UNIT INFORMATION

LHT

100087
09-2024

6.5 / 7.5 / 8.5 / 10 / 12.5

Service Literature

LHT HEAT PUMP SERIES

⚠ WARNING

To prevent serious injury or death:

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

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

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

⚠ WARNING

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.

The LHT commercial heat pump is available in 6.5, 7.5, 8.5, 10 and 12.5 ton capacities. The refrigerant systems utilize two compressors, two reversing valves, two accumulators, and other parts common to a heat pump. Electric heat operates in single or multiple stages depending on the kW input size. 7.5kW through 60kW heat sections are available for the LHT heat pump.

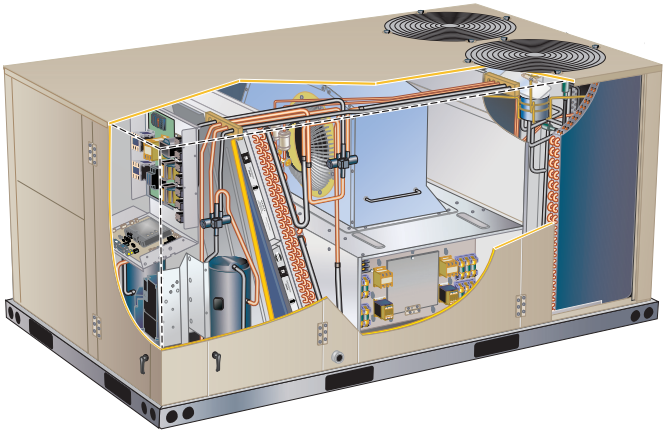
LHT078-150 units are equipped with variable-volume, direct drive blowers. These units will provide supply air at lower speeds when cooling demand is low and increase to higher speeds when cooling demand is high. Refer to Supply Air Start-Up sections.

LHT units are designed to accept any of several different

energy management thermostat control systems with minimum field 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 078	092	102	122	150
COOLING SYSTEM							
Condensate Drain Trap	PVC	**22H54**	X	X	X	X	X
	Copper	**76W27**	X	X	X	X	X
Drain Pan Overflow Switch		**21Z07**	OX	OX	OX	OX	OX
BLOWER - SUPPLY AIR							
Blower Option	DirectPlus™ Blower System with MSAV®	Factory	O	O	O	O	O
CABINET							
Combination Coil/Hail Guards		**24C86**	OX	OX	OX		
		24C87				OX	OX
Corrosion Protection		Factory	O	O	O	O	O
Horizontal Discharge Kit		**51W25**	X	X	X	X	X
Return Air Adaptor Plate (for LC/LG/LH and TC/TG/TH unit replacement)		**54W96**	OX	OX	OX	OX	OX
CONTROLS							
Blower Proving Switch		**21Z10**	OX	OX	OX	OX	OX
Commercial Controls	CPC Einstein Integration	Factory	O	O	O	O	O
	LonTalk® Module	**54W27**	OX	OX	OX	OX	OX
	Novar® LSE	Factory	O	O	O	O	O
Dirty Filter Switch		**53W67**	OX	OX	OX	OX	OX
Fresh Air Tempering		**21Z08**	OX	OX	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		**11K76**	OX	OX	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		**11K80**	OX	OX	OX	OX	OX
INDOOR AIR QUALITY							
Air Filters							
Healthy Climate® High Efficiency Air Filters	MERV 8	**50W61**	OX	OX	OX	OX	OX
20 x 25 x 2 in. (Order 4 per unit)	MERV 13	**52W41**	OX	OX	OX	OX	OX
	MERV 16	**21U41**	X	X	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		**Y3063**	X	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	X
Sensor - Wall-mount, off-white plastic cover, no display		**23V86**	X	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		**87N52**	X	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	X	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**77N39**)		**90N43**	X	X	X	X	X
Needlepoint Bipolar Ionization (NPBI)							
Needlepoint Bipolar Ionization (NPBI) Kit		**22U15**	X	X	X	X	X
UVC Germicidal Lamps							
[1] Healthy Climate® UVC Light Kit (110/230v-1ph)		**21A93**	X	X	X	X	X
Step-Down Transformers	460V primary, 230V secondary	**10H20**	X	X	X	X	X
	575V primary, 230V secondary	**10H21**	X	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 078	092	102	122	150
ELECTRICAL							
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O	O
Disconnect Switch	80 amp	**54W56**	OX	OX	OX	OX	OX
	150 amp	**54W57**	OX	OX	OX	OX	OX
[1] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O	O	O
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX	OX
	15 amp factory-wired and powered (208/230V, 460V)	Factory	O	O	O	O	O
	[2] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X	X	X
	[2] 20 amp non-powered, field-wired (575V only)	Factory	O	O	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	X	X	X
ELECTRIC HEAT							
7.5 kW	208/240V-3ph	**23U73**	OX	OX	OX		
	460V-3ph	**23U74**	OX	OX	OX		
	575V-3ph	**23U75**	OX	OX	OX		
15 kW	208/240V-3ph	**23U76**	OX	OX	OX	OX	OX
	460V-3ph	**23U77**	OX	OX	OX	OX	OX
	575V-3ph	**23U78**	OX	OX	OX	OX	OX
22.5 kW	208/240V-3ph	**23U79**	OX	OX	OX	OX	OX
	460V-3ph	**23U80**	OX	OX	OX	OX	OX
	575V-3ph	**23U81**	OX	OX	OX	OX	OX
30 kW	208/240V-3ph	**23U82**	OX	OX	OX	OX	OX
	460V-3ph	**23U83**	OX	OX	OX	OX	OX
	575V-3ph	**23U84**	OX	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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O = Configure To Order (Factory Installed).
X = Field Installed.

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 078	092	102	122	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	OX
Horizontal Barometric Relief Dampers							
Horizontal Low Profile Barometric Relief Dampers (Exhaust hood furnished)		**53K04**	X	X	X	X	X
Economizer Controls							
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	OX	OX	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX	OX	OX
Building Pressure Control		**13J77**	X	X	X	X	X
Outdoor Air CFM Control		**13J76**	X	X	X	X	X
Global Control	Sensor Field Provided	Factory	O	O	O	O	O
OUTDOOR AIR							
Outdoor Air Dampers With Outdoor Air Hood							
Motorized		**14G28**	OX	OX	OX	OX	OX
Manual		**14G29**	X	X	X	X	X
POWER EXHAUST							
Standard Static	208/230V-3ph	**53W44**	OX	OX	OX	OX	OX
	460V-3ph	**53W45**	OX	OX	OX	OX	OX
	575V-3ph	**53W46**	OX	OX	OX	OX	OX
ROOF CURBS							
Hybrid Roof Curbs, Downflow							
8 in. height		**11F54**	X	X	X	X	X
14 in. height		**11F55**	X	X	X	X	X
18 in. height		**11F56**	X	X	X	X	X
24 in. height		**11F57**	X	X	X	X	X
Adjustable Pitch Curb							
14 in. height		**54W50**	X	X	X	X	X
CEILING DIFFUSERS							
Step-Down - Order one	RTD11-95S	**13K61**	X	X			
	RTD11-135S	**13K62**			X	X	X
Flush - Order one	FD11-95S	**13K56**	X	X			
	FD11-135S	**13K57**			X	X	X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X	X			
	C1DIFF31B-1	**12X66**			X	X	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 — 6.5 TON | 7.5 TON | 8.5 TON

General Data		**Nominal Tonnage**	**6.5 Ton**	**7.5 Ton**	**8.5 Ton**
		Efficiency Type	**High**	**High**	**High**
		Model Number	**LHT078H4E**	**LHT092H4E**	**LHT102H4E**
		Blower Type	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®
Cooling Performance		Gross Cooling Capacity - Btuh	79,000	92,000	100,000
		[1] Net Cooling Capacity - Btuh	78,000	90,000	98,000
		AHRI Rated Air Flow - cfm	2400	2800	2800
		Total Unit Power - kW	6.3	7.4	8.1
		[1] EER (Btuh/Watt)	12.4	12.1	12.1
		[1] IEER (Btuh/Watt)	16.5	16.0	15.5
		Refrigerant Type	R410A	R410A	R410A
	Refrigerant Charge Furnished	Circuit 1	12 lbs. 0 oz.	11 lbs. 10 oz.	12 lbs. 8 oz.
		Circuit 2	12 lbs. 8 oz.	11 lbs. 10 oz.	13 lbs. 12 oz.
Heating Performance		[1] Total High Heat Capacity - Btuh	73,000	84,000	94,000
		[1] AHRI Rated Air Flow - cfm	2600	3000	3400
		Total Unit Power - kW	6.1	7.0	7.9
		[1] C.O.P.	3.5	3.5	3.5
		[1] Total Low Heat Capacity - Btuh	40,000	46,000	53,000
		Total Unit Power (kW)	5.2	6.0	6.9
		[1] C.O.P.	2.25	2.25	2.25
Electric Heat Options Available			7.5, 15, 22.5, 30 kW	7.5, 15, 22.5, 30, 45 kW	
Compressor Type (number)			Two-Stage Scroll (1) Single-Stage Scroll (1)		
Outdoor Coil		Net face area (total) - sq. ft.	25.9	25.9	25.9
		Tube diameter - in.	3/8	3/8	3/8
		Number of rows	3	3	3
		Fins per inch	20	20	20
Outdoor Coil Fans		Motor - (No.) hp	(2) 1/3 ECM	(2) 1/3 ECM	(2) 1/3 ECM
		Motor rpm	530-950	530-950	650-1010
		Total Motor watts	140-620	140-620	220-700
		Diameter - (No.) in.	(2) 24	(2) 24	(2) 24
		Number of blades	3	3	3
		Total Air volume - cfm	3600-7000	3600-7000	4600-7500
Indoor Coil		Net face area (total) - sq. ft.	12.8	12.8	12.8
		Tube diameter - in.	3/8	3/8	3/8
		Number of rows	4	4	4
		Fins per inch	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)
		Blower wheel nominal diameter x width - in.	(1) 22 x 19	(1) 22 x 19	(1) 22 x 19
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 hertz - 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:

Cooling Ratings - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.

High Temperature Heating Ratings - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.

Low Temperature Heating Ratings - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

SPECIFICATIONS — 10 TON | 12.5 TON

			10 Ton	12.5 Ton
General Data		**Nominal Tonnage**	**10 Ton**	**12.5 Ton**
		Efficiency Type	**High**	**High**
		Model Number	**LHT122H4E**	**LHT150H4E**
		Blower Type	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®
Cooling Performance		Gross Cooling Capacity - Btuh	121,000	141,000
		[1] Net Cooling Capacity - Btuh	118,000	136,000
		AHRI Rated Air Flow - cfm	3400	4200
		Total Unit Power - kW	9.7	12.4
		[1] EER (Btuh/Watt)	12.1	11.0
		[1] IEER (Btuh/Watt)	15.5	14.3
		Refrigerant Type	R410A	R410A
	Refrigerant Charge Furnished	Circuit 1	21 lbs. 8 oz.	22 lbs. 8 oz.
		Circuit 2	20 lbs. 8 oz.	21 lbs. 8 oz.
Heating Performance		[1] Total High Heat Capacity - Btuh	114,000	128,000
		[1] AHRI Rated Air Flow - cfm	3600	4200
		Total Unit Power - kW	9.5	11.0
		[1] C.O.P.	3.5	3.35
		[1] Total Low Heat Capacity - Btuh	65,000	73,000
		Total Unit Power (kW)	8.5	10.2
		[1] C.O.P.	2.25	2.10
Electric Heat Options Available			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.	40.4	40.4
		Tube diameter - in.	3/8	3/8
		Number of rows	3	3
		Fins per inch	20	20
Outdoor Coil Fans		Motor - (No.) hp	(3) 1/3 ECM	(3) 1/3 ECM
		Motor rpm	530-950	530-950
		Total Motor watts	180-800	180-800
		Diameter - (No.) in.	(3) 24	(3) 24
		Number of blades	3	3
		Total Air volume - cfm	5500-10,600	5500-10,600
Indoor Coil		Net face area (total) - sq. ft.	12.8	12.8
		Tube diameter - in.	3/8	3/8
		Number of rows	4	4
		Fins per inch	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)
		Blower wheel nominal diameter x width - in.	(1) 22 x 19	(1) 22 x 19
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 hertz - 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:

Cooling Ratings - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.

High Temperature Heating Ratings - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.

Low Temperature Heating Ratings - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

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	Filters			Return Air Adaptor Plate
	078, 092	102, 122, 150			MERV 8	MERV 13	MERV 16	
1750	0.04	0.04	0.03	0.05	0.01	0.03	0.06	0.00
2000	0.05	0.05	0.03	0.06	0.01	0.03	0.08	0.00
2250	0.06	0.06	0.04	0.08	0.01	0.04	0.09	0.00
2500	0.07	0.07	0.04	0.11	0.01	0.05	0.10	0.00
2750	0.08	0.08	0.05	0.12	0.02	0.05	0.11	0.00
3000	0.10	0.09	0.06	0.13	0.02	0.06	0.12	0.02
3250	0.11	0.10	0.06	0.15	0.02	0.06	0.13	0.02
3500	0.12	0.11	0.09	0.15	0.03	0.07	0.15	0.04
3750	0.14	0.13	0.09	0.15	0.03	0.08	0.16	0.07
4000	0.15	0.14	0.09	0.19	0.04	0.08	0.17	0.09
4250	0.17	0.15	0.13	0.19	0.04	0.09	0.19	0.11
4500	0.19	0.17	0.14	0.22	0.04	0.09	0.20	0.12
4750	0.20	0.18	0.17	0.25	0.05	0.10	0.21	0.16
5000	0.22	0.20	0.20	0.29	0.06	0.10	0.23	0.18
5250	0.24	0.22	0.22	0.32	0.06	0.11	0.24	0.19
5500	0.25	0.23	0.25	0.34	0.07	0.12	0.25	0.22
5750	0.27	0.25	0.31	0.45	0.07	0.12	0.27	0.25
6000	0.29	0.27	0.33	0.52	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	
078 & 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 & 122 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.
078, 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, 122 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 — 6.5 TON

		Model No.	LHT078H4E		
[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	8.5	3.8	3.5
		Locked Rotor Amps	70	31	27
Outdoor Fan Motors (2)		Full Load Amps (2 ECM)	2.8	1.4	1.1
		Total	5.6	2.6	2.2
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	25	20
[3] Minimum Circuit Ampacity (MCA)		Unit Only	39	21	16
		With (1) 0.33 HP Power Exhaust	42	22	17

