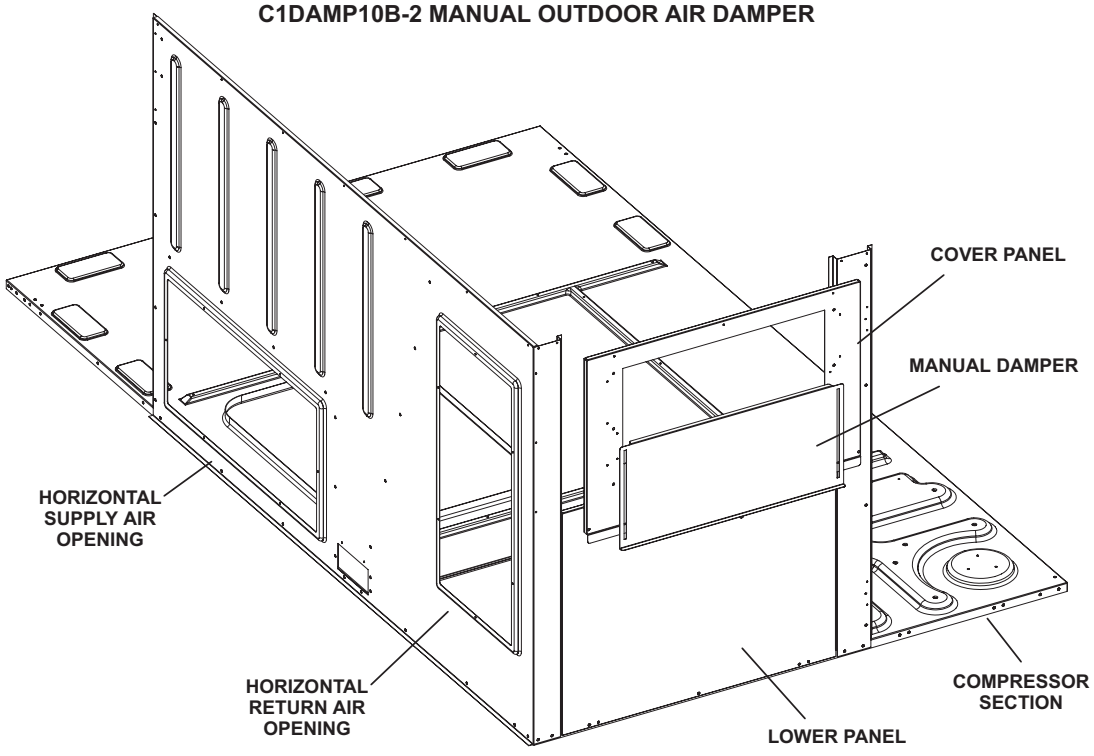


FIGURE 23

Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set.

The Unit Controller will open the dampers to “Min OCP Blwr Low” when blower CFM is BELOW a “midpoint” CFM.

The Unit Controller will open the damper to “Min OCP Blwr High” when blower CFM is at or ABOVE the “midpoint” CFM.

The Unit Controller will calculate the “midpoint” CFM.

Set Minimum Position 1

Use the following menu in the Unit Controller to set “Min OCP Blwr Low” for the blower CFM below the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

SETTINGS > RTU Options > EDIT PARAMETER > ENTER DATA ID - 9 > MIN DAMPER LOW BLOWER = X.X %

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

Set Minimum Position 2

Use the same menu in the Unit Controller to set “Min OCP Blwr High” for the blower CFM above the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

SETTINGS > RTU OPTIONS > DAMPER > MIN DAMPER POSITION BLOWER ON HIGH = X.X %

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

TABLE 18

Electric Heat Minimum CFM

LCX Unit	Heat Size (kW)	Airflow CFM
92, 102	7.5, 15, 22.5, 30, 45	2800
120, 150	15, 22.5, 30, 45	2800
120, 150	60	4000

Staged Supply Air Operation

This is a summary of cooling operation for both belt and direct drive blowers.

Note - *During a dehumidification demand the blower operates at the highest speed. Free cooling is locked-out during reheat operation. Refer to Hot Gas Reheat start-up and operation section for details.*

Two-Stage Thermostat

1-Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate to maintain 55° supply air

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate to maintain 55° supply air

Note - *If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.*

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On
Blower Cooling Low

Y2 Demand -

Compressor 1 and 2 On
Blower Cooling High

G-Gravity Exhaust Dampers

Dampers are used in downflow (FIGURE 25) and horizontal (FIGURE 26) air discharge applications. Horizontal gravity exhaust dampers are installed in the return air duct. The dampers must be used any time an economizer and a power exhaust fan is applied to LCX series units. Gravity exhaust dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

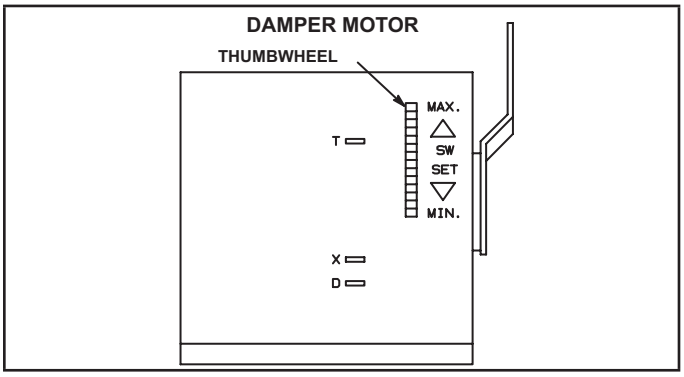


FIGURE 24

NOTE - *GED is optional except when used with power exhaust dampers, where it is required.*

