UNIT INFORMATION

100037

LCM SERIES
7.5 to 12.5 ton

Service Literature

LCM092 through 150U

The LCM092U, 102U, 120U and 150U units are configure to order units (CTO) with a wide selection of factory installed options.

Cooling capacities range from 7.5 to 12.5 tons. Units use two separate refrigeration circuits. One circuit uses a high efficiency variable speed scroll compressor and the second circuit uses a fixed speed scroll compressor. Units also offer mechanical cooling down to 0°F.

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

All units are equipped with direct drive blowers. The blower will operate at lower speeds when demand is low and increase to higher speeds when demand is high. Variable speed VAV system is available as an option which enables supply duct static measurement to control blower CFM and discharge air temperature to control cooling stages.

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

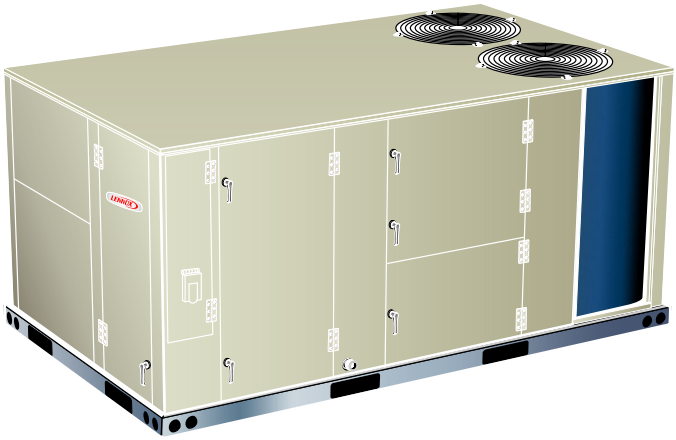
The CORE Control System is designed to accelerate equipment install and service. Standard with all Model L™ rooftop units, control system integrates key technologies that lower installation costs, drive system efficiency, and protect your investments. The CORE Unit Controller is a microprocessor-based controller that provides flexible control of all unit functions.

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.

⚠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

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, jewelery, tools, etc.,c away from moving parts.

⚠WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property va, 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

Table of Contents

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	OX	OX	OX	OX
	Copper	**76W27**	X	X	X	X
Corrosion Protection		Factory	O	O	O	O
Drain Pan Overflow Switch		**21Z07**	OX	OX	OX	OX
Refrigerant Type		R-410A	O	O	O	O
Service Valves (not for Humiditrol™+ equipped units)		Factory	O	O	O	O
BLOWER - SUPPLY AIR						
Blower	DirectPlus™ Direct Drive ECM Blower System with SZVAV	Factory	O	O	O	O
	DirectPlus™ Direct Drive ECM Blower System with VAV	Factory	O	O	O	O
CABINET						
Combination Coil/Hail Guards		**24M51**	X	X		
		24C85			X	X
Horizontal Discharge Kit		**51W25**	X	X	X	X
Return Air Adaptor Plate (for LC/LG and TC/TG/TH unit replacement)		**54W96**	OX	OX	OX	OX
CONTROLS						
Blower Proving Switch		**21Z10**	OX	OX	OX	OX
Commercial Controls	LonTalk® Module - For Lennox® CORE Control System	**54W27**	OX	OX	OX	OX
	Novar® LSE	Factory	O	O	O	O
Dirty Filter Switch		**53W67**	OX	OX	OX	OX
Fresh Air Tempering		**21Z08**	OX	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		**11K76**	OX	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		**11K80**	OX	OX	OX	OX
INDOOR AIR QUALITY						
Air Filters						
Healthy Climate® High Efficiency Air Filters 20 x 25 x 2 in.	MERV 8 (Order 4)	**50W61**	OX	OX	OX	OX
	MERV 13 (Order 4)	**52W41**	OX	OX	OX	OX
	MERV 16 (Order 4)	**21U41**	OX	OX	OX	OX
Replacement Media Filter With Metal Mesh Frame 20 x 25 x 2 in. (includes non-pleated filter media)	(Order 4)	**Y3063**	X	X	X	X
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**87N53**	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		**87N52**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)		**90N43**	X	X	X	X
Needlepoint Bipolar Ionization (NPBI)						
Needlepoint Bipolar Ionization (NPBI) Kit		**21U36**	OX	OX	OX	OX
UVC Germicidal Lamps						
[1] Healthy Climate® UVC Light Kit (110/230V-1ph)		**21A93**	OX	OX	OX	OX

[1] For 460V and 575V units, field installed lamps utilize jumpers to the outdoor fan transformer for voltage needed. See the installation Instructions.

NOTE - Catalog numbers shown are for ordering optional accessories if a field installed option is available.

OX = Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
ELECTRICAL						
Voltage 60 Hz	208/230V-3ph	Factory	O	O	O	O
	460V-3ph	Factory	O	O	O	O
	575V-3ph	Factory	O	O	O	O
HACR Circuit Breakers		Factory	O	O	O	O
Disconnect Switch - See Electrical/Electric Heat tables for selection	80 amp	**54W56**	OX	OX	OX	OX
	150 amp	**54W57**	OX	OX	OX	OX
[1] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O	O
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX
	20 amp non-powered, field-wired (575V only)	**67E01**	OX	OX	OX	OX
Weatherproof Cover for GFI		**10C89**	X	X	X	X
ELECTRIC HEAT						
7.5 kW	208/230V-3ph	**23U73**	OX	OX		
	460V-3ph	**23U74**	OX	OX		
	575V-3ph	**23U75**	OX	OX		
15 kW	208/230V-3ph	**23U76**	OX	OX	OX	OX
	460V-3ph	**23U77**	OX	OX	OX	OX
	575V-3ph	**23U78**	OX	OX	OX	OX
22.5 kW	208/230V-3ph	**23U79**	OX	OX	OX	OX
	460V-3ph	**23U80**	OX	OX	OX	OX
	575V-3ph	**23U81**	OX	OX	OX	OX
30 kW	208/230V-3ph	**23U82**	OX	OX	OX	OX
	460V-3ph	**23U83**	OX	OX	OX	OX
	575V-3ph	**23U84**	OX	OX	OX	OX
45 kW	208/230V-3ph	**23U85**	OX	OX	OX	OX
	460V-3ph	**23U86**	OX	OX	OX	OX
	575V-3ph	**23U87**	OX	OX	OX	OX
60 kW	208/230V-3ph	**23U88**			OX	OX
	460V-3ph	**23U89**			OX	OX
	575V-3ph	**23U90**			OX	OX
[2] SCR (Silicon Controlled Rectifier) Electric Heat Control		Factory	O	O	O	O
Thermostat (required)		**Y9682**	X	X	X	X
Duct Sensor (required)		**Y9683**	X	X	X	X

[1] Disconnect Switch not available with higher SCCR option. Short-Circuit Current Rating option only available with factory installed electric heat.
[2] SCR option is not available with 45 kW and 60 kW electric heat (208/230V) models.

NOTE - Catalog numbers shown are for ordering optional accessories if a field installed option is available.
OX = Configure To Order (Factory Installed) or Field Installed
O = Configure To Order (Factory Installed)
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OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
ECONOMIZER						
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer Downflow or Horizontal - Includes Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood NOTE - For horizontal economizer applications order optional Horizontal Low Profile Barometric Relief Dampers and Horizontal Discharge Kit separately.		**20U80**	OX	OX	OX	OX
Economizer Controls						
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	OX	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX	OX
Global Control	Sensor Field Provided	Factory	O	O	O	O
Building Pressure Control		**13J77**	X	X	X	X
Outdoor Air CFM Control		**13J76**	X	X	X	X
Horizontal Barometric Relief Dampers (for horizontal economizer applications)						
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood		**53K04**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers						
Motorized Dampers (Hood furnished)		**14G28**	OX	OX	OX	OX
Manual Dampers (Hood furnished)		**14G29**	OX	OX	OX	OX
POWER EXHAUST						
Standard Static	208/230V-3ph	**53W44**	OX	OX	OX	OX
	460V-3ph	**53W45**	OX	OX	OX	OX
	575V-3ph	**53W46**	OX	OX	OX	OX
HUMIDITROL™+ HOT GAS REHEAT OPTION						
Humiditrol+ Dehumidification Option			O	O	O	O
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**11F54**	X	X	X	X
14 in. height		**11F55**	X	X	X	X
18 in. height		**11F56**	X	X	X	X
24 in. height		**11F57**	X	X	X	X
Adjustable Pitch Curb						
14 in. height		**54W50**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	**13K61**	X	X		
	RTD11-135S	**13K62**			X	
	RTD11-185S	**13K63**				X
Flush - Order one	FD11-95S	**13K56**	X	X		
	FD11-135S	**13K57**			X	
	FD11-185S	**13K58**				X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X	X		
	C1DIFF31B-1	**12X66**			X	
	C1DIFF32B-1	**12X67**				X

NOTE - Catalog numbers shown are for ordering optional accessories if a field installed option is available.

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O = Configure To Order (Factory Installed)

X = Field Installed

SPECIFICATIONS — UNIT

General Data		**Nominal Tonnage**	**7.5 Ton**	**8.5 Ton**	**10 Ton**	**12.5 Ton**
		Efficiency Type	**Ultra-High**	**Ultra-High**	**Ultra-High**	**Ultra-High**
		Model Number	**LCM092U4E**	**LCM102U4E**	**LCM120U4E**	**LCM150U4E**
		Blower Type	DirectPlus™ ECM Direct Drive with SZVAV	DirectPlus™ ECM Direct Drive with SZVAV	DirectPlus™ ECM Direct Drive with SZVAV	DirectPlus™ ECM Direct Drive with SZVAV
		Model Number	**LCM092U4P**	**LCM102U4P**	**LCM120U4P**	**LCM150U4P**
		Blower Type	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV	DirectPlus™ ECM Direct Drive with VAV
Cooling Performance		Gross Cooling Capacity - Btuh	90,500	101,600	121,800	144,000
		[1] Net Cooling Capacity - Btuh	86,000	97,000	114,000	138,000
		[1] AHRI Rated Air Flow - cfm	2800	3400	3600	4400
		Total Unit Power - kW	7.2	8.1	9.5	12.5
		[1] IEER (Btuh/Watt)	22.0	21.0	21.0	20.0
		[1] EER (Btuh/Watt)	12.6	12.6	12.2	11.0
Refrigerant Charge		Refrigerant Type	R-410A	R-410A	R-410A	R-410A
	Without Reheat Option	Circuit 1	13 lbs.11 oz.	13 lbs. 15 oz.	15 lbs. 8 oz.	15 lb. 12 oz.
		Circuit 2	9 lbs. 13 oz.	9 lbs. 10 oz.	11 lbs. 2 oz.	10 lb. 8 oz.
	With Reheat Option	Circuit 1	15 lbs. 0 oz.	15 lbs. 0 oz.	18 lbs. 12 oz.	19 lb. 12 oz.
		Circuit 2	9 lbs. 13 oz.	9 lbs. 10 oz.	11 lbs. 2 oz.	10 lb. 8 oz.
Electric Heat Available - See page 19			7.5, 15, 22.5, 30 & 45 kW		15, 22.5, 30, 45 & 60 kW	
Compressor Type (number)			Variable Capacity Scroll (1) Fixed Capacity Scroll (1)			
Outdoor Coil		Net face area (total) - sq. ft.	20.5	20.5	28	28
		Tube diameter - in.	3/8	3/8	3/8	3/8
		Number of rows	3	3	3	3
		Fins per inch	20	20	20	20
Outdoor Coil Fans		Motor - (No.) hp	(2) 1/3 ECM	(2) 1/3 ECM	(2) 1/3 ECM	(2) 1/3 ECM
		Motor rpm	400-850	400-1020	500-1020	500-1020
		Total Motor watts	65-450	65-750	65-750	65-750
		Diameter - (No.) in.	(2) 24	(2) 24	(2) 24	(2) 24
		Number of blades	3	3	3	3
		Total Air volume - cfm	7300	8800	8800	8800
Indoor Coil		Net face area (total) - sq. ft.	13.54	13.54	13.54	13.54
		Tube diameter - in.	3/8	3/8	3/8	3/8
		Number of rows	4	4	4	4
		Fins per inch	14	14	14	14
		Drain connection - Number and size	(1) 1 in. NPT coupling			
		Expansion device type	Balance port TXV, removable head			
Indoor Blower		Nominal motor output	3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)
		Blower wheel nominal diameter x width - in.	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9
Filters		Type of filter	MERV 4, Disposable			
		Number and size - in.	(4) 20 x 25 x 2			
Electrical characteristics			208/230V, 460V, or 575V - 60 hz -3 phase			

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

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

BLOWER DATA

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

FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.
2 − Any factory installed options air resistance (heat section, Economizer, etc.)
3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)
See page 26 for wet coil and option/accessory air resistance data.
See page 26 for minimum air volume required for use with optional electric heat.