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	[4] 60	70	35	25
		15 kW	[4] 80	90	45	35
		22.5 kW	[4] 100	110	60	45
		30 kW	[4] 125	150	70	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	59	62	32	25
		15 kW	79	85	43	34
		22.5 kW	98	107	55	43
		30 kW	118	130	66	52
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	70	70	35	30
		15 kW	90	90	45	35
		22.5 kW	[4] 100	110	60	45
		30 kW	[4] 125	150	70	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	61	64	33	26
		15 kW	81	87	45	35
		22.5 kW	100	109	56	44
		30 kW	120	132	67	53

ELECTRICAL ACCESSORIES

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

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

		Model No.	**LHT092H4E**		
[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 ECM)		2.8	1.4	1.1
	Total		5.6	2.8	2.2
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		60	30	20
[3] Minimum Circuit Ampacity (MCA)	Unit Only		45	23	17
	With (1) 0.33 HP Power Exhaust		47	24	18

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	70	70	35	30
		15 kW	90	90	50	35
		22.5 kW	[4] 110	125	60	45
		30 kW	[4] 125	150	70	60
		45 kW	[4] 175	200	100	80
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	64	67	34	26
		15 kW	84	90	46	35
		22.5 kW	103	112	57	44
		30 kW	123	135	68	53
		45 kW	162	180	91	72
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	70	70	40	30
		15 kW	[4] 90	100	50	40
		22.5 kW	[4] 110	125	60	45
		30 kW	[4] 125	150	70	60
		45 kW	[4] 175	200	100	80
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	67	70	36	27
		15 kW	86	92	47	36
		22.5 kW	106	115	58	45
		30 kW	125	137	69	54
		45 kW	164	183	92	73

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	15 kW	**54W57**	**54W57**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**N/A**	**N/A**	**54W57**	**54W56**

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

		Model No.	LHT102H4E		
[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	16	7.8	5.7
		Locked Rotor Amps	110	52	38.9
Outdoor Fan Motors (2)		Full Load Amps (2 ECM)	2.8	1.4	1.1
		Total	5.6	2.8	2.2
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	60	30	20
		With (1) 0.33 HP Power Exhaust	60	30	20
[3] Minimum Circuit Ampacity (MCA)		Unit Only	48	25	19
		With (1) 0.33 HP Power Exhaust	50	26	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	7.5 kW	[4] 70	80	40	30
		15 kW	[4] 90	100	50	40
		22.5 kW	[4] 110	125	60	50
		30 kW	150	150	70	60
		45 kW	[4] 175	200	100	80
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	7.5 kW	67	70	36	28
		15 kW	87	93	47	37
		22.5 kW	106	115	59	46
		30 kW	126	138	70	55
		45 kW	165	183	93	73
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	80	80	40	30
		15 kW	[4] 90	100	50	40
		22.5 kW	[4] 110	125	60	50
		30 kW	150	150	80	60
		45 kW	[4] 175	200	100	80
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	70	73	37	29
		15 kW	89	95	49	38
		22.5 kW	109	118	60	47
		30 kW	128	140	71	56
		45 kW	167	185	94	74

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	15 kW	**54W57**	**54W57**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**N/A**	**N/A**	**54W57**	**54W56**

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

		Model No.	LHT122H4E		
[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	19.6	8.2	6.6
		Locked Rotor Amps	136	66.1	55.3
Outdoor Fan Motors (3)		Full Load Amps (3 ECM)	2.8	1.4	1.1
		Total	8.4	4.2	3.3
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	70	30	25
		With (1) 0.33 HP Power Exhaust	80	35	25
[3] Minimum Circuit Ampacity (MCA)		Unit Only	59	27	22
		With (1) 0.33 HP Power Exhaust	61	28	23

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	[4] 100	110	50	40
		22.5 kW	[4] 125	150	70	50
		30 kW	150	150	80	60
		45 kW	200	200	100	80
		60 kW	[4] 200	225	100	80
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	98	104	49	40
		22.5 kW	117	126	61	49
		30 kW	137	149	72	58
		45 kW	176	194	94	76
		60 kW	184	203	99	80
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	110	110	60	45
		22.5 kW	[4] 125	150	70	50
		30 kW	[4] 150	175	80	60
		45 kW	200	200	100	80
		60 kW	[4] 200	225	100	90
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	100	106	51	41
		22.5 kW	120	129	62	50
		30 kW	139	151	73	59
		45 kW	178	197	96	77
		60 kW	186	206	100	81

ELECTRICAL ACCESSORIES

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

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

		Model No.	LHT150H4E		
[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 (3)		Full Load Amps (3 ECM)	2.8	1.4	1.1
		Total	8.4	4.2	3.3
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	30
		With (1) 0.33 HP Power Exhaust	80	40	30
[3] Minimum Circuit Ampacity (MCA)		Unit Only	63	30	24
		With (1) 0.33 HP Power Exhaust	66	32	25

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	110	110	60	45
		22.5 kW	[4] 125	150	70	60
		30 kW	[4] 150	175	80	60
		45 kW	200	200	100	80
		60 kW	[4] 200	225	110	90
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	103	109	53	42
		22.5 kW	122	131	64	51
		30 kW	142	154	76	60
		45 kW	181	199	98	78
		60 kW	189	208	103	81
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	[4] 110	125	60	45
		22.5 kW	[4] 125	150	70	60
		30 kW	[4] 150	175	80	70
		45 kW	[4] 200	225	100	80
		60 kW	[4] 200	225	110	90
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	105	111	54	43
		22.5 kW	124	134	66	52
		30 kW	144	156	77	61
		45 kW	183	201	99	79
		60 kW	191	210	104	82

ELECTRICAL ACCESSORIES

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

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

LHT078-150 PARTS ARRANGEMENT

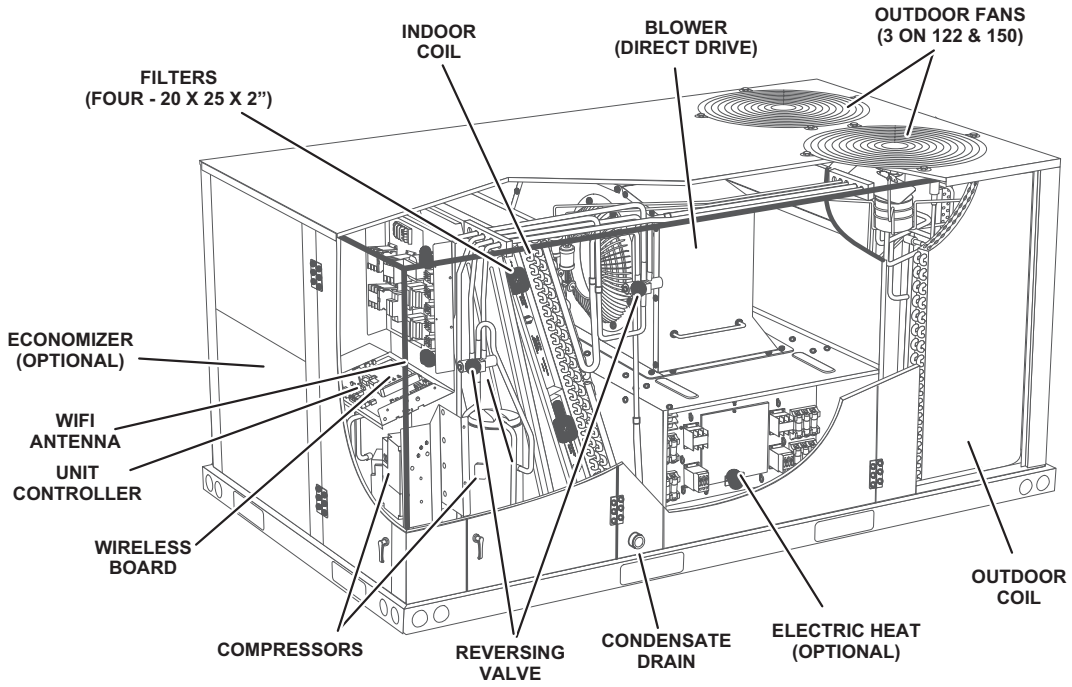


FIGURE 1

LHT078-150 CONTROL BOX

SHADED AREA IS A HINGED PANEL IN FRONT OF CONTROLS AREA (OPTIONAL A173 LOCATION)

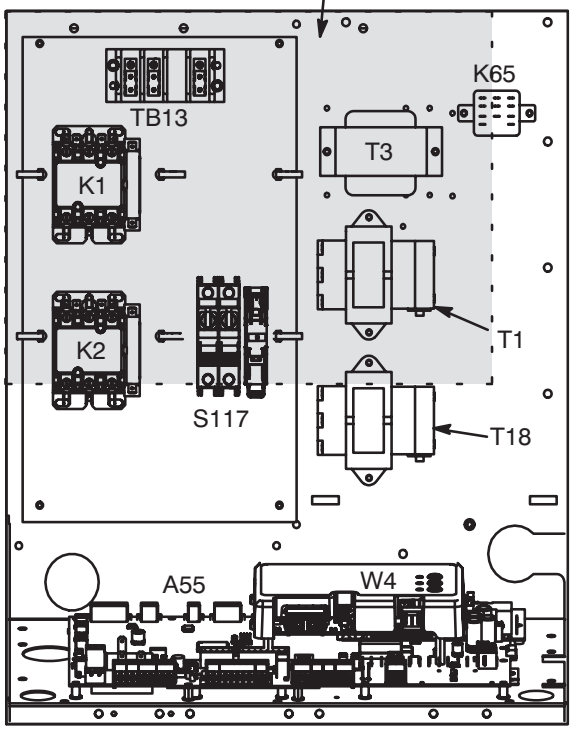


FIGURE 2

I-UNIT COMPONENTS

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.

The LHT unit parts arrangement are shown in FIGURE 1. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue. See wiring diagrams in the back of this manual for complete call out of components per LHT unit. All 7.5 through 12.5 ton units are configure to order units (CTO).

A-Control Box Components

LHT 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 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.

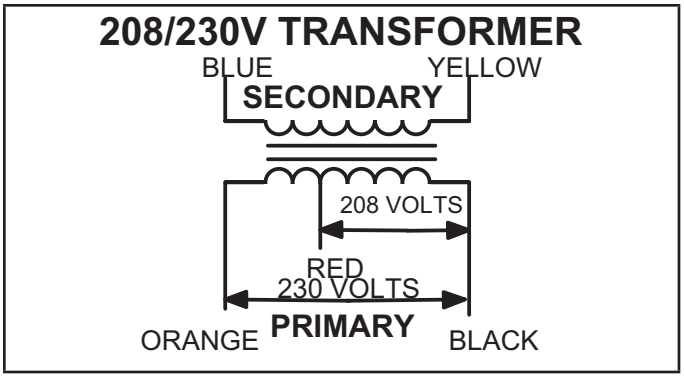


FIGURE 3

3-Transformer T18

T18 is a single line voltage to 24VAC transformer used in all LHT units. T18 is rated at 70VAC and is protected by a 3.5 amp circuit breaker (CB18).

4-Compressor Contactor K1, K2

All compressor contactors are three-pole-double-break contactors with a 24VAC coil. In all LHT units, K1 and K2 energize compressors B1 and B2 respectively in response to first, second or third stage cooling demands. The auxiliary N.C. contacts are opened to disable the crankcase heaters when compressor is energized.

5-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 LHT 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.

6-Terminal Block (TB13)

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

PLUMBING COMPONENTS

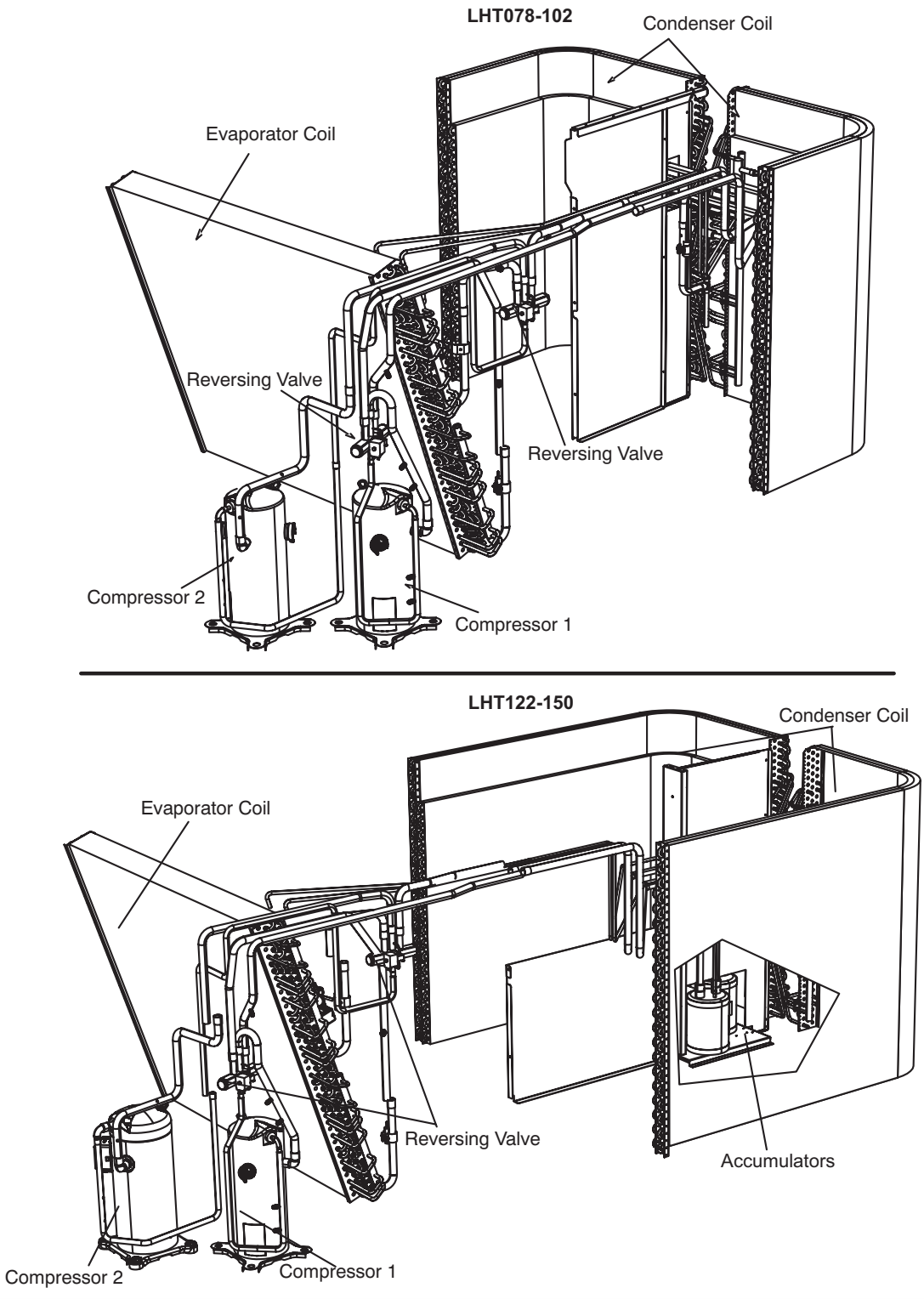


FIGURE 4

B-Cooling Components

LHT units use independent cooling circuits consisting of separate compressors, outdoor coils and indoor coil (with 2 separate stages). See FIGURE 4. Units are equipped with two or three draw-through type condenser fans. and directdrive blowers. The blower draws air across the indoor coil during unit operation.