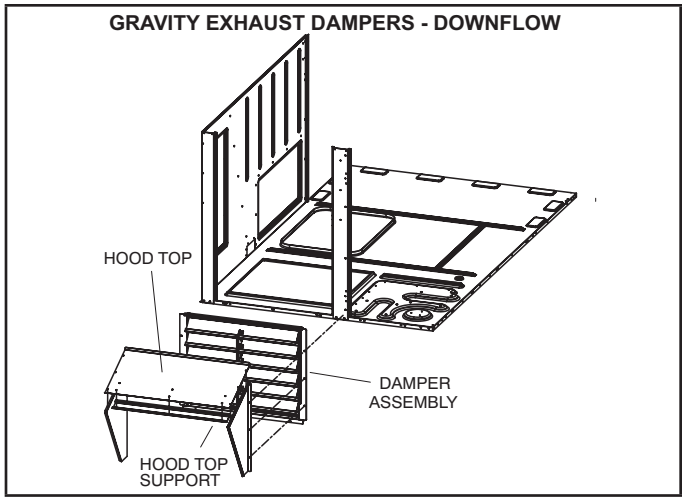


FIGURE 25

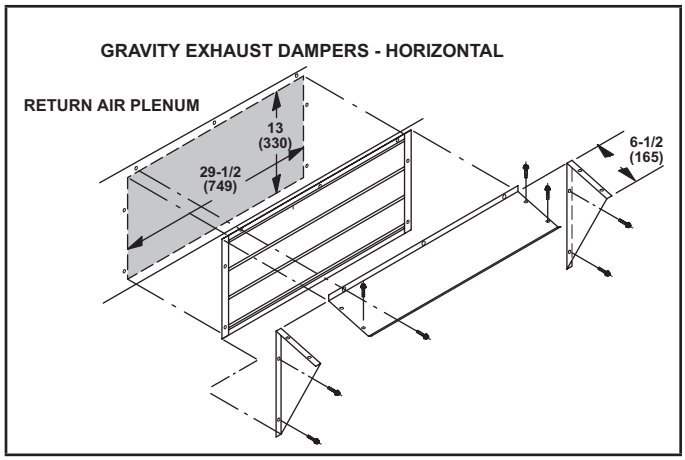


FIGURE 26

H-Power Exhaust Fan (Option - Field Installed)

The power exhaust fan (PEF) requires the use of a gravity exhaust damper and economizer and is used in downflow applications only. See FIGURE 27. The PEF provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

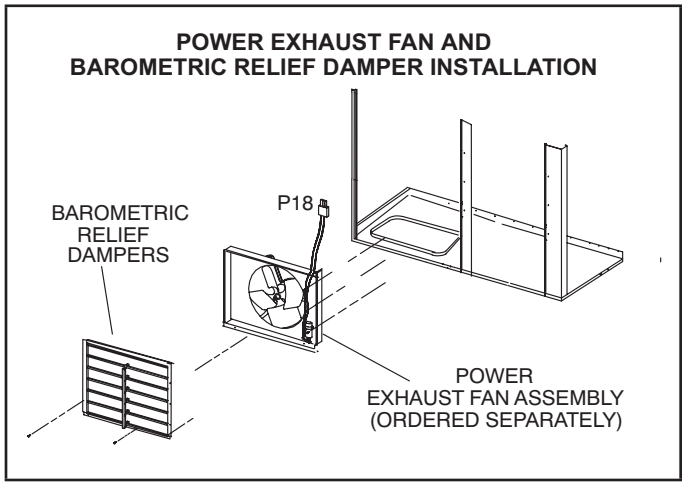


FIGURE 27

I-Control Systems

The A55 Unit Controller provides all control function for the rooftop unit. Default operation requires a standard room thermostat or direct digital controller (DDC). The A55 can also control the unit from a zone temperature sensor.

J-Smoke Detectors A171 and A172 (Option - Field Installed)

Photoelectric smoke detectors are a field-installed option. The smoke detectors can be installed in the supply air section (A172), return air section (A171), or in both the supply and return air sections. Smoke detection control module (A173) is located in swing panel. Wiring for the smoke detectors are shown on the temperature control section (C) wiring diagram in back of this manual.

K-Hot Gas Reheat Start-Up and Operation

General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See FIGURE 28 for reheat refrigerant routing.

L14 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14 reheat valve is energized (Unit Controller J394-1) and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). The reheat setpoint can be adjusted by changing Unit Controller Settings - Control menu. A setting of 100% will operate reheat from an energy management system digital output. The reheat setpoint can also be adjusted using an optional Network Control Panel (NCP). Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes. The reheat deadband can be adjusted at Settings - Control menu.

Check-Out

Test hot gas reheat operation using the following procedure.

1 - Make sure reheat is wired as shown in wiring section.

2 - Make sure unit is in local thermostat mode.

3 - Select Unit Controller Service - Test. The blower and compressor 1 (reheat) should be operating. Reheat mode will be appear on the Unit Controller display.

4 - Deselect Unit Controller Service - Test. Compressor 1 (reheat) and blower should deenergize.

Default Reheat Operation

TABLE 19

Reheat Operation - Two Cooling Stages - Default

T'stat & Humidity Demands	Operation
Reheat Only	Compressor 1 Full Load Reheat ON Blower Low
Reheat & Y1	Compressor 1 & 2 Full Load Reheat ON Blower High
Reheat & Y1 & Y2	Compressor 1 & 2 Full Load, Reheat OFF Blower High

*If there is no reheat demand and outdoor air is suitable, free cooling will operate.