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

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

BLOWER DATA

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

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

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

Electric Heat kW	Minimum cfm
7.5	1750
15	2750
22.5	2750
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.

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

CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume	[1] Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
092 Models	2600	24 - 29	19 - 24
	2800	25 - 30	20 - 28
	3000	27 - 33	21 - 29
	3200	28 - 35	22 - 29
	3400	30 - 37	22 - 30
102, 120 Models	3600	25 - 33	22 - 29
	3800	27 - 35	22 - 30
	4000	29- 37	24 - 33
	4200	32 - 40	26 - 35
	4400	34 - 42	28 - 37
150 Models	5600	39 - 49	28 - 37
	5800	42 - 51	29 - 38
	6000	44 - 54	40 - 50
	6200	45 - 55	42 - 51
	6400	46 - 55	43 - 52
	6600	47 - 56	45 - 56

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

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

		Model No.	**LCM092U4E/ LCM092U4P**		
[1] Voltage - 60Hz			**208/230V-3ph**	**460V-3ph**	**575V-3ph**
Compressor 1 (Inverter)	Rated Load Amps		8.5	4	3.2
	Locked Rotor Amps		17	10	12
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		50	25	20
[3] Minimum Circuit Ampacity (MCA)	Unit Only		40	20	16
	With (1) 0.33 HP Power Exhaust		43	21	17

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	25	20
		15 kW	[4] 50	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	40	40	20	16
		15 kW	50	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	25	20
		15 kW	60	60	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	43	43	21	17
		15 kW	53	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

		Model No.	**LCM102U4E/ LCM102U4P**		
[1] Voltage - 60Hz			**208/230V-3ph**	**460V-3ph**	**575V-3ph**
Compressor 1 (Inverter)	Rated Load Amps		11.8	5.5	4.4
	Locked Rotor Amps		17	10	12
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		50	25	20
[3] Minimum Circuit Ampacity (MCA)	Unit Only		44	21	17
	With (1) 0.33 HP Power Exhaust		46	22	18

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	25	20
		15 kW	[4] 50	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	44	44	21	17
		15 kW	50	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	25	20
		15 kW	60	60	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	46	46	22	18
		15 kW	53	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

		Model No.	**LCM120U4E/ LCM120U4P**		
[1] Voltage - 60Hz			**208/230V-3ph**	**460V-3ph**	**575V-3ph**
Compressor 1 (Inverter)	Rated Load Amps		13.5	6.3	5
	Locked Rotor Amps		21	11	12
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	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only		48	24	19
	With (1) 0.33 HP Power Exhaust		51	25	20

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	60	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	50	56	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
		60 kW	136	156	79	63
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	60	60	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	53	59	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61
		60 kW	139	159	80	65

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

		Model No.	**LCM150U4E/ LCM150U4P**		
[1] Voltage - 60Hz			**208/230V-3ph**	**460V-3ph**	**575V-3ph**
Compressor 1 (Inverter)		Rated Load Amps	16.4	7.7	6.2
		Locked Rotor Amps	21	11	12
Compressor 2 (Non-Inverter		Rated Load Amps	22.4	10.6	7.7
		Locked Rotor Amps	149	75	54
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	80	35	25
		With (1) 0.33 HP Power Exhaust	80	40	30
[3] Minimum Circuit Ampacity (MCA)		Unit Only	59	29	23
		With (1) 0.33 HP Power Exhaust	62	30	24

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**480V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	80	80	35	25
		22.5 kW	80	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	59	59	29	24
		22.5 kW	70	79	40	33
		30 kW	90	102	51	42
		45 kW	129	147	74	60
		60 kW	136	156	79	63
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	80	80	40	30
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	70
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	62	62	31	25
		22.5 kW	73	82	42	34
		30 kW	93	105	53	43
		45 kW	132	150	76	61
		60 kW	139	159	80	65

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRIC HEAT CAPACITIES

Volts Input	7.5 kW			15 kW			22.5 kW			30 kW			45 kW			60 kW		
	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages
208	5.6	19,100	1	11.3	38,600	1	16.9	57,700	2	22.5	76,800	2	33.8	115,300	2	45.0	153,600	2
220	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
230	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
240	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
440	6.9	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
460	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
480	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
550	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
575	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
600	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2