Cooling may be supplemented by a factory-or-field-installed economizer. The indoor coils are slab type and are stacked. Each indoor coil uses a thermostatic expansion valve as the primary expansion device. Each indoor coil is also equipped with enhanced fins and rifled tubing. In all units, each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by by thermistors for low ambient control and freezing prevention.

1-Compressors B1 and B2

Units use two scroll compressors and two independent cooling circuits. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

⚠ 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-High Pressure Switches S4 and 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 allaluminum 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 standard and high efficiency 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 A55 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.

3-Reversing Valve L1 and L2

A refrigerant reversing valve with a 24 volt solenoid coil is used to reverse refrigerant flow during unit operation in all LHT units. The reversing valve is connected in the vapor line of the refrigerant circuit. The reversing valve coil is energized during cooling demand and during defrost.

Reversing valve L1 and L2 are controlled by the M4 controller in response to cooling demand or by defrost.

4-Defrost Pressure Switch S46 and S104

The defrost pressure switch S46 and S104 are auto-reset SPST N.C. pressure switches which open on a pressure rise. All LHT units are equipped with these switches. The switches are located on the discharge line. S46 and S104 are wired in series with the CMC1 control board.

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.

S87 (compressor one) and S88 (compressor two) are wired to A55 Unit Controller. A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during first thermostat demand, before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control.

When suction pressure drops to 25 $\pm$ 5 psig, (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 40 $\pm$ 5 psig due to many causes such as refrigerant being added.

When discharge pressure reaches 450 $\pm$ 10 psig (3102 $\pm$ 69 kPa) in either circuit (indicating defrost is completed) the appropriate switch opens. The switches automatically reset when pressure in the suction line drops to 300 $\pm$ 20 psig (2068 $\pm$ 138 kPa).

6-Defrost Temperature Switch S6 and S9

Defrost thermostat switches S6 and S9 have S.P.S.T. N.O. contacts which close on a temperature fall (initiating defrost). The switches are located on the expansion valve distributor assembly at the inlet to the outdoor coil. The switch monitors the outdoor coil suction temperature to determine when defrost is needed. When the outdoor coil suction temperature falls to 35ºF $\pm$ 4ºF (1.7ºC $\pm$ 2.2ºC) the switch closes (initiating defrost after minimum run time of 30, 60, or 90 minutes). When the temperature rises to 60ºF $\pm$ 5ºF (15.6ºC $\pm$ 2.8ºC) the switch opens.

7-Filter Drier (all units)

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

8-Condenser Fan Motors B4, B5, B21

See specifications section of this manual for specifications of condenser fans B4 , B5, and B21 (B21 on 122 and 150 units only). All LHT motors are electrically commutated condenser fan motors (ECM). The ECM motors are wired directly to 230VAC power but do not operate until a pulse width modulated (PWM) control signal is sent from the M4 controller. All outdoor fans will run at the same speed when the appropriate PWM signal is received. The fans may be removed for servicing and cleaning by removing the fan grilles.

9-Crankcase Heaters HR1, HR2

Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor manufacturer.

10-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 5 and FIGURE 6 proper locations.

LHT078, 092, 102, 122, 150
INDOOR COIL
RT46, RT47

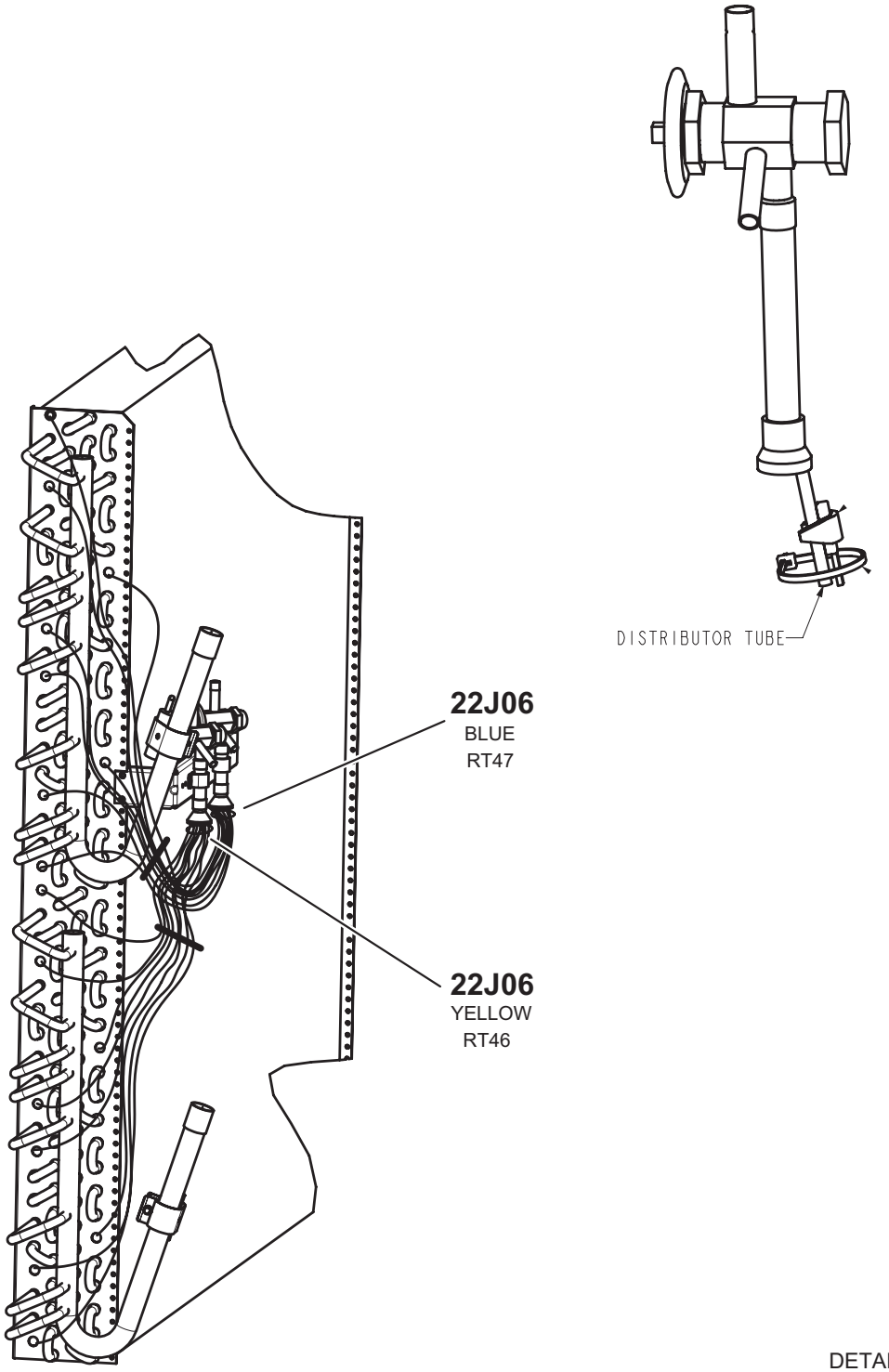
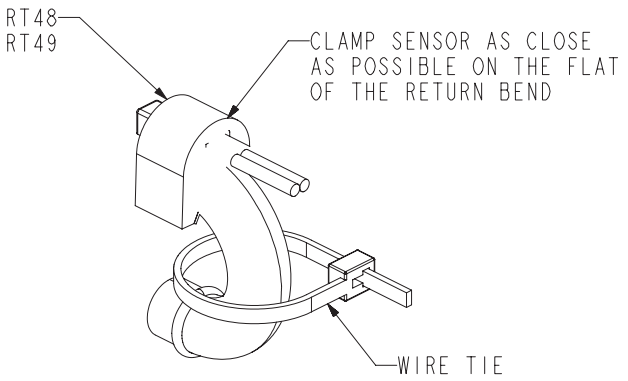
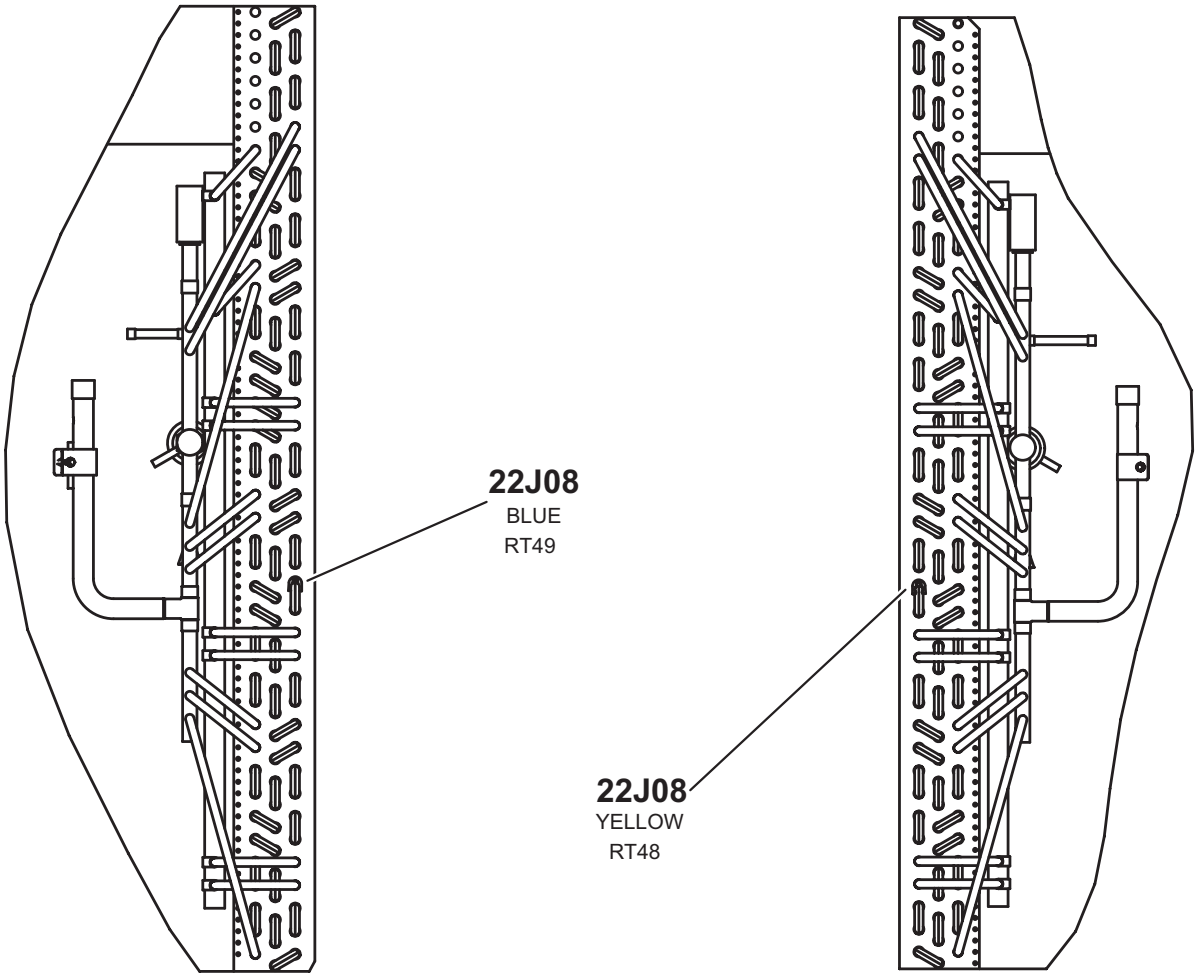


FIGURE 5

LHT078, 092, 102, 122, 150
OUTDOOR COIL
RT48, RT49



SENSOR DETAIL



STAGE 2

DETAILS NOT TO SCALE

FIGURE 6

C-Blower Compartment

The blower compartment in all LHT078-150H units is located between the indoor coil and the outdoor coil section. The blower assembly is accessed by disconnecting the blower motor and all other plugs and removing the screws in front of the blower housing.

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 name plate for information specific to your unit.

A-Blower Operation

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

In both thermostat and zone control mode, the Unit Controller will stage 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 factoryinstalled, 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 8.

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.