**If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 will operate.

TABLE 20

Reheat Operation - Three Cooling Stages - Default

T'stat & Humidity Demands	Operation
Reheat Only	Compressor 1 Full Load, Reheat ON, Blower Low
Reheat & Y1	Compressor 1 & 2 Full Load, Reheat ON, Blower Medium
Reheat & Y1, Y2	Compressor 1 & 2 Full Load, Reheat ON, Blower High
Reheat & Y1, Y2, Y3	Compressor 1 & 2 Full Load, No Reheat OFF, Blower High

*If there is no reheat demand and outdoor air is suitable, free cooling will operate.

**If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 will operate.

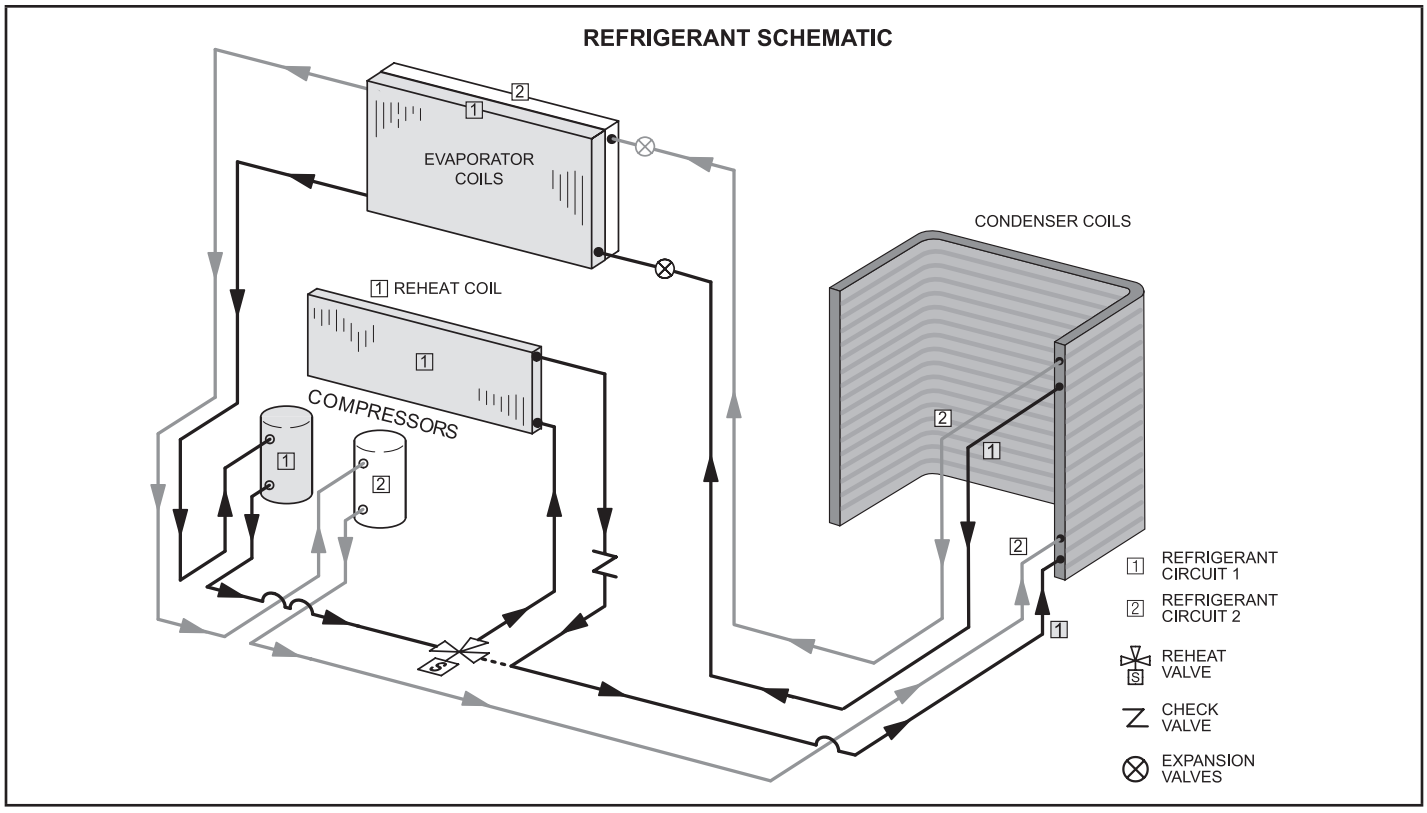


FIGURE 28

L-Dirty Filter Switch S27 (Option - Field Installed)

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 1" W.C. (248.6 Pa) The switch is mounted on the top filter channel corner. Wiring for the dirty filter switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

M-Indoor Air Quality (CO2) (Option - Field Installed)

Sensor A63 The indoor air quality sensor monitors CO2 levels and reports the levels to the A55 Unit Controller. The board adjusts the economizer dampers according to the CO2 levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment. Wiring for the indoor air quality switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

N-Needlepoint Bipolar Ionizer (Option - Field Installed)

The ionizer was designed for low maintenance. The device should be checked semi-annually to confirm the brushes are clean for maximum output. The ionizer is located on the blower deck. See FIGURE 29.