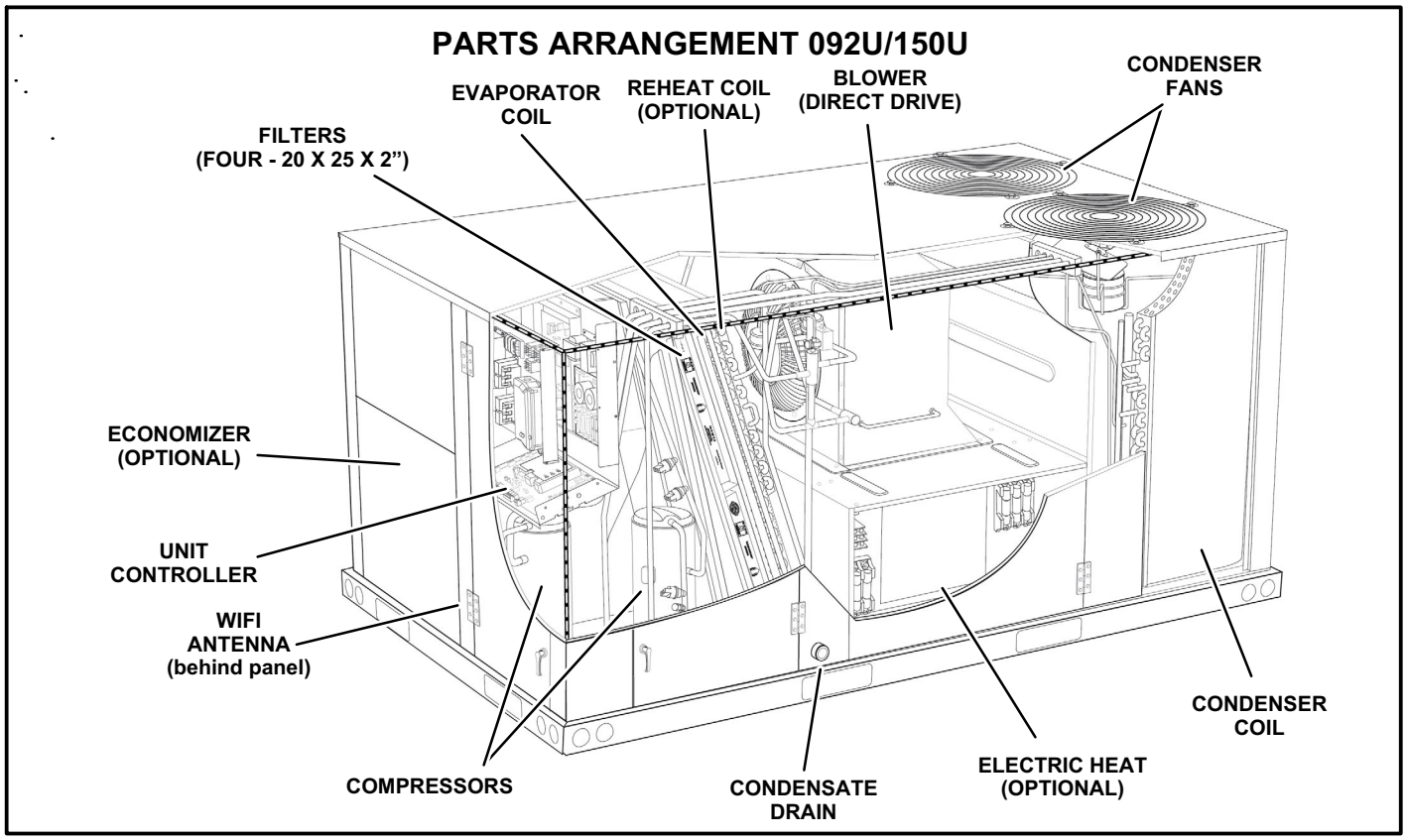


FIGURE 1

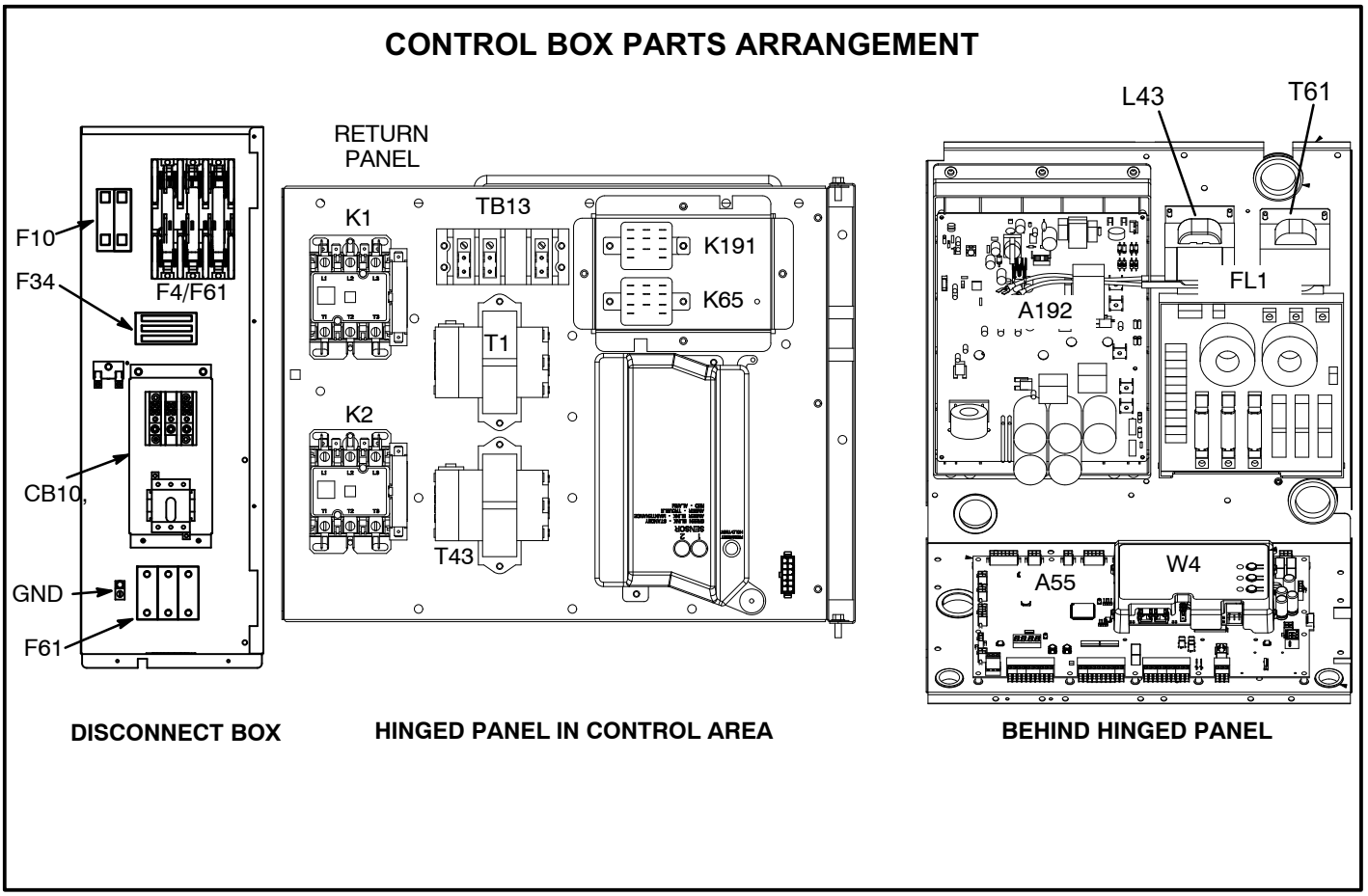


FIGURE 2

⚠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.

I-UNIT COMPONENTS

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

A-Control Box Components

⚠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.

Unit 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 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use primary voltage taps as shown in figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

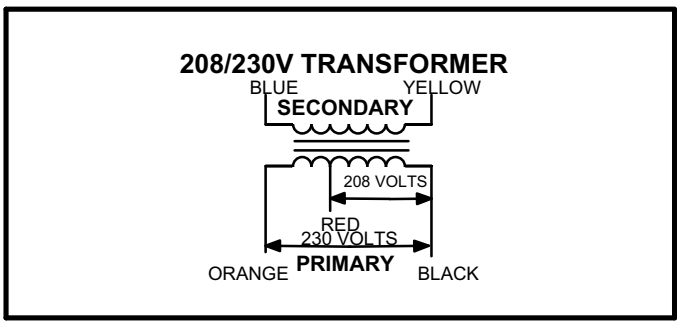


FIGURE 3

3-Compressor Contactor K1, K2

All compressor contactors are three-pole, double-break contactors with 24VAC coils. K1 and K2 (both energized by A55) energize the A192 Inverter for compressor B1 and the B2.

4-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 LCM units equipped with the optional power exhaust dampers. K65 is energized by the unit controller A55, after the economizer dampers reach 50% open (adjustable in CORE APP). When K65 closes, the exhaust fans B10 IS energized.

5-Unit Controller A55

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

6-Terminal Block TB13

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

7-Outdoor Fan Motor Fuse Block & Fuse F10

STD SCCR 240V, 300V and higher rated SCCR units have three line voltage fuses F10 provide overcurrent protection to all condenser fans. The fuses are rated at 30A in all 208/230V units but 10A in the 208/230V 240U and 300U models.

8-Transformer T4 (J voltage)

All J volt units are equipped with a line voltage to 460V 3-phase transformer to power the indoor blower motor. T4 is mounted in the back panel of the compressor section.

9-Ultraviolet Germicidal Lamp (UVC) Transformer T49

UVC transformer T49 is used by units of all voltages except 208/230V and 575V which are equipped with a UVC. The auto voltage to 230VAC transformer is installed in the control box. The transformer has an output rating of 0.5 amps. T49 transformer supplies 230VAC power to the UVC lamp.

10-Wireless Antenna

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

Antenna Location

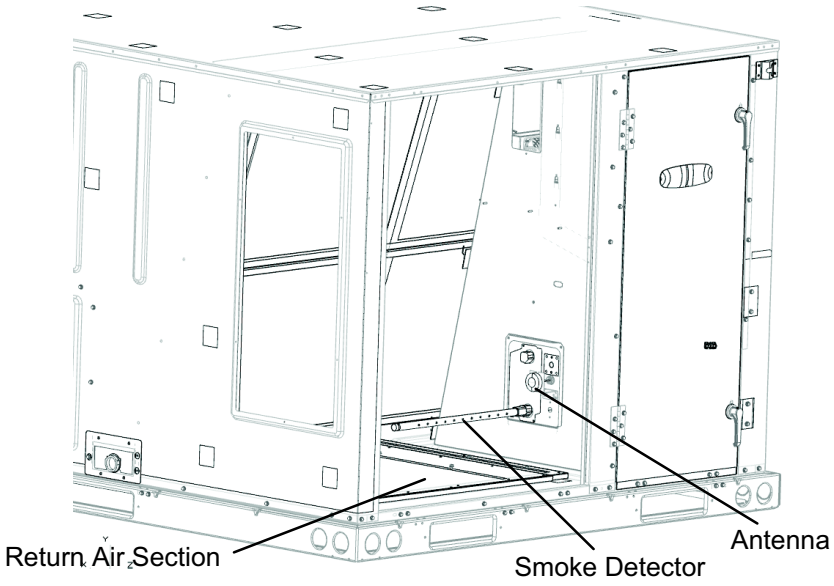


FIGURE 4

Cable Routing

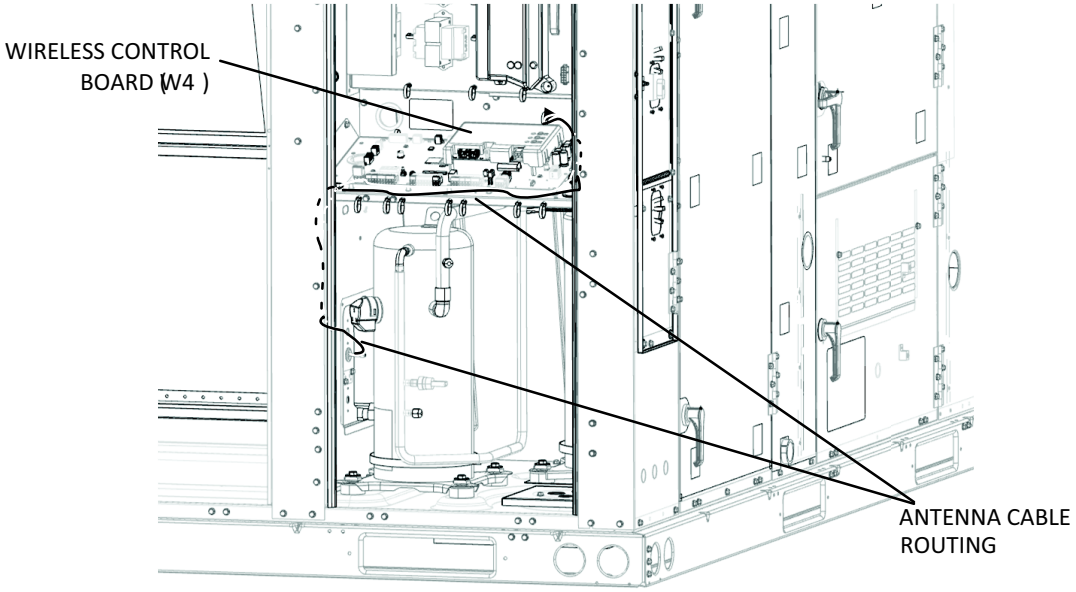


FIGURE 5

Temperature Sensors

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

Table 1
Resistance vs. Temperature

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

Room Sensors

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

Table 2
Two-Wire Thermistor

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

Carbon Dioxide Sensor

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

Table 3
Carbon Dioxide Range

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

VAV Supply Static Sensor

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

Table 4
Static Pressure

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

Relative Humidity Sensor - Optional

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

Enthalpy Sensor - Optional

The optional enthalpy sensors (A7 and A63) used with the economizer have an output of 4-20mA. The sensor is powered with 18VAC provided by M3 unit control.

Economizer Differential Pressure Sensor - Optional

Rooftop units installed with Smart Airflow™ will have a Pressure Transducer (PT5) present in the economizer. PT5 requires 5VDC power supply (P266-5 and {P266-6) and gives 0.25 VDC to 4 VDC output (P266-4) corresponding to 0” water column and 2” water column respectively. For all practical purposes the output should be less than 1.2” water column if not an error code is stored and service alarm output is turned on.