The supply CFM can be adjusted by changing the percentage of motor output using the Unit Controller settings Refer to TABLE 1 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).*

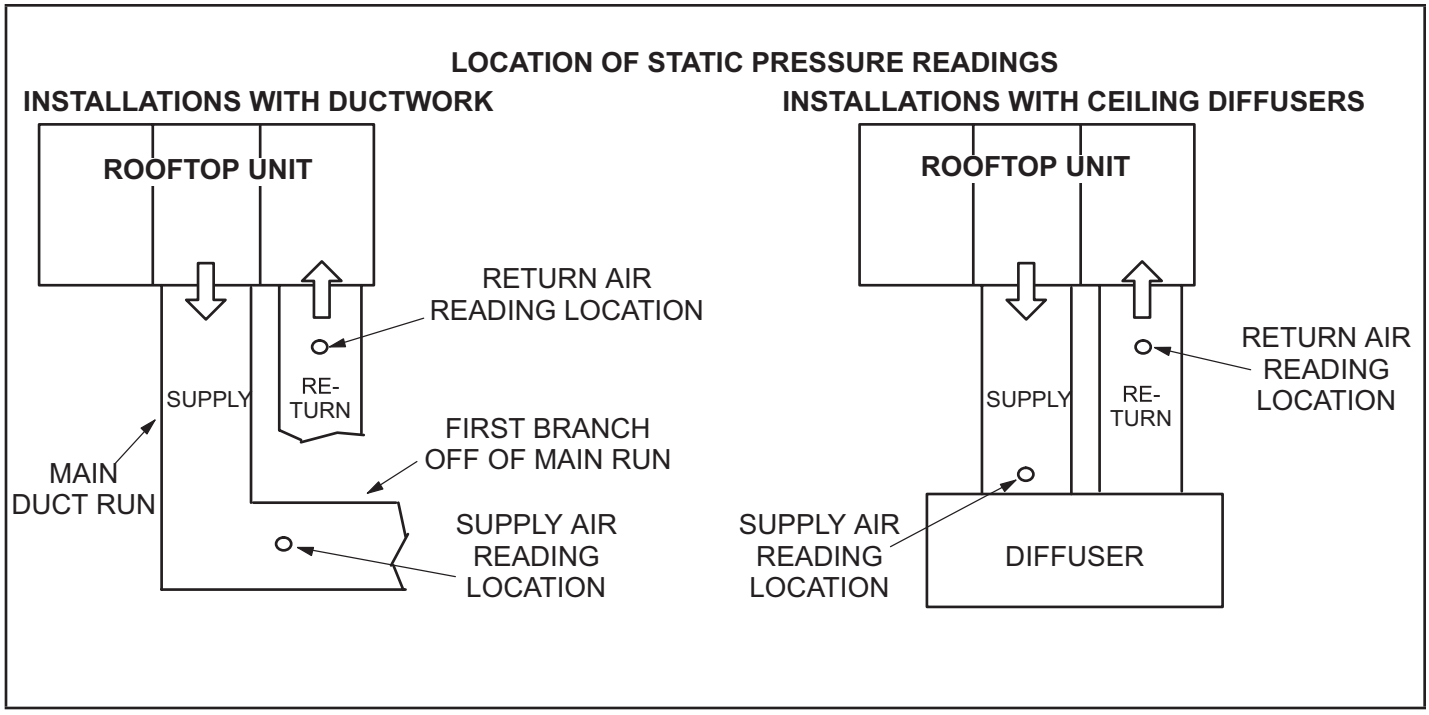


FIGURE 7

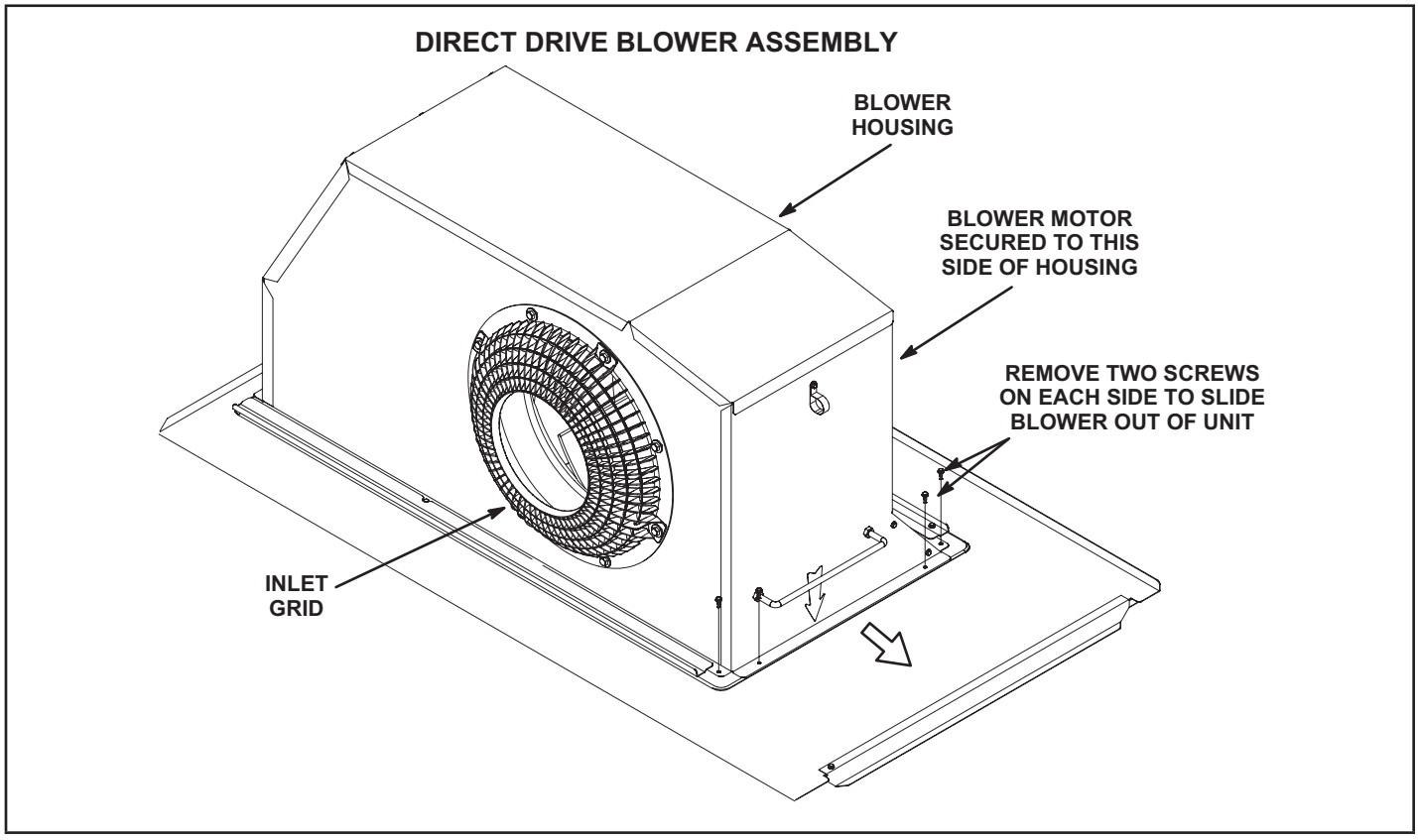


FIGURE 8

TABLE 1

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-Optional Electric Heat Components

Table 2 shows electric heat fuse ratings. See Options/Accessories section (see table of contents) for LHT to EHO match-ups. See Electrical/Electric Heat Data section (see table of contents) of this manual for electrical ratings and capacities.

All electric heat sections consist of electric heating elements exposed directly to the air stream. See FIGURE 9 and FIGURE 10.

EHO parts arrangement is shown in FIGURE 9 and FIGURE 10. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil. The coils in the K15 and K16 contactors are energized by a W2 thermostat demand, K9, and DL2. Contactor K15 energizes the first stage heating elements, while K16 energizes the second stage heating elements.

2-High Temperature Limits S15 (Primary)

S15 is a SPST N.C. auto-reset thermostat located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactor K15 is de-energized.

When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. For EHO102-150 units, the electric heat section thermostat is factory set to open at 170ºF ± 5ºF (76ºC ± 2.8ºC) on a temperature rise and automatically reset at 130F ± 6F (54.4C ± 3.3C) on a temperature fall.

For EHO100 units, the electric heat section thermostat is factory set to open at 160F ± 5ºF (71.0ºC ± 2.8ºC) on a temperature rise and automatically reset at 120ºF ± 6ºF (49.0ºC ± 3.3ºC) on a temperature fall. The thermostat is not adjustable.

3-High Temperature Limit S20, S157, S158, S15, S160 & S161 (Secondary)

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

4-Terminal Strip TB2

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

5-Terminal Strip TB3

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

6-Heating Elements HE1 through HE6

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

7-Fuse F3

Fuse F3 are housed in a fuse block which holds three fuses. Each F3 fuse is connected in series with each leg of electric heat. FIGURE 10 and TABLE 2 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1 through F3 - 4.

8-Unit Fuse Block & Fuse F3 and F4

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

TABLE 2

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	

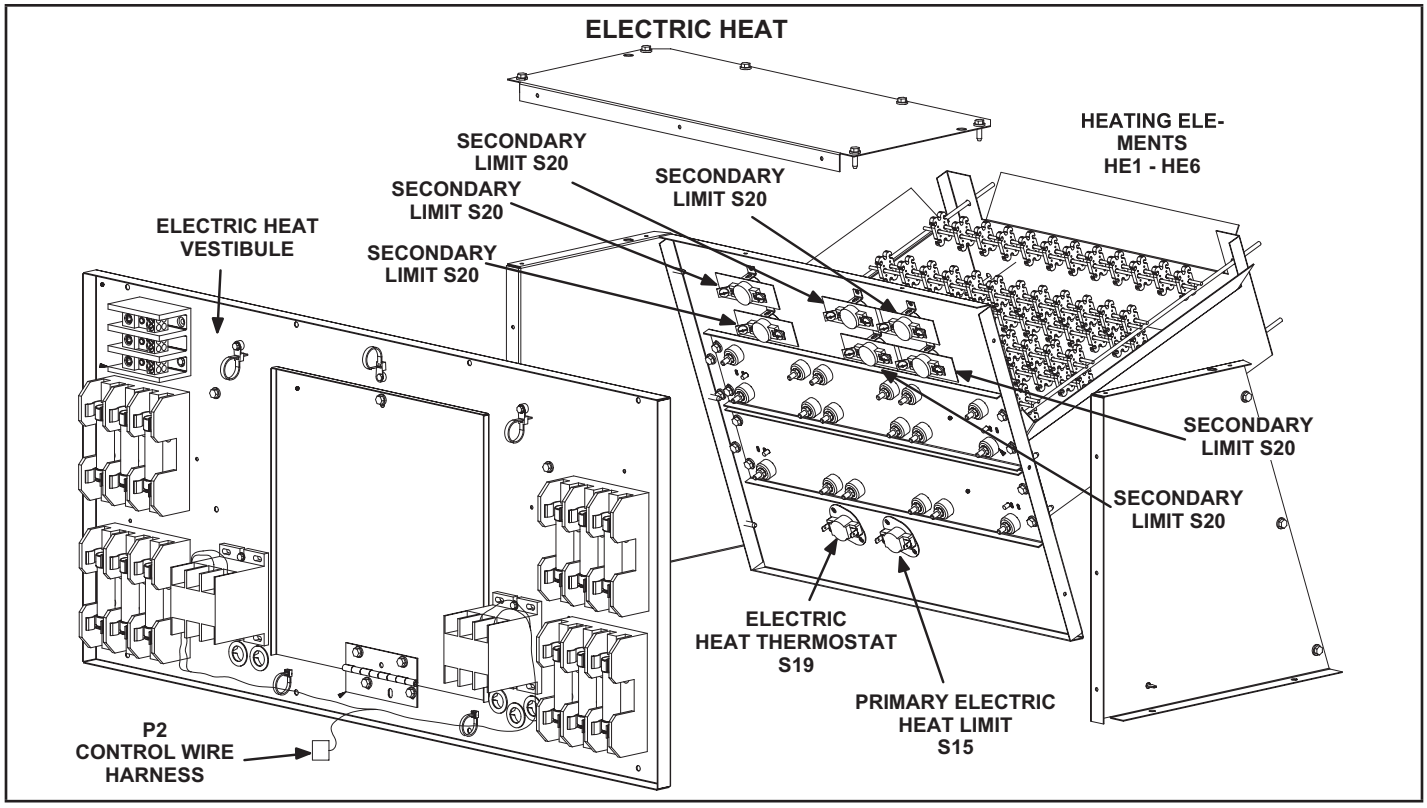


FIGURE 9

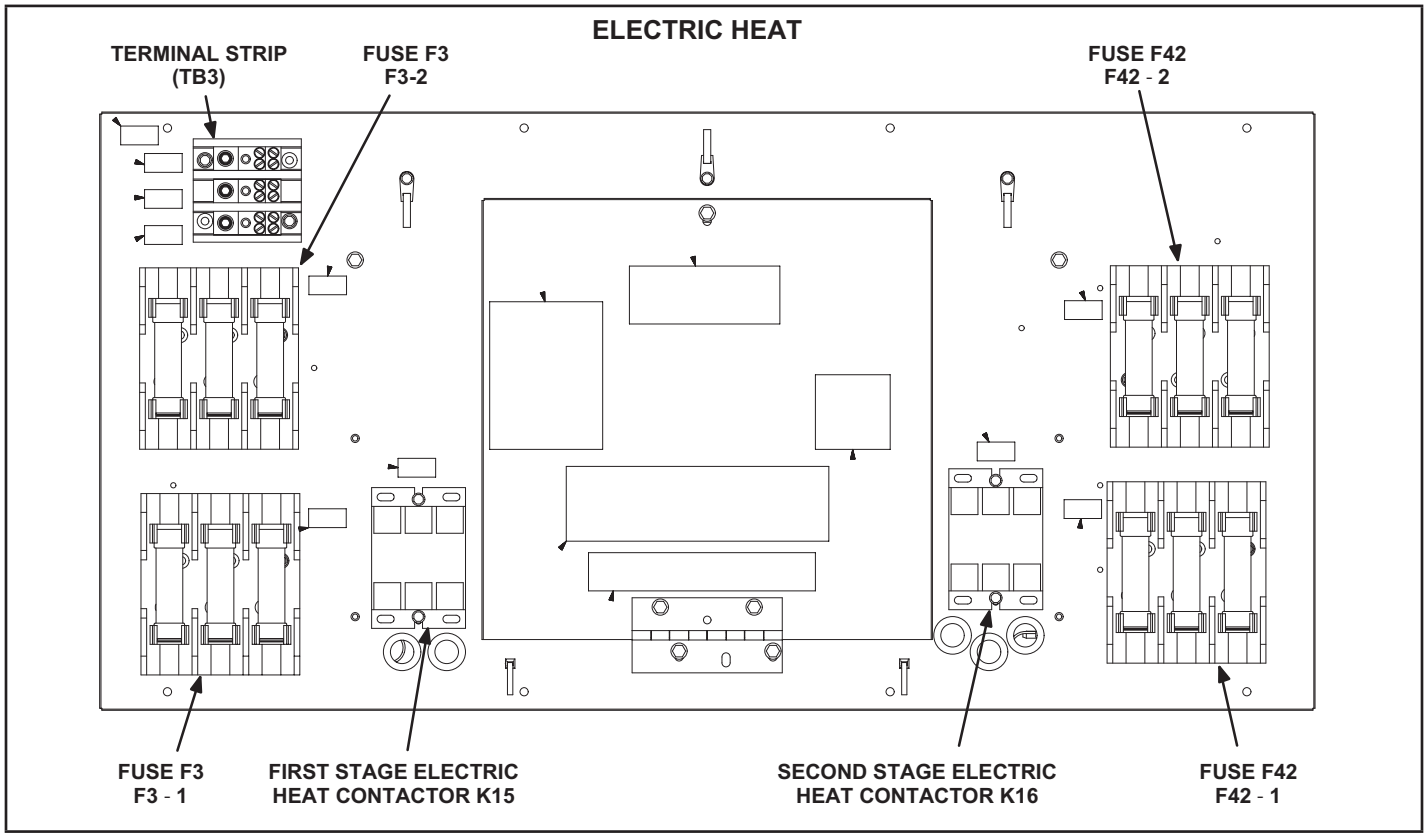


FIGURE 10

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 (LARMF).

III-START UP - OPERATION

Refer to start-up directions and refer closely to the unit wiring diagram when servicing. See unit nameplate for minimum circuit ampacity and maximum fuse size.