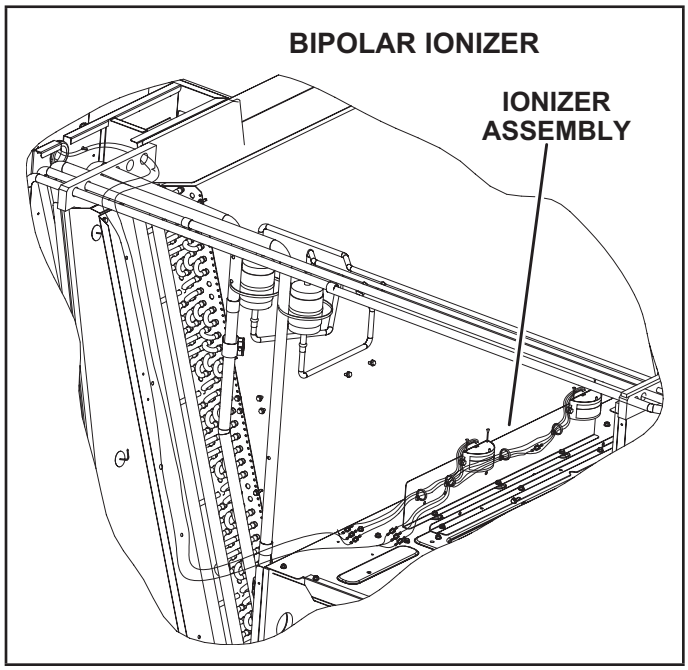


FIGURE 29

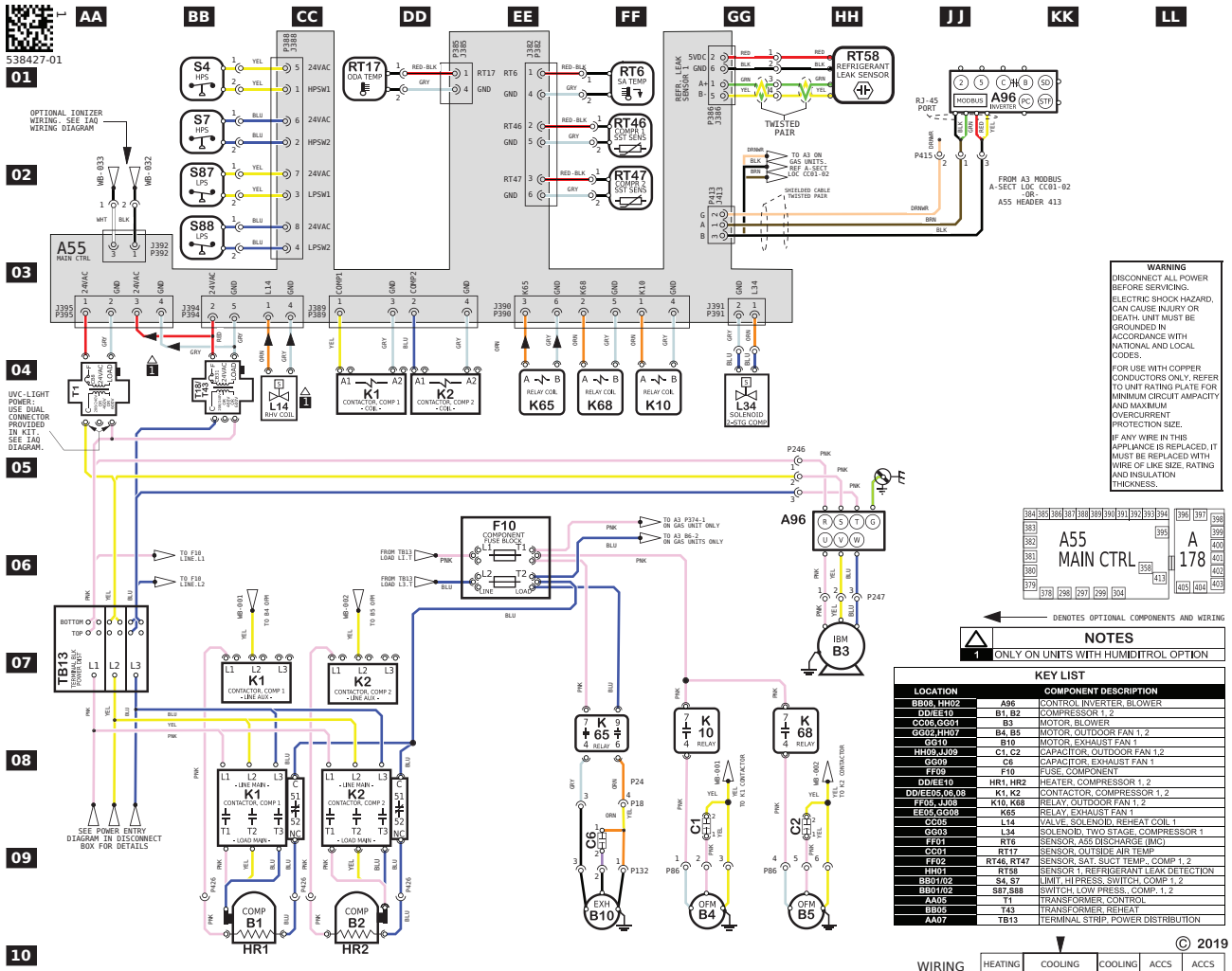
O-Optional UVC Lights (Option - Field Installed)

The Healthy Climate- germicidal light emits ultraviolet (UVC) energy that has been proven effective in reducing microbial life forms (viruses, bacteria, yeasts and molds) in the air.

UVC germicidal lamps greatly reduce the growth and proliferation of mold and other bio-aerosols (bacteria and viruses) on illuminated surfaces.

Germicidal lamps are NOT intended to be used for removal of active mold growth. Existing mold growth must be appropriately removed PRIOR to installation of the germicidal lamp. Refer closely to UVC light installation instruction warnings when servicing units.

