UNIT INFORMATION

LCT SERIES
7.5 to 12.5 ton

100075

Service Literature

LCT092H through 150H

⚠ 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.

The LCT092H-150H units are configure to order units (CTO) with a wide selection of factory-installed options.

Cooling capacities range from 7.5 to 12.5 tons. All units are equipped with two compressors.

Optional electric heat is factory-or field-installed. Electric heat operates in single or multiple stages depending on the kW input size. 7.5kW to 45kW heat sections are available for the 092 & 102 and 15kW to 60kW heat sections are available for 120 &150.

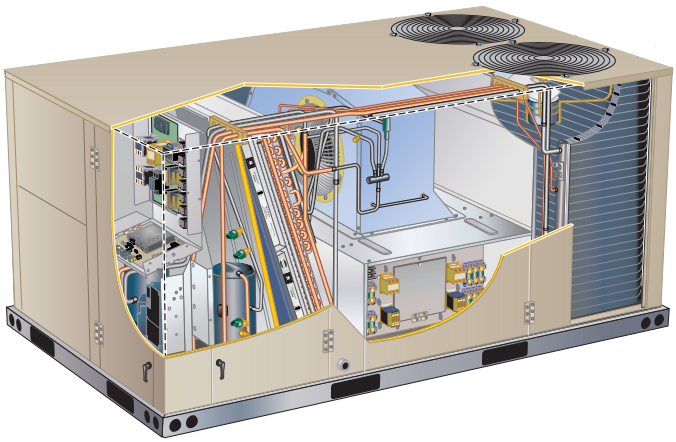
Units are available with direct drive blower. The blower will operate at lower speeds when demand is low and increase to higher speeds when demand is high.

All units come standard with a lightweight, all-aluminum condenser coil, one two stage compressor and one single stage compressor.

All LCT 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.



⚠ 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

⚠ 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.

Table of Contents

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	OX	OX	OX	OX
	Copper	**76W27**	X	X	X	X
Drain Pan Overflow Switch		**21Z07**	OX	OX	OX	OX
BLOWER - SUPPLY AIR						
Blower Option	DirectPlus™ Blower System with MSAV®	Factory	O	O	O	O
	DirectPlus™ Blower System with VAV	Factory	O	O	O	O
CABINET						
Combination Coil/Hail Guards		**24C85**	OX	OX	OX	OX
Corrosion Protection		Factory	O	O	O	O
Horizontal Discharge Kit		**51W25**	X	X	X	X
Return Air Adaptor Plate (for LC/LG/LH and TC/TG/TH unit replacement)		**54W96**	OX	OX	OX	OX
CONTROLS						
Blower Proving Switch		**21Z10**	OX	OX	OX	OX
Commercial Controls	CPC Einstein Integration	Factory	O	O	O	O
	LonTalk® Module	**54W27**	OX	OX	OX	OX
	Novar® LSE	Factory	O	O	O	O
Dirty Filter Switch		**53W67**	OX	OX	OX	OX
Fresh Air Tempering		**21Z08**	OX	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		**11K76**	OX	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		**11K80**	OX	OX	OX	OX
INDOOR AIR QUALITY						
Air Filters						
Healthy Climate® High Efficiency Air Filters	MERV 8	**50W61**	OX	OX	OX	OX
20 x 25 x 2 in. (Order 4 per unit)	MERV 13	**52W41**	OX	OX	OX	OX
	MERV 16	**21U41**	X	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		**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 with LCD display, rated for plenum mounting		**87N52**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	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		**22U15**	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

[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).

NOTE - Catalog 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		Catalog Number	Unit Model No 092	102	120	150
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
HACR Circuit Breakers		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
[1] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O	O
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX
	15 amp factory-wired and powered (208/230V, 460V)	Factory	O	O	O	O
	[2] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X	X
	[2] 20 amp non-powered, field-wired (575V only)	Factory	O	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	X	X
ELECTRIC HEAT						
7.5 kW	208/240V-3ph	**23U73**	OX	OX		
	460V-3ph	**23U74**	OX	OX		
	575V-3ph	**23U75**	OX	OX		
15 kW	208/240V-3ph	**23U76**	OX	OX	OX	OX
	460V-3ph	**23U77**	OX	OX	OX	OX
	575V-3ph	**23U78**	OX	OX	OX	OX
22.5 kW	208/240V-3ph	**23U79**	OX	OX	OX	OX
	460V-3ph	**23U80**	OX	OX	OX	OX
	575V-3ph	**23U81**	OX	OX	OX	OX
30 kW	208/240V-3ph	**23U82**	OX	OX	OX	OX
	460V-3ph	**23U83**	OX	OX	OX	OX
	575V-3ph	**23U84**	OX	OX	OX	OX
45 kW	208/240V-3ph	**23U85**	OX	OX	OX	OX
	460V-3ph	**23U86**	OX	OX	OX	OX
	575V-3ph	**23U87**	OX	OX	OX	OX
60 kW	208/240V-3ph	**23U88**			OX	OX
	460V-3ph	**23U89**			OX	OX
	575V-3ph	**23U90**			OX	OX

[1] Disconnect Switch not available with SCCR option.
SCCR option is only available with factory installed electric heat or no electric.
SCCR option is not available if the MOCP of the configured unit is greater than 200A.

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

NOTE - Catalog numbers shown are for ordering field installed accessories.
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X = Field Installed.

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 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 Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood Order Horizontal Barometric Relief Dampers separately		**20U80**	OX	OX	OX	OX
Horizontal Barometric Relief Dampers						
Horizontal Low Profile Barometric Relief Dampers (Exhaust hood furnished)		**53K04**	X	X	X	X
Economizer Controls						
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	OX	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX	OX
Building Pressure Control		**13J77**	X	X	X	X
Outdoor Air CFM Control		**13J76**	X	X	X	X
Global Control	Sensor Field Provided	Factory	O	O	O	O
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized		**14G28**	OX	OX	OX	OX
Manual		**14G29**	X	X	X	X
POWER EXHAUST						
Standard Static	208/230V-3ph	**53W44**	OX	OX	OX	OX
	460V-3ph	**53W45**	OX	OX	OX	OX
	575V-3ph	**53W46**	OX	OX	OX	OX
HUMIDITROL® CONDENSER REHEAT OPTION						
Humiditrol Dehumidification Option		Factory	O	O	O	O
Humidity Sensor Kit, Remote mounted (required)		**17M50**	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 - Catalog 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.

SPECIFICATIONS — MSAV MODELS

General Data			7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
	Nominal Tonnage		7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
	Efficiency Type		High	High	High	High
	Model Number		LCT092H4E	LCT102H4E	LCT120H4E	LCT150H4E
	Blower Type		DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®
Cooling Performance	Gross Cooling Capacity - Btuh		93,000	101,000	117,000	141,000
	[1] Net Cooling Capacity - Btuh		90,000	98,000	114,000	136,000
	[1] AHRI Rated Air Flow - cfm		3000	3400	3400	4100
	Total Unit Power - kW		7.5	8.1	9.5	12.5
	[1] IEER (Btuh/Watt)		15.7	15.7	15.5	14.6
	[1] EER (Btuh/Watt)		12.5	12.3	12.3	11.0
Refrigerant Charge	Refrigerant Type		R-410A	R-410A	R-410A	R-410A
	Without Reheat Option	Circuit 1	7 lbs. 0 oz.	7 lbs. 0 oz.	7 lbs. 0 oz.	7 lbs. 4 oz.
		Circuit 2	7 lbs. 0 oz.	7 lbs. 6 oz.	7 lbs. 0 oz.	7 lbs. 0 oz.
	With Reheat Option	Circuit 1	7 lbs. 4 oz.	7 lbs. 4 oz.	7 lbs. 4 oz.	7 lbs. 8 oz.
		Circuit 2	7 lbs. 0 oz.	7 lbs. 6 oz.	7 lbs. 0 oz.	7 lbs. 0 oz.
Electric Heat Available - See page 21			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 (total) - sq. ft.		28.0	28.0	28.0	28.0
	Number of rows		1	1	1	1
	Fins per inch		23	23	23	23
Outdoor Coil Fans	Motor - (No.) hp		2 (1/3)	2 (1/3)	2 (1/2)	2 (1/2)
	Motor rpm		1075	1075	1075	1075
	Total Motor watts		860	860	1000	1000
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3	3
	Total Air volume - cfm		9000	9000	9700	9700
Indoor Coil	Net face area (total) - sq. ft.		12.78	12.78	12.78	12.78
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		4	4	4	4
	Fins per inch		14	14	14	14
	Drain connection - Number and size		(1) 1 in. NPT coupling			
	Expansion device type		Balanced Port Thermostatic Expansion Valve (removable element head)			
Indoor Blower	Nominal motor output		3.75 hp (ECM)	3.75 hp (ECM)	3.75 hp (ECM)	3.75 hp (ECM)
	Blower wheel nominal diameter x width - in.		(1) 22 x 9	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9
Filters	Type of filter		MERV 4, Disposable			
	Number and size - in.		(4) 20 x 25 x 2			
Electrical characteristics			208/230V, 460V, or 575V - 60 Hz -3 phase			

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.

SPECIFICATIONS — VAV MODELS

General Data			7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
		Nominal Tonnage	**7.5 Ton**	**8.5 Ton**	**10 Ton**	**12.5 Ton**
		Efficiency Type	**High**	**High**	**High**	**High**
		Model Number	**LCT092H4P**	**LCT102H4P**	**LCT120H4P**	**LCT150H4P**
		Blower Type	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV
Cooling Performance		Gross Cooling Capacity - Btuh	93,000	101,000	117,000	141,000
		[1] Net Cooling Capacity - Btuh	90,000	98,000	114,000	136,000
		[1] AHRI Rated Air Flow - cfm	3000	3400	3400	4100
		Total Unit Power - kW	7.5	8.1	9.5	12.5
		[1] IEER (Btuh/Watt)	14.8	14.8	14.8	14.2
		[1] EER (Btuh/Watt)	12.5	12.3	12.3	11.0
Refrigerant Charge		Refrigerant Type	R-410A	R-410A	R-410A	R-410A
	Without Reheat Option	Circuit 1	7 lbs. 0 oz.	7 lbs. 0 oz.	7 lbs. 0 oz.	7 lbs. 4 oz.
		Circuit 2	7 lbs. 0 oz.	7 lbs. 6 oz.	7 lbs. 0 oz.	7 lbs. 0 oz.
Electric Heat Available			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 (total) - sq. ft.	28.0	28.0	28.0	28.0
		Number of rows	1	1	1	1
		Fins per inch	23	23	23	23
Outdoor Coil Fans		Motor - (No.) hp	2 (1/3)	2 (1/3)	2 (1/2)	2 (1/2)
		Motor rpm	1075	1075	1075	1075
		Total Motor watts	860	860	1000	1000
		Diameter - (No.) in.	(2) 24	2 (24)	2 (24)	2 (24)
		Number of blades	3	3	3	3
		Total Air volume - cfm	9000	9000	9700	9700
Indoor Coil		Net face area (total) - sq. ft.	12.78	12.78	12.78	12.78
		Tube diameter - in.	3/8	3/8	3/8	3/8
		Number of rows	4	4	4	4
		Fins per inch	14	14	14	14
		Drain connection - Number and size	(1) 1 in. NPT coupling			
		Expansion device type	Balanced Port Thermostatic Expansion Valve (removable element head)			
Indoor Blower		Nominal motor output	3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)
		Blower wheel nominal diameter x width - in.	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9
Filters		Type of filter	MERV 4, Disposable			
		Number and size - in.	(4) 20 x 25 x 2			
Electrical characteristics			208/230V, 460V, or 575V - 60 Hz -3 phase			

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.

BLOWER DATA

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.)
See page 8 for wet coil and option/accessory air resistance data.
See page 8 for minimum air volume required for use with optional electric heat.

Total Air Volume cfm	Total Static Pressure - in. w.g.													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	759	223	864	298	961	359	1049	420	1128	508	1199	607	1260	704
2000	846	271	943	345	1035	410	1117	488	1189	598	1255	704	1313	804
2250	945	303	1030	391	1111	476	1184	577	1247	697	1310	806	1367	905
2500	1035	366	1109	476	1180	583	1245	688	1306	797	1368	903	1426	1008
2750	1113	476	1182	601	1248	715	1310	809	1371	902	1432	1011	1491	1129
3000	1195	596	1261	718	1324	827	1385	922	1444	1024	1503	1146	1559	1279
3250	1282	711	1346	827	1406	935	1464	1044	1521	1167	1576	1306	1629	1460
3500	1372	821	1432	940	1489	1060	1544	1192	1598	1337	1650	1494	1700	1663
3750	1461	949	1517	1081	1571	1221	1624	1373	1675	1532	1725	1700	1773	1875
4000	1549	1109	1602	1256	1653	1413	1703	1576	1753	1743	1801	1916	1847	2091
4250	1637	1298	1687	1458	1735	1625	1784	1795	1831	1966	1877	2139	1923	2310
4500	1724	1510	1772	1678	1818	1851	1864	2023	1910	2195	1955	2365	2000	2530
4750	1811	1738	1856	1910	1901	2083	1946	2254	1990	2423	2034	2587	2079	2746
5000	1897	1973	1941	2144	1985	2314	2028	2480	2071	2644	2114	2805	2158	2959
5250	1983	2205	2026	2373	2069	2538	2111	2699	2153	2860	2195	3017	- - -	- - -
5500	2070	2428	2112	2595	2153	2756	2194	2912	- - -	- - -	- - -	- - -	- - -	- - -
5750	2156	2643	2197	2809	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

Total Air Volume cfm	Total Static Pressure - in. w.g.											
	1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	1316	793	1373	875	1432	963	1491	1064	1548	1175	1604	1300
2000	1368	894	1425	982	1483	1081	1540	1196	1596	1322	1650	1458
2250	1423	1001	1480	1101	1537	1216	1593	1344	1647	1483	1700	1629
2500	1483	1117	1539	1236	1594	1368	1648	1509	1700	1657	1752	1810
2750	1547	1256	1601	1394	1654	1539	1705	1690	1756	1846	1806	2004
3000	1612	1425	1664	1577	1715	1734	1765	1893	1815	2053	1864	2213
3250	1680	1623	1729	1787	1778	1949	1828	2110	1876	2269	1925	2426
3500	1748	1835	1796	2003	1844	2165	1893	2324	1942	2479	1991	2633
3750	1819	2048	1866	2214	1914	2374	1963	2530	2012	2684	2061	2837
4000	1893	2260	1940	2423	1988	2581	2036	2737	2084	2891	2134	3044
4250	1969	2475	2016	2634	2063	2790	2111	2945	2159	3098	- - -	- - -
4500	2046	2689	2093	2844	2140	2998	2187	3153	- - -	- - -	- - -	- - -
4750	2124	2900	2170	3053	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5000	2203	3111	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5250	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5500	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

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

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

Electric Heat kW	Minimum cfm
7.5	1750
15	2250
22.5	2250
30	2750
45	2750
60	3500

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

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

Unit Size	RTD11 Step-Down Diffuser				FD11 Flush Diffuser
	Air Volume cfm	2 Ends Open	1 Side, 2 Ends Open	All Ends & Sides Open	
092 Models	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 Models	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 Models	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

Model No.	Air Volume	[1] Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
092 Models	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 Models	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 Models	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 No.	LCT092H4E / LCT092H4P		
[1] Voltage - 60Hz			208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)		Rated Load Amps	12.9	7.1	4.6
		Locked Rotor Amps	105	62	39
Compressor 2 (Non-Inverter)		Rated Load Amps	13.1	6.1	4.4
		Locked Rotor Amps	83.1	41	33
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		Horsepower	3.75	3.75	3.75
		Full Load Amps	8.7	4.7	4.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	50	25	20
		With (1) 0.33 HP Power Exhaust	50	30	20
[3] Minimum Circuit Ampacity (MCA)		Unit Only	43	23	17
		With (1) 0.33 HP Power Exhaust	46	24	18

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	25	20
		15 kW	[4] 50	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	43	43	23	17
		15 kW	50	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	30	20
		15 kW	60	60	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	46	46	24	18
		15 kW	53	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61

ELECTRICAL ACCESSORIES

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

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.

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

		Model No.	LCT102H4E/ LCT102H4P		
[1] Voltage - 60Hz			208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)		Rated Load Amps	12.9	7.1	4.6
		Locked Rotor Amps	105	62	39
Compressor 2 (Non-Inverter)		Rated Load Amps	13.7	6.1	4.8
		Locked Rotor Amps	83.1	43	33
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		Horsepower	3.75	3.75	3.75
		Full Load Amps	8.7	4.7	4.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	50	25	20
		With (1) 0.33 HP Power Exhaust	50	30	20
[3] Minimum Circuit Ampacity (MCA)		Unit Only	44	23	17
		With (1) 0.33 HP Power Exhaust	46	24	18

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	25	20
		15 kW	[4] 50	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	44	44	23	17
		15 kW	50	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	30	20
		15 kW	60	60	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	46	46	24	18
		15 kW	53	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61

ELECTRICAL ACCESSORIES

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

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.

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

		Model No.	LCT120H4E/ LCT120H4P		
[1] Voltage - 60Hz			208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)		Rated Load Amps	16.7	7.1	5.7
		Locked Rotor Amps	110	54.7	47.8
Compressor 2 (Non-Inverter)		Rated Load Amps	16	7.8	5.7
		Locked Rotor Amps	110	52	38.9
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		Horsepower	3.75	3.75	3.75
		Full Load Amps	8.7	4.7	4.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	60	30	25
		With (1) 0.33 HP Power Exhaust	70	30	25
[3] Minimum Circuit Ampacity (MCA)		Unit Only	52	25	20
		With (1) 0.33 HP Power Exhaust	54	26	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	60	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	52	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
		60 kW	136	156	79	63
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	70	70	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	54	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61
		60 kW	139	159	80	65

ELECTRICAL ACCESSORIES

Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W57**	**54W56**	**54W56**
	60 kW	**N/A**	**N/A**	**54W57**	**54W56**

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.