A-Preliminary and Seasonal Checks

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

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

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

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

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

B-Heat Pump Start Up

Note - The outdoor air ambient temperature must be above the heat pump balance point setpoint (35_F default) to enable heat pump operation. The balance point setpoint can be adjusted using the following mobile service app menu path: Go to *RTU MENU > SETTINGS > RTU OPTIONS > EDIT PARAMETER = 526 (HP DF BALANCE POINT)*

1 - Set thermostat or temperature control device to initiate a first-stage heating demand.

A first-stage heating demand (W1) will energize compressors 1 and 2. All outdoor fans are energized with a W1 demand.

Note - L1 and L2 reversing valves are de-energized in the heating mode.

2 - An increased heating demand (W2) will energize high gas heat and de-energize heat pump operation.

C-Cooling Start Up

⚠ IMPORTANT

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

1 - Initiate full load cooling operation using the following mobile service app menu path:

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

2 - Refer to Cooling Operation section for cooling start-up.

3 - Units have two refrigerant circuits. See FIGURE 11 or FIGURE 12.

4 - Each refrigerant circuit is charged with R410A refrigerant. See unit rating plate for correct amount of charge.

5 - Refer to Refrigerant Check and Charge section for proper method to check refrigerant charge.

Three Phase Scroll Compressor Voltage Phasing

Three phase power supplied to the unit disconnect switch must be phased sequentially to ensure the scroll compressor and indoor blower rotate in the correct direction. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

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

2 - Suction pressure must drop, discharge pressure must rise and blower rotation must match rotation marking. If pressure differential is not observed or blower rotation is not correct:

3 - Disconnect all remote electrical power supplies.

4 - Reverse any two field-installed wires connected to the line side of K2 contactor or disconnect switch if installed. Do not reverse wires at blower contactor.

5 - Make sure the connections are tight. Discharge and suction pressures should operate at their normal start-up ranges.

D-Safety or Emergency Shutdown

Turn off power to the unit. Close manual and main gas valves.

REFRIGERANT STAGES - 078, 092, 102

(BOTH FANS ARE ENERGIZED IN LOW SPEED WITH A Y1 DEMAND AND HIGH SPEED WITH A Y2 DEMAND)

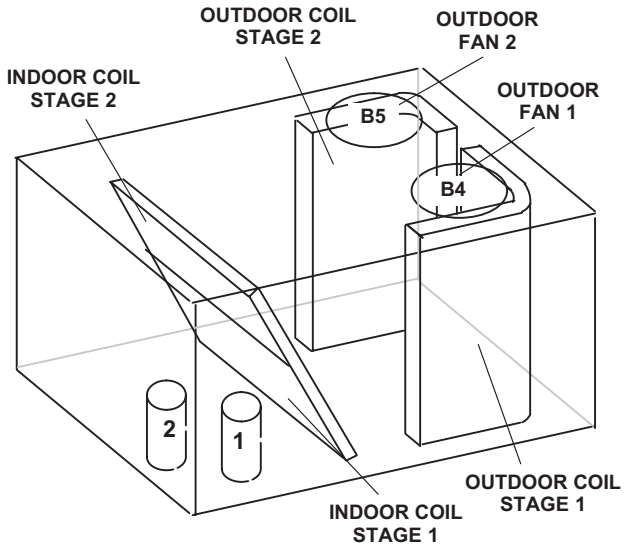


FIGURE 11

REFRIGERANT STAGES - 122, 150

(ALL FANS ARE ENERGIZED IN LOW SPEED WITH A Y1 DEMAND AND HIGH SPEED WITH A Y2 DEMAND)

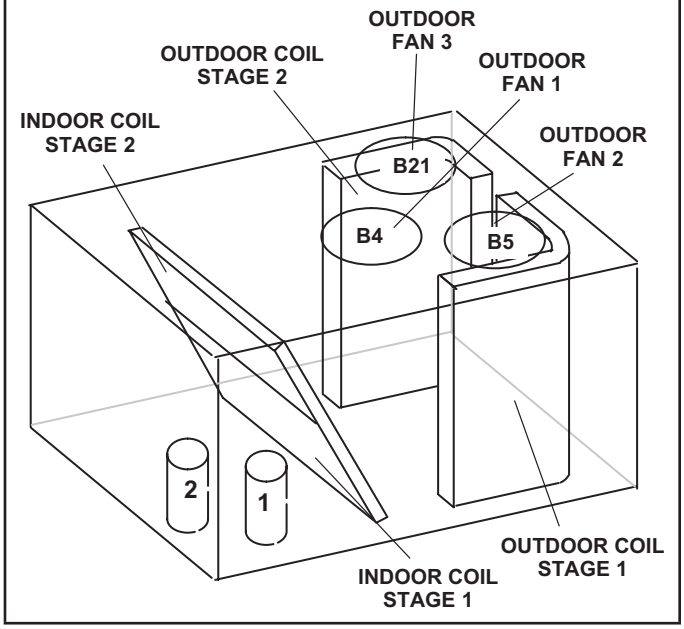


FIGURE 12

IV- SYSTEMS SERVICE CHECKS

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

A-Charging

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:

1 - Attach gauge manifolds to discharge and suction lines. With the economizer disabled, operate the unit in cooling mode at high speed using the following mobile service app menu path:

SERVICE > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Use a thermometer to accurately measure the outdoor ambient temperature.

3 - Apply the outdoor temperature to TABLE 3 through TABLE 7 to determine normal operating pressures. Pressures are listed for sea level applications at 80F dry bulb and 67F wet bulb return air.

4 - Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. Correct any system problems before proceeding.

5 - If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.

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

6 - Use the following subcooling method along with the normal operating pressures to confirm readings.

TABLE 3

LHT078 - 581118-01

Outdoor Coil Entering Air Temp º F	CIRCUIT 1		CIRCUIT 1	
	Dis-charge +10 psig	Suction +5 psig	Discharge +10 psig	Suction +5 psig
65	244	132	236	145
75	281	134	271	146
85	322	136	309	148
95	366	138	354	150
105	415	139	399	152
115	464	141	449	154

TABLE 4

LHT078 - 581118-01

Outdoor Coil Entering Air Temp º F	CIRCUIT 1		CIRCUIT 1	
	Dis-charge +10 psig	Suction +5 psig	Discharge +10 psig	Suction +5 psig
65	244	132	236	145
75	281	134	271	146
85	322	136	309	148
95	366	138	354	150
105	415	139	399	152
115	464	141	449	154

TABLE 5

LHT102 - 581120-01

Outdoor Coil Entering Air Temp º F	CIRCUIT 1		CIRCUIT 1	
	Dis-charge +10 psig	Suction +5 psig	Discharge +10 psig	Suction +5 psig
65	245	139	258	130
75	283	142	296	133
85	321	141	336	133
95	370	146	389	138
105	417	148	435	141
115	469	151	492	144

TABLE 6

LHT120 - 581121-01

Outdoor Coil Entering Air Temp º F	CIRCUIT 1		CIRCUIT 1	
	Discharge +10 psig	Suction +5 psig	Discharge +10 psig	Suction +5 psig
65	248	126	256	125
75	285	128	293	127
85	326	130	334	129
95	372	132	379	131
105	420	135	426	134
115	475	139	477	137

TABLE 7

LHT150 - 581122-01

Outdoor Coil Entering Air Temp º F	CIRCUIT 1		CIRCUIT 1	
	Dis-charge +10 psig	Suction +5 psig	Dis-charge +10 psig	Suction +5 psig
65	255	125	252	112
75	295	128	293	124
85	337	130	335	130
95	382	134	381	133
105	430	136	427	135
115	485	139	476	137

B-Charging - Subcooling

1 - Attach gauge manifolds to discharge and suction lines. With the economizer disabled, operate the unit in cooling mode at high speed using the following mobile service app menu path:

RTU MENU > SERVICE > COMPONENT TEST > COOLING > COOL STAGE 3

2 - Use the liquid line pressure and a PT chart to determine the saturated liquid temperature.

3 - Measure the liquid line temperature at the condenser outlet.

Subcooling Temperature = Liquid Saturated Temperature Minus Liquid Temperature.

4 - Refer to TABLE 8 for subcooling temperatures. A subcooling temperature greater than this value indicates an overcharge. A subcooling temperature less than this value indicates an undercharge.

TABLE 8

SUBCOOLING TEMPERATURE

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
078	2°F ± 1 (1.1°C ± 0.5)	3°F ± 1 (1.7°C ± 0.5)
092, 102	2°F ± 1 (1.1°C ± 0.5)	5°F ± 1 (2.8°C ± 0.5)
120,150	1°F ± 1 (0.5°C ± 0.5)	1°F ± 1 (0.5°C ± 0.5)

V-MAINTENANCE

⚠ 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.

⚠ CAUTION

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

⚠ WARNING

This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

A-Lubrication

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

B-Filters

Units are equipped with four 18 X 24 X 2" filters. Filters should be checked and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. See FIGURE 13.

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

C-Supply Air Blower Wheel

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

D-Indoor Coil

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

E-Outdoor Coil

Clean outdoor coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. Outdoor coils are made of two formed slabs. Dirt and debris may become trapped between the slabs. To clean between slabs, carefully separate coil slabs (no more than 4 inches) and wash them thoroughly. See FIGURE 14. Flush coils with water following cleaning.

F-Filter Drier

The unit is equipped with a bi-flow filter drier. If replacement is necessary, order another of like design.

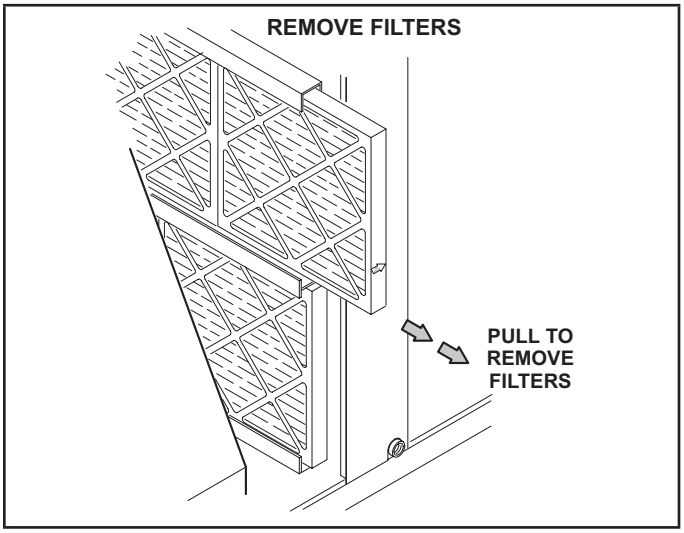
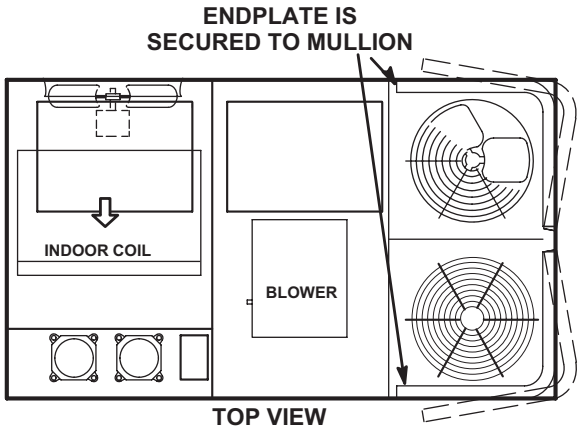


FIGURE 13

CLEAN OUTDOOR COIL



1- Remove screws securing coil end plate to mullion.

2- Remove clips connecting coils slabs and separate slabs 3-4" (76-102mm).

3- Clean coils with detergent or commercial coil cleaner.

4- Rinse thoroughly with water and reassemble.

FIGURE 14

VI-ACCESSORIES

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

A-C1CURB Mounting Frames

When installing the LHT units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are available in heights from 8 to 24 inches and are recommended in all other applications but not required. If the LHT 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 15. 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 16. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

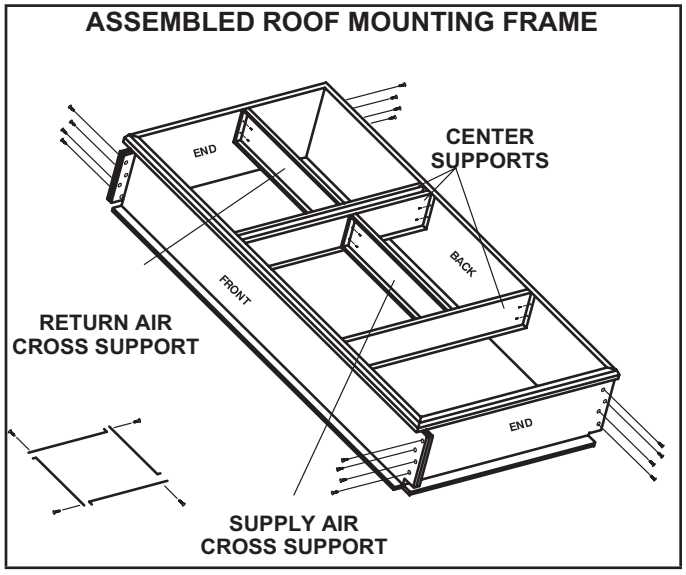


FIGURE 15

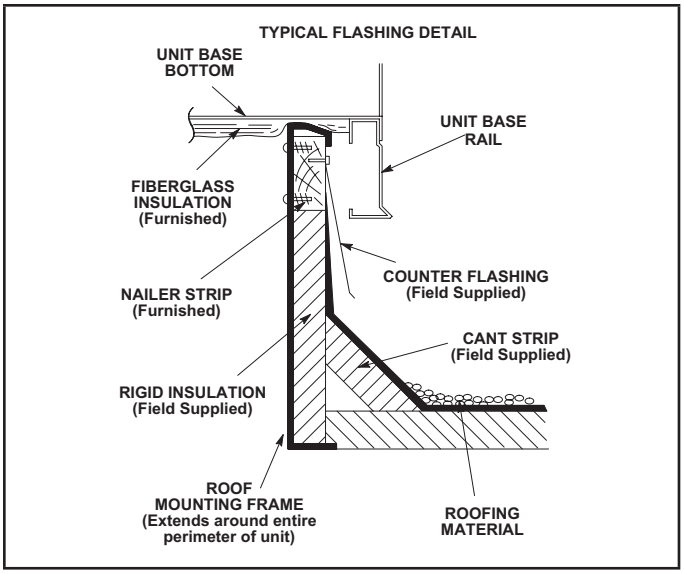


FIGURE 16

B-Transitions

Optional supply/return transition C1DIFF30B-1 is available for use with LHT 7.5-ton units. C1DIFF31B-1 is available for 8.5 and 10-ton units and C1DIFF32B-1 is available for use with LHT 12.5 ton units. All transitions are used with the appropriate C1CURB roof mounting frame. Transition must be installed in the mounting frame before installing the unit on the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