LCX G, Y, J VOLT COOLING DIAGRAM



Product: LCX, LGX B Box - G, Y, J VOLT Cooling Diagram

Voltage: 208-230V, 460V, 600V/ 3~/ 60hz (Y/G/J)

Supersedes: XXXXXX-XX Form No: 538427-01 Rev: 1

10x12 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012332	04-17-2024	MCF	VXC	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-012332D	08-30-2024	MCF	VXC	A) SWITCHED K10 AND K68. K10 WAS WIRED TO B5 AND K68 WAS WIRED TO B4.

Sequence of Operation

Power:

1 - Line voltage through the S48 unit disconnect, TB2 terminal block energizes the T1 transformer. T1 provides 24VAC power to A55 Unit Controller which provides 24VAC to the unit cooling, heating and blower controls.

2 - Line voltage is also routed to compressor crankcase heaters, compressor contactors, the blower motor, condenser fan relays and exhaust fan relays.

Blower Operation:

3 - Units are controlled by A96 inverter.

4 - The A55 Unit Controller module receives a demand from thermostat terminal G.

5 - B3 recieves the pre-set blower setting through MODUS.

Economizer Operation:

6 - A55 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).

7 - N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.

1st Stage Cooling (compressor B1)

8 - A55 receives a Y1 thermostat demand.

9 - After A55 proves N.C. low pressure switch S87, RT46 reading above freeze point and N.C. high pressure switch S4, compressor contactor K1 is energized.

10 - N.O. contacts K1-1 close energizing compressor B1. Crankcase heater HR1 is de-energized.

11 - At the same time, A55 energizes condenser fan relays K10 and K68.

12 - N.O. contacts K10-1 close energizing condenser fan B4 and N.O. contacts K68-1 close energizing condenser fan B5.

2nd Stage Cooling (compressor B2)

13 - A55 receives a Y2 thermostat demand.

14 - After A55 proves N.C. low pressure switch S88, RT47 reading above freeze point, and N.C. high pressure switch S7, compressor contactor K2 is energized.

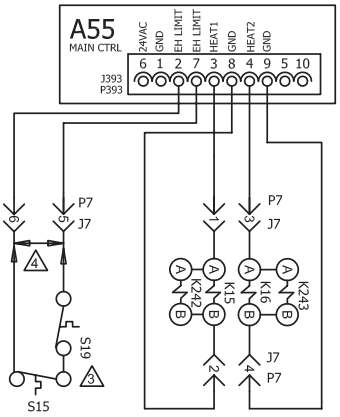
15 - N.O. contacts K2-1 close energizing compressor B2. Crankcase heater HR2 is de-energized.

3rd Stage Cooling (compressor B1 in full load and compressor 2 is energized)

16 - A55 receives a Y3 thermostat demand (Y1 + Y2 thermostat inputs).

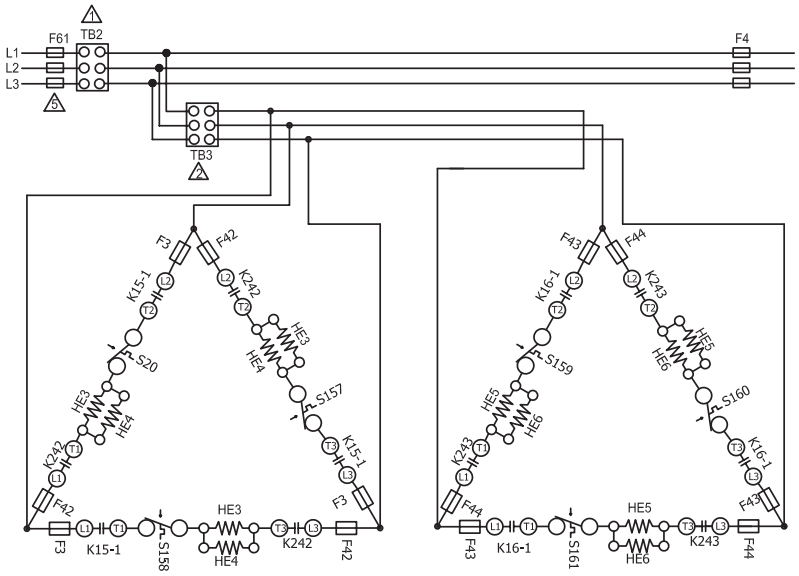
17 - A55 sends 24VAC to B1 compressor solenoid (L34), B1 compressor runs at full load.

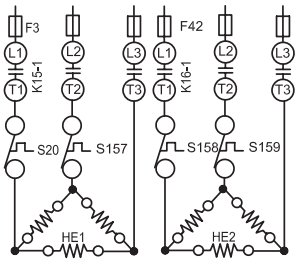
EHA-7.5, 15, 22.5, 30, 45, 60kW Y VOLTAGE
LC/LH UNITS



KEY	DESCRIPTION
A55	PANEL MAIN
F3	FUSE, ELECTRIC HEAT 1
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 2
F43	FUSE, ELECTRIC HEAT 3 ,4
F44	FUSE, ELECTRIC HEAT 5
F61	FUSE, UNIT - SCCR
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
K15-1	CONTACTOR, ELECTRIC HEAT 1, 2
K16-1	CONTACTOR, ELECTRIC HEAT 3, 4
K242-1	CONTACTOR, ELECTRIC HEAT 1
K243-1	CONTACTOR, ELECTRIC HEAT 2
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S157	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
S158	SWITCH, LIMIT SECONDARY ELEC. HEAT 3 (NO RESET)
S159	SWITCH, LIMIT SECONDARY ELEC. HEAT 4 (NO RESET)
S160	SWITCH, LIMIT SECONDARY ELEC. HEAT 5 (NO RESET)
S161	SWITCH, LIMIT SECONDARY ELEC. HEAT 6 (NO RESET)
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRC HEAT