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

		Model No.	**LCT150H4E/ LCT150H4P**		
[1] Voltage - 60Hz			**208/230V-3ph**	**460V-3ph**	**575V-3ph**
Compressor 1 (Non-Inverter)		Rated Load Amps	17.6	8.5	6.3
		Locked Rotor Amps	136	66.1	55.3
Compressor 2 (Non-Inverter)		Rated Load Amps	22.6	10	7.5
		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		Horsepower	3.75	3.75	3.75
		Full Load Amps	8.7	4.7	4.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	80	35	25
		With (1) 0.33 HP Power Exhaust	80	40	30
[3] Minimum Circuit Ampacity (MCA)		Unit Only	61	29	23
		With (1) 0.33 HP Power Exhaust	63	30	24

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	80	80	35	25
		22.5 kW	80	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	61	61	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
		60 kW	136	156	79	63
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	80	80	40	30
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	63	63	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61
		60 kW	139	159	80	65

ELECTRICAL ACCESSORIES

Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W57**	**54W56**	**54W56**
	60 kW	**N/A**	**N/A**	**54W57**	**54W56**

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.

[4] Factory installed circuit breaker not available.

ELECTRIC HEAT CAPACITIES

Volts Input	7.5 kW			15 kW			22.5 kW			30 kW			45 kW			60 kW		
	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of 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

PARTS ARRANGEMENT - 092H, 102H, 120H, 150H

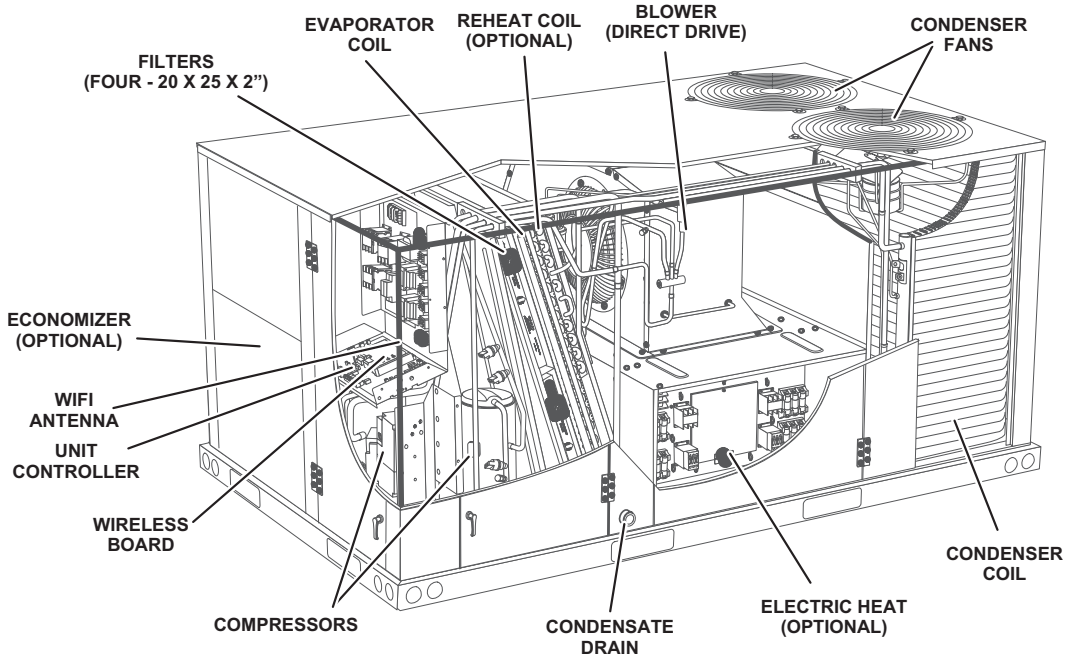


FIGURE 1

CONTROL BOX PARTS ARRANGEMENT

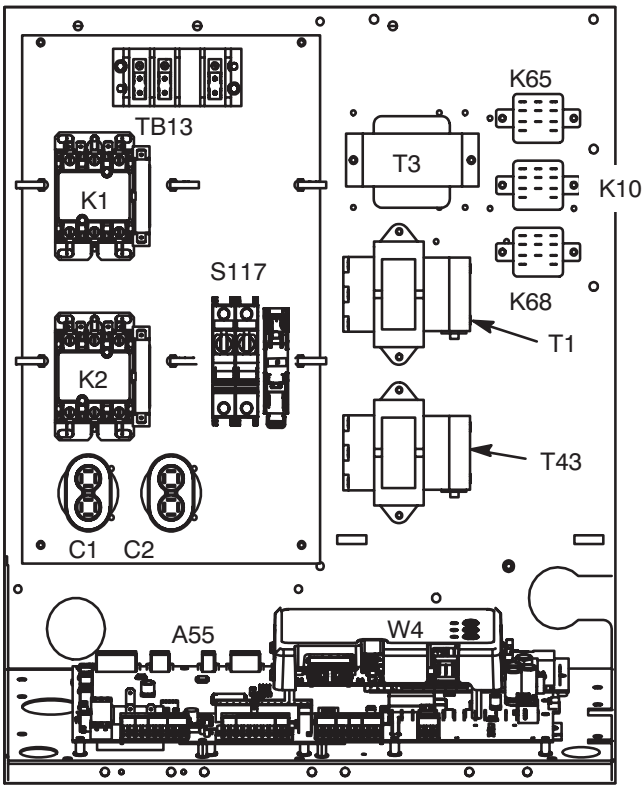


FIGURE 2

I-UNIT COMPONENTS

⚠ 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.

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.

All 7.5 through 12.5 ton (38.1 through 70.3 kW) units are configure to order units (CTO). The LCT unit components are shown in figure 1. All units come standard with hinged unit panels. All L1, L2 and L3 wiring is color coded; L1 is red, L2 is yellow and L3 is blue.

A-Control Box Components

LCT 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 (Optional)

All units may be equipped with an optional disconnect switch S48. Other factory or field installed optional circuit breakers may be used, such as CB10. S48 and CB10 are toggle switches, which can be used by the service technician to disconnect power to the unit.

2-Control Transformer T43 (Re-Heat Units)

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 transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). 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.

3-Control Transformer T1

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 92VA and is protected by a 6 amp circuit breaker (CB8). 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.

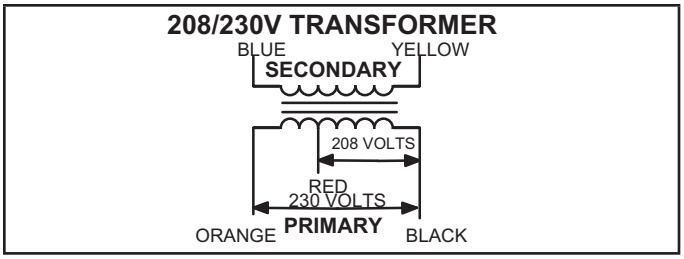


FIGURE 3

4-Outdoor 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.

5-Outdoor Fan Capacitors C1, C2

Fan capacitors C1 and C2 are used to assist in the start up of condenser fans B4 and B5. Capacitor size varies with unit tonnage and voltage.

LCT092-102 all voltages - 370V/10 MFD

LCT120-150 J volt - 370/10 MFD

LCT120-150 G volt - 370V/12.5 MFD

LCT120-150 Y volt - 370V/15 MFD

6-Compressor Contactor K1, K2

All compressor contactors are three-pole, double-break contactors with 24VAC coils. K1 and K2 (both energized by A55) energize compressors B1 and B2.

7-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.

8-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a N.O. DPDT relay with a 24VAC coil. K65 is used in all LCT units equipped with the optional power exhaust dampers. K65 is energized by the economizer control panel (A56), after the economizer dampers reach 50% open (adjustable in CORE). When K65 closes, the exhaust fan B10 is are energized.

9-Terminal Block TB13

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

10-Wireless Antenna

Wireless antenna is located above the return air compartment of the unit. FIGURE 4 shows location and FIGURE 5 shows cable routing. Please follow the CORE Controller setup guide included in the unit.

Antenna Location

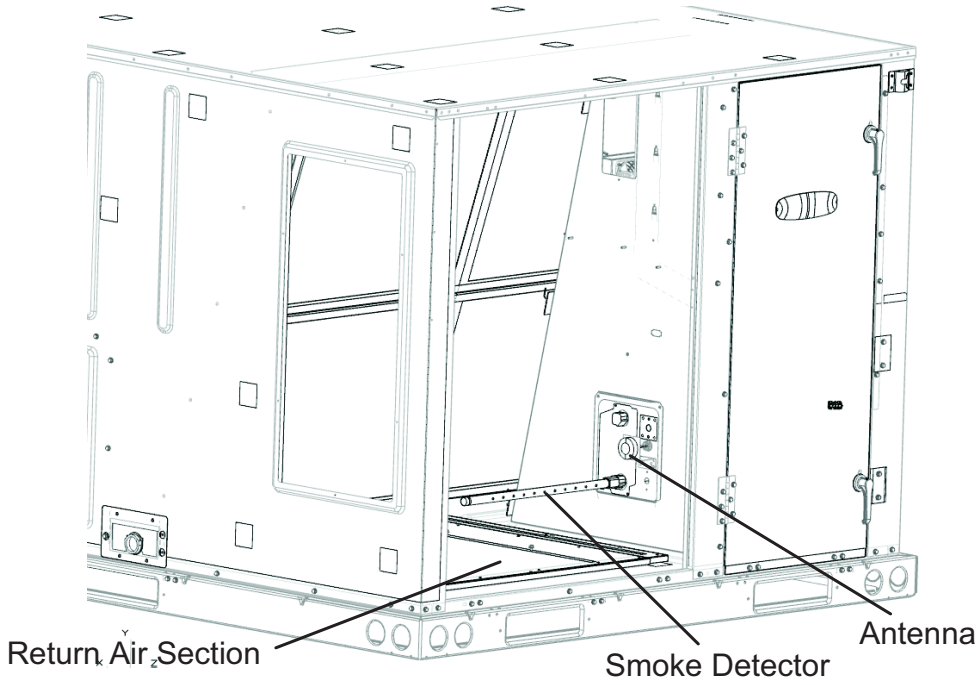


FIGURE 4

Cable Routing

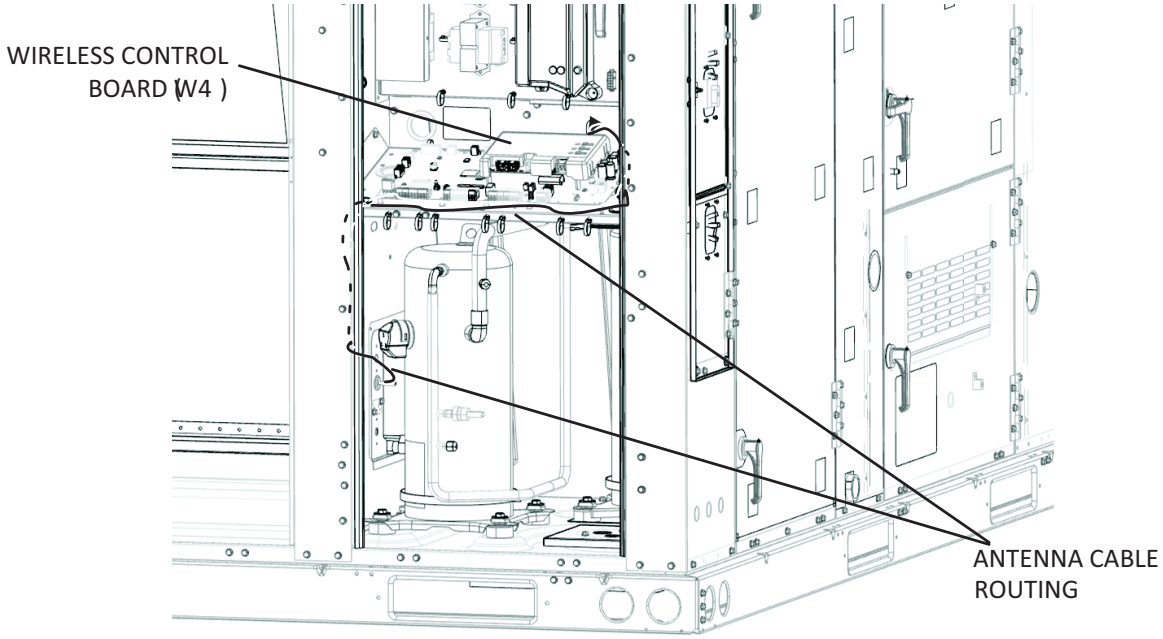


FIGURE 5

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:

Relative Humidity Sensor - 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.

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 M3 unit control.

Economizer Differential Pressure Sensor - Optional

Rooftop units installed with Smart Airflow™ will have a Pressure Transducer (PT5) present in the economizer. PT5 requires 5VDC power supply (P266-5 and {P266-6) and gives 0.25 VDC to 4 VDC output (P266-4) corresponding to 0" water column and 2" water column respectively.

For all practical purposes the output should be less than 1.2" water column if not an error code is stored and service alarm output is turned on.

TABLE 1

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		

Room Sensors

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

TABLE 2

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		

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.

TABLE 3

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		

VAV Supply Static Sensor

The supply duct differential static pressure sensor (A30) is an analog sensor with a 0-10VDC output over a range of 0-5"w.c as shown in the following table. The sensor is powered with 24VAC.

TABLE 4

Carbon Dioxide Range

Pressure "w.c.	DC Voltage	Pressure "w.c.	DC Voltage	Pressure "w.c.	DC Voltage	Pressure "w.c.	DC Voltage
0	0	1.5	3	3	6	4.5	9
0.5	1	2	4	3.5	7	5	10
1	2	2.5	5	4	8		

PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL

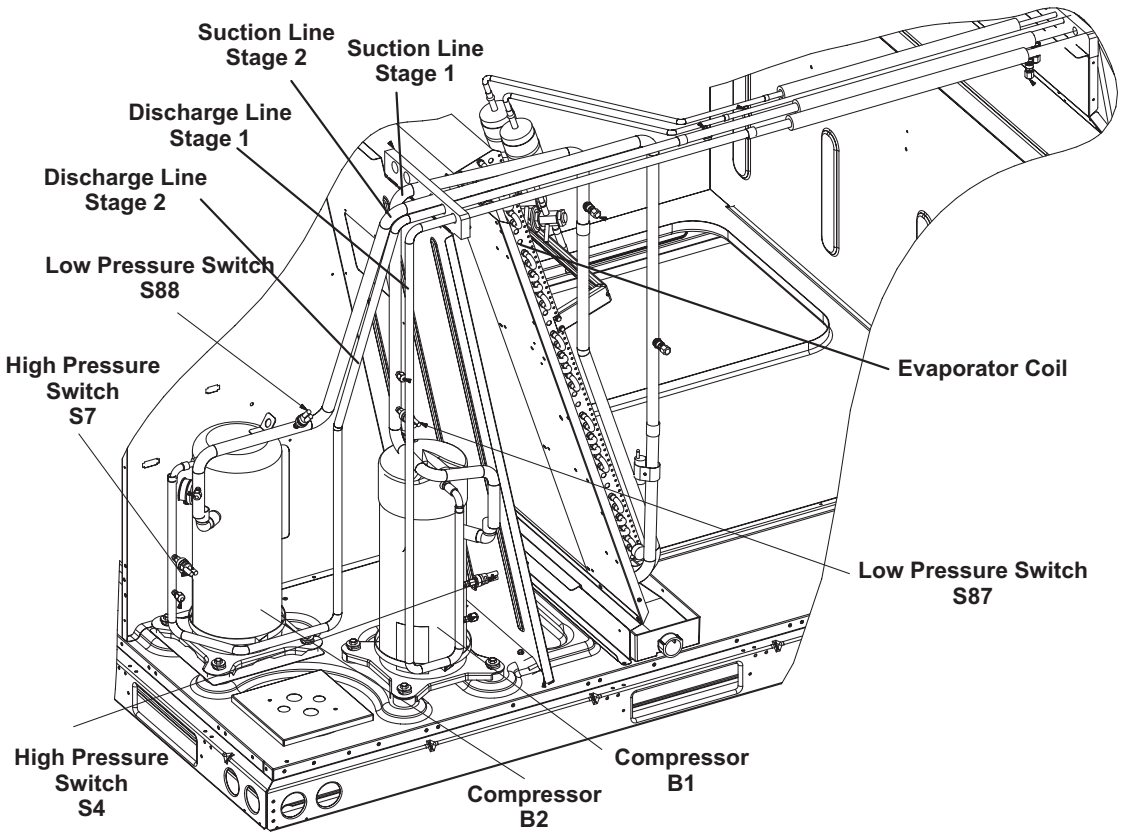


FIGURE 6

B-Cooling Components

High efficiency units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See FIGURE 6. Units are equipped with ECM direct drive blowers which draw air across the evaporator during unit operation.

On all units the evaporators are slab type and are row split. Each evaporator uses a thermostatic expansion valve as the primary expansion device.

In all units, each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by thermistors for low ambient control and freezing prevention.

Cooling may be supplemented by a factory- or field-installed economizer.

1-Compressors B1, B2

Units are equipped with two scroll compressors and two independent cooling circuits. B1 is 2-stage compressor, with L34 to switching between part load and full load, B2 is 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 cover over 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-Crankcase Heaters HR1, HR2

All LCT 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 size.

3-High Pressure Switches S4, S7

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All units are equipped with this switch. On fin/tube outdoor coils, the switch is located in the compressor discharge line. On aluminum outdoor coils, the switch is located on the liquid line in the blower section. Switches are wired in series with the compressor contactor coil.

On all units, S4 (first circuit) and S7 (second circuit) are wired in series with the respective compressor contactor coils. On ultra high efficiency units, only S4 is used. S4 is located on the common compressor discharge line and is wired to both compressor contactors via the A55 Unit Controller.

When discharge pressure rises to 610 ± 15 psig (4206 ± 103 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 15 psig (3275 ± 103 kPa) the pressure switch will close.

The M4 Unit Controller has a three-strike counter before locking out. This means the control allows three high pressure trips per one thermostat demand. The control can be reset by breaking and remaking the thermostat demand or manually resetting the control.

4-Filter Drier

LCT units have a filter drier located in the liquid line of each refrigerant circuit. The drier removes contaminants and moisture from the system.

5-Low Pressure Switches 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.