C-Supply and Return Diffusers

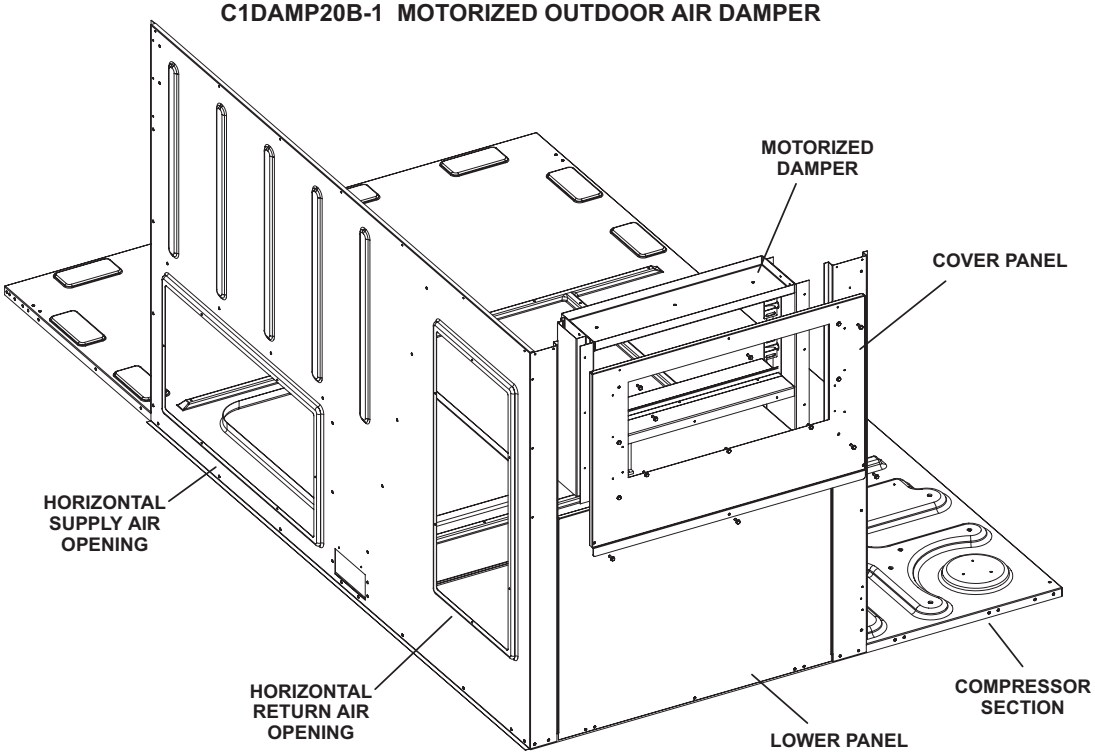
Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all LHT units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

D-C1DAMP Outdoor Air Dampers

Field- or Factory-Installed

Optional manual (C1DAMP10B-1) and motorized (C1DAMP20B-1) outdoor air dampers provide up to 25 percent fresh air for return. Motorized damper opens to minimum position simultaneously with the blower during the occupied period and remains closed during the unoccupied period. Manual damper assembly is manually operated; damper position is manually set at installation and remains in that position.

C1DAMP20B-1 MOTORIZED OUTDOOR AIR DAMPER



C1DAMP10B-2 MANUAL OUTDOOR AIR DAMPER

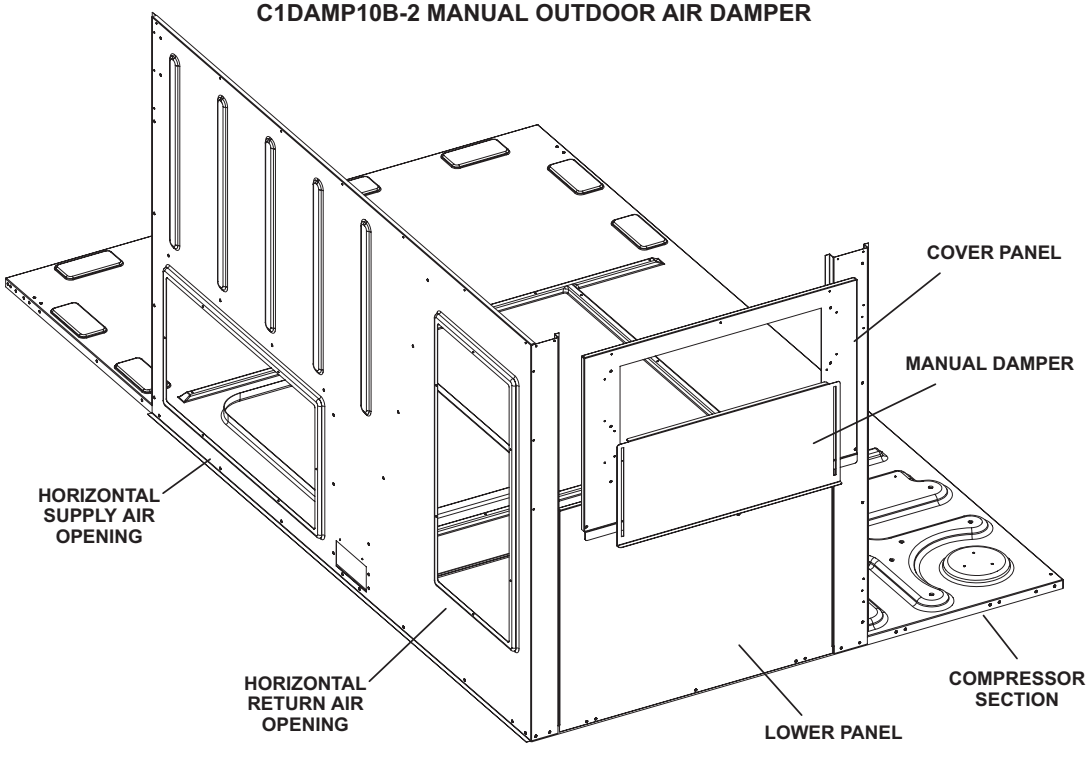


FIGURE 17

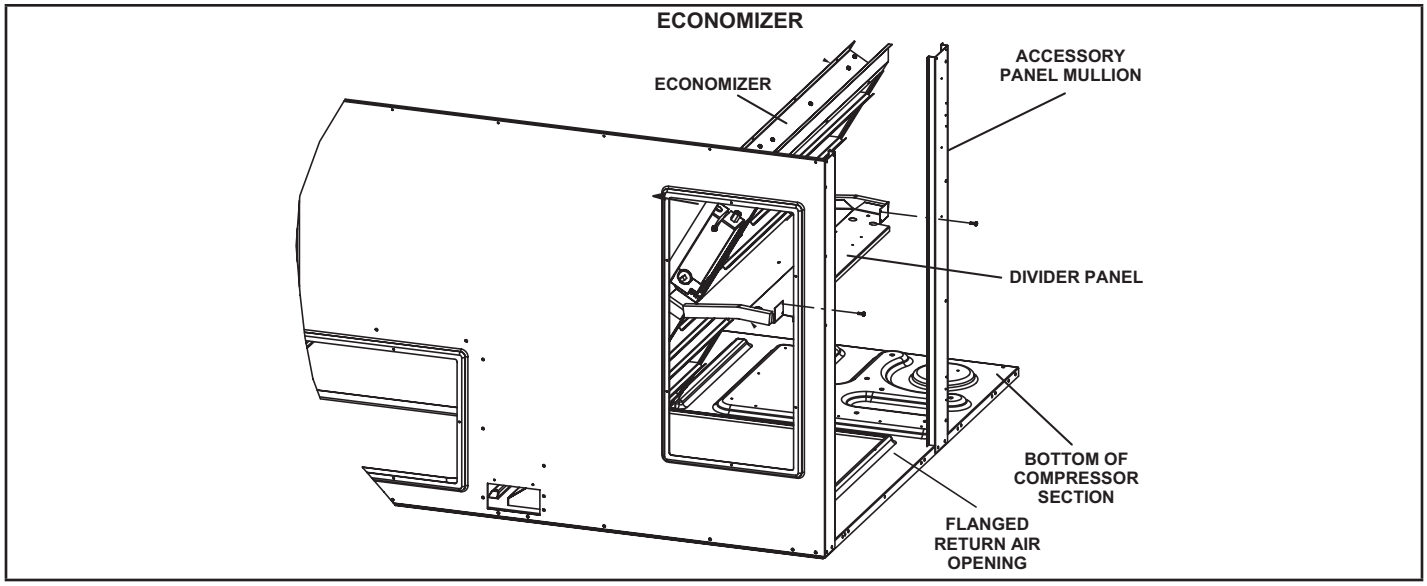


FIGURE 18

TABLE 9

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.

E-K1ECON20B Economizer

(Field- or Factory-Installed)

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See FIGURE 18. 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 9 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-Barometric Relief Dampers

Dampers are used in downflow (FIGURE 19) and horizontal (FIGURE 20) air discharge applications. Horizontal barometric relief dampers are installed in the return air duct. The dampers must be used any time an economizer and a power exhaust fan is applied to LHT series units.

Barometric relief dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Barometric relief dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

NOTE- *Barometric relief damper is optional except required with power exhaust dampers.*

G-Power Exhaust Fan

The power exhaust fan (K1PWRE10B) requires an optional gravity exhaust damper and economizer and is used in downflow applications only. See FIGURE 21. The power exhaust fan provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

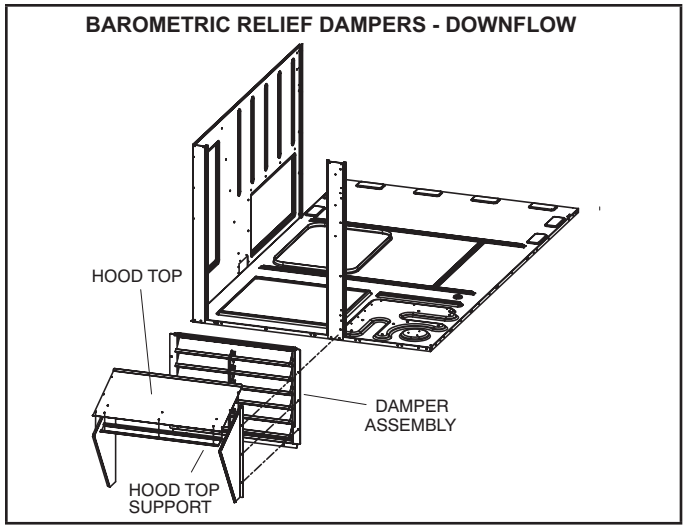


FIGURE 19

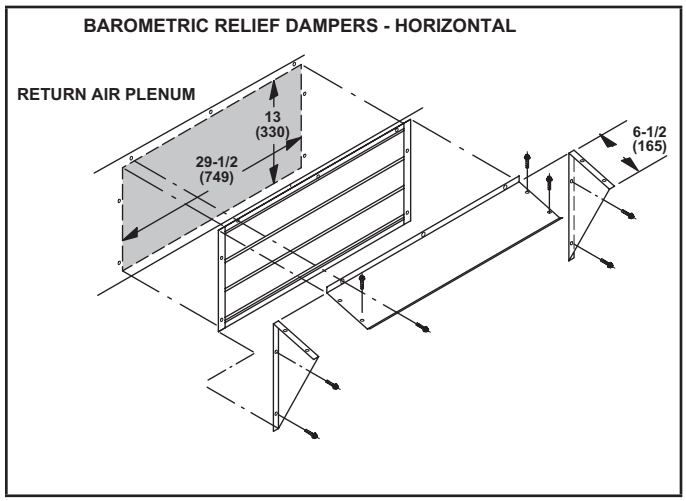


FIGURE 20

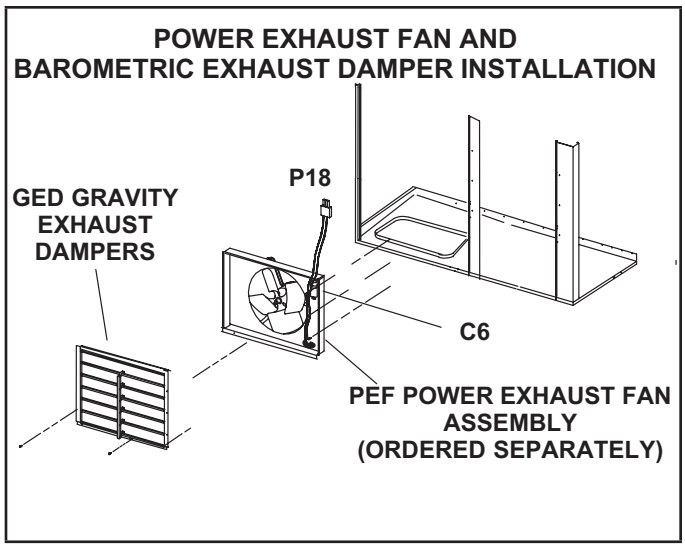


FIGURE 21

H-Control Systems

Any two-heat, two-cool thermostat may be used. All thermostat wiring is connected to terminal block TB1. Each thermostat has additional control options available. See thermostat installation instructions for more detail.

I-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 fivesecond 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.

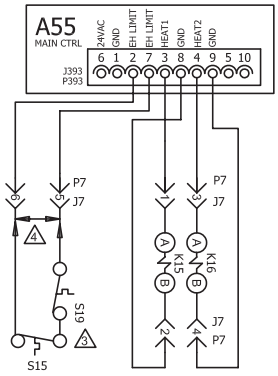
J-Smoke Detectors A171 and A172

Photoelectric smoke detectors are a field 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.