J/P	JACK/PLUG DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT





1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS
3. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY
4. REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
5. F61 USED ON UNITS WITH SCCR OPTION

DENOTES OPTIONAL COMPONENTS

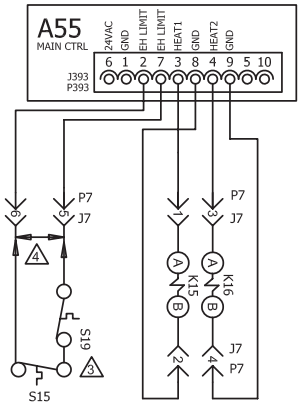
KW	HE1	HE2	HE3	HE4	HE5	HE6
7.5	7.5					
15	15					
22.5	15	7.5				
30	15	15				
45	15				15	15
60			15	15	15	15

2020/10	WIRING DIAGRAM 538120-01	10/20
HEATING - ELECTRIC		
ELECTRIC HEAT 7.5, 15, 22.5, 30, 45, 60 - Y		
SECTION A		REV 0
Supersedes	New Form No. 538120-01	

EHA-7.5, 15, 22.5, 30, 45, 60kW G & J VOLTAGE
LC/LH UNITS

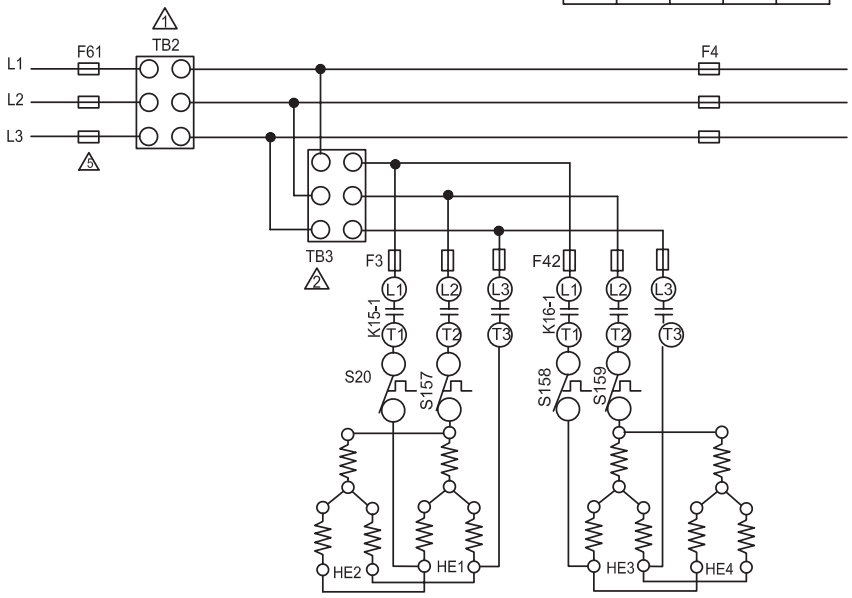
J/P	JACK/PLUG DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT
271	HEATING SENSORS STG 1

KEY	DESCRIPTION
A55	PANEL MAIN
F3	FUSE, ELECTRIC HEAT 1
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 2
F43	FUSE, ELECTRIC HEAT 3 ,4
F44	FUSE, ELECTRIC HEAT 5
F61	FUSE, UNIT - SCCR
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
K15-1	CONTACTOR, ELECTRIC HEAT 1, 2
K16-1	CONTACTOR, ELECTRIC HEAT 3, 4
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S157	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
S158	SWITCH, LIMIT SECONDARY ELEC. HEAT 3 (NO RESET)
S159	SWITCH, LIMIT SECONDARY ELEC. HEAT 4 (NO RESET)
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRC HEAT



G, J VOLT UNITS

KW	HE1	HE2	HE3	HE4
7.5	7.5			
15	15			
22.5	15		7.5	
30	15		15	
45	15		15	15
60	15	15	15	15



1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS
3. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY
4. REMOVE JUMPER PLUG WHEN FIELD INSTALLATING ELECTRIC HEAT
5. F61 USED ON UNITS WITH SCCR OPTION

DENOTES OPTIONAL COMPONENTS

2021/09	WIRING DIAGRAM 538121-02	9/21
HEATING-ELECTRIC		
7.5, 15, 22.5, 30, 45, 60 - G, J		
SECTION A		REV. 0
Supersedes 538121-01	New Form No. 538121-02	

SEQUENCE OF OPERATION EHA7.5, 15, 22.5, 30, 45, 60 kW - G, J and Y

G and J Voltage

1 - Terminal strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1, HE2, HE3 and HE4. HE1 and HE2 elements are protected by F3 and HE3 and HE4 elements are protected by fuse F42.

First Stage Heat:

2 - Heating demand initiates at W1 in the thermostat.

3 - 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S15, contactor K15 is energized.

4 - N.O. K15-1 contacts close energizing HE1 and HE2.

Second Stage Heat:

5 - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

6 - A second stage heating demand is received by A55 control module.

7 - A55 energizes contactor K16.

8 - N.O. K16-1 contacts close energizing HE3 and HE4.

Y Voltage

1 - Terminal strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1, HE2, HE3, HE4, HE5 and HE6.

First Stage Heat:

2 - 7.5 - 45 KW - Heating demand initiates at W1 in the thermostat.

3 - 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S15 and S157, contactor K15 is energized.

4 - N.O. K15 contacts close energizing HE1.

5 - ***60KW*** - Heating demand initiates at W1 in the thermostat.

6 - 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S157, contactor K242 is energized.

7 - N.O. K242 contacts close energizing HE3 and HE4.