On standard and high efficiency units, S87 (compressor one) and S88 (compressor two) are wired to A55 Unit Controller. On ultra high efficiency units, S87 (only) is located on the common suction line and is 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 $\pm$ 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 $\pm$ 5 psig (620 ± 34 kPa) due to many causes such as refrigerant being added.

6-Condenser Fans B4 and B5

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

7-Temperature Sensors RT46, RT47, RT48 & RT49

Units are equipped with four factory-installed thermistors (RT46 / RT49) located on different points on the refrigerant circuit.

The thermistors provide the Unit Controller with constant temperature readings of four specific locations on the refrigeration circuit. These temperatures are used as feedback in certain modes of unit operation.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See FIGURE 7 and FIGURE 8 proper locations.

THERMISTOR LOCATION - EVAPORATOR COIL
RT46, RT47

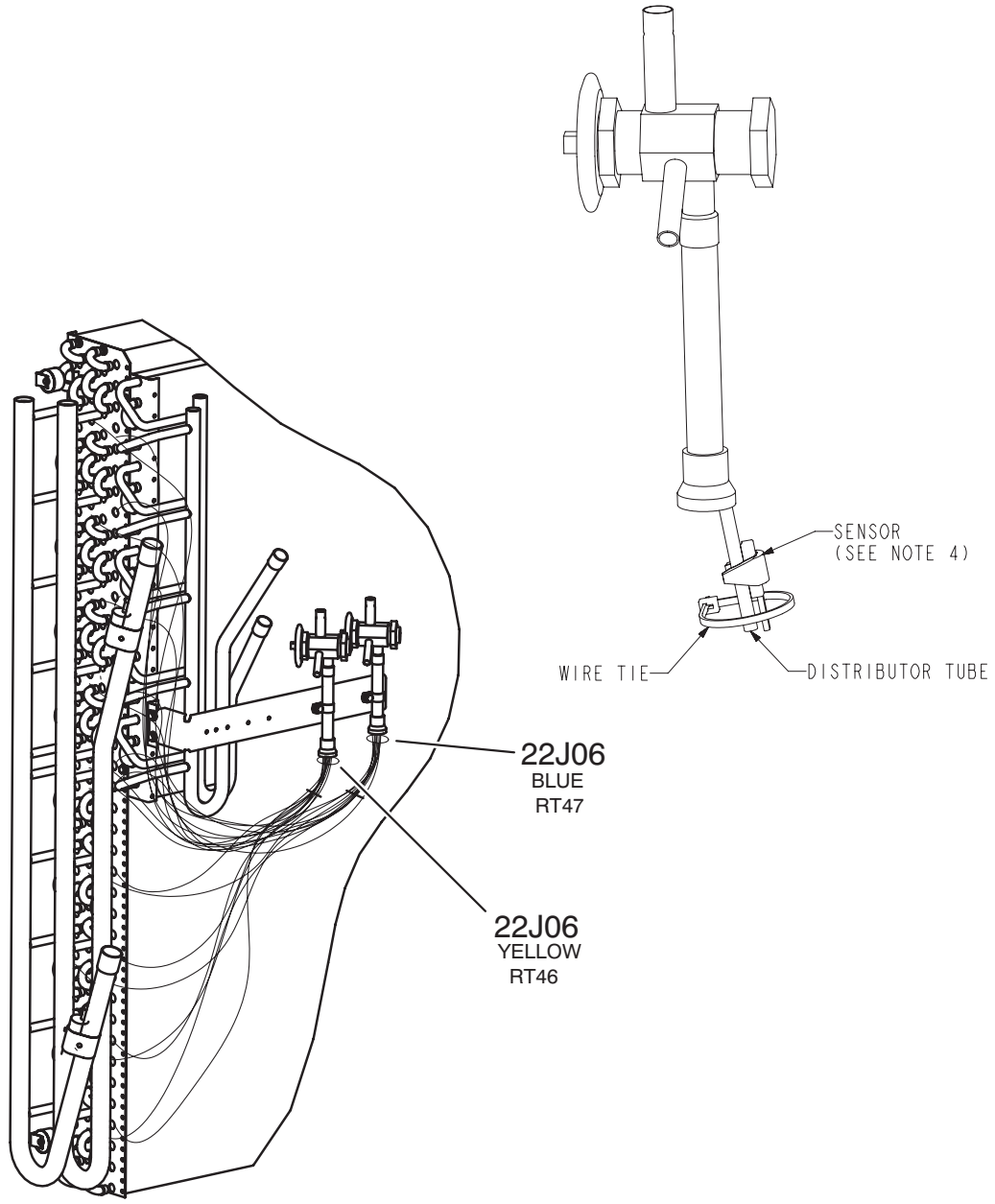


FIGURE 7

THERMISTOR LOCATION - CONDENSER COIL
RT48, RT49

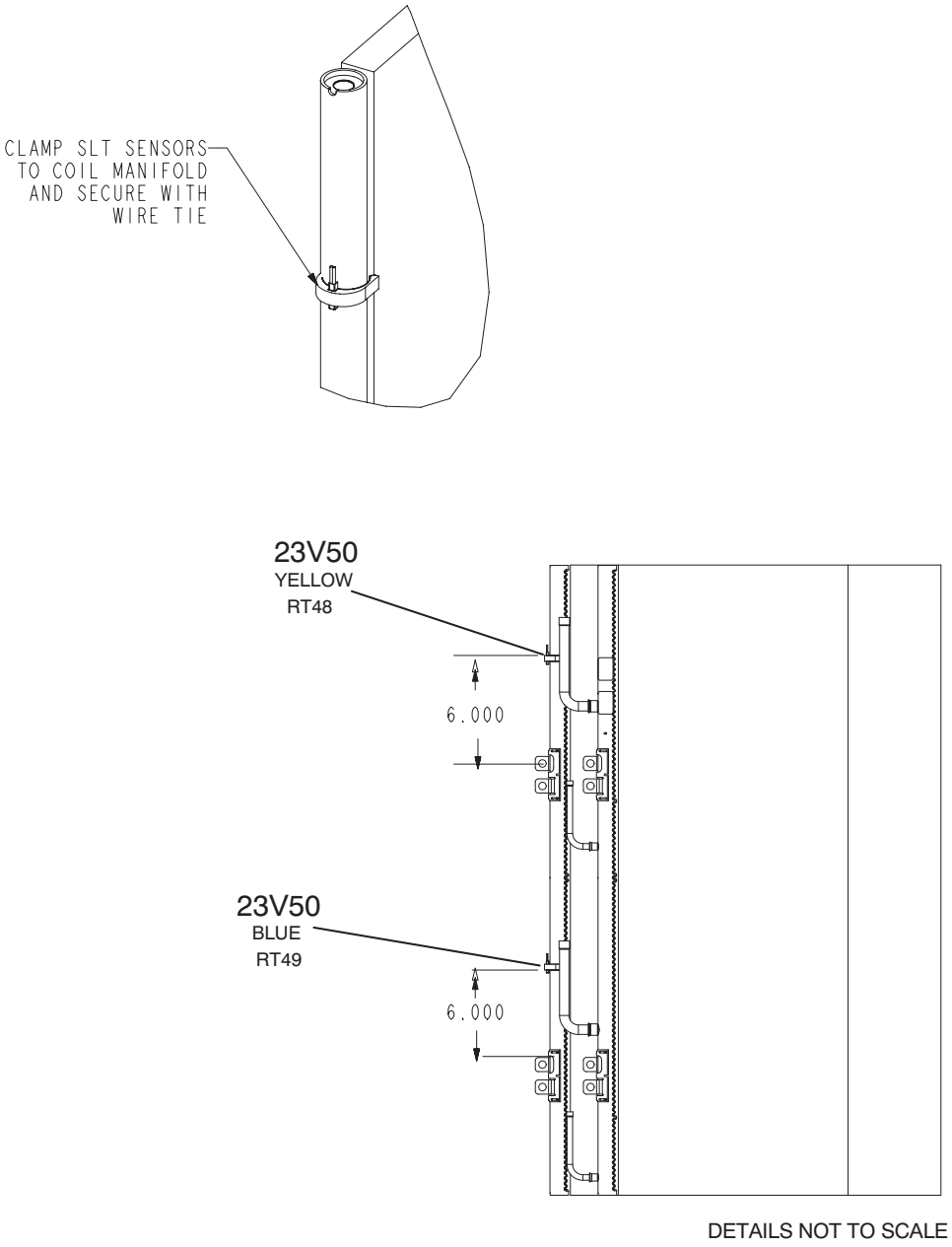


FIGURE 8

C-Blower Compartment

The blower compartment is located between the evaporator coil and the condenser coil section. The blower assembly is secured to a sliding frame which allows the blower motor assembly to be pulled out of the unit.

Units are equipped with variable speed, direct drive blowers. The supply CFM can be adjusted by changing the percentage of motor output using the Unit Controller settings. Measure the intake air CFM and adjust the RPM% to get design-specified supply air CFM.

1-Blower Wheels

Units are be equipped with a backward inclined blower wheel. See “SPECIFICATIONS” at the front this manual for more detail.

2-Indoor Blower Motor B3

Units are equipped with a direct drive blower assembly with a three-phase, variable speed, direct drive blower motor.

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.

⚠ IMPORTANT

Compressor two is the only component that must be checked to ensure proper phasing. Follow “COOLING START-UP” section of installation instructions to ensure proper compressor and blower operation.

The Unit Controller checks the incoming power during start-up. If the voltage or phase is incorrect, the Unit Controller will display an alarm and the unit will not start.

A-Blower Operation

Refer to the Unit Controller Setup Guide to energize blower. Use the mobile service app menu; see SERVICE > TEST.

In thermostat control mode, the Unit Controller will stage the blower between low and high speed. In zone sensor control mode, the Unit Controller will vary (VAV) the blower between low and high speed.

⚠ WARNING

1-Make sure that 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.

3-Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.

4-Check voltage at disconnect switch. Voltage must be within range listed on nameplate. If not, consult power company and have voltage condition corrected before starting unit.

5-Make sure filters are new and in place before start-up.

Initiate blower only (G) demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

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

2- 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.

NOTE - *Blower operation mode can also be initiated by the mobile service app.*

Direct-drive motor may not immediately stop when power is interrupted to the Unit Controller. Disconnect unit power before opening the blower compartment. The Controller’s digital inputs must be used to shut down the blower. See Unit Controller manual for operation sequences.

B-Blower Access

The blower assembly is secured to a sliding frame which allows the blower assembly to be pulled out of the unit. See FIGURE 10.

1 - Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing. Disconnect the pressure sensor low voltage wire harness.

2 - Remove and retain screws on either side (and on the front for direct drive) of sliding frame. Use the metal handle to pull frame toward outside of unit.

3 - Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location using the wire tie. Reconnect pressure sensor low voltage wire harness.

4 - Replace retained screws.

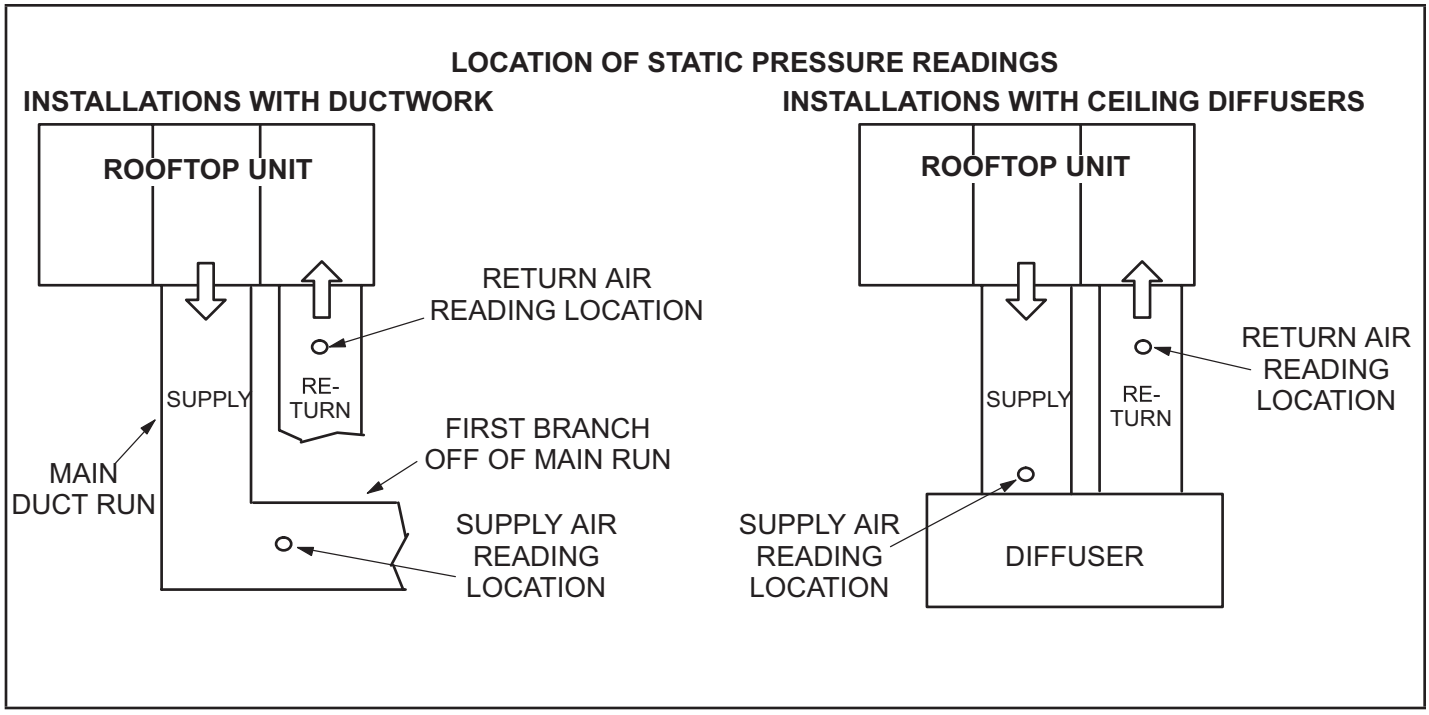


FIGURE 9

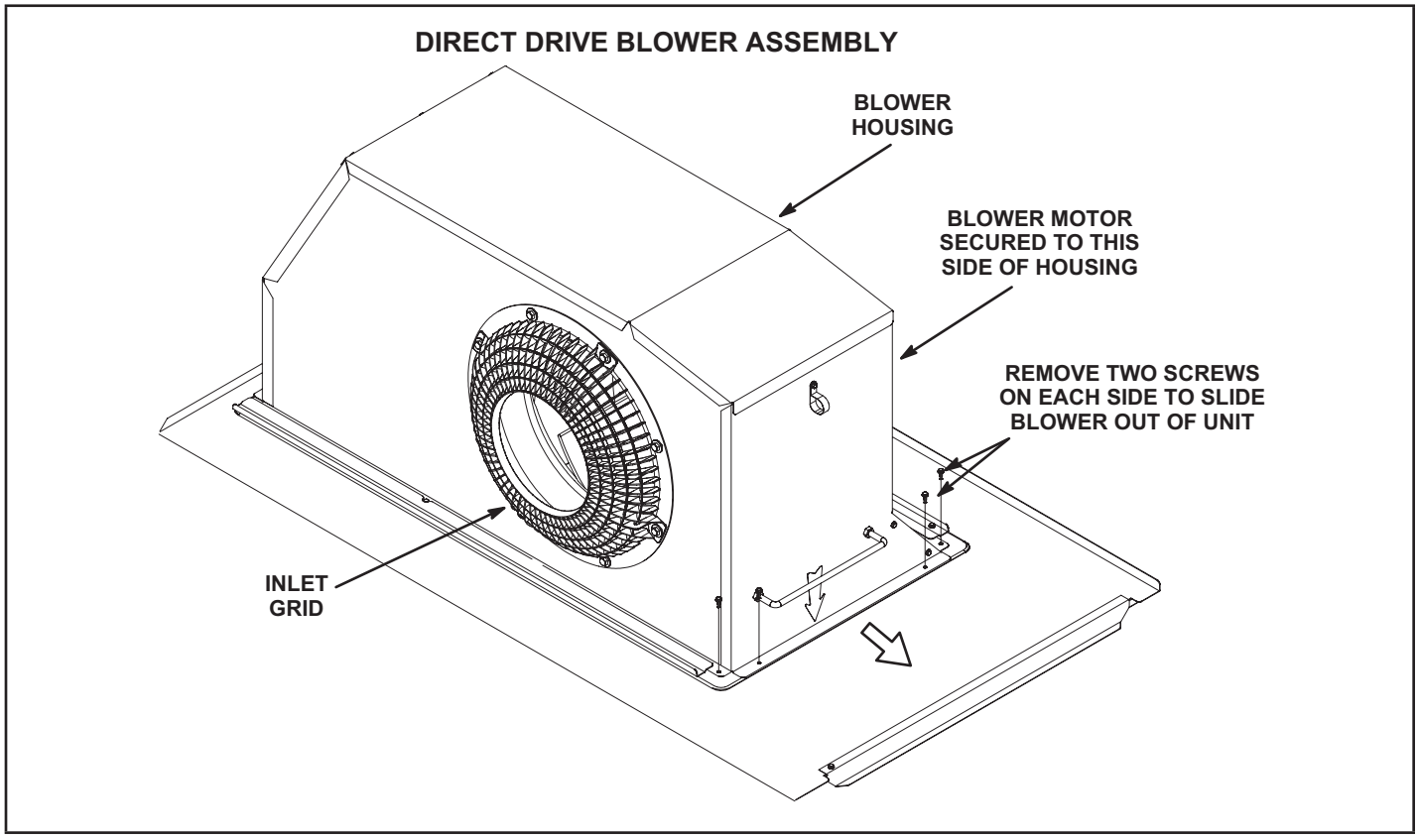


FIGURE 10

The supply CFM can be adjusted by changing the percentage of motor output using the Unit Controller settings Refer to TABLE 5 for menu paths and default settings.. Record any RPM% changes on the parameter settings label located on the inside of the compressor access panel.

⚠ CAUTION

The BLOWER CALIBRATION process starts the indoor blower at operational speeds and moves the economizer damper blades. Before starting this process, replace any access panels and close all unit doors except compressor compartment door.

Blower calibration is required only on units that are newly installed or if there is a change in the duct work or air filters after installation..