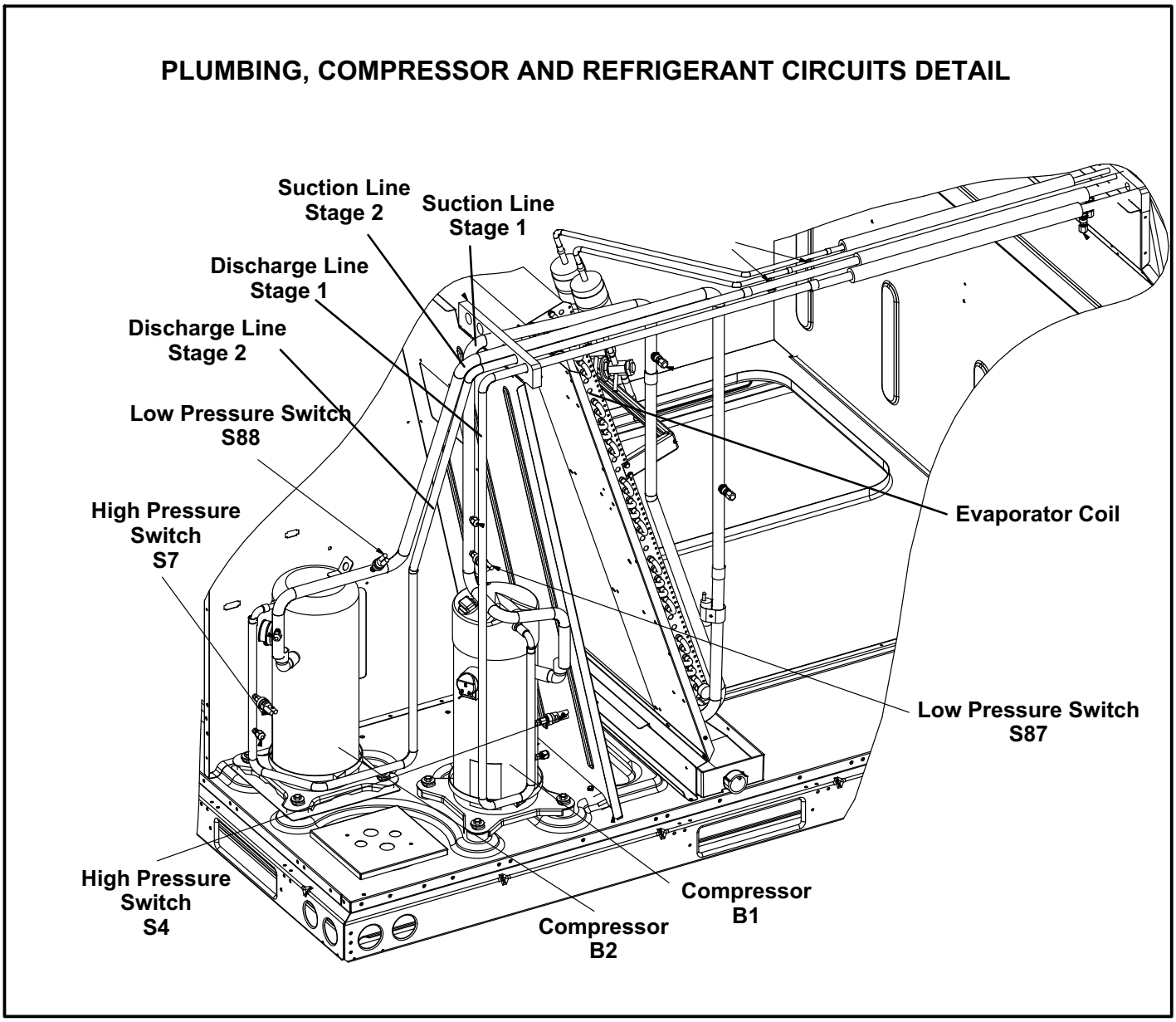


FIGURE 6

B-Cooling Components

Units use two separate refrigeration circuits. Circuit 1 uses a variable speed compressor (B1) and Circuit two uses a fixed speed scroll compressor (B2). The single evaporator coil is row-split and return air first goes to circuit two before passing through circuit one. A single condenser coil is used that has interlaced circuits for circuit one and two. See figure 6. Units are equipped with a direct drive drive blower which draws air across the evaporator during unit operation.

Units are equipped with a single slab style evaporator. The evaporator uses two thermostatic expansions valves. Evaporators are 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 comes from a suction line pressure transducer and compressor sump thermistors (temperature sensors) for added compressor reliability.

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

1-Compressors B1, B2

Units use two separate refrigeration circuits. Circuit 1 uses a variable speed compressor (B1) and Circuit two uses a fixed speed scroll compressor (B2). The single evaporator coil is row-split and return air first goes to circuit two before passing through circuit one. A single condenser coil is used

that has interlaced circuits for circuit one and two. See figure 6. Units are equipped with a direct drive drive blower which draws air across the evaporator during unit operation.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

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

2-Compressor Inverter A192

⚠ WARNING

Electrical Hazard

High Voltage

Wait 7 Minutes

Electrical components may hold charge. Do not remove this panel or service this area for 7 minutes after the power has been removed.

See figure 7 for compressor inverter controls located behind the hinged control panel.

The inverter varies the compressor speed (capacity) by converting an AC input signal to a pulse high voltage DC output. To initiate cooling operation, the Unit Controller (A55) supplies a control signal to the inverter (A192) via a MODBUS protocol. Inverter status and diagnostics are continuously monitored and reported to the Unit Controller such as:

-Improper Unit Controller input voltage compared to unit model number

-High input voltage

-Low input voltage

-Imbalanced input voltage

-A communication issue - check MODBUS communication wire for good connections between the Unit Controller and the inverter board.

See table 5 for inverter-related alarms.

Inverter component wire routing is shown in figure 8.

⚠ WARNING

Electrical shock hazard. Variable speed compressor components must be grounded. Failure to follow these precautions could cause electrical shock resulting in injury or death.

INVERTER CONTROLS BEHIND THE HINGED CONTROL PANEL

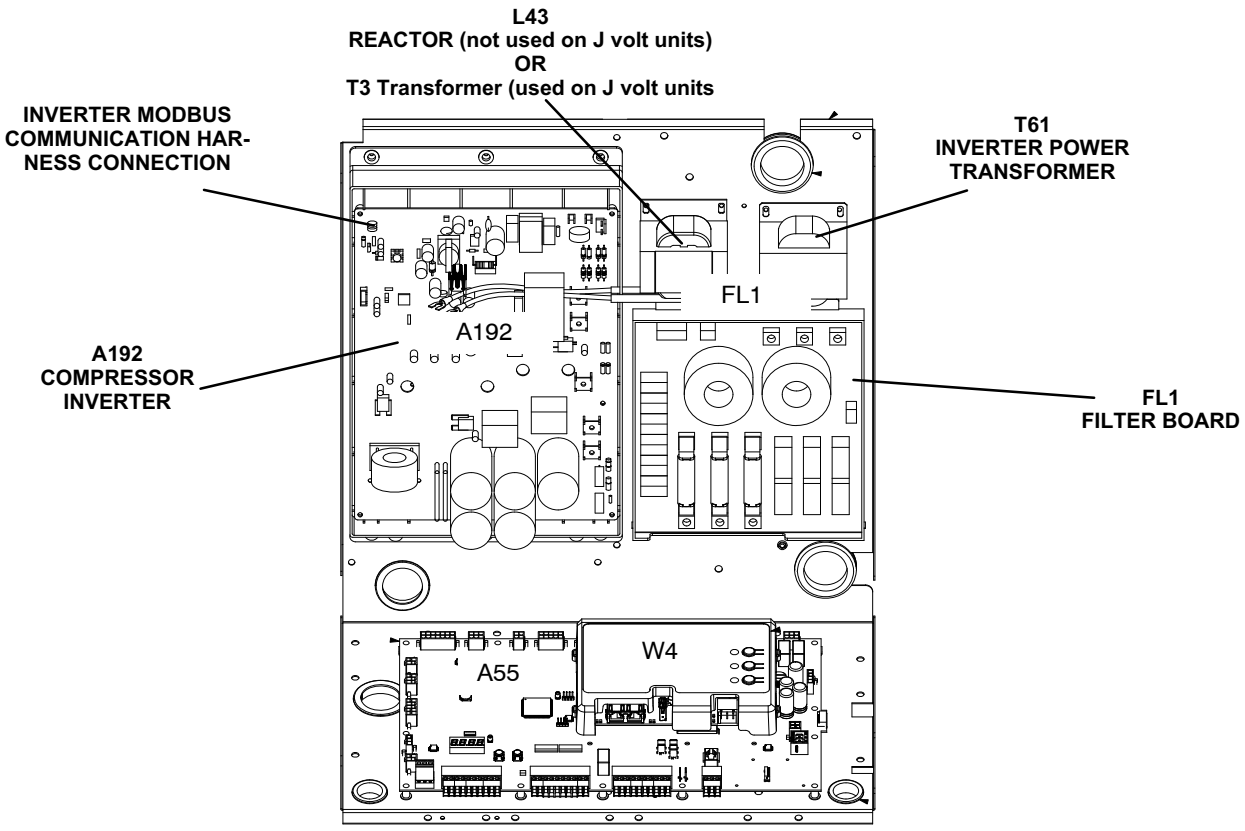


FIGURE 7

TABLE 5

INVERTER-RELATED ALARMS		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
187	INVERTER LOW LEVEL ALARM	Possible alarming values for Prodigy Alarm 187 are: 12 - High compressor input current 13 - High heat sink temperature 14 - High PFC input current Alarm might be caused by outdoor fan abnormal operation, high ambient conditions, dirty outdoor coil, refrigerant overcharge, or a blocked heat sink. The compressor speed will slow down until the temperature or current lowers, then the compressor will speed up again. If the alarm continues after outdoor conditions have moderated, check the fan, charge and coil. Alarm 187 will automatically clear when minimum off time expires. **REFER TO TROUBLE SHOOTING GUIDE IN SERVICE MANUAL FOR MORE INFORMATION.**
188	INVERTER HIGH LEVEL ALARM	Possible alarming values for Prodigy Alarm 188 are: 21 - Peak DC current - Intelligent Power Module (IPM) fault condition (follow 12) 22 - Maximum current reached lockout 23 - DC link low voltage 26 - Locked rotor 28 - DC link high voltage 29 - Compressor over-current 61 - Low outdoor ambient inverter lockout 62 - High heat sink temperature lockout 75 - Low input voltage No action required. Compressor stops for the duration of the minimum run time (anti-short-cycle delay of 180 seconds). Unit shuts down after ten occurrences in one hour and Alarm 189 is initiated. Alarm 188 will automatically clear when inverter error clears. **REFER TO TROUBLE SHOOTING GUIDE IN SERVICE MANUAL FOR MORE INFORMATION.**
189	INVERTER FATAL ALARM	Possible alarming values for Prodigy Alarm 189 are the same as alarm 188. Alarm 189 will clear upon manual reset. **REFER TO TROUBLE SHOOTING GUIDE IN SERVICE MANUAL FOR MORE INFORMATION.**
190	INVERTER COMMUNICATION ERROR	Unable to communicate with inverter. Unit Controller will disable compressor operation. Replace communication cable between inverter and M3 unit controller. If alarm continues, replace M3 unit controller or inverter.
191	INVERTER VOLTAGE MISMATCH	Unit Controller will disable compressor operation. Replace with correct inverter part.

a-Filter Board FL1

The filter, also called a line or noise filter, is used to prevent static interference from outside sources. In addition, the filter prevents electrical interference from transferring to other appliances. The input voltage should read the same value as the output voltage. The same filter is used on all unit sizes and voltages.

b-Inverter Transformer T61

This transformer is used to supply power to the inverter's low voltage logic circuit. It also provides electrical isolation to protect sensitive components from electrical surges.

c-Reactor L43

The reactor (inductor or choke) is used to improve the power factor. This passive, two-terminal electrical component has a magnetic field that stores energy. Reactors are one of the basic components used in electronics where current and voltage change with time (due to the ability of inductors to delay and reshape alternating currents). This component is connected to the compressor inverter A192. A 2mH reactor is used on 208/230V units and a 13mH reactor is used on 460V units.

d-Inverter Heat Sink

The A192 inverter heat sink is cooled by B47 fan located behind the inverter mounting panel. The B47 fan can be accessed as shown by opening the filter access panel. Relay K191 provides power to the B47 fan through P417 Plug. The fan is always energized while the B1 Compressor is running. See figure 9.