VII-Wiring Diagrams and Sequence of Operation

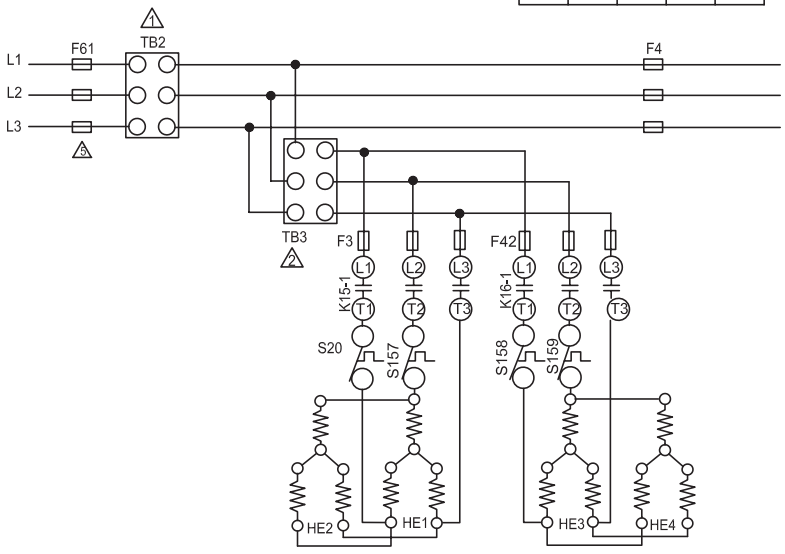
J/P	JACK/PLUG DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT
271	HEATING SENSORS STG 1

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

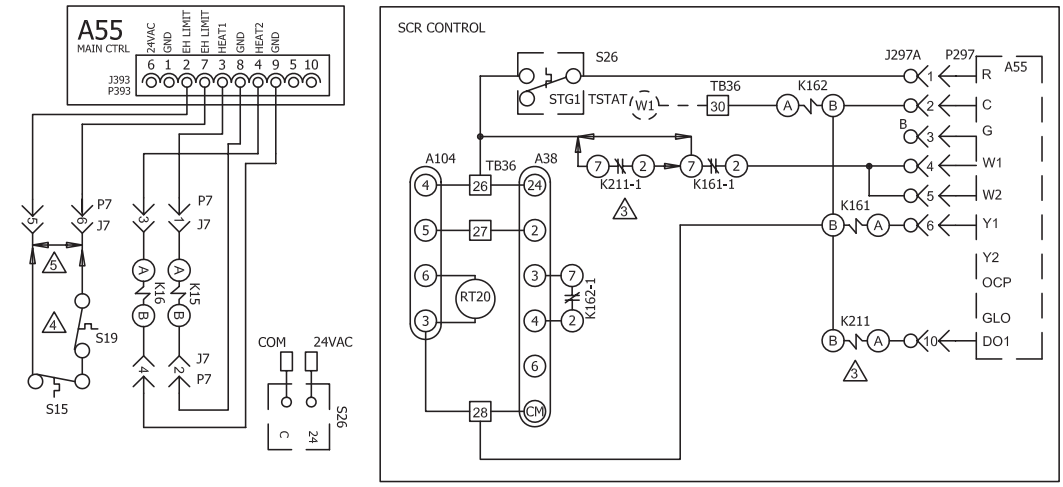
KW	HE1	HE2	HE3	HE4
7.5	7.5			
15	15			
22.5	15		7.5	
30	15		15	
45	15		15	15
60	15	15	15	15



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

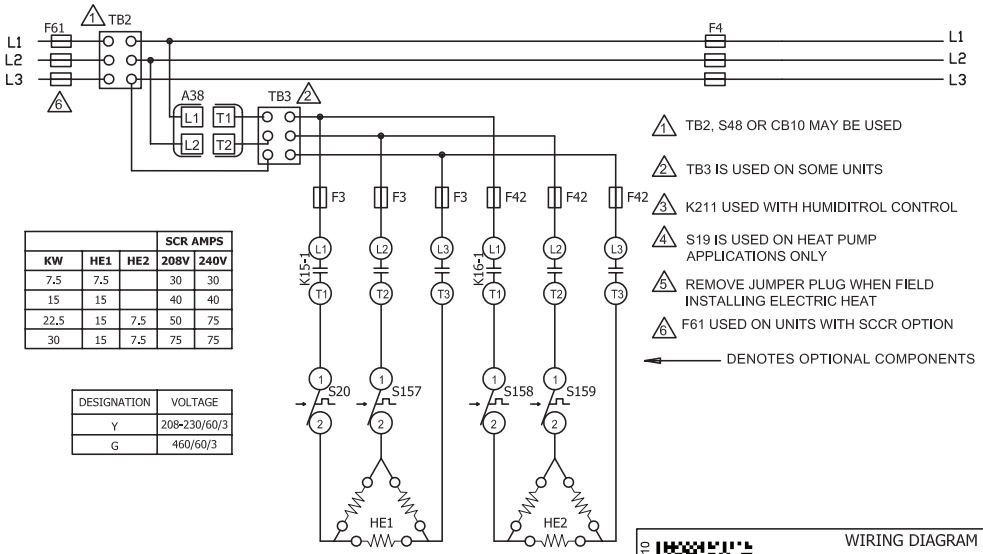
2021/09	WIRING DIAGRAM 538121-02	9/21
HEATING-ELECTRIC		
7.5, 15, 22.5, 30, 45, 60 - G, J		
	SECTION A	REV. 0
Supersedes 538121-01	New Form No. 538121-02	



KEY	DESCRIPTION
A38	CONTROL, SCR ELECTRIC HEAT
A55	PANEL, MAIN
A104	THERMOSTAT, SUPPLY AIR
F3	FUSE, ELECTRIC HEAT 1
F4	FUSE, UNIT
F4 2	FUSE, ELECTRIC HEAT 2
F61	FUSE, UNIT - SCCR
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
K15,-1	CONTACTOR, ELECTRIC HEAT 1
K16,-1	CONTACTOR, ELECTRIC HEAT 2
K161,-1	RELAY, SCR INTERRUPT

K162,-1	RELAY, SCR HIGH OUTPUT
K211-1	RELAY, LOCKOUT
RT20	SENSOR, DISCHARGE SCR
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S26	THERMOSTAT, AMBIENT
S157	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S158	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
S159	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
TB2	TERMINAL STRIP, UNIT
TB36	TERMINAL STRIP, SCR

KEY	DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT
297	THERMOSTAT INTERFACE



			SCR AMPS	
KW	HE1	HE2	208V	240V
7.5	7.5		30	30
15	15		40	40
22.5	15	7.5	50	75
30	15	7.5	75	75

DESIGNATION	VOLTAGE
Y	208-230/60/3
G	460/60/3

1. TB2, S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS
3. K211 USED WITH HUMIDITROL CONTROL
4. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY
5. REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
6. F61 USED ON UNITS WITH SCCR OPTION

DENOTES OPTIONAL COMPONENTS

2020/10	WIRING DIAGRAM 538122-01	10/20
	HEATING - SCR	
	SCR ELECTRIC HEAT CONTROL - STAND ALONE 7.5, 15, 22.5, 30 - Y	
	SECTION A	REV. 0
Supersedes	New Form No. 538122-01	

Sequence of Operation -EHO 7.5, 15, 22.5, 30, 45, 60 kW - Y and G, J, M

NOTE: *This sequence of operation is for all Electric Heat kW ratings Y through J voltages. Each step of operation is numbered and can be followed in sequence on the diagrams. Operation for G, J, and M voltages will be the same.*

HEATING ELEMENTS:

1 - Terminal Strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 through HE7. Each element is protected by fuse F3.

SECOND STAGE HEAT:

2 - Heating demand initiates at W1 in thermostat.

3 - 24VAC W2 signal is routed through from the thermostat to TB1. After S15 N.C. primary limit and S20 secondary limit is proved, the electric heat contactor K15 is energized.

4 - N.O. contacts K15-1 close allowing the first bank of elements to be energized.

5 - Relay K9 is energized. N.O. contacts K9-1 close energizing timer DL2.

6 - After a 30-second delay, DL2 closes energizing contactor K16.

7 - N.O. contacts K16-1 close allowing the second bank of elements to be energized.

END OF SECOND STAGE HEAT:

8 - Heating demand is satisfied. Terminal W1 in the thermostat is de-energized.

9 - Electric heat contactor K16 is de-energized.

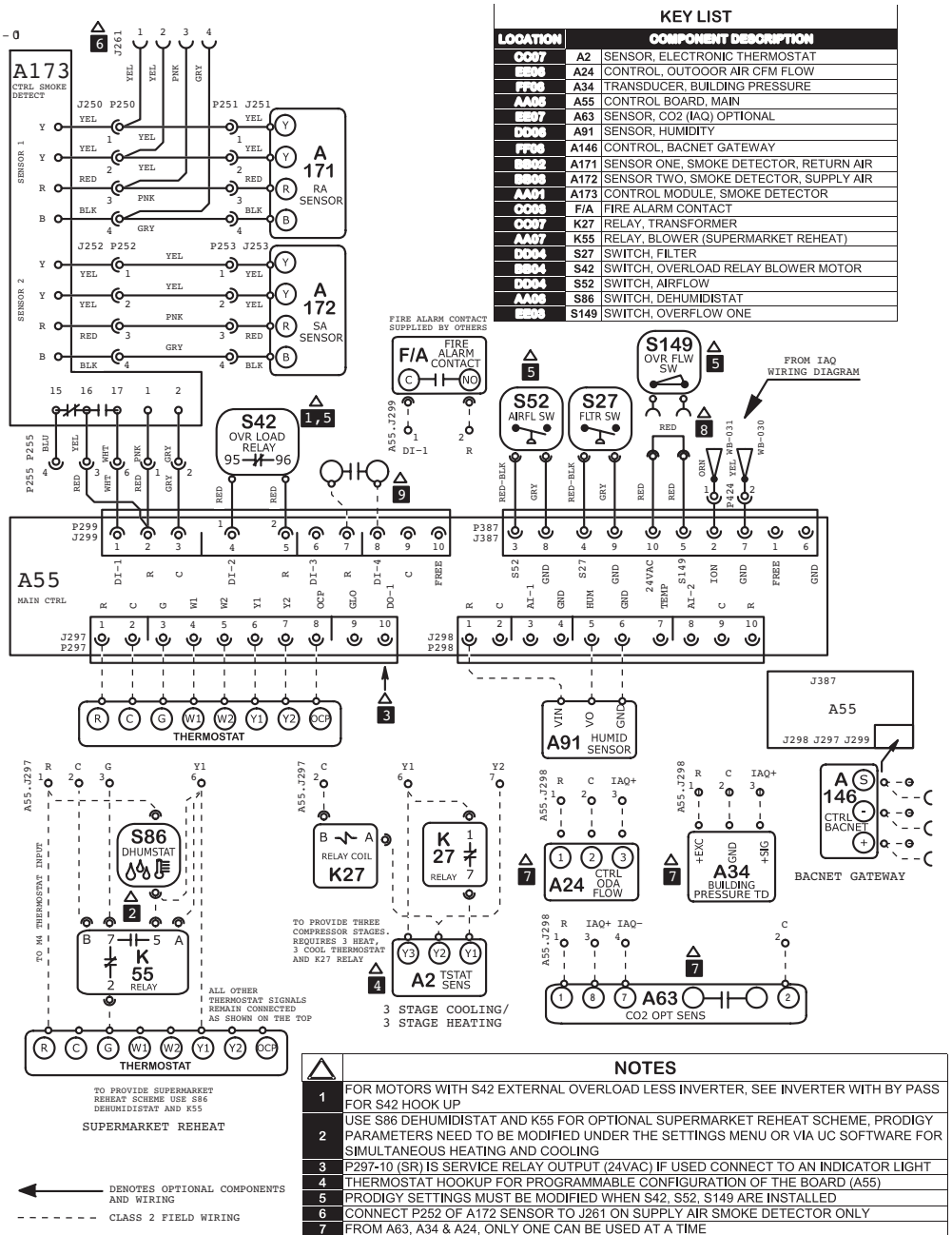
10 - The second set of electric heat elements are de-energized.

11 - Electric heat contactor K15 is de-energized.

12 - The first set of electric heat elements are de-energized.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT

KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
CC07	A2	SENSOR, ELECTRONIC THERMOSTAT
BB08	A24	CONTROL, OUTOOOR AIR CFM FLOW
FF08	A34	TRANSDUCER, BUILDING PRESSURE
AA06	A55	CONTROL BOARD, MAIN
BB07	A63	SENSOR, CO2 (IAQ) OPTIONAL
DD06	A91	SENSOR, HUMIDITY
FF06	A146	CONTROL, BACNET GATEWAY
BB05	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
BB06	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
AA01	A173	CONTROL MODULE, SMOKE DETECTOR
CC08	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
AA08	S86	SWITCH, DEHUMIDISTAT
BB08	S149	SWITCH, OVERFLOW ONE



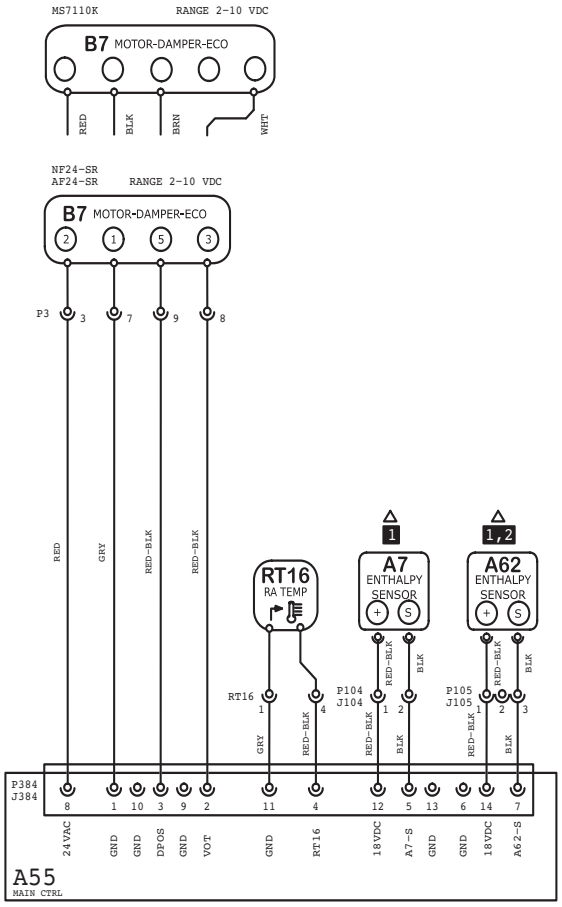
NOTES	
1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10 (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 SECTION 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