Use the mobile service app to navigate to the SETUP>TEST & BALANCE>BLOWER menu. After the new RPM% values are entered, select START CALIBRATION. The blower calibration status is displayed as a % complete. Upon successful completion, the mobile service app will display CALIBRATION SUCCESS and go back to the blower calibration screen.

IMPORTANT - *The default value for Cooling Low motor speed is lower than a traditional singe- or two-speed unit. If operating the unit with a 2- or 3-stage controller (2- or 3-stage thermostat, DDC controller, etc.), it is recommended to increase the Cooling Low CFM default value to a suitable level for part load cooling (typically 60% of full load CFM).*

TABLE 5

DIRECT DRIVE PARAMETER SETTINGS - 581102-01

Parameter	Field Setting	Description
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 12 for EBM, 6 for ECM		
BLOWER SMOKE CFM	%	Percentage of RPM for blower smoke speed.
SETUP > TEST & BALANCE > BLOWER		
BLOWER HEATING HIGH CFM	%	Percentage of RPM for blower heating high speed.
BLOWER HEATING LOWCFM	%	Percentage of RPM for blower heating low speed (P volt gas heat only).
BLOWER COOLING HIGH CFM	%	Percentage of RPM for blower cooling high speed.
BLOWER COOLING LOW CFM	%	Percentage of RPM for blower cooling low speed and vent speed for standard static blowers.
BLOWER VENTILATION CFM	%	Percentage of RPM for high static blower ventilation speed.
SETUP > TEST & BALANCE > DAMPER		
BLOWER HIGH CFM DAMPER POS %	%	Minimum damper position for high speed blower operation. Default 0%.
BLOWER LOW CFM DAMPER POS %	%	Minimum damper position for low speed blower operation. Default 0%.
POWER EXHAUST DAMPER POS %	%	Minimum damper position for low power exhaust operation. Default 50%.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 216		
POWER EXHAUST DEADBAND %	%	Deadband % for power exhaust operation. Default 10%.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 10 (Applies to Thermostat Mode ONLY)		
FREE COOLING STAGE-UP DELAY	sec	Number of seconds to hold blower at low speed before switching to blower at high speed. Default 300 seconds.

Installer: Record any parameter changes under “Field Setting” column. Settings need to be recorded by installer for use when Unit Controller is replaced or reprogrammed.

D-Electric Heat Components

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 11. All electric heat sections consist of electric heating elements exposed directly to the air stream.

1-Heating Elements HE1, HE2

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.

2-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.

3-Primary Limit Switch S15

S15 is a SPST N.C. auto-reset switch located on the back panel of the electric heat section below the heating elements. The switch is wired in series with the first stage contactor coil. When S15 opens, indicating a problem in the system, contactor K15 is d-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. The switch is factory-set to open at 200°F ± 5°F (93.3°C ± 2.8°C) on a temperature rise and automatically reset at 160°F ± 6F (71.1°C ± 3.3C) on a temperature fall. The switch is not adjustable.

4-High Temperature Thermostat S19

S19 is a SPST N.C. auto-reset thermostat located on the back panel of the electric heat section below the heating elements. The thermostat is wired in series with the first stage contactor coil. When either S15 or S19 opens, indicating a problem in the system, contactor K15 is de-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. The thermostat is factory-set to open at 170F ± 5F (76.7°C ± 2.8°C) on a temperature rise and automatically reset at 130°F ± 6°F (54.4°C ± 3.3°C) on a temperature fall. The thermostat is not adjustable.

5-High Temperature Limits S20, S158

Limits are SPST N.C. manual-reset thermostats. Like the primary temperature limit, S20 is wired in series with the first-stage contactor coil (K15). When S20 opens, heating elements (HE1, HE2) are de-energized. S158 is wired in series with the second-stage contactor coil (K16). When S158 opens, heating elements (HE1, HE2) 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 ± 6°F (104C ± 3.3°C) on a temperature rise and can be manually reset when temperature falls below 160°F (71.0°C).

6-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 connection do not use TB2.

7-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.

8-Fuse F3 and F42

Fuses are housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. Figure 11 and TABLE 6 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F42 - 1, 2.

9-Unit Fuse Block F4

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

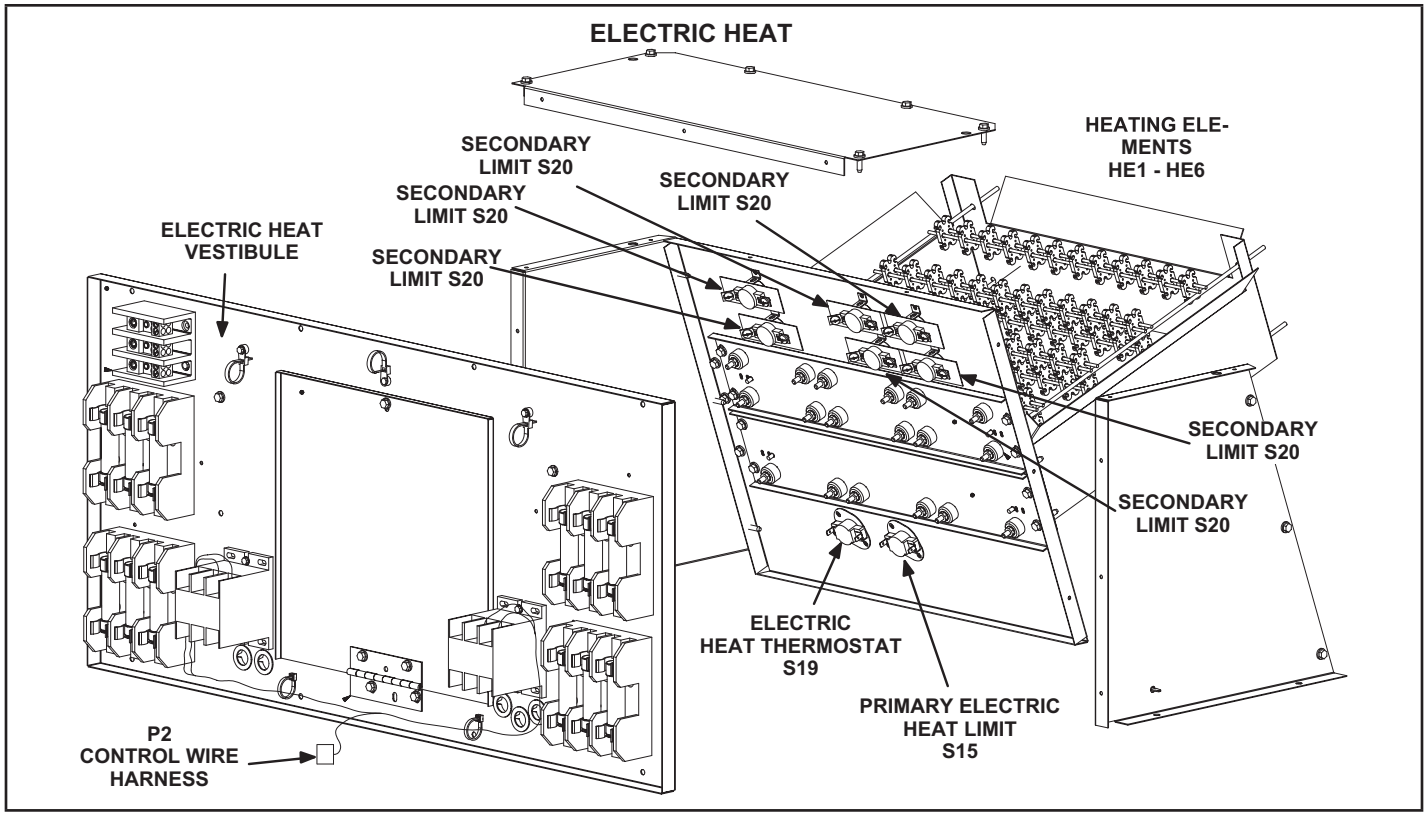


FIGURE 11

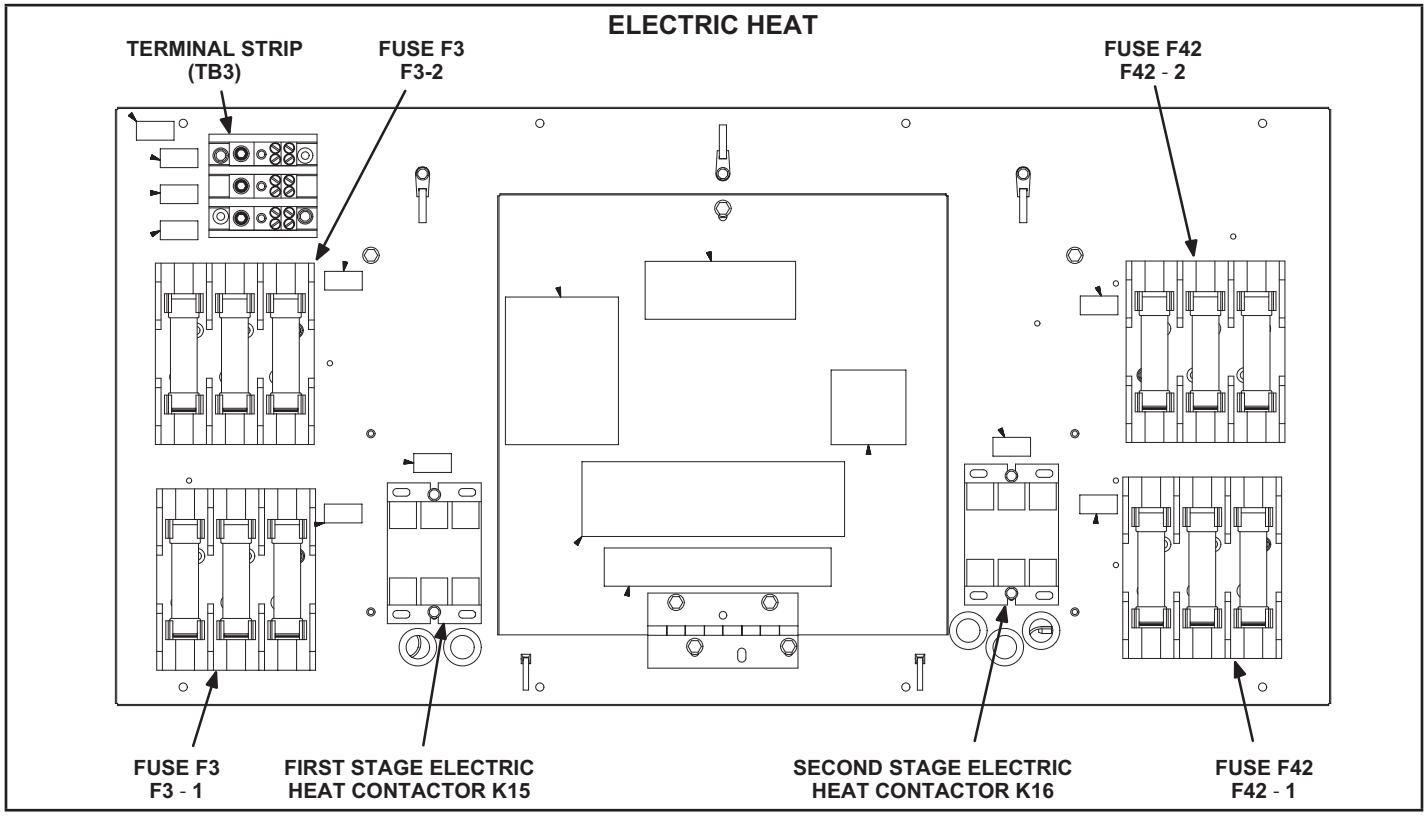


FIGURE 12

TABLE 6

ELECTRIC HEAT SECTION FUSE RATING					
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**			
		F-3-1	**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	

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 (C1CURB10).

III-CHARGING

A-Refrigerant Charge and Check

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 at full load..

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 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 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: At 95F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 96F. For a measured liquid temperature of 106F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 7

LCT/LCT092 581114-01

Normal Operating Pressures												
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	101	230	103	266	106	312	108	361	111	436	114	514
	108	233	111	268	113	313	116	366	119	435	122	512
	126	238	128	271	131	315	133	371	136	433	139	508
	147	244	149	275	152	317	154	376	157	431	159	505
Circuit 2	120	236	122	273	124	315	126	364	128	418	129	478
	129	239	131	275	133	318	135	366	137	420	139	480
	147	245	150	281	153	323	155	370	157	424	160	484
	168	252	171	287	174	328	177	376	179	429	182	488

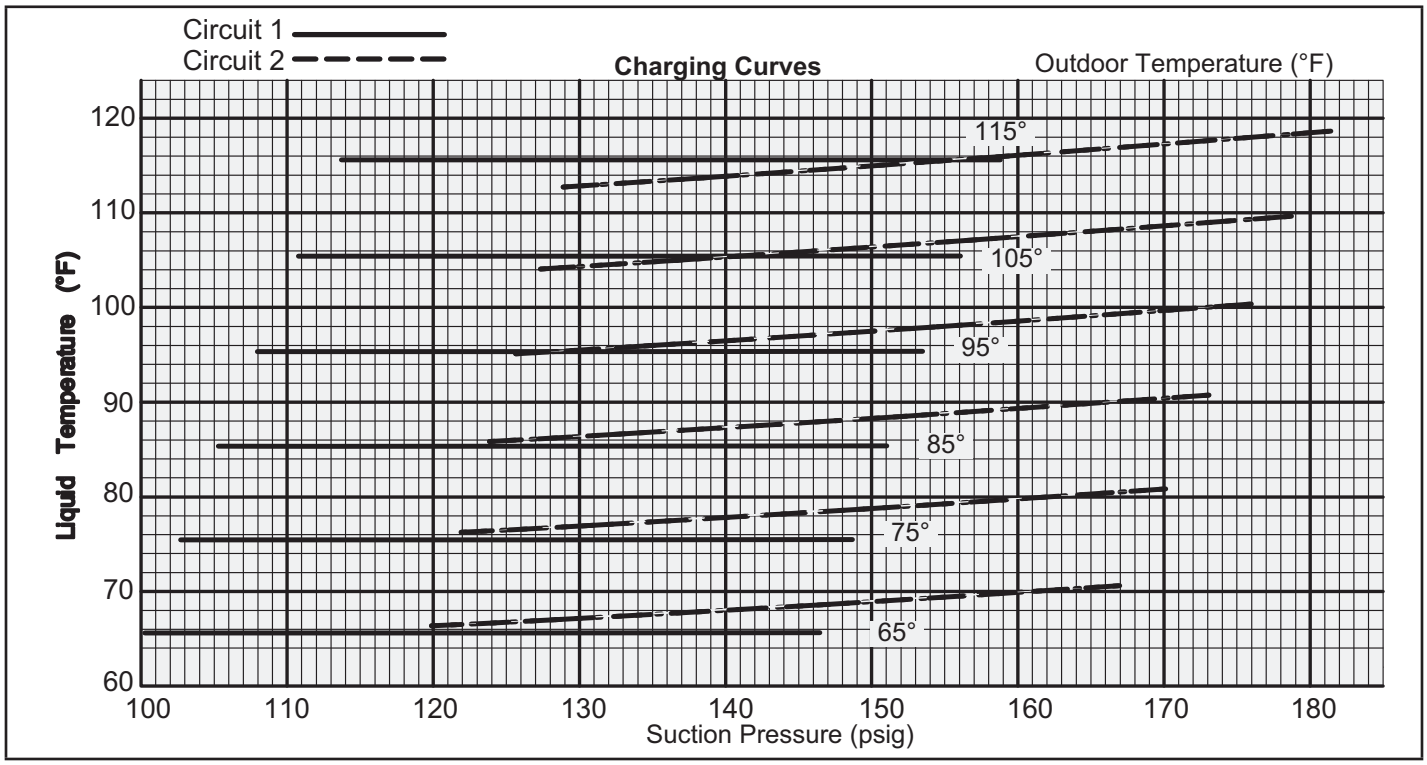


TABLE 8

LCT/LCT102 581115-01

Normal Operating Pressures												
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	109	228	111	266	114	312	116	362	118	430	119	502
	117	231	119	267	122	312	125	363	127	427	129	497
	133	239	137	272	140	314	143	366	146	423	148	490
	151	250	155	280	159	319	163	373	166	423	169	487
Circuit 2	124	243	126	280	128	327	130	383	132	448	135	523
	132	249	134	285	136	331	139	385	142	449	144	522
	150	261	153	294	155	337	158	388	161	449	164	520
	170	271	173	301	176	341	179	390	183	448	186	515