INVERTER WIRE ROUTING

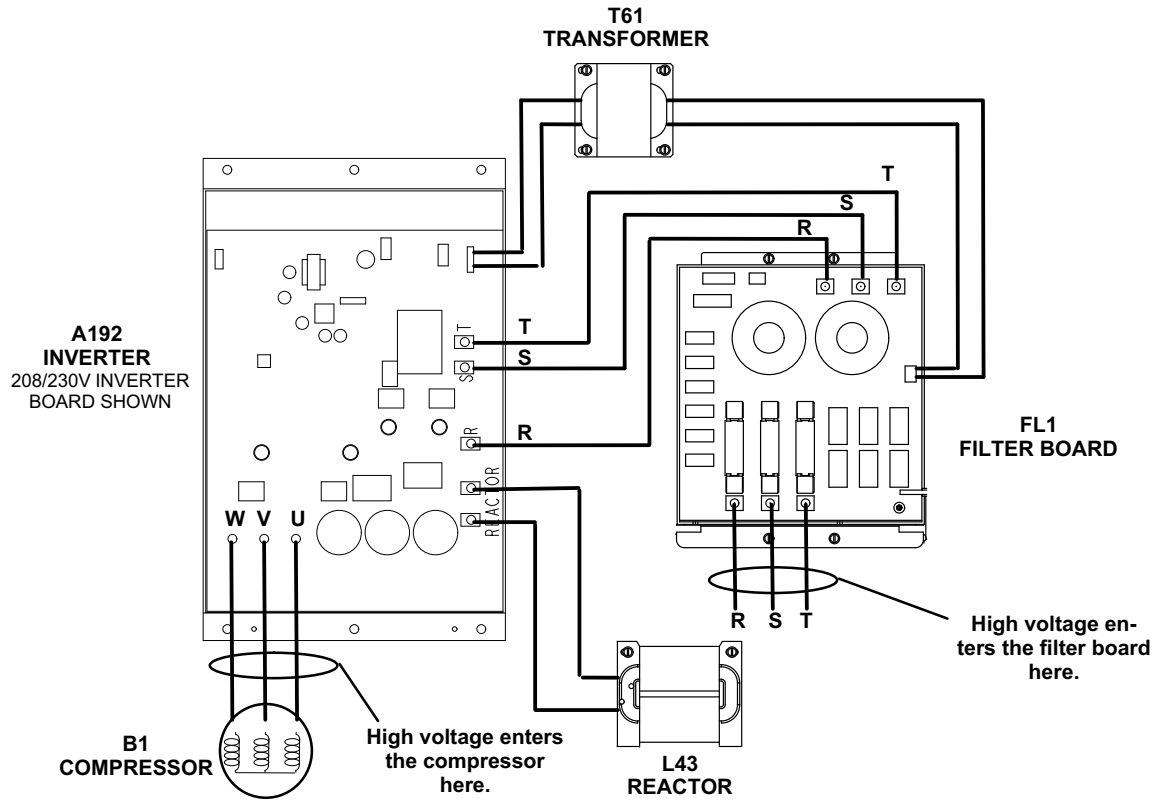


FIGURE 8

INVERTER HEAT SINK

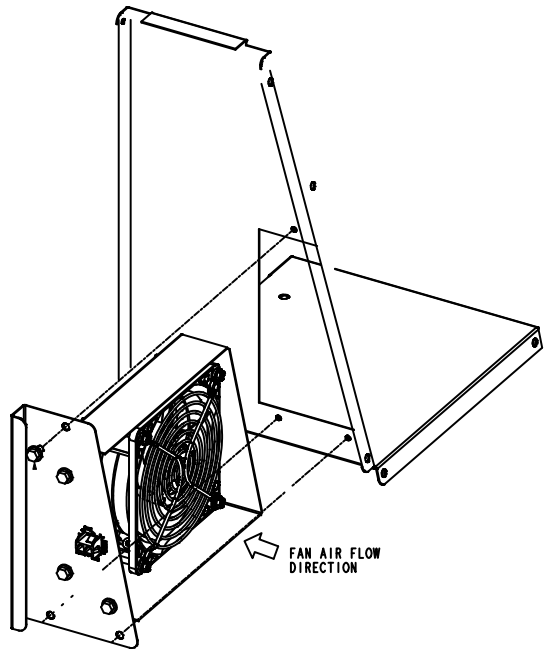


FIGURE 9

⚠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.

3-Crankcase Heaters HR1, HR2

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

4-High Pressure Switches S4, S7

The high pressure switch is an auto-reset SPST N.C. which open on a pressure rise. The switch is located in the compressor discharge line and is wired to the both the compressor contactor via controller A55. S4 protects compressor B1 and S7 protects compress B2. S4 is wired to the K1 contactor that disables power to the A192 Compressor Variable Speed Inverter. S7 is wired to the K2 contactor that dissables the B2 compressor.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 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 ± 20 psig (3275 ± 138 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.

5-Filter Drier

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

6-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 and wired to A55 unit controller.

A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during first thermostat demand, before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control.

When suction pressure drops to 40 $\pm$ 5 psig (276 ± 34 kPa), (indicating low pressure), the switch opens and the compressor(s) is(are) de-energized. The switch automatically resets when pressure in the suction line rises to 90 $\pm$ 5 psig (620 ± 34 kPa) due to many causes such as refrigerant being added.

7-Condenser Fans B4, B5

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

Units are equipped with electronically 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 A55 Unit Controller. The PWM signal determines the condenser fan speed. Both fans will operate in low speed with a Y1 demand and both will will operate in high speed with a Y2 demand.

Transformer T5 and Fuse F57 460VAC & 575VAC only

460VAC and 575VAC units will use a Transformer T5 to step-down the line voltage to the correct 230VAC. There are two fuses F57 located next to the T5 transformer. The location of the T5 transformer is behind the disconnect box just above the bottom power entry cover.

Both low and high voltage plugs are located at the top of the blower compartment in the indoor section of the unit. Condenser fan motors B4 and B5 high voltage plugs are J86, and J87. Low voltage plugs are J336 and and J338 respectively. Refer to wiring markings to identify plugs.

If an ECM fan is not operating:

1 Check to make sure high voltage is present before checking low voltage.
2 Read the voltage at the appropriate high voltage fan motor plug (J86 or J87) using the VAC meter setting.
3 If high voltage is present, check the low voltage plug (J336 or J337) for a signal from the Unit Controller. Use either the duty cycle (%) or a VDC meter setting.

Note - The VDC reading may fluctuate and is normal for a PWM signal.

8-Temperature Sensors RT42, RT43, RT44, RT45, RT46, RT47RT48 and RT49

Units are equipped with eight factory-installed thermistors (RT42 - 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. In addition, the Unit Controller uses these temperatures to initiate alarms such as loss of condenser or evaporator airflow and loss of charge. See figures 10, 11 and 12 for location.

THERMISTOR LOCATION RT42, 43, 46, 47
(EVAPORATOR COIL VIEW FROM FRONT SIDE OF UNIT)

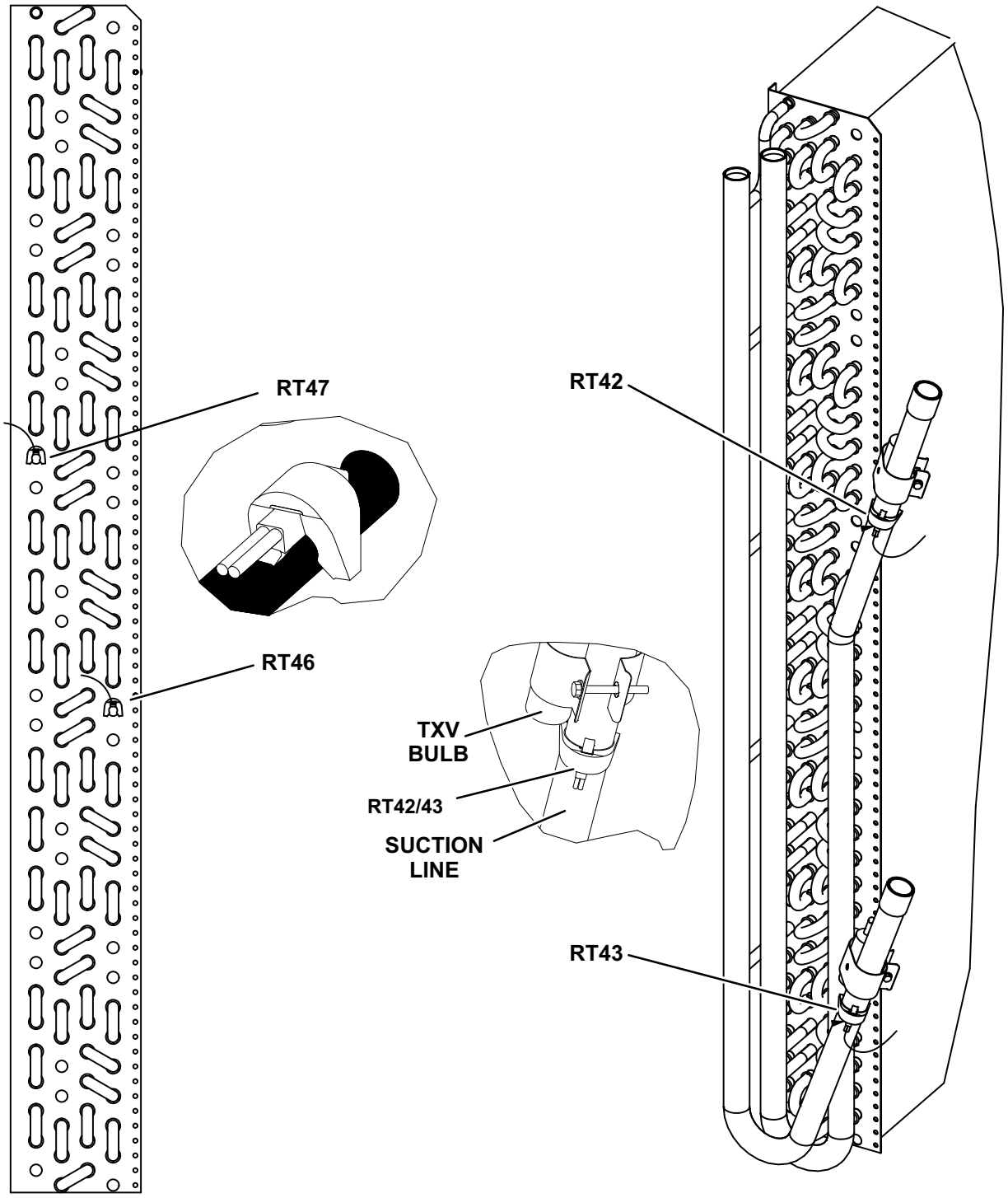


FIGURE 10

THERMISTOR LOCATION RT44 & 45
(VIEW FROM FRONT SIDE OF UNIT)