Second Stage Heat:

8 - ***22.5 - 45 KW*** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

9 - A second stage heating demand is received by A55 control module. After A55 proves N.C. primary limit S58 and S159, contactor K16 is energized.

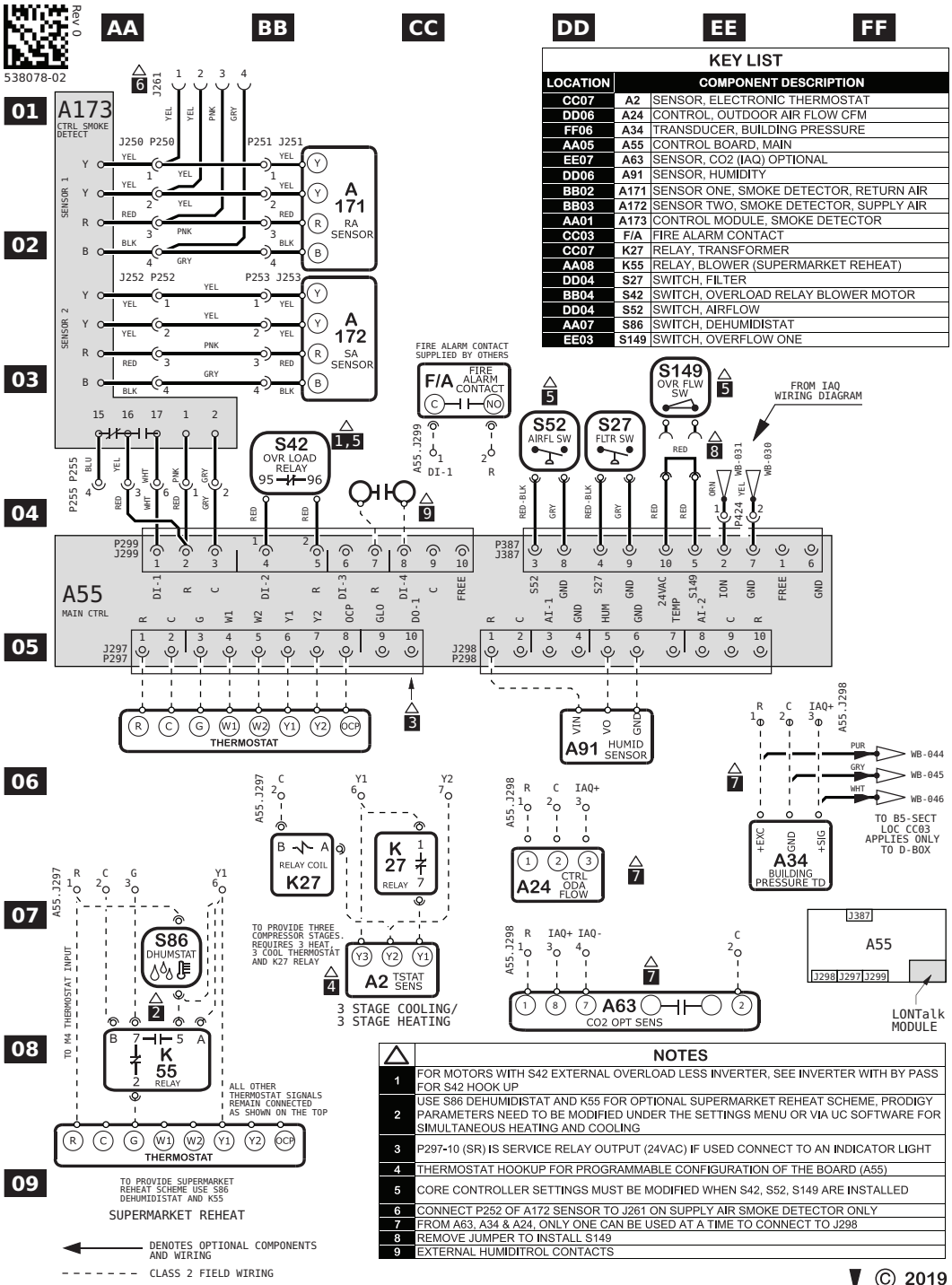
10 - N.O. K16 contacts close energizing HE2 (22.5 and 30KW units only) and HE5 and HE6 (45 KW units only).

11 - ***60KW*** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

12 - A second stage heating demand is received by A55 control module. After A55 proves N.C. primary limit S160 and S161, contactor K16 is energized.

13 - N.O. K16 contacts close energizing HE5 and HE6.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
CC07	A2	SENSOR, ELECTRONIC THERMOSTAT
DD06	A24	CONTROL, OUTDOOR AIR FLOW CFM
FF06	A34	TRANSDUCER, BUILDING PRESSURE
AA05	A55	CONTROL BOARD, MAIN
EE07	A63	SENSOR, CO2 (IAQ) OPTIONAL
DD06	A91	SENSOR, HUMIDITY
BB02	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
BB03	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
AA01	A173	CONTROL MODULE, SMOKE DETECTOR
CC03	F/A	FIRE ALARM CONTACT
CC07	K27	RELAY, TRANSFORMER
AA08	K55	RELAY, BLOWER (SUPERMARKET REHEAT)
DD04	S27	SWITCH, FILTER
BB04	S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
DD04	S52	SWITCH, AIRFLOW
AA07	S86	SWITCH, DEHUMIDISTAT
EE03	S149	SWITCH, OVERFLOW ONE