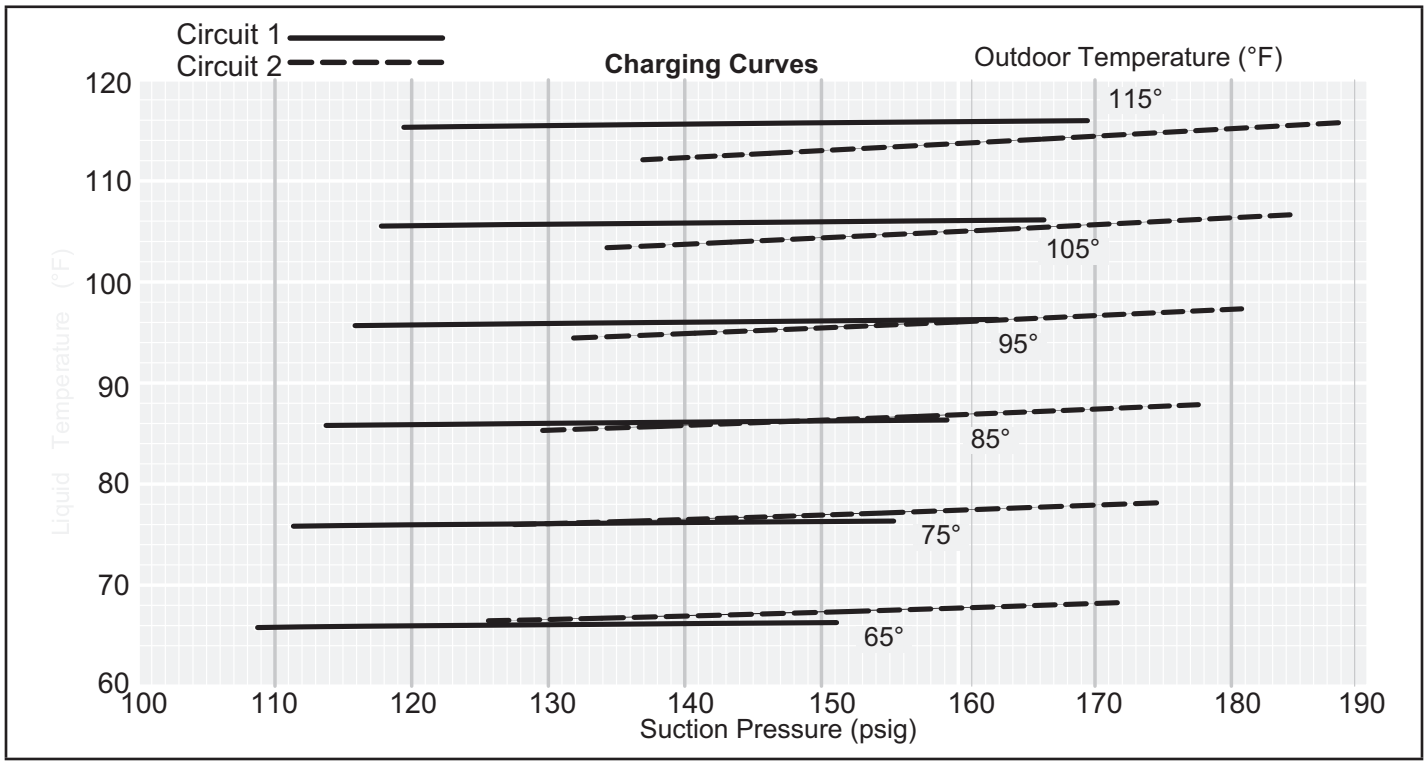


TABLE 9

LCT/LCT120 581116-01

Normal Operating Pressures												
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	98	234	100	274	103	320	106	369	109	431	113	496
	105	236	107	275	110	320	113	372	116	430	120	494
	122	242	124	279	127	323	130	374	133	429	137	491
	140	249	143	285	145	327	149	378	152	430	157	491
Circuit 2	118	249	120	286	122	330	124	381	126	440	128	505
	127	252	129	288	131	331	133	382	135	439	138	504
	145	261	147	295	150	336	153	385	155	441	158	504
	164	274	167	307	170	346	173	393	176	447	179	508

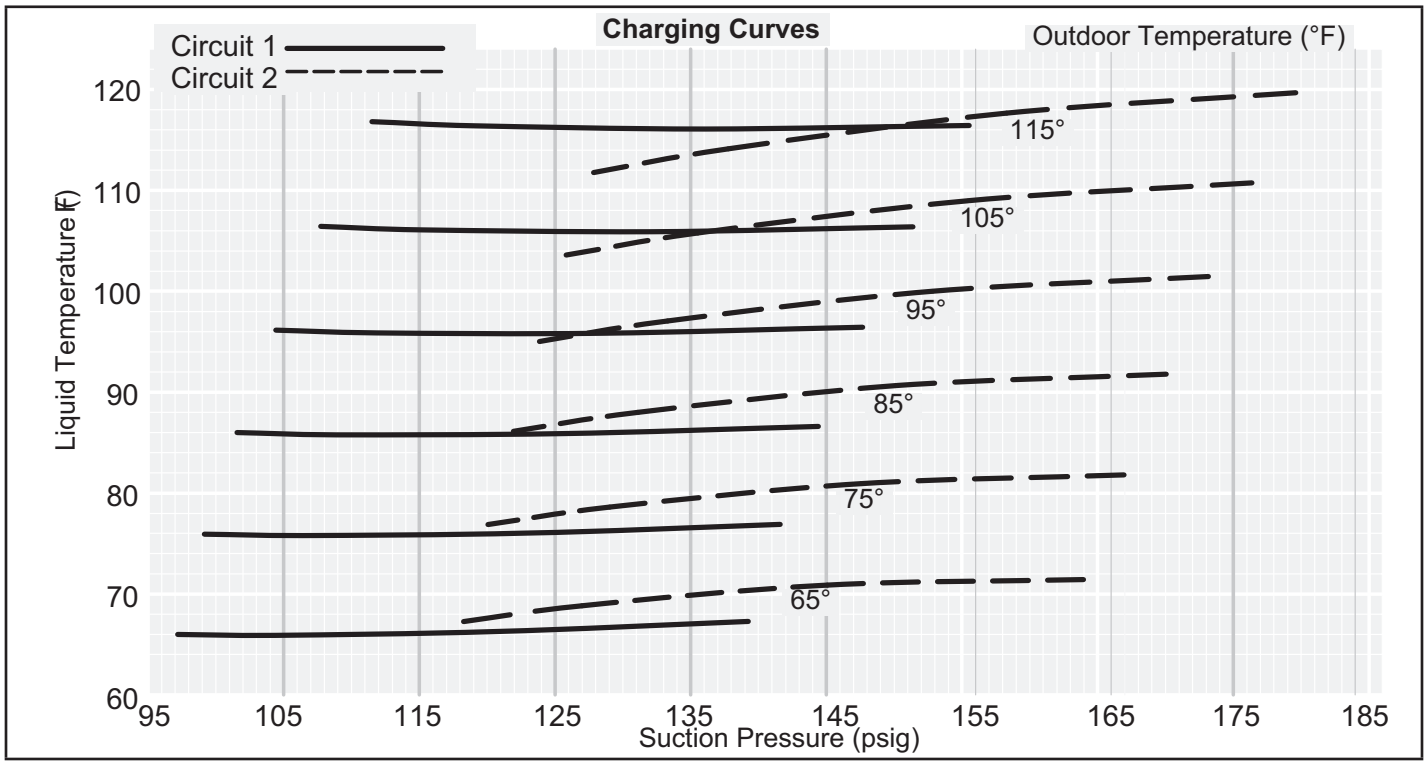
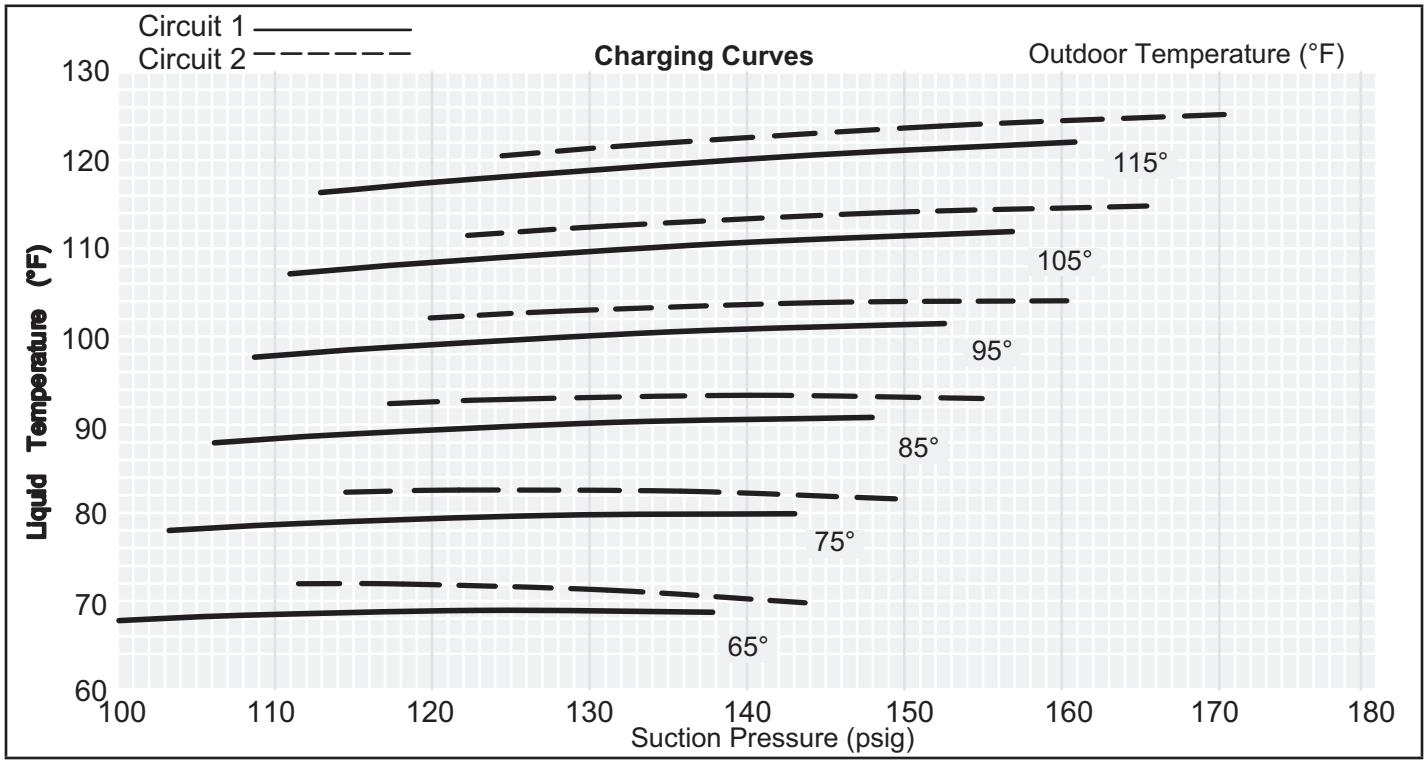


TABLE 10

LCT/LCT150 581117-01

Normal Operating Pressures												
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	238	103	274	106	317	108	365	111	420	113	481
	107	240	111	276	114	318	117	366	120	421	122	482
	123	249	127	284	131	325	135	373	138	427	142	487
	137	263	143	298	148	338	152	385	157	439	161	498
Circuit 2	112	264	115	302	118	345	120	393	123	446	125	503
	119	268	122	307	126	350	129	398	132	451	134	508
	132	280	136	319	141	363	145	411	149	464	153	522
	144	297	150	337	155	381	161	429	166	483	171	542



IV-START-UP - OPERATION

Refer to start-up 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. Voltage must be within the range listed on the nameplate. If not, consult 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 13

NOTE-*Crankcase heaters must be energized 24 hours before attempting to start compressor. Set thermostat so that there is no demand to prevent compressor from cycling. Apply power to unit.*

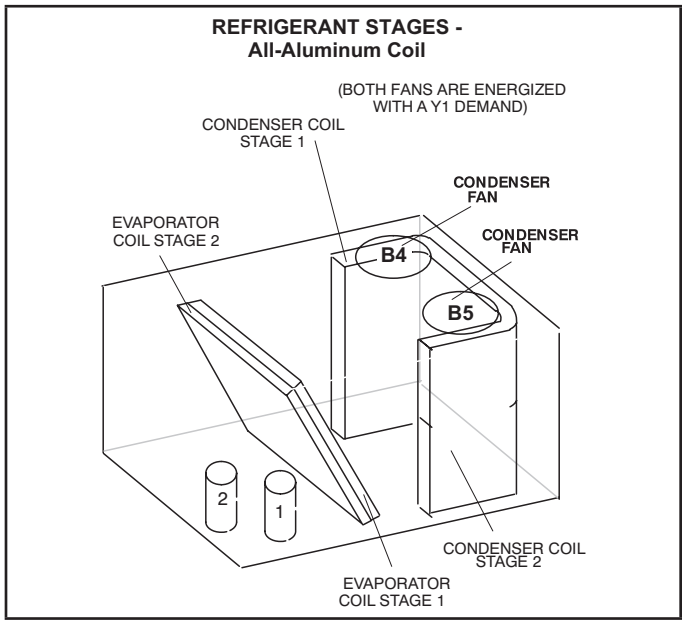


FIGURE 13

1 - Initiate first, second or third stage cooling demands according to instructions provided with thermostat.

2 - 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

3 - Units contain two refrigerant circuits or stages.

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

V- SYSTEMS SERVICE CHECKS

A-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____

VI-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the LCT units.

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, a C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LCT units are not mounted 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 mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled C1CURB mounting frame is shown in FIGURE 14. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 15. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

Optional supply/return transitions LASRT08/10 is available for use with the LCT 7.5 ton units and LASRT10/12 is available for the 8.5 and 10 ton units, utilizing optional C1CURB roof mounting frames. LCT 12.5 ton units will use LASRT15 with C1CURB roof mounting frame. Transition must be installed in the C1CURB mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

C-LAOAD(M) Outdoor Air Dampers (all units)

LAOAD(M) consists of a set of dampers which may be manually or motor (M) operated to allow up to 25 percent outside air into the system at all times (see FIGURE 16 and FIGURE 17). Either air damper can be installed in LCT units. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild detergent. It should be sprayed with Filter Handicoater when dry prior to re-installation.

D-Supply and Return Diffusers (all units)