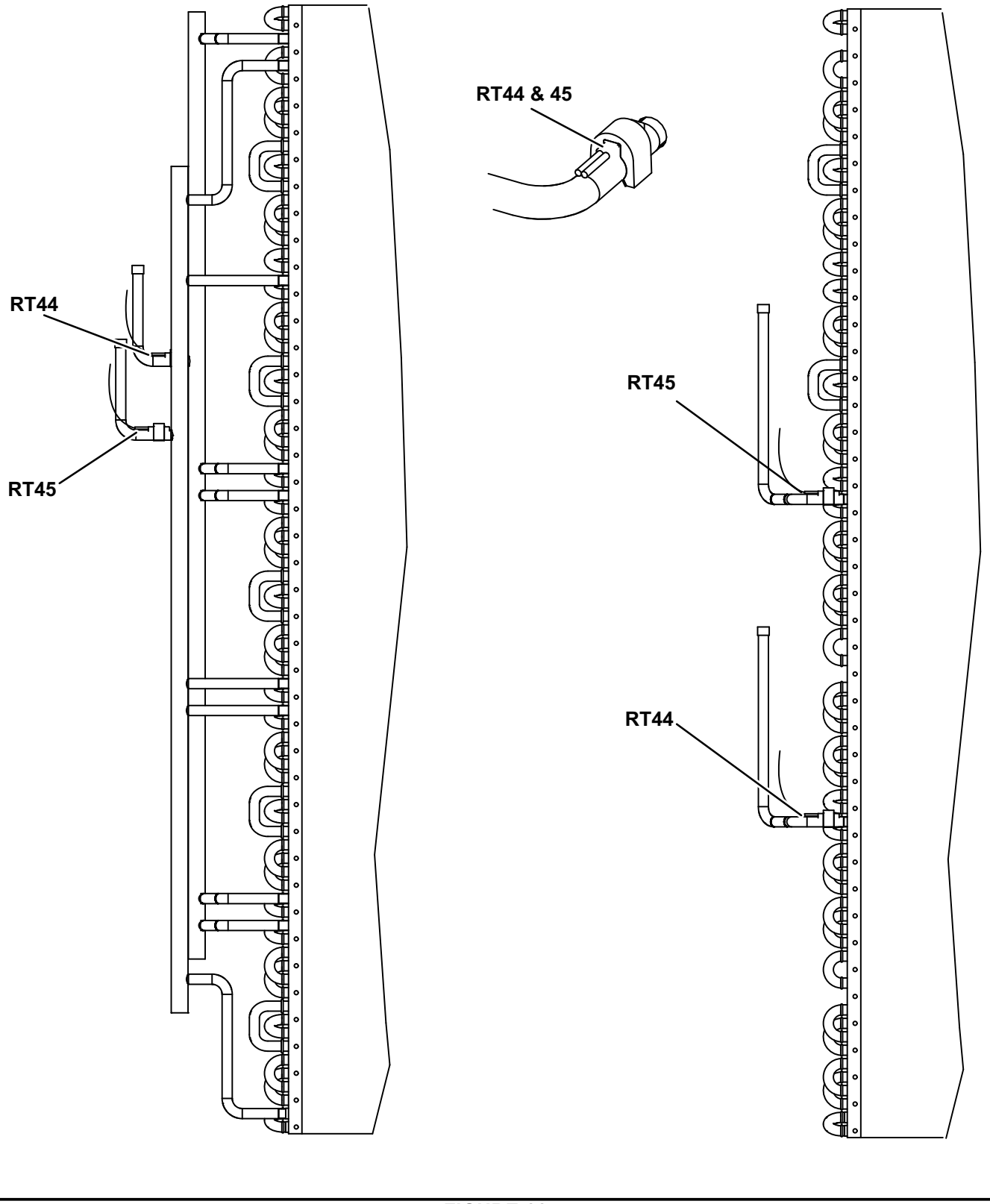


FIGURE 11

THERMISTOR LOCATION RT48 & 49
(VIEW FROM FRONT SIDE OF UNIT)

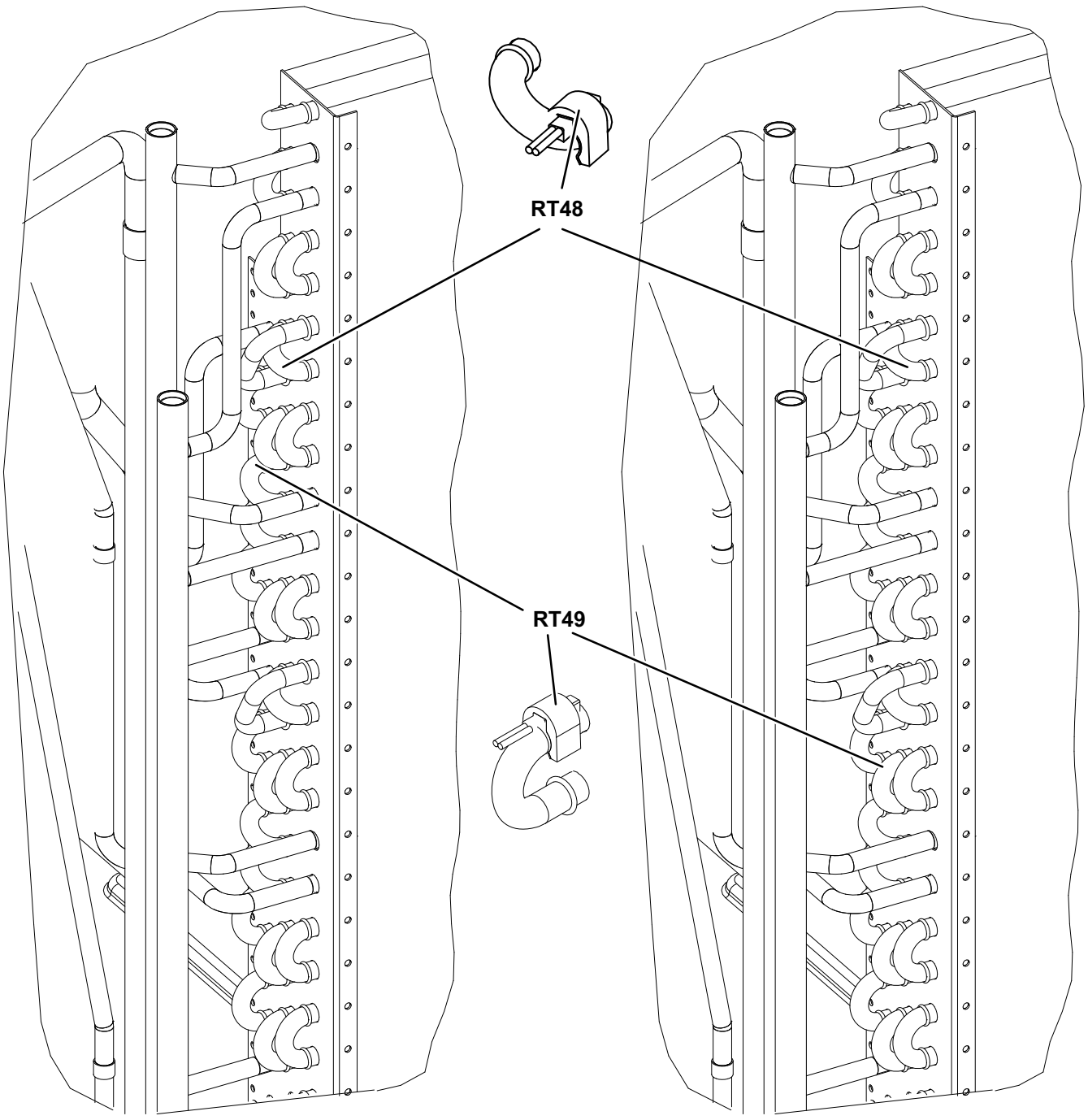


FIGURE 12

C-Blower Compartment

1-Blower Wheels

Units are equipped with an optional direct drive blower assembly with a backward inclined blower wheel.

2-Indoor Blower Motor B3

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

All motor specifications are listed in the SPECIFICATIONS (table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit.

A-Blower Operation

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

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

⚠WARNING

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

2-Inspect all electrical wiring, both field- and factory-installed, for loose connections. Tighten as required.

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

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

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

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

1 Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.
2 With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

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

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 14.

1 Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing. Disconnect the pressure sensor low voltage wire harness.
2 Remove and retain screws on either side (and on the front for direct drive) of sliding frame. Use the metal handle to pull frame toward outside of unit.
3 Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location using the wire tie. Reconnect pressure sensor low voltage wire harness.
4 Replace retained screws.