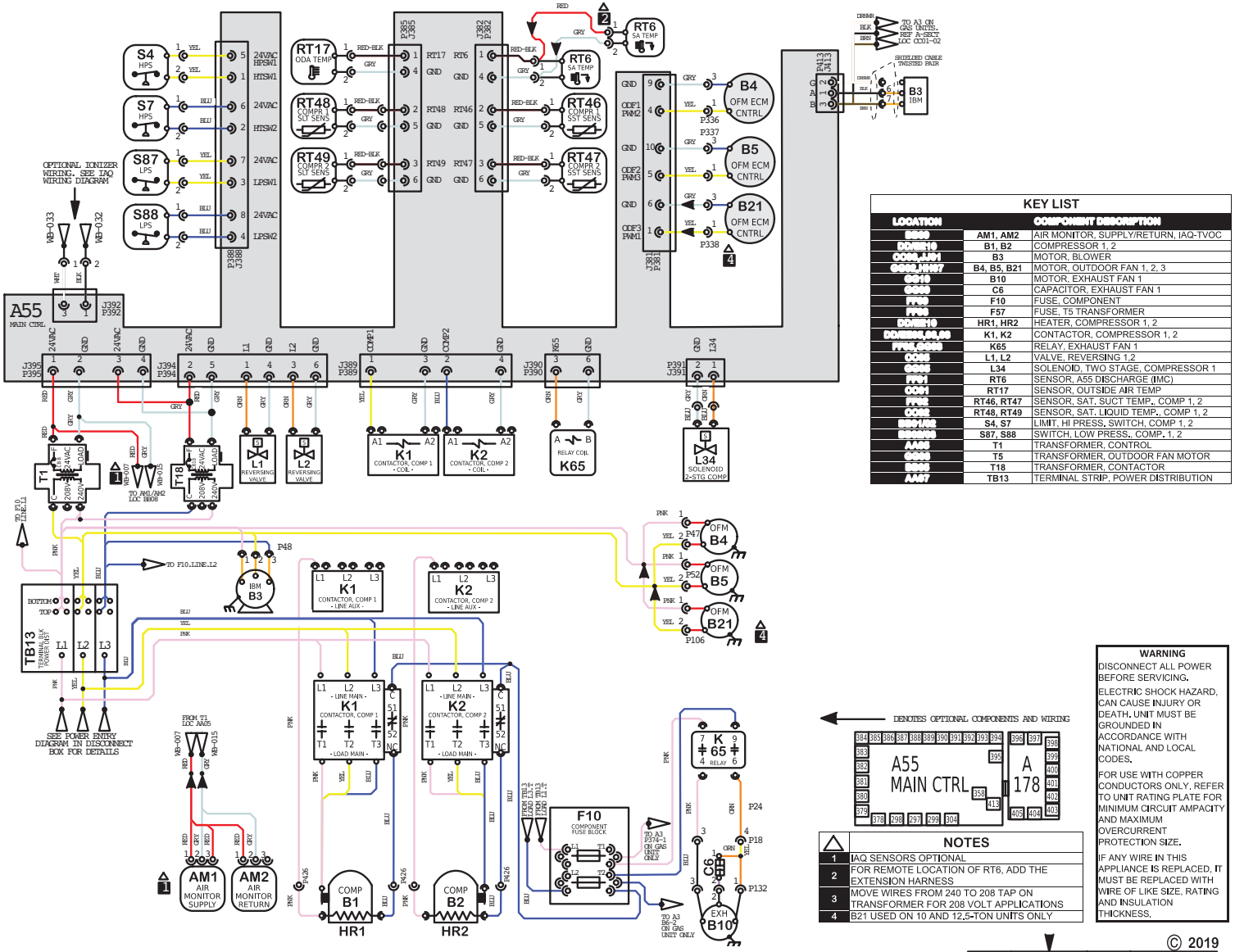
KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
CC05	A7	SENSOR, SOLID STATE ENTHALPY
AA06	A55	CONTROL BOARD, MAIN
DD05	A62	SENSOR, ENTHALPY INDOOR
BB02	B7	MOTOR, DAMPER ECONOMIZER
CC05	RT16	SENSOR, RETURN AIR TEMP

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

Y Voltage With Higher SCCR



KEY LIST

LOCATION	COMPONENT DESCRIPTION	
[illegible]	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5, B21	MOTOR, OUTDOOR FAN 1, 2, 3
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	L1, L2	VALVE, REVERSING 1,2
[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]	T5	TRANSFORMER, OUTDOOR FAN MOTOR
[illegible]	T18	TRANSFORMER, CONTACTOR
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

DENOTES OPTIONAL COMPONENTS AND WIRING

	NOTES
1	IAQ SENSORS OPTIONAL
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	B21 USED ON 10 AND 12.5-TON UNITS ONLY

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.

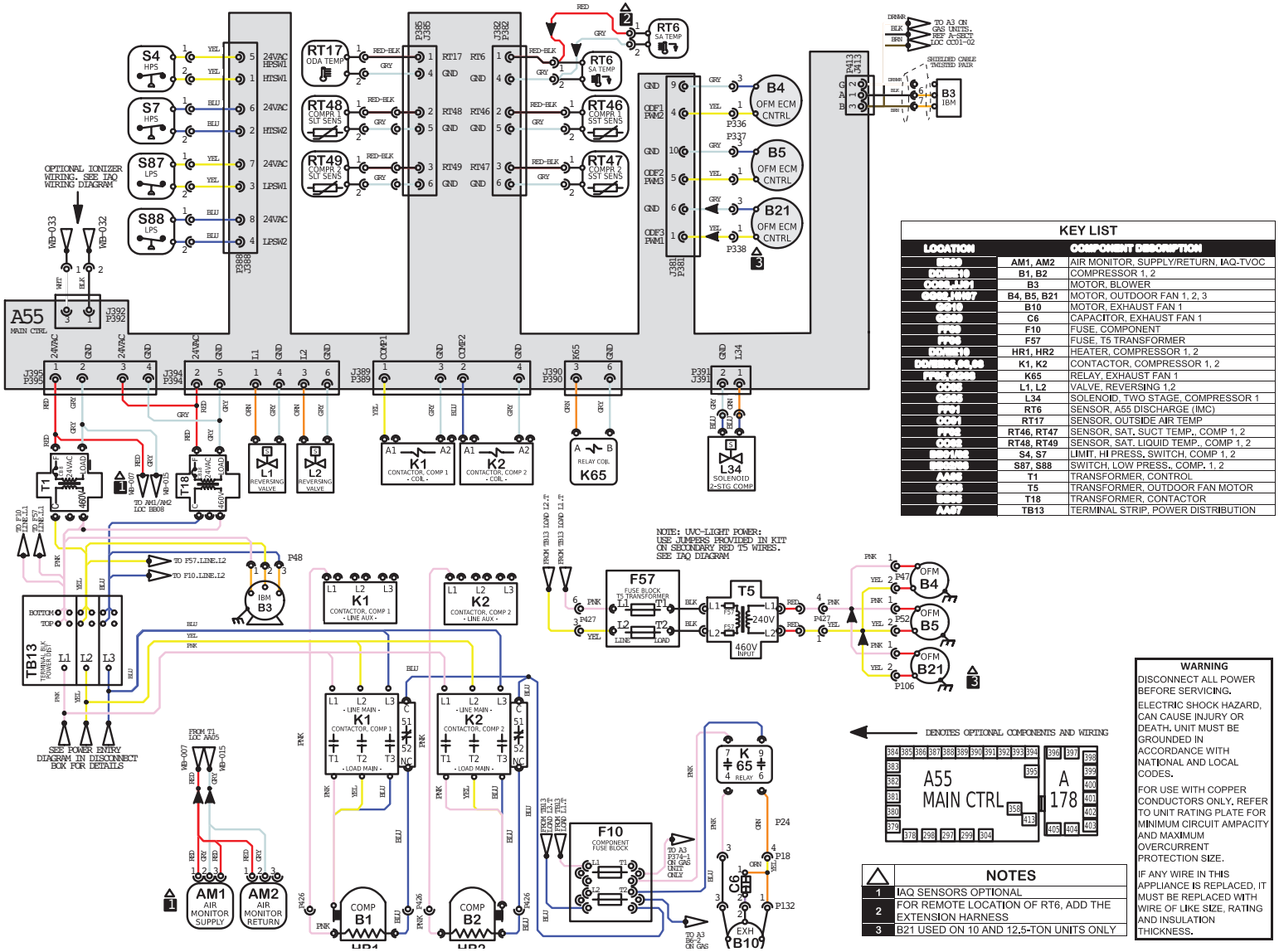
IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

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

Product: LHT, LDT B Box - Y VOLT
Heat Pump Diagram with Higher SCCR

Voltage: 208-230V/3~/60Hz (Y)
Supersedes: XXXXXX-XX Form No: 538206-0 Rev: 0

G Voltage With Higher SCCR



KEY LIST

LOCATION	COMPONENT DESCRIPTION	
[illegible]	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5, B21	MOTOR, OUTDOOR FAN 1, 2, 3
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	L1, L2	VALVE, REVERSING 1,2
[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]	T5	TRANSFORMER, OUTDOOR FAN MOTOR
[illegible]	T18	TRANSFORMER, CONTACTOR
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

WARNING

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

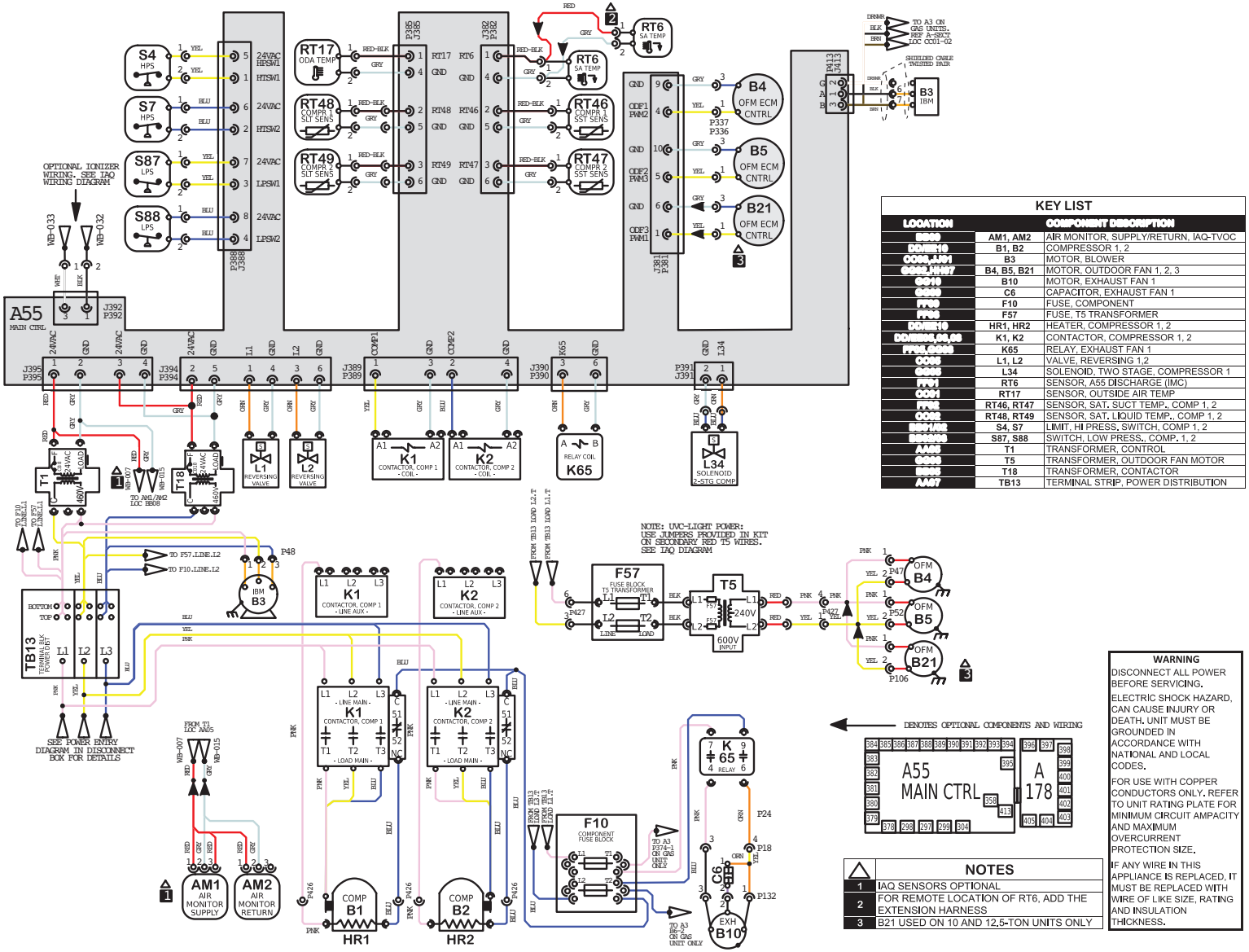
NOTES

1	IAQ SENSORS OPTIONAL
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	B21 USED ON 10 AND 12.5-TON UNITS ONLY

Product: LHT, LDT B Box - G VOLT
Heat Pump Diagram with Higher SCCR

Voltage: 460V/3~/60Hz (G)
Supersedes: XXXXXX-XX Form No: 538204-0 Rev: 0

J Voltage With Higher SCCR



KEY LIST

LOCATION	COMPONENT DESCRIPTION	
[illegible]	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5, B21	MOTOR, OUTDOOR FAN 1, 2, 3
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	L1, L2	VALVE, REVERSING 1,2
[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]	T5	TRANSFORMER, OUTDOOR FAN MOTOR
[illegible]	T18	TRANSFORMER, CONTACTOR
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

NOTES

1	IAQ SENSORS OPTIONAL
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	B21 USED ON 10 AND 12.5-TON UNITS ONLY

WARNING

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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.

Product: LHT, LDT B Box - J VOLT
Heat Pump Diagram with Higher SCCR

Voltage: 575V/3~/60Hz (J)
Supersedes: XXXXXX-XX Form No: 538205-0 Rev: 0

SEQUENCE OF OPERATION LHT078-150

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.

First Stage Cooling Demand (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 condenser fans B4 and B5 and are energized.

Second Stage Cooling Demand (compressor B2)

11 - A55 receives a Y2 thermostat demand.

12 - 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.

13 - 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 energized)

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

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

First Stage Heat -

1 - Unit controller A55 receives W1 demand. If the OD air temperature is above the balance point setpoint (35 F default), HP heating is initiated.

2 - After A55 proves N.C. low pressure switch S87, high pressure switch S4, compressors contactors K1, K2 are energized.

3 - K1-1 and K2-1 close energizing compressor B1 and B2. K1 and K2 auxiliary switch open de-energizing crankcase heaters

4 - Outdoor ECM fans B4, B5 and (B21 in 122, 150 units) receive pre-set fan settings at high speed from A55 unit controller

Second Stage Heat -

5 - Second stage heat demand energizes W2 in the thermostat. A55 unit controller will activate electric heat in addition to heat pump operation.

6 - See sequence of operation for electric heat.

Defrost Mode:

7 - Defrost is enabled when outdoor coil temperature is below 35F. The Unit Controller will cycle in and out of defrost depending on the temperature difference between the outdoor coil and outdoor air temperature. Defrost is also initiated when the accumulated run time with the outdoor coil temperature below 35F reaches six hours. Electric heat is energized during a defrost cycle to maintain discharge air temperature.

NOTE - *Only one refrigerant circuit will go into defrost at a time.*

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 10 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 10 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 10

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	