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

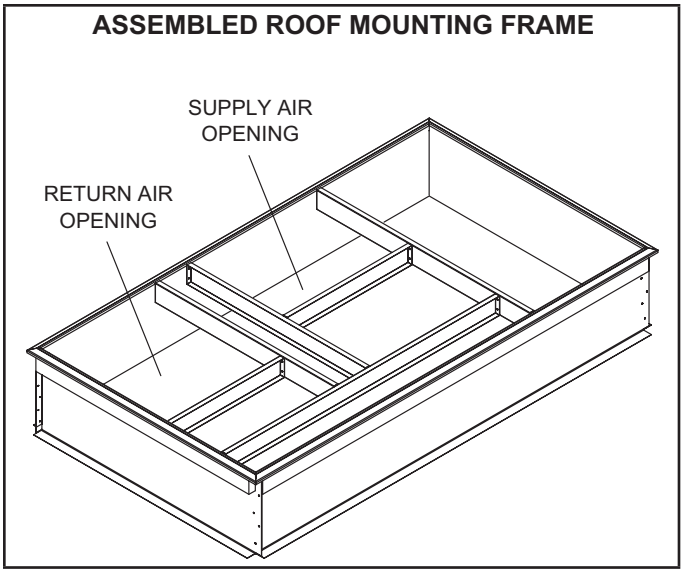


FIGURE 14

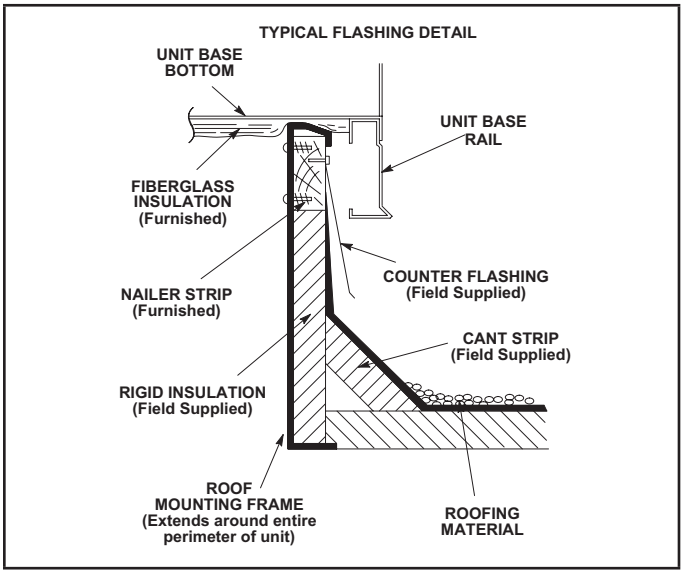


FIGURE 15

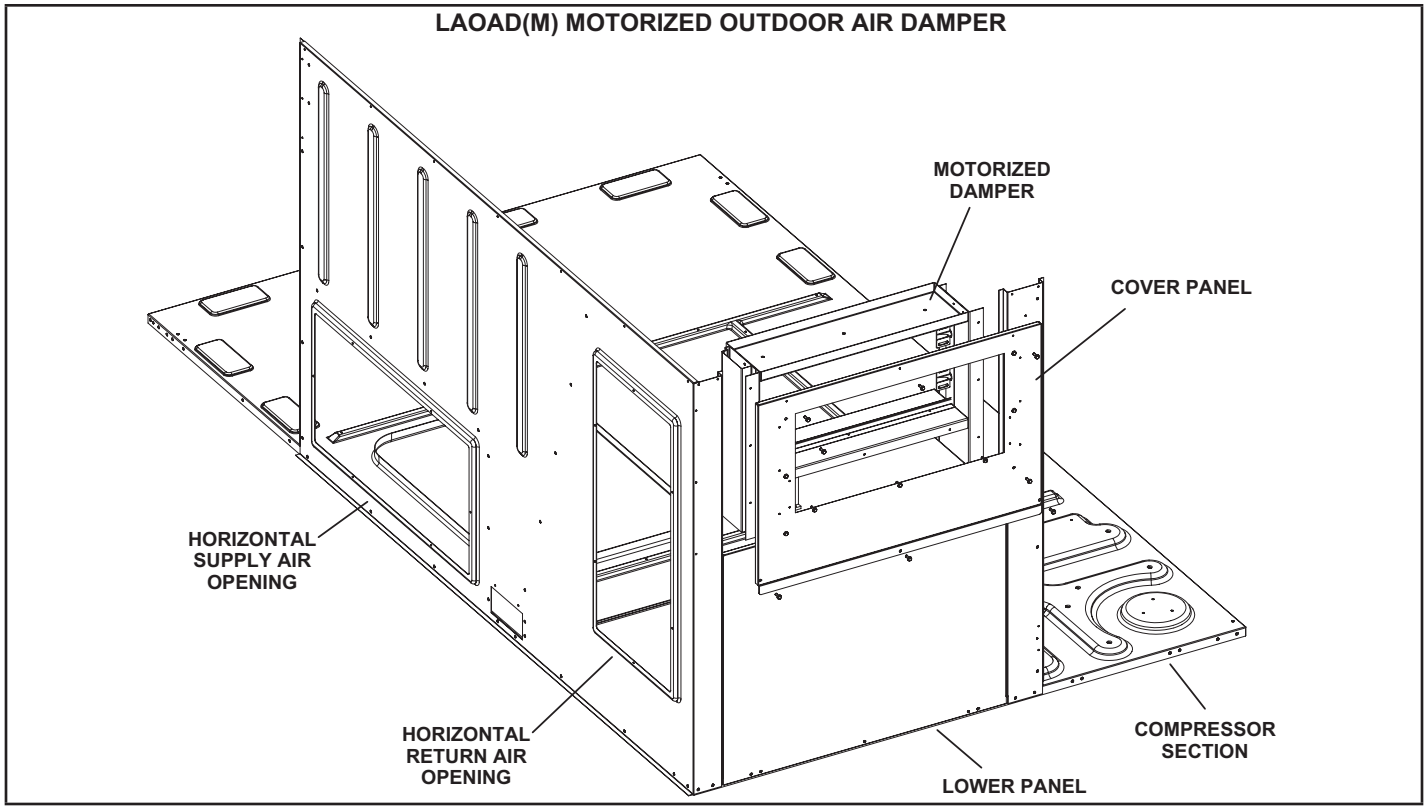


FIGURE 16

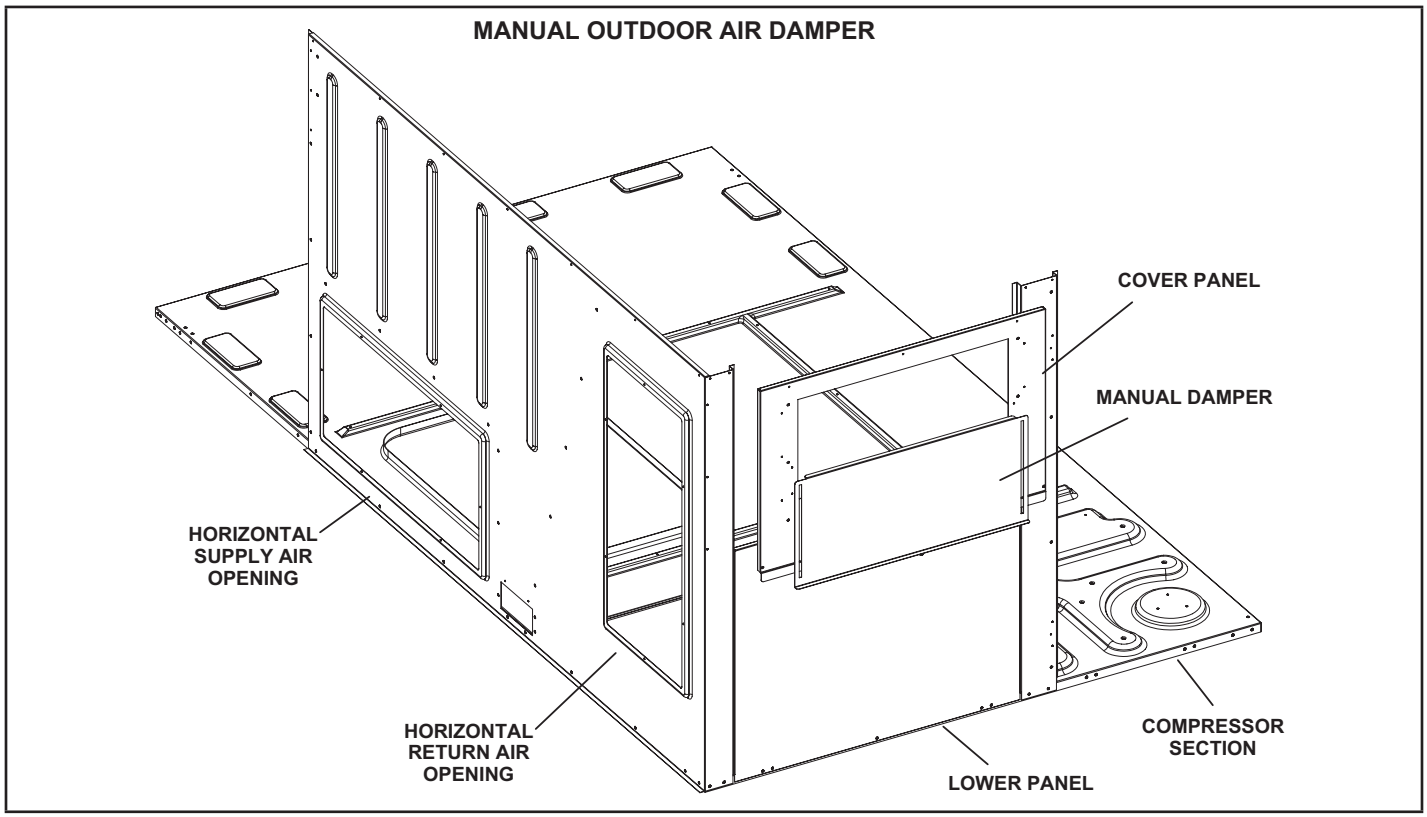


FIGURE 17

E-Economizer (all units) (Field or Factory Installed)

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See FIGURE 20. 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 11 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 and Unit Controller installation and application manuals.

F-Gravity Exhaust Dampers

LAGEDH03/15 dampers (FIGURE 18) are used in downflow and horizontal air discharge applications. Horizontal gravity exhaust dampers are installed in the return air plenum . The dampers must be used any time an economizer or power exhaust fans are applied to LCT 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.

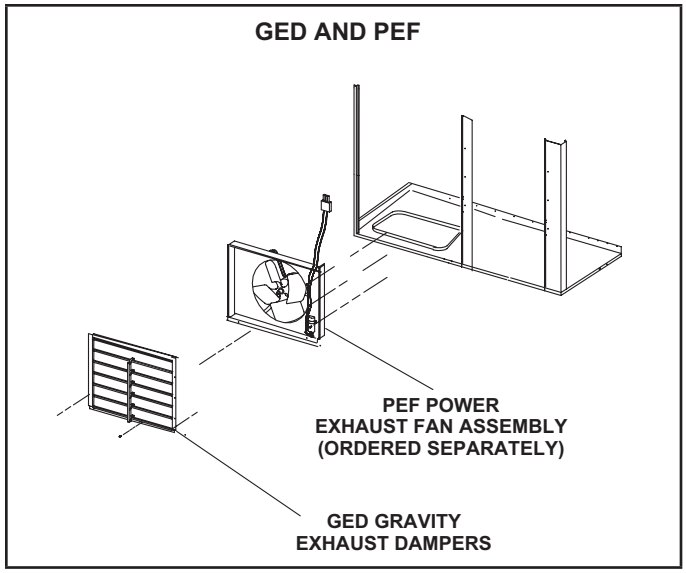


FIGURE 18

G-LAPEF Power Exhaust Fans

Power exhaust fans are used in downflow applications only. Fan requires optional down flow gravity exhaust dampers and LAREMD economizer. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. FIGURE 19 shows the location of the LAPEF. See installation instructions for more detail.

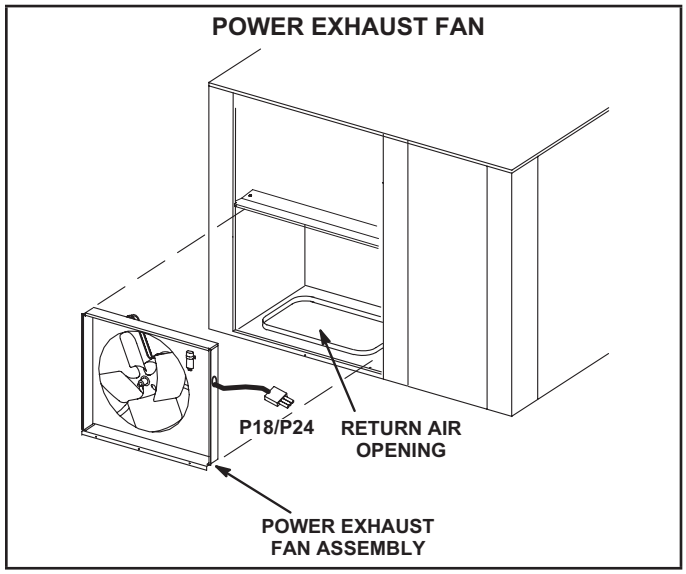


FIGURE 19

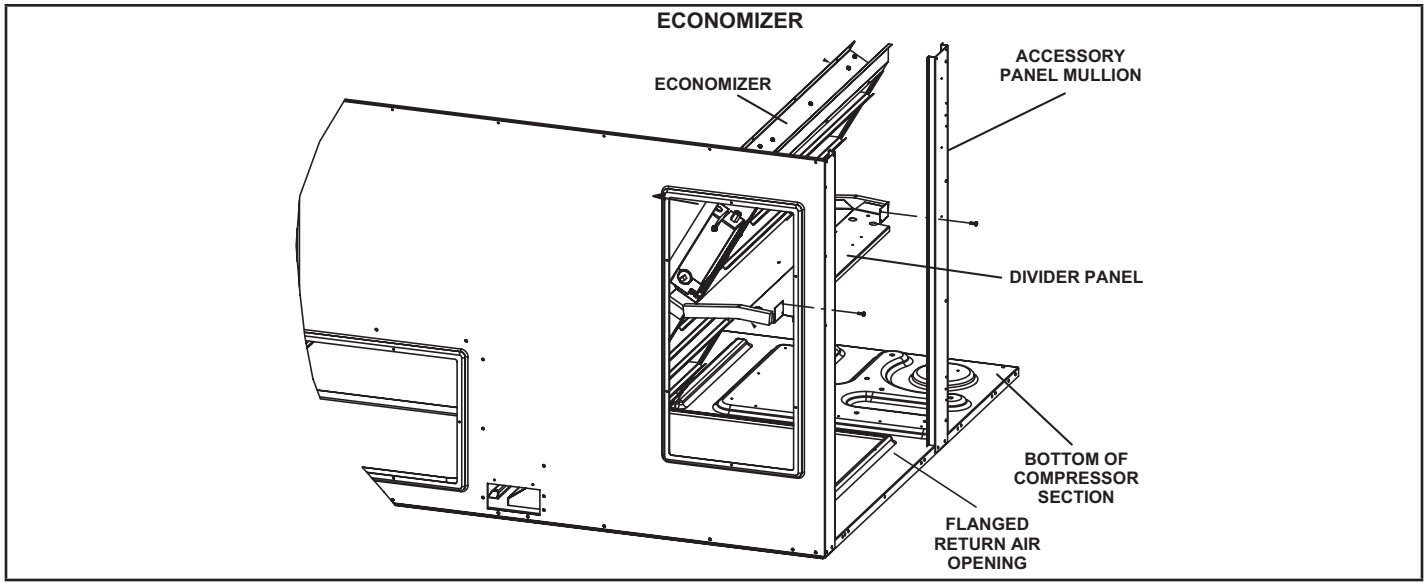


FIGURE 20

TABLE 11

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.

H-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. The A55 Unit Controller is a network controller when daisy-chained to the L Connection® Network Control System. For ease of configuration, the A55 can be connected to a PC with Unit Controller PC software installed.

I-Smoke Detectors A17 and A64

Photoelectric smoke detectors are a factory installed option. The smoke detectors can be installed in the supply air section (A64), return air section (A17), or in both the supply and return air section. Wiring for the smoke detectors are shown on the temperature control section (C2) wiring diagram in back of this manual.

J-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at 14" W.C. (34.9 Pa) The switch is mounted on the upper left hand corner of the blower deck. Wiring for the blower proving switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

K-Dirty Filter Switch S27

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.

L-Indoor Air Quality (CO2) 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.

M-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.O. overflow switch is controlled by K220 and DL46 relays, located in the unit control panel. When the overflow switch closes, 24VAC power is interrupted and after a five second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

N-Factory Installed-Hot Gas Reheat (optional)

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 21 for reheat refrigerant routing and FIGURE 22 for standard cooling 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 P269-3) 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 de-energize.

Default Reheat Operation

TABLE 12

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 13

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.

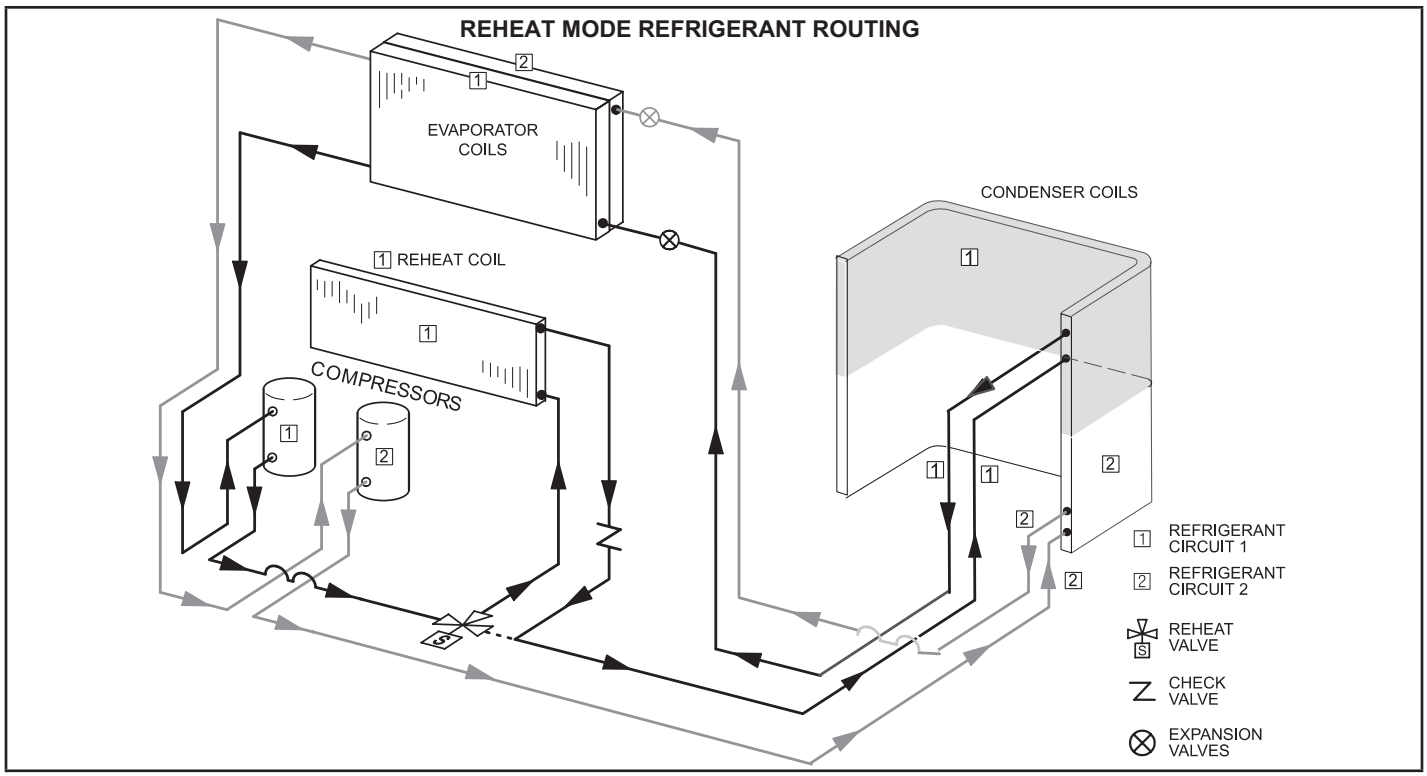


FIGURE 21

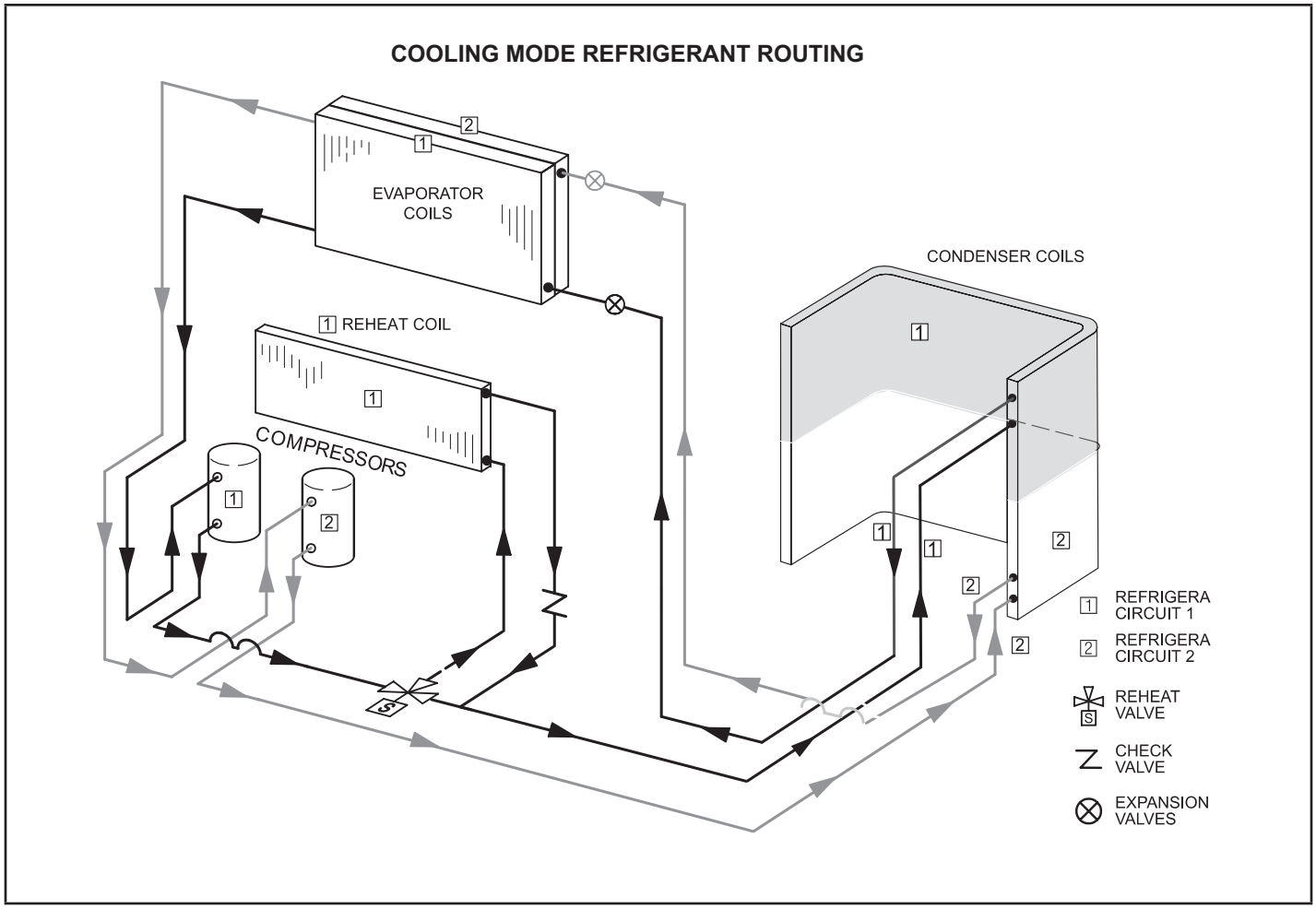

COOLING MODE REFRIGERANT ROUTING
EVAPORATOR COILS
CONDENSER COILS
REHEAT COIL
COMPRESSORS
REFRIGERA CIRCUIT 1
REFRIGERA CIRCUIT 2
REHEAT VALVE
CHECK VALVE
EXPANSION VALVES

FIGURE 22

VII-Direct Drive Supply Air Inverter

If a test and balance contractor has not commissioned the unit, use this section to set supply air CFM.