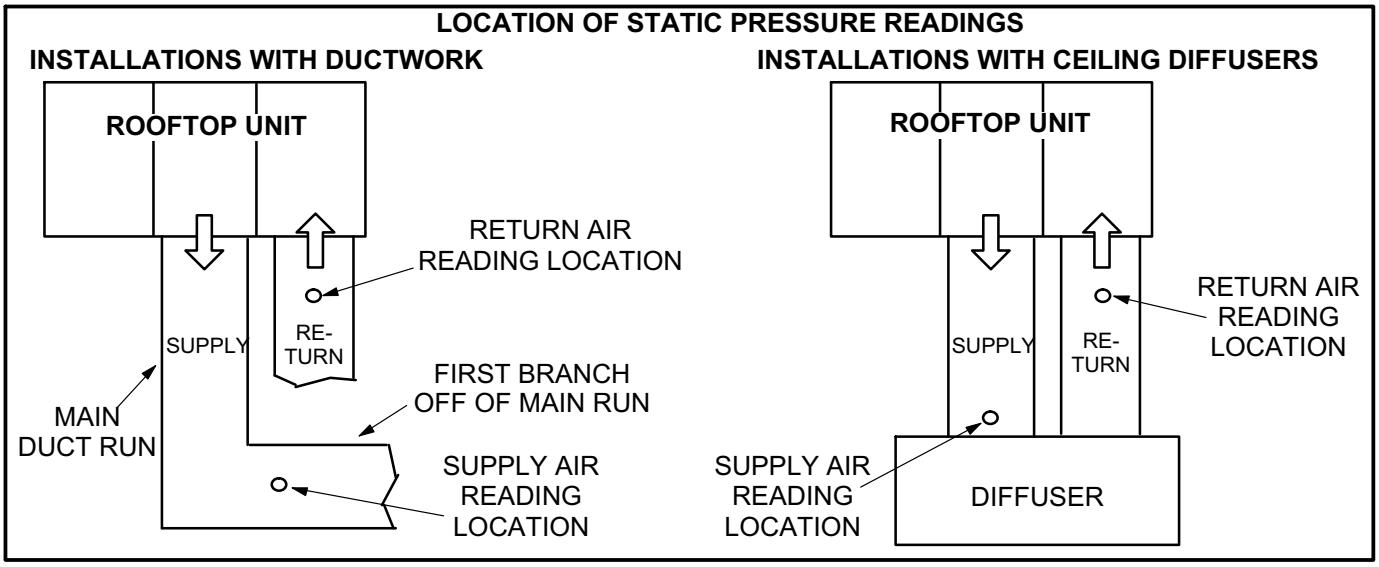


FIGURE 13

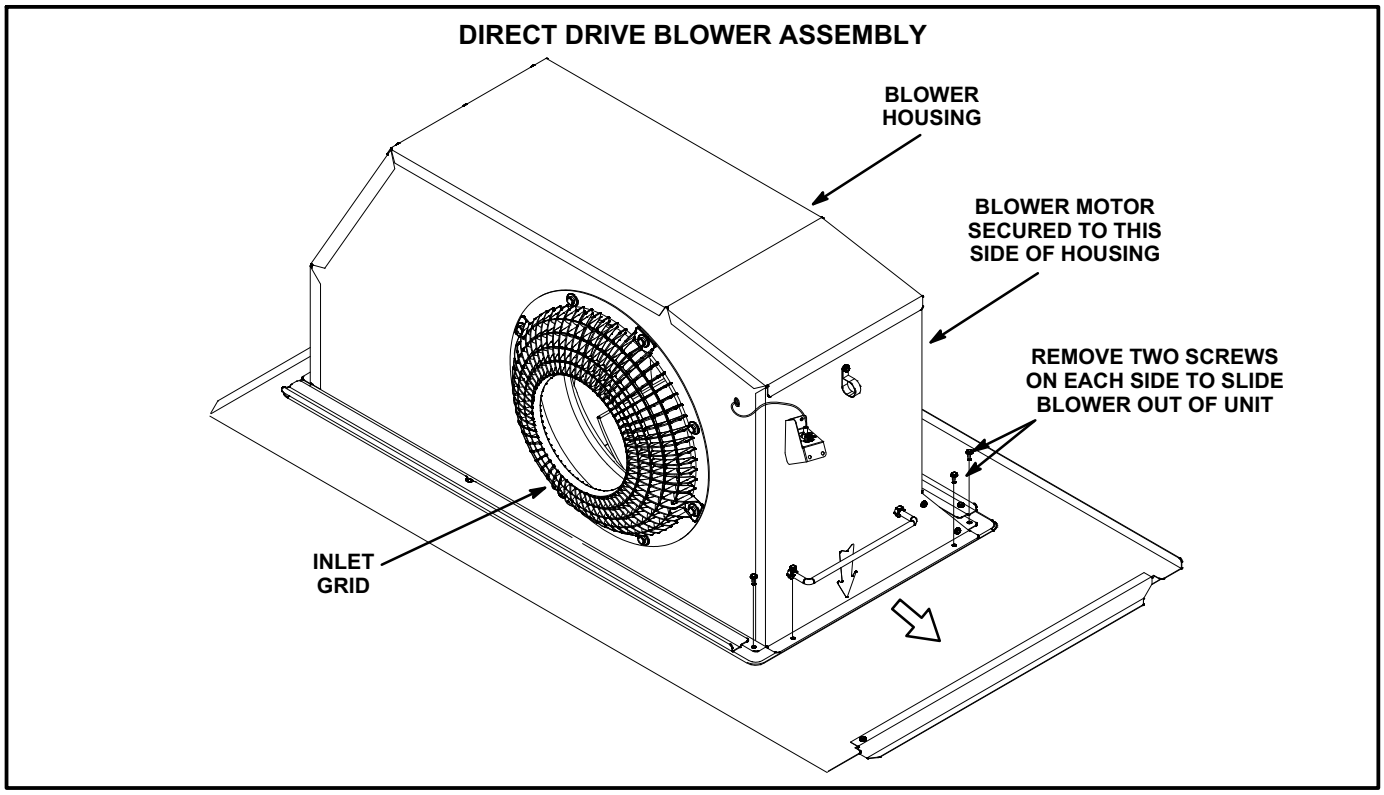


FIGURE 14

C-Direct Drive Start-Up

The supply CFM can be adjusted by changing Unit Controller settings. Refer to table 6 for menu paths and default settings. Record any CFM 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 CFM 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 CFM is lower than a traditional singe- or two-speed unit. If operating the unit with a 2- or 3-stage controller (2- or 3-stage thermostat, DDC controller, etc.), it is recommended to increase the Cooling Low CFM default value to a suitable level for part load cooling (typically 60% of full load CFM).

TABLE 6
DIRECT DRIVE PARAMETER SETTINGS

Parameter	Factory Setting				Field Setting	Description
	092	102	120	150		
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 12						
BLOWER SMOKE CFM	3000	3400	4000	5000	CFM	Smoke blower speed
SETUP > TEST & BALANCE > BLOWER						
BLOWER HEATING HIGH CFM	3000	3400	4000	5000	CFM	Heating blower speed
BLOWER COOLING HIGH CFM	2625	2975	3500	4375	CFM	High cooling blower speed
BLOWER COOLING LOW CFM	800	800	875	1100	CFM	Low cooling blower speed
BLOWER VENTILATION CFM	800	800	875	1100	CFM	Ventilation blower speed
SETUP > TEST & BALANCE > DAMPER						
BLOWER HIGH CFM DAMPER POS %	0%	0%	0%	0%	%	Minimum damper position for high speed blower operation.
BLOWER LOW CFM DAMPER POS %	0%	0%	0%	0%	%	Minimum damper position for low speed blower operation.
POWER EXHAUST DAMPER POS %	50%	50%	50%	50%	%	Minimum damper position for power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 216						
POWER EXHAUST DEADBAND %	10%	10%	10%	10%	%	Deadband % for power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETER = 10 (Applies to Thermostat Mode ONLY)						
FREE COOLING STAGE-UP DELAY	300 sec.	300 sec.	300 sec.	300 sec.	sec	Number of seconds to hold indoor blower at low speed before switching to indoor blower at high speed.

Installer: Circle applicable unit model number and record any parameter changes under “Field Setting” column. Settings need to be recorded by installer for use when Unit Controller is replaced or reprogrammed.

TABLE 7
DIRECT DRIVE BLOWER MOTOR TROUBLESHOOTING

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

D-Electric Heat Components

See ELECTRICAL / ELECTRIC HEAT DATA and ELECTRIC HEAT CAPACITIES (table of contents) for electric heat match-ups and electrical ratings.

Electric heat is shown in figure 15. All electric heat sections consist of electric heating elements exposed directly to the air stream.

1-Heating Elements HE1, HE2, HE3, HE4, HE5, 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.

2-Contactors K15, K16

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

3-Primary Limit Switch S15

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

4-High Temperature Limits S20, S157, S158, S159

Limits are SPST N.C. manual-reset thermostats. Like the primary temperature limit, S20 and S157 are wired in series with the first-stage contactor coil (K15). S158 and S159 are wired in series with contactor coil (K16). When any of the switches open the respective heating elements are de-energized. When the contactors are de-energized, first-stage and all subsequent stages of heat are de-energized. The limits are factory-set to open at 220°F ± 6°F (104°C ± 3.3°C) on a temperature rise and can be manually reset when temperature falls below 160°F (71.0°C).

5-Terminal Strip TB2

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

6-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.

7-Fuse F3 and F42

Fuses are housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. Figure 15 and table 8 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F42 - 1, 2.