△	NOTES
1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10 (SR) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
4	THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE BOARD (A55)
5	CORE CONTROLLER SETTINGS MUST BE MODIFIED WHEN S42, S52, S149 ARE INSTALLED
6	CONNECT P252 OF A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
7	FROM A63, A34 & A24, ONLY ONE CAN BE USED AT A TIME TO CONNECT TO J298
8	REMOVE JUMPER TO INSTALL S149
9	EXTERNAL HUMIDITROL CONTACTS

10 Model: LC, LG, LH, LD Series RTU Thermostat
Voltage: All Voltages
Supersedes: 538078-01 Form No: 538078-02 Rev: 0

HEATING SECTION A	COOLING SECTION B	COOLING SECTION B3/5	ACCS SECTION C	ACCS SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012295C	04-03-2024	MXR6	MXT5	ORIGINATED AT PD&R CARROLLTON, TX

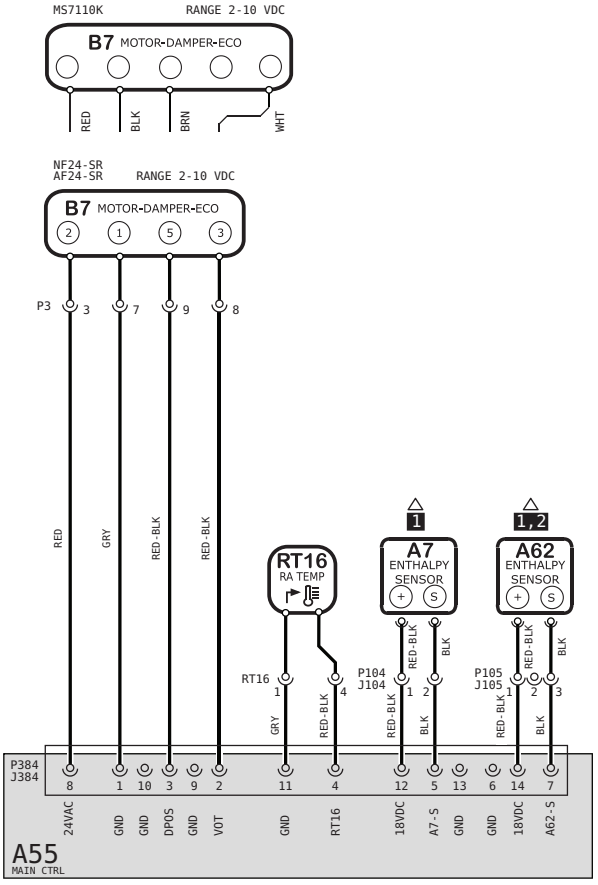
ECONOMIZER

Rev 2

538072-01

AA BB CC DD

01 02 03 04 05 06 07 08 09 10



△	NOTES
1	A7 AND A62 NOT USED FOR SENSIBLE TEMPERATURE CONTROL
2	FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR

KEY LIST

LOCATION		COMPONENT DESCRIPTION
CC05	A7	SENSOR, SOLID STATE ENTHALPY
AA06	A55	CONTROL BOARD, MAIN
DD05	A62	SENSOR, ENTHALPY INDOOR
BB02	B7	MOTOR, DAMPER ECONOMIZER
CC05	RT16	SENSOR, RETURN AIR TEMP

HTG SEC A	CLG SEC B	CLG SEC B3	ACCS SEC C	ACCS SEC D

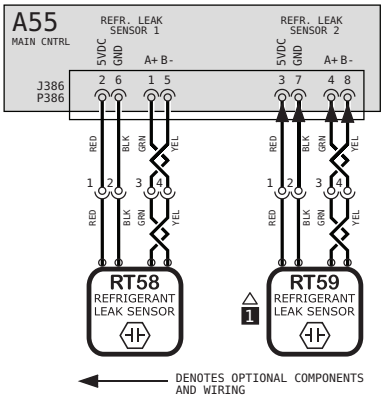
WIRING DIAGRAM FLOW

Model: LC,LG,LH,LD,SC,SG Series
Economizer & Motorized OAD
Voltage: All Voltages
Supersedes: N/A Form No: 538072-01 Rev: 2

5x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-008594	10/15/2020	RV	MXR6	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-010356B	03/24/2022	MXR6	JAL21	UPDATED APPLICABLE MODEL NUMBERS.
002	CN-012457P	03/06/2024	AXL	AAH	A) ADDED SC, SG TO MODELS

RDS SENSOR



KEY LIST	
COMPONENT	**DESCRIPTION**
A55	CONTROL BOARD, MAIN
RT58	SENSOR 1, REFR. LEAK DETECTION
RT59	SENSOR 2, REFR. LEAK DETECTION

△	NOTES
1	REFRIGERANT LEAK SENSOR 2 (RT59), MAY NOT BE PRESENT IN ALL UNITS.

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

MODEL: Units w/CORE Contr.
Refr. Leak Detection
VOLT: All
SUPSDS: N/A NO: 538440-01

Rev.0

3 x 7
CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012295C	04-03-2024	MXR6	MXT5	ORIGINATED AT PD&R CARROLLTON, TX

IX-Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available befor the task is commenced.

Steps to ensure this are:

- Become familiar with the equipment and its operation,
- Isolate the system electrically,
- Ensure that before attempting the procedure that mechanical handling equipment is available, if required, for handling refrigerant cylinders, and that all personal protective equipment is available and being used correctly while the recovery process is supervised at all times by a competent person and that the recovery equipment and cylinders conform to the appropriate standards.

Additionally, pump down refrigerant system, if possible, and if a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system. Make sure that cylinders are situated on the scales before recovery takes place. Start the recovery machine and operate in accordance with instructions. Do not overfill cylinders (no more than 80 % volume liquid charge). Do not exceed the maximum working pressure of the cylinder, even temporarily. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area)

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.