A-Set Blower Speed

1 - Use TABLE 14 to fill in field-provided, design specified blower CFM.

TABLE 14

Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Medium	
Cooling Low	
Ventilation	

2 - Use the following menu to enter the blower design specified CFM into the Unit Controller. Don't press "SAVE" until all CFM are entered. Refer to the Unit Controller manual provided with unit.

SETUP > TEST & BALANCE > BLOWER

3 - Once all four speeds are entered, the target (highest of the heating and cooling settings) CFM and default RPM will be displayed.

Note - *When units are not equipped with heat, the Blower Heat speed will not be displayed. Blower Cooling High will be the first blower speed to appear.*

4 - Measure the static pressure as shown in the Blower Start-Up section. Use the static pressure, target CFM and blower tables to determine the RPM needed. Values in the blower table reflect the static pressures taken in locations shown in FIGURE 9.

5 - Enter the RPM and repeat the previous step until the design CFM is reached.

6 - Press SAVE followed by MAIN MENU.

Note - *Once the CFM settings are saved, the Unit Controller will set all other blower CFM.*

B-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 15

Electric Heat Minimum CFM

LCT Unit	Heat Size (kW)	Airflow CFM
092, 102	7.5	1750
092, 102	15, 22.5, 30, 45	2750
120, 150	15, 22.5, 30, 45	2750
120, 150	60	3500

VIII-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.*

A-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

B-Three-Stage Thermostat OR Zone Sensor

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. Economizer stays at maximum position after compressors are energized.*

Y3 Demand -

Compressors 1 and 2 On
Blower Cooling High
Dampers Maximum Open

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On Part Load
Blower Cooling Low

Y2 Demand -

Compressor 1 On Part Load Compressor 2 On.
Blower Cooling Medium

Y3 Demand -

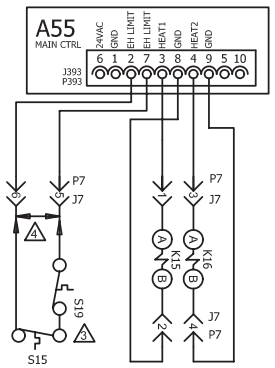
Compressors 1 and 2 On
Blower Cooling High

IX-Wiring Diagrams and Sequence of Operation

ELECTRIC HEAT FOR LCT092/150 UNITS

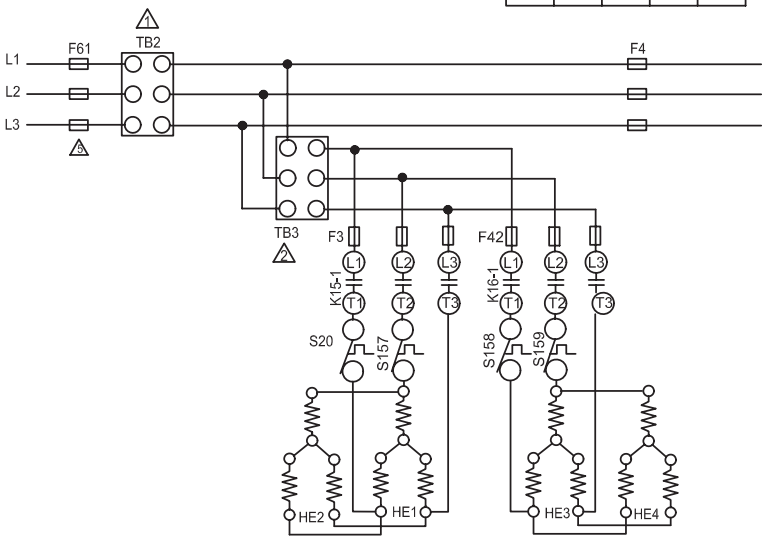
J/P	JACK/PLUG DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT
271	HEATING SENSORS STG 1

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

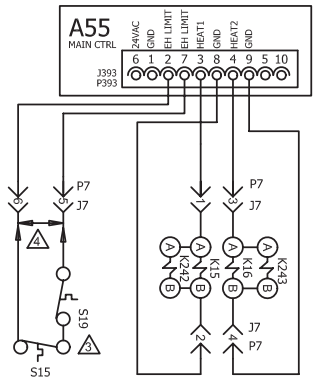


1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS
3. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY
4. REMOVE JUMPER PLUG WHEN FIELD INSTALLATING ELECTRIC HEAT
5. F61 USED ON UNITS WITH SCCR OPTION

DENOTES OPTIONAL COMPONENTS

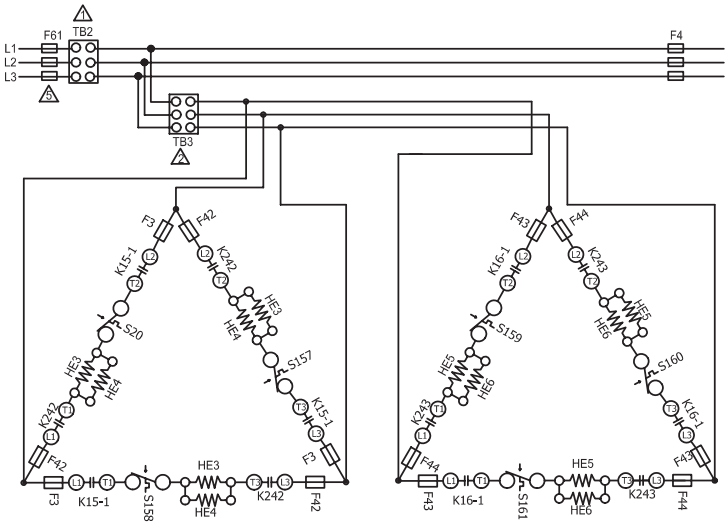
2021/09	WIRING DIAGRAM 538121-02	9/21
HEATING-ELECTRIC		
7.5, 15, 22.5, 30, 45, 60 - G, J		
SECTION A		REV. 0
Supersedes 538121-01	New Form No. 538121-02	

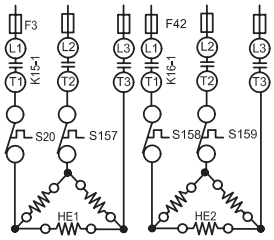
ELECTRIC HEAT FOR LCT092/150 UNITS



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





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

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

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	

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).

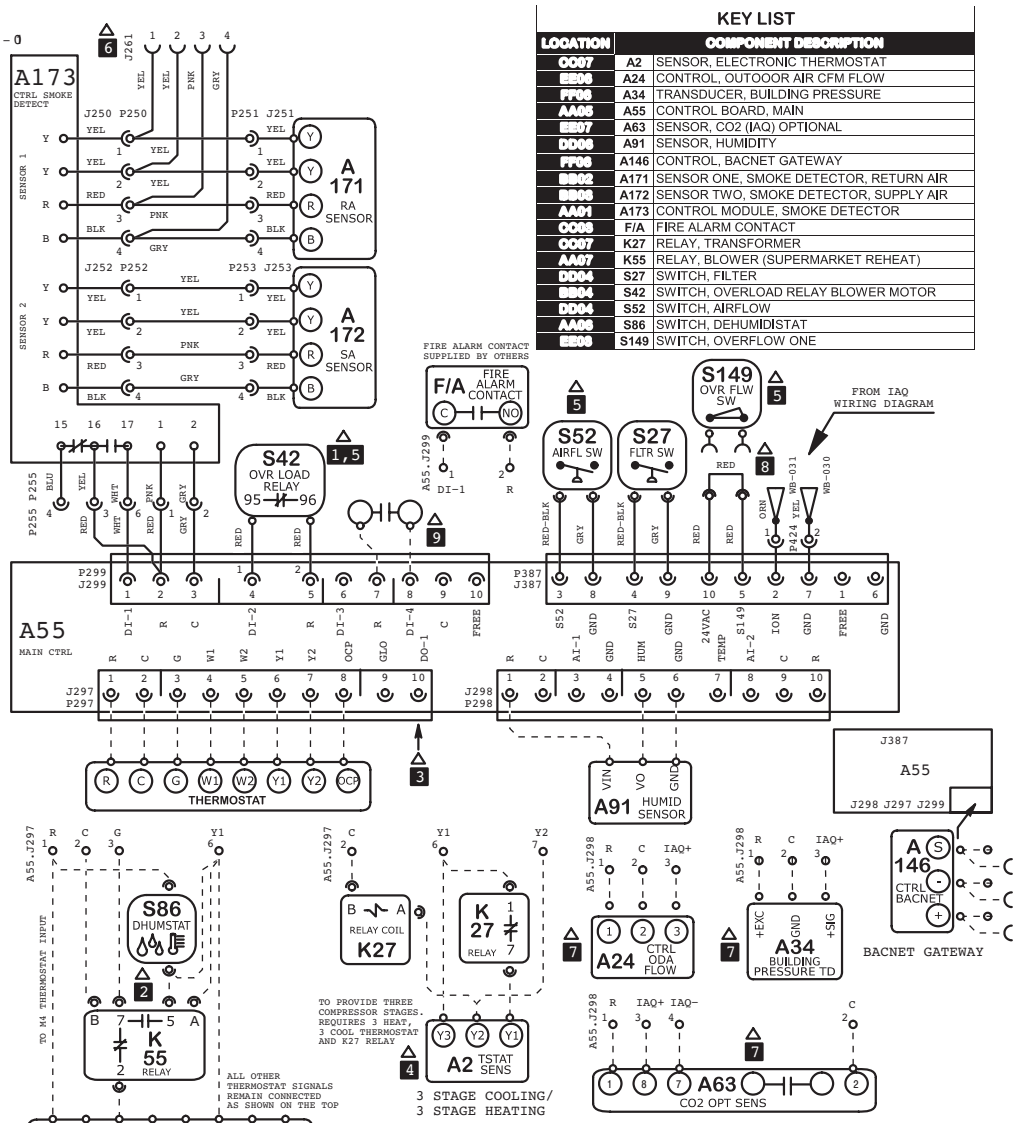
11 - ***60KW*** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

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
EE06	A24	CONTROL, OUTOOOR AIR CFM FLOW
FF06	A34	TRANSDUCER, BUILDING PRESSURE
AA05	A55	CONTROL BOARD, MAIN
EE07	A63	SENSOR, CO2 (IAQ) OPTIONAL
DD06	A91	SENSOR, HUMIDITY
FF05	A146	CONTROL, BACNET GATEWAY
BB02	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
BB05	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
AA01	A173	CONTROL MODULE, SMOKE DETECTOR
CC05	F/A	FIRE ALARM CONTACT
CC07	K27	RELAY, TRANSFORMER
AA07	K55	RELAY, BLOWER (SUPERMARKET REHEAT)
DD04	S27	SWITCH, FILTER
BB04	S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
DD04	S52	SWITCH, AIRFLOW
AA05	S86	SWITCH, DEHUMIDISTAT
EE05	S149	SWITCH, OVERFLOW ONE



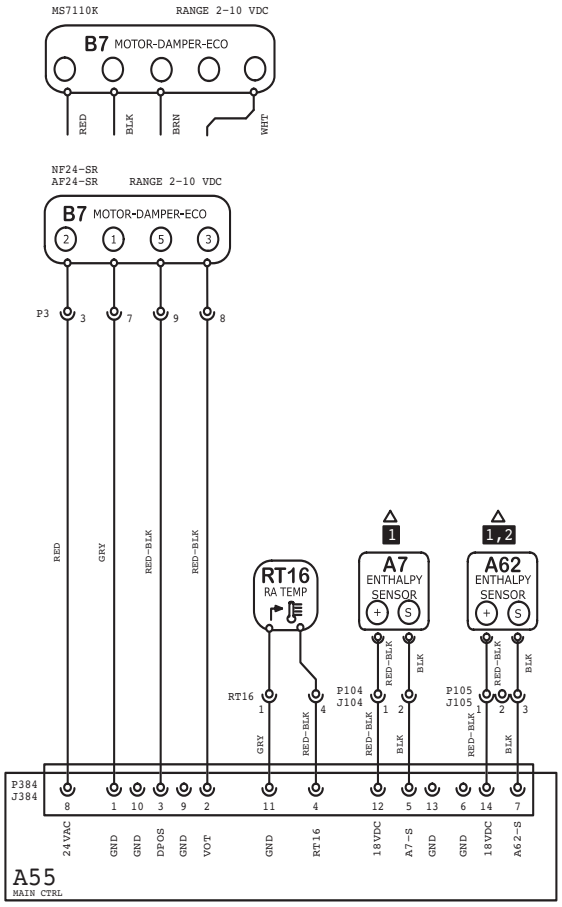
△	NOTES
1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10 (SR) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
4	THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE BOARD (A55)
5	PRODIGY 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
8	REMOVE JUMPER TO INSTALL S149
9	EXTERNAL HUMIDITROL CONTACTS

Model: LC, LG, LH, LD Series RTU Thermostat
Voltage: All Voltages
Supersedes: N/A Form No: 538078-01 Rev: 1

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

WIRING DIAGRAM FLOW

ECONOMIZER



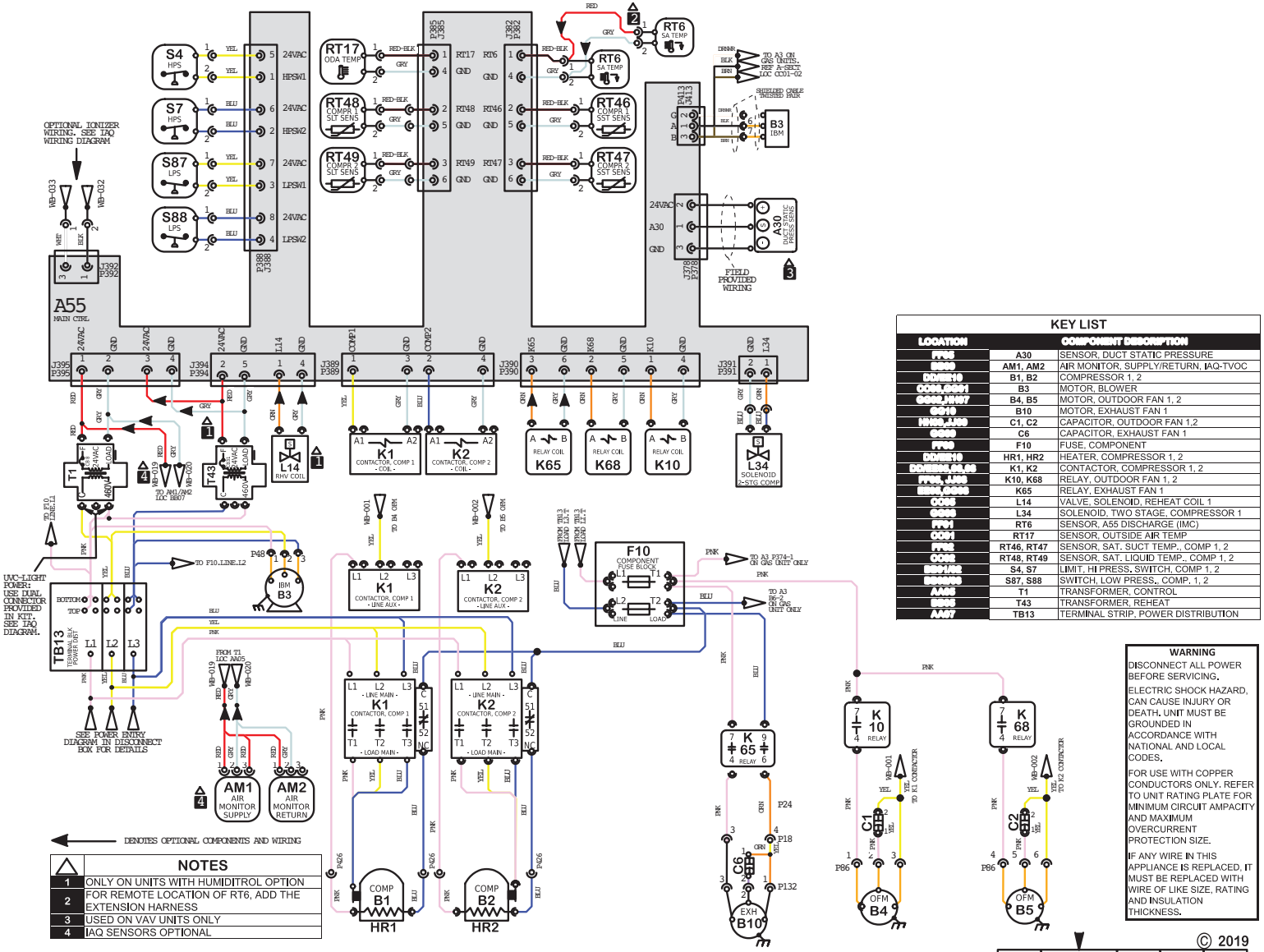
△	NOTES
1	A7 AND A62 NOT USED FOR SENSIBLE TEMPERATURE CONTROL
2	FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR

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 Series RTU
Economizer & Motorized OAD
Voltage: All Voltages
Supersedes: N/A Form No: 538072-01 Rev: 1



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
[illegible]	A30	SENSOR, DUCT STATIC PRESSURE
[illegible]	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5	MOTOR, OUTDOOR FAN 1, 2
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	C1, C2	CAPACITOR, OUTDOOR FAN 1,2
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K10, K68	RELAY, OUTDOOR FAN 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	L14	VALVE, SOLENOID, REHEAT COIL 1
[illegible]	L34	SOLENOID, TWO STAGE, COMPRESSOR 1
[illegible]	RT6	SENSOR, A55 DISCHARGE (IMC)
[illegible]	RT17	SENSOR, OUTSIDE AIR TEMP
[illegible]	RT46, RT47	SENSOR, SAT. SUCT TEMP., COMP 1, 2
[illegible]	RT48, RT49	SENSOR, SAT. LIQUID TEMP., COMP 1, 2
[illegible]	S4, S7	LIMIT, HI PRESS. SWITCH, COMP 1, 2
[illegible]	S87, S88	SWITCH, LOW PRESS., COMP, 1, 2
[illegible]	T1	TRANSFORMER, CONTROL
[illegible]	T43	TRANSFORMER, REHEAT
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

NOTES	
1	ONLY ON UNITS WITH HUMIDITROL OPTION
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	USED ON VAV UNITS ONLY
4	IAQ SENSORS OPTIONAL

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.