8-Unit Fuse Block F4

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

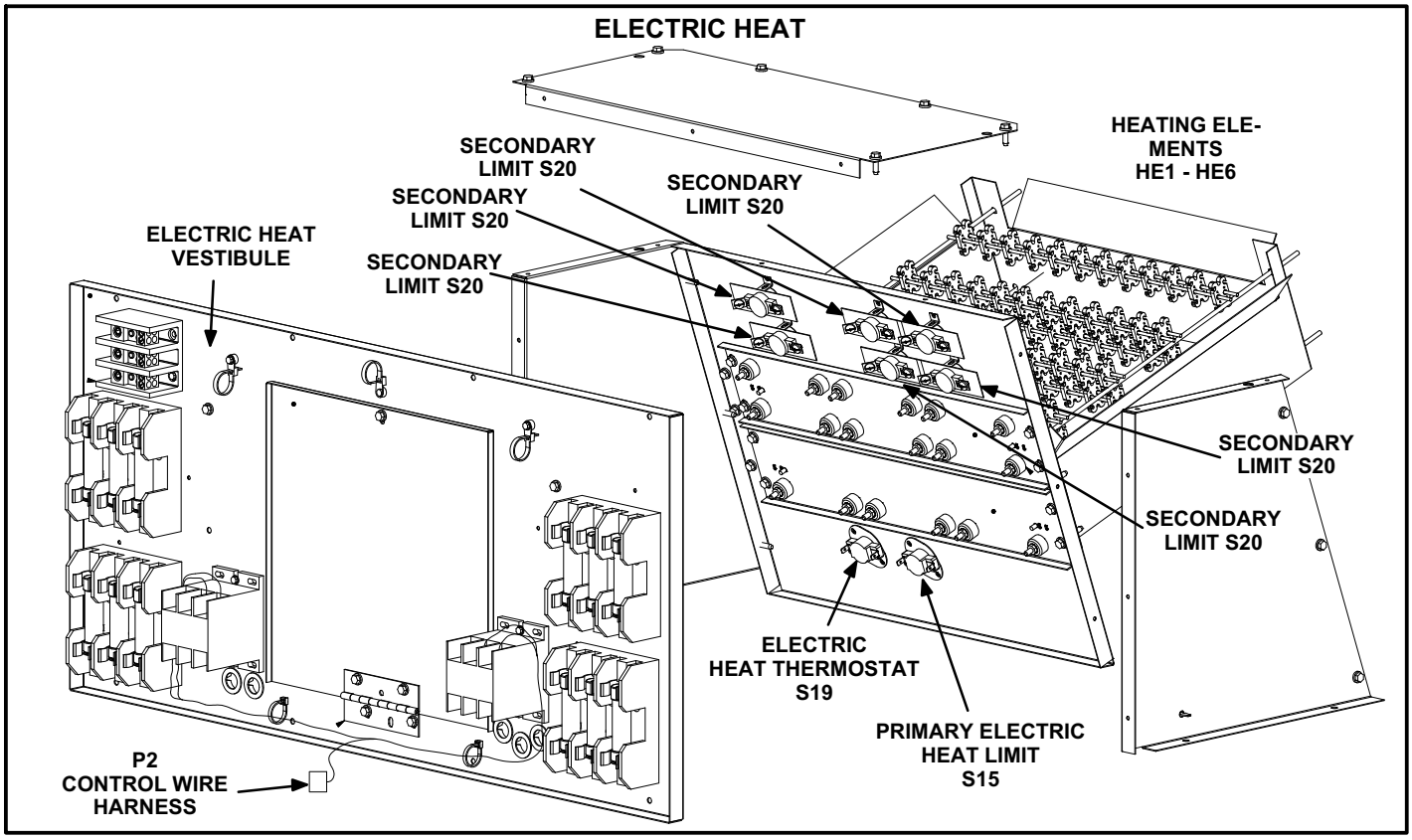


FIGURE 15

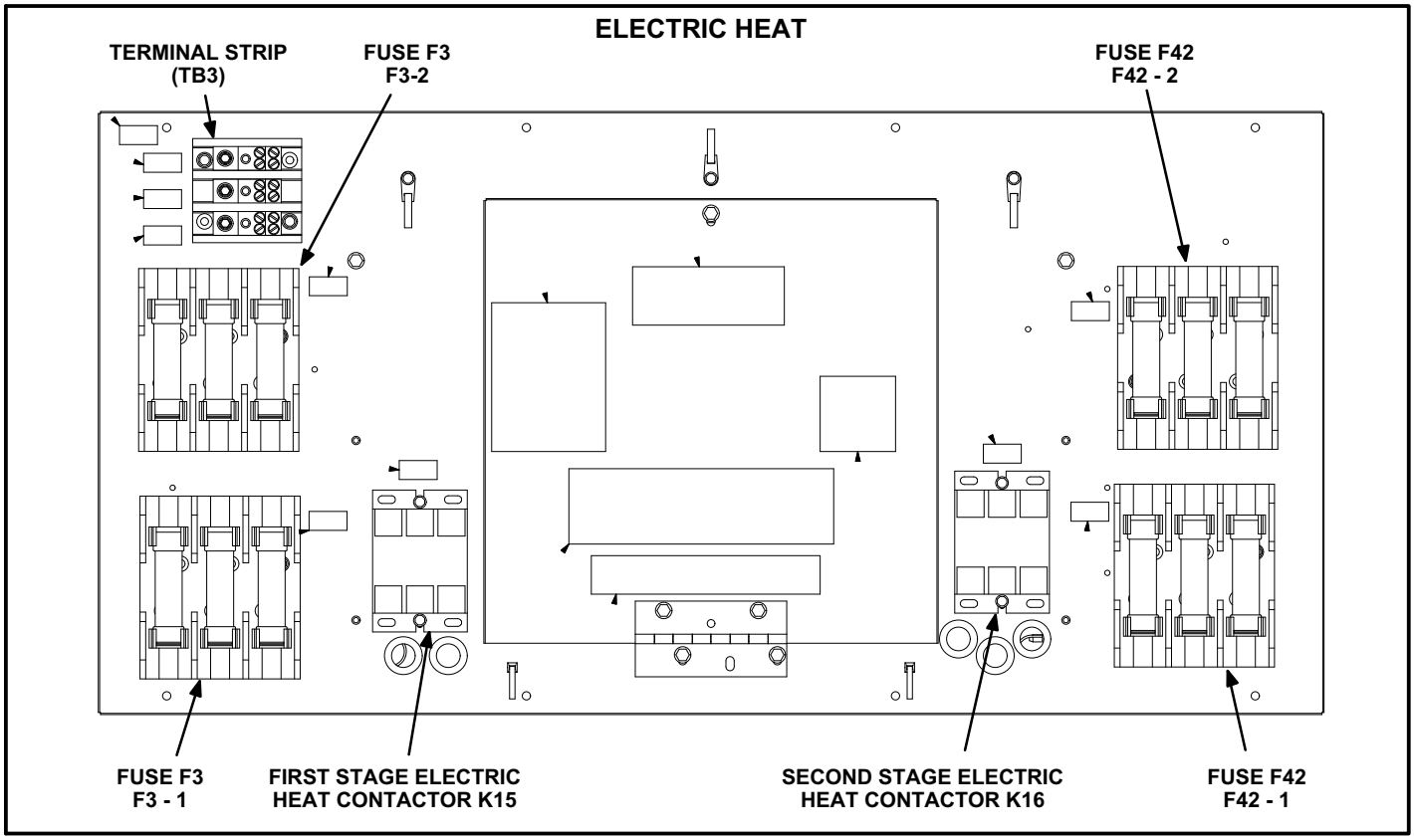


FIGURE 16

TABLE 8

ELECTRIC HEAT SECTION FUSE RATING					
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**			
		F3 - 1	**F3 - 2**	**F42 - 1**	**F42 - 2**
EHO075-1, 7.5	208/230	-	25 Amp 250V	-	-
	460	-	15 Amp 600V	-	-
	575	-	10 Amp 600V	-	-
EHO150-1, 15	208/230	-	50 Amp 250V	-	-
	460	-	25 Amp 600V	-	-
	575	-	20 Amp 600V	-	-
EHO225-1, 22.5	208/230	50 Amp 250V	-	25 Amp 250V	-
	460	25 Amp 600V	-	15 Amp 600V	-
	575	20 Amp 600V	-	10 Amp 600V	-
EHO300-1, 30	208/230	50 Amp 250V	-	50 Amp 250V	-
	460	25 Amp 600V	-	25 Amp 600V	-
	575	20 Amp 600V	-	20 Amp 600V	-
EHO450-1, 45	208/230	50 Amp 250V	-	60 Amp 250V	60 Amp 250V
	460	25 Amp 600V	-	50 Amp 600V	-
	575	20 Amp 600V	-	40 Amp 600V	-
EHO600-1, 60	208/230	60 Amp 250V	60 Amp 250V	60 Amp 250V	60 Amp 250V
	460	50 Amp 600V	-	50 Amp 600V	-
	575	40 Amp 600V	-	40 Amp 600V	-
EHO057-1, 5.7	384	-	15 Amp 600V	-	-
EHO115-1, 15	384	-	25 Amp 600V	-	-
EHO172-1, 17.2	384	25 Amp 600V	-	15 Amp 600V	-
EHO230-1, 23.0	384	25 Amp 600V	-	25 Amp 600V	-
EHO345-1, 34.5	384	25 Amp 600V	-	40 Amp 600V	-
EHO459-1, 45.9	384	40 Amp 600V	-	40 Amp 600V	-

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (C1CURB10).

III-CHARGING

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:

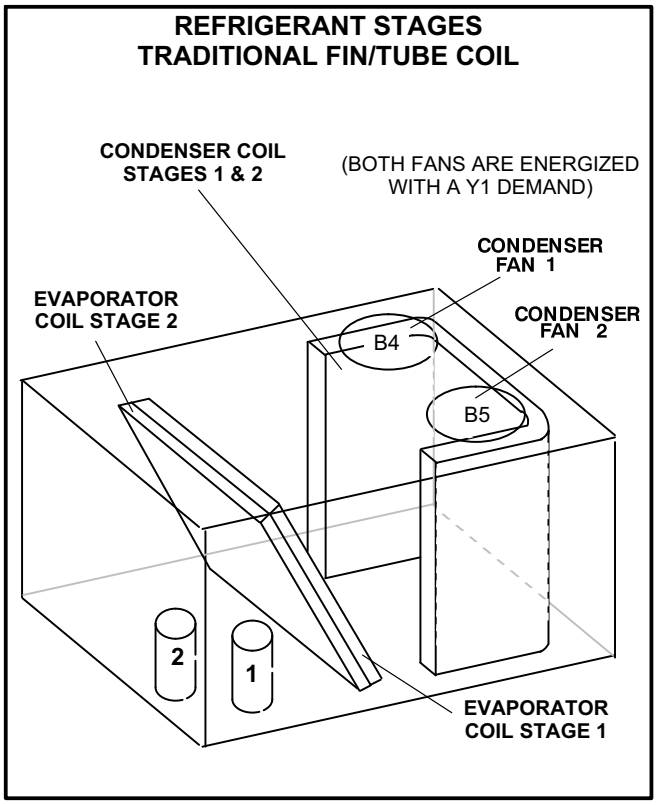


FIGURE 17

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 > COOL 4

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

3 Apply the outdoor temperature to tables 9 through 16 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F 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 9 581027-01
LGM/LCM092U No Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	252	140	269	137
75° F	293	143	311	139
85° F	335	146	354	142
95° F	382	148	403	144
105° F	434	150	454	147
115° F	490	153	508	150

TABLE 10 581028-01
LGM/LCM092U Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	258	140	269	136
75° F	301	139	308	137
85° F	344	141	349	139
95° F	392	143	398	142
105° F	445	145	447	144
115° F	504	148	501	147

TABLE 11 581029-01
LGM/LCM102U No Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	256	140	259	139
75° F	294	143	300	141
85° F	333	147	341	143
95° F	381	149	388	146
105° F	433	151	438	149
115° F	487	155	491	153

TABLE 12 581030-01
LGM/LCM102U Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	264	140	266	137
75° F	301	139	300	139
85° F	349	141	341	141
95° F	399	144	390	144
105° F	450	146	440	147
115° F	508	149	494	150

TABLE 13 581031-01
LGM/LCM120U No Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	258	132	263	131
75° F	296	137	302	133
85° F	337	139	344	135
95° F	383	141	389	137
105° F	439	142	438	140
115° F	490	145	494	143

TABLE 14 581032-01
LGM/LCM120U Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	272	131	255	133
75° F	309	135	294	135
85° F	350	138	335	137
95° F	396	139	381	139
105° F	452	141	430	142
115° F	503	144	485	145

TABLE 15 581033-01
LGM/LCM150U No Reheat

Outdoor Coil Entering Air Temp	Circuit 1		Circuit 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	267	122	270	113
75° F	308	128	313	120
85° F	355	133	363	127
95° F	399	136	407	130
105° F	448	139	456	132
115° F	503	142	510	136

TABLE 16 581034-01
LGM/LCM150U Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	313	123	259	113
75° F	353	129	302	121
85° F	401	134	351	127
95° F	445	137	396	130
105° F	493	140	445	133
115° F	548	143	499	137

Charge Verification - Subcooling Method - AHRI Testing

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 4

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 17 for subcooling temperatures. A subcooling temperature greater than this value indicates an overcharge. A subcooling temperature less than this value indicates an undercharge.

TABLE 17
SUBCOOLING TEMPERATURE

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
092	12°F ± 1 (6.7°C ± 0.5)	15°F ± 1 (8.3°C ± 0.5)
092 Reheat	17°F ± 1 (9.4°C ± 0.5)	15°F ± 1 (8.3°C ± 0.5)
102	11°F ± 1 (6.1°C ± 0.5)	14°F ± 1 (7.7°C ± 0.5)
102 Reheat	19°F ± 1 (6.7°C ± 0.5)	14°F ± 1 (7.7°C ± 0.5)
120	9°F ± 1 (5.0°C ± 0.5)	13°F ± 1 (7.2°C ± 0.5)
120 Reheat	15°F ± 1 (8.3°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)
150	10°F ± 1 (5.6°C ± 0.5)	11°F ± 1 (6.1°C ± 0.5)
150 Reheat	22°F ± 1 (12°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)

IV-STARTUP - OPERATION

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

A-Preliminary and Seasonal Checks

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

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

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

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

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

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

B-Cooling Start-up See Figure 18

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

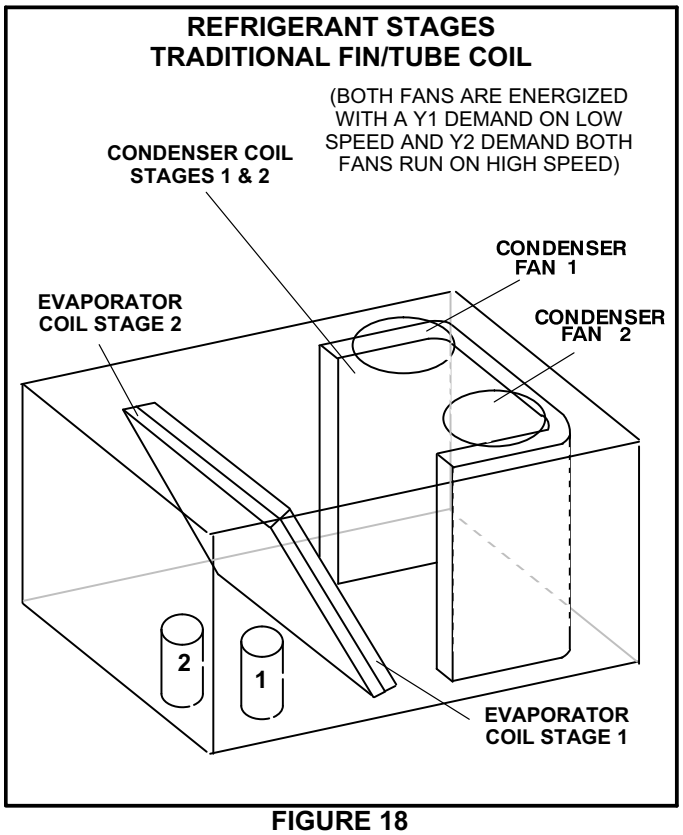


FIGURE 18

VFD Units - Refer to the Supply Air Inverter Start-Up section.

1 Initiate first and second stage cooling demands according to instructions provided with thermostat.

2 First-stage thermostat demand will energize compressors 1 and 2 on low speed. Second-stage thermostat demand will energize compressors 1and 2 on high speed.

3 Ultra high efficiency units have one common (tandem) refrigerant circuit.

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

V- SYSTEMS SERVICE CHECKS

A-Electrical

1 Check all wiring for loose connections.

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

3 Check amp-draw on both condenser fan motor and blower motor.
Fan Motor Rating Plate ____ Actual _____
Indoor Blower Motor Rating Plate____ Actual____