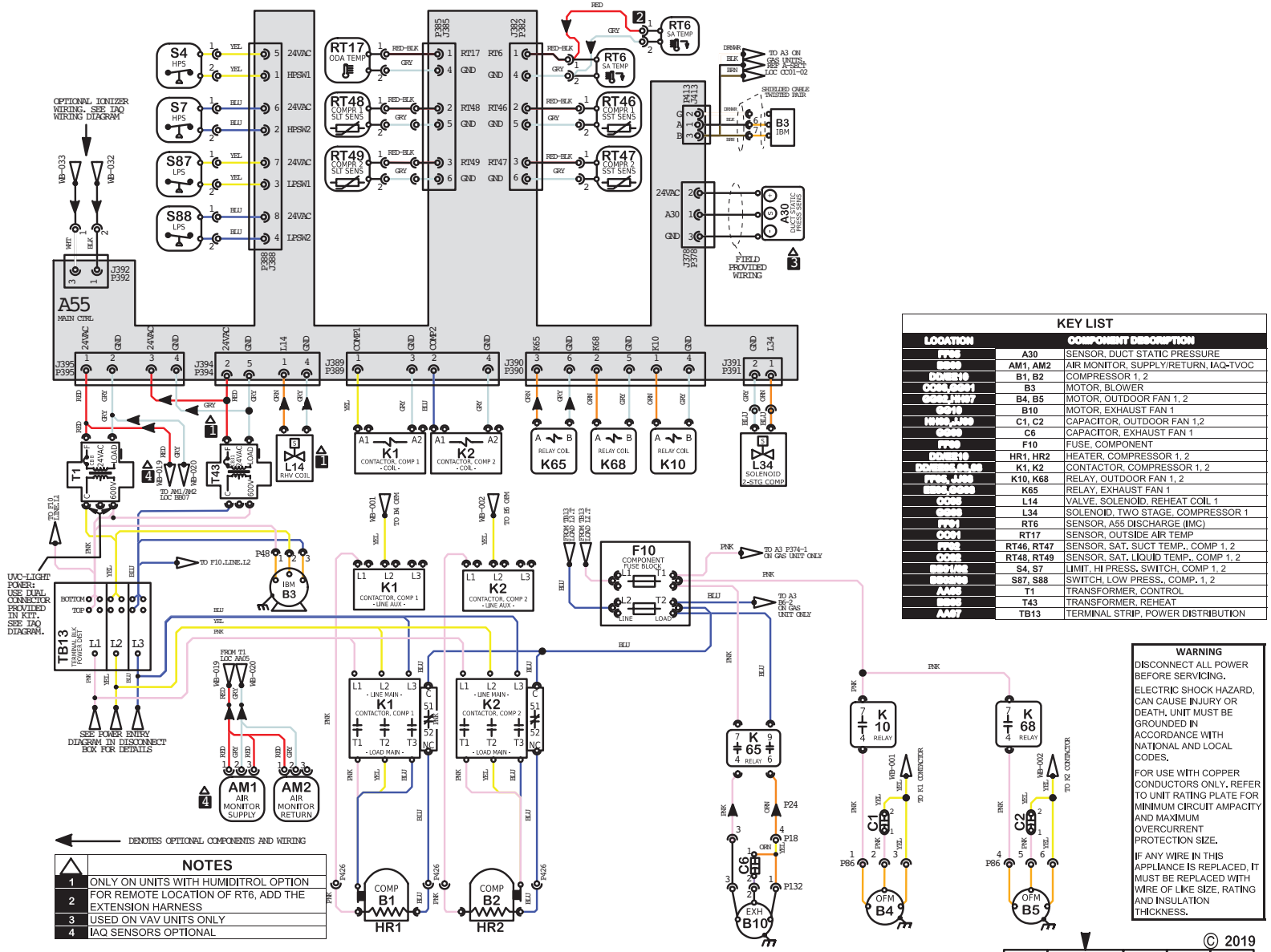
WIRING DIAGRAM FLOW

HEATING SECTION A	COOLING SECTION B	COOLING SECTION B8	ACCS SECTION C	ACCS SECTION D

Product: LCT, LGT B Box - G VOLT
Cooling Diagram with Higher SCCR

Voltage:460V/3~/60Hz (G)

Form No: 538176-0 Rev9



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
[illegible]	A30	SENSOR, DUCT STATIC PRESSURE
[illegible]	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5	MOTOR, OUTDOOR FAN 1, 2
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	C1, C2	CAPACITOR, OUTDOOR FAN 1,2
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K10, K68	RELAY, OUTDOOR FAN 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	L14	VALVE, SOLENOID, REHEAT COIL 1
[illegible]	L34	SOLENOID, TWO STAGE, COMPRESSOR 1
[illegible]	RT6	SENSOR, A55 DISCHARGE (IMC)
[illegible]	RT17	SENSOR, OUTSIDE AIR TEMP
[illegible]	RT46, RT47	SENSOR, SAT. SUCT TEMP., COMP 1, 2
[illegible]	RT48, RT49	SENSOR, SAT. LIQUID TEMP., COMP 1, 2
[illegible]	S4, S7	LIMIT, HI PRESS. SWITCH, COMP 1, 2
[illegible]	S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
[illegible]	T1	TRANSFORMER, CONTROL
[illegible]	T43	TRANSFORMER, REHEAT
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

NOTES	
1	ONLY ON UNITS WITH HUMIDITROL OPTION
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	USED ON VAV UNITS ONLY
4	IAQ SENSORS OPTIONAL

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.

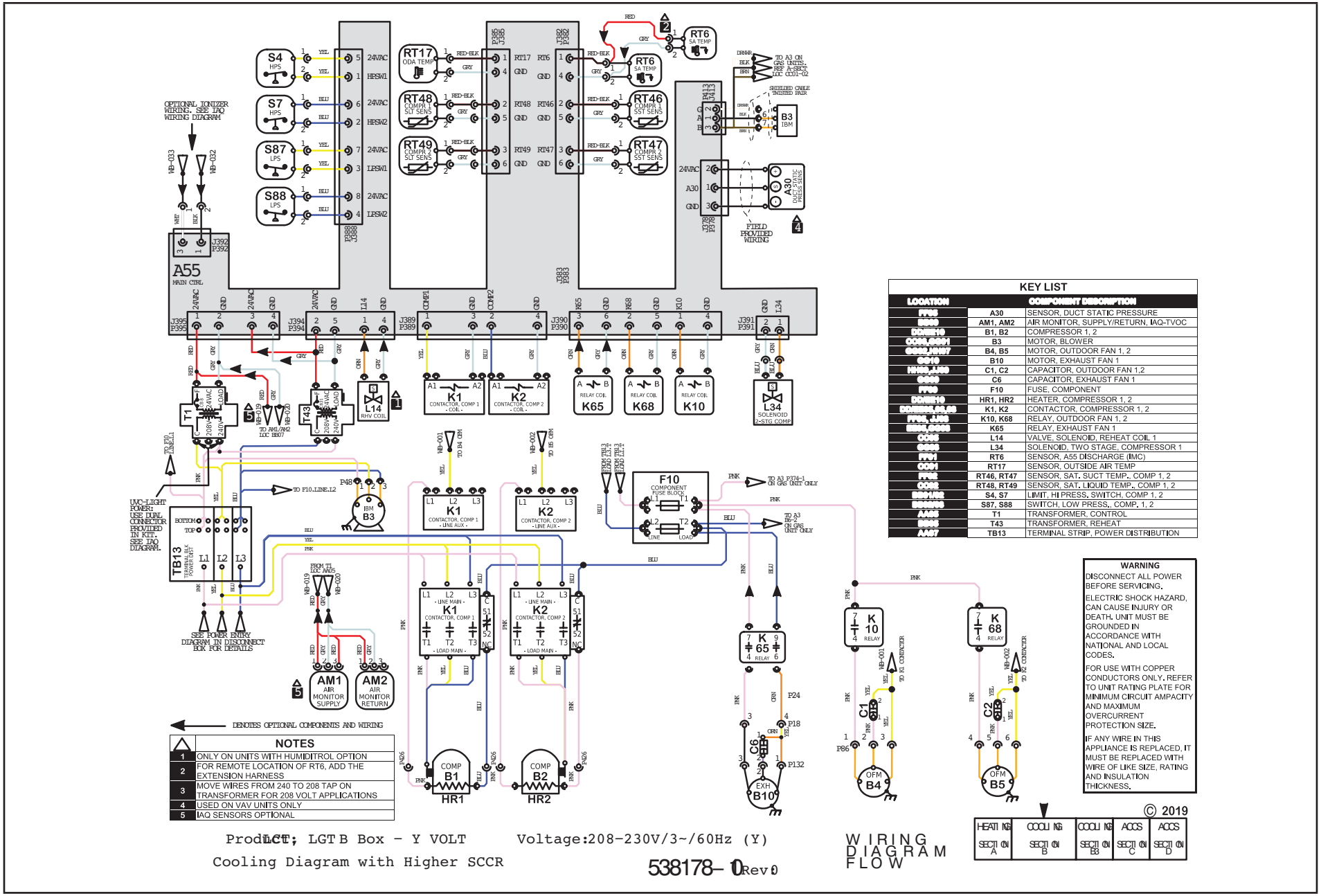
WIRING DIAGRAM FLOW

HEATING SECTION A	COOLING SECTION B	COOLING SECTION B8	ACCS SECTION C	ACCS SECTION D

Product: LCT, LGT B Box - J VOLT
Cooling Diagram with Higher SCCR

Voltage:575V/3~/60Hz (J)

Form No: 538177-10


KEY LIST
LOCATION
COMPONENT DESCRIPTION
A30 SENSOR, DUCT STATIC PRESSURE
AM1, AM2 AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
B1, B2 COMPRESSOR 1, 2
B3 MOTOR, BLOWER
B4, B5 MOTOR, OUTDOOR FAN 1, 2
B10 MOTOR, EXHAUST FAN 1
C1, C2 CAPACITOR, OUTDOOR FAN 1,2
C6 CAPACITOR, EXHAUST FAN 1
F10 FUSE, COMPONENT
HR1, HR2 HEATER, COMPRESSOR 1, 2
K1, K2 CONTACTOR, COMPRESSOR 1, 2
K10, K68 RELAY, OUTDOOR FAN 1, 2
K65 RELAY, EXHAUST FAN 1
L14 VALVE, SOLENOID, REHEAT COIL 1
L34 SOLENOID, TWO STAGE, COMPRESSOR 1
RT6 SENSOR, A55 DISCHARGE (IMC)
RT17 SENSOR, OUTSIDE AIR TEMP
RT46, RT47 SENSOR, SAT. SUCT TEMP., COMP 1, 2
RT48, RT49 SENSOR, SAT. LIQUID TEMP., COMP 1, 2
S4, S7 LIMIT, HI PRESS. SWITCH, COMP 1, 2
S87, S88 SWITCH, LOW PRESS., COMP. 1, 2
T1 TRANSFORMER, CONTROL
T43 TRANSFORMER, REHEAT
TB13 TERMINAL STRIP, POWER DISTRIBUTION
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.
DENOTES OPTIONAL COMPONENTS AND WIRING
NOTES
1 ONLY ON UNITS WITH HUMIDITROL OPTION
2 FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3 MOVE WIRES FROM 240 TO 208 TAP ON TRANSFORMER FOR 208 VOLT APPLICATIONS
4 USED ON VAV UNITS ONLY
5 IAQ SENSORS OPTIONAL
Product: LGT B Box - Y VOLT
Voltage:208-230V/3~/60Hz (Y)
Cooling Diagram with Higher SCCR
538178-10 Rev0
WIRING DIAGRAM FLOW
HEATING SECTION A
COOLING SECTION B
COOLING SECTION B3
ACCS SECTION C
ACCS SECTION D
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LCT092H-150H SEQUENCE OF OPERATION

Power:

1 - Line voltage through the S48 unit disconnect, TB2 terminal block, or CB10 circuit breaker 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 - The A55 Unit Controller module receives a demand from thermostat terminal G.

4 - B3 receives the pre-set blower setting through MODUS.

Economizer Operation:

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

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

1st Stage Cooling (compressor B1)

7 - A55 receives a Y1 thermostat demand.

8 - 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.

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

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

11 - 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 is energized)

12 - A55 receives a Y2 thermostat demand.

13 - 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.

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

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

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

16 - A55 sends 24VAC to B1 compressor solenoid (L14), B1 compressor runs at full load.

DIRECT DRIVE BLOWER SEQUENCE OF OPERATION / TROUBLESHOOTING

Blower Operation:

1 - Line voltage is routed to B3 blower motor through TB2 terminal strip, TB13 terminal strip and J/P48 terminals 1, 2 and 3.

2 - B3 blower motor runs internal diagnostics to check for proper temperature, voltage, etc. (KL2-2 and -3). This process takes approximately 10 seconds. Refer to the Failure Handling/Troubleshooting section.

3 - A55 Unit Controller receives a thermostat demand. After theA55 proves (P259-7 and -6) that B3 blower motor internal relay (KL2-2 and -3) is closed, B3 blower motor is energized (0-10VDC from P259-4 to KL3-4). B3 blower motor controls are grounded through KL2-2 and -3 to A55 P259-6.

4 - If configured, A55 checks S52 blower proving switch to make sure it closes within 16 seconds of the 0-10VCD signal being sent to B3 blower motor.

Blower Fault Sequence Direct Drive Motor - No S52:

1 - Line voltage is provided to B3 blower motor.

2 - After 10 seconds, the B3 blower motor internal relay does not close.

3 - Alarm 186 is set by the A55 Unit Controller, de-energizing unit. If one of the “Error” failures listed in TABLE 16 occurs (“Warning” failures will not set Alarm 186), service is required. Refer to the Failure Handling/Troubleshooting section.

4 - If B3 blower motor internal relay closes continue to next step.

5 - A55 sends 0-10VDC signal to B3 blower motor.

6 - \During B3 blower motor operation, the internal motor relay opens.

7 - \Alarm 186 is set by A55 and de-energizes the unit. Service is required. Refer to the Failure Handling/Troubleshooting section.

Blower Fault Sequence Direct Drive Motor - With S52 (If Configured):

1 - A55 Unit Controller sends 0-10VDC signal to B3 blower motor.

2 - After 16 seconds, if S52 blower proving switch remains open, A55 will remove 0-10VDC signal for 5 minutes.

3 - A55 sends 0-10VDC signal to B3 blower motor.

4 - After 16 seconds, if S52 blower proving switch remains open, A55 will remove 0-10VDC signal for another 5 minutes.

5 - After the third try, A55 will de-energize the unit. Service is required.

Failure Handling/Troubleshooting:

1 - Follow TABLE 16 to troubleshoot possible failures that would cause Alarm 186 to set.

2 - BEFORE DETERMINING THAT THE BLOWER ASSEMBLY HAS FAILED, use the A55 Unit Controller to clear delays and operate the blower.

3 - Main Menu > Service > Offline > Clear Delays > Yes > Save

4 - Main Menu > Service > Test > Blower

5 - Observe if the blower operates or if Alarm 186 sets again.

6 - If blower does not operate and Alarm 186 is set again, blower assembly must be replaced.

7 - If blower assembly does operate, wait a minimum of 30 minutes to ensure Alarm 186 is not set again.

TABLE 16

DIRECT DRIVE BLOWER MOTOR TROUBLESHOOTING

Failure	Error	Warning	Reason	Troubleshoot
Locked Rotor	o		No changes in hall signals within 2000ms	Check for obstruction keeping impeller from rotating
Braking Mode		o	Warning, no error code set, Motor start not possible after 20 sec	Check for secondary airflow source in the system causing the impeller to rotate backwards when off
Hall Error	o		Combination of 3 hall signals gives false signal after one rotation	Measure voltage across each leg, Check electrical connections
Power Module Overheated	o		Temperature > 115°C	Check operating conditions in blower compartment, Check for high motor load (current draw), Check for corrosion-free and secure electrical connections
Motor Overheated	o		Motor over-temperature protector opens	
Gate Driver Error	o		Internal software fault	Measure voltage across each leg, Check electrical connections
Phase Failure	o		Input voltage has phase imbalance	Measure voltage across each leg, Check electrical connections, Repair low/high voltage leg(s)
DC Link Voltage Low	o		Rectified DC link voltage is too low	
DC Link Over-voltage	o		Rectified DC link voltage is too high	
Line Over-voltage	o		Line voltage too high	
Line Under-voltage	o		Line voltage too low	
Communication Error			Internal communication failure. Not connected with master/slave wiring	Check low voltage wiring connections
DC Link Voltage Low		o	Warning, not low enough to set error code	Measure voltage across each leg, Check electrical connections, Repair low/high voltage leg(s)
Electronics Temp High		o	Warning, not high enough to set error code, Temperature > 95°C	Check operating conditions in blower compartment, Check for high motor load (current draw), Check for corrosion-free and secure electrical connections
Power Module Temp High		o	Warning, not high enough to set error code, Temperature > 105°C	
Motor Temp High		o	Warning, not high enough to set error code, Temperature > 130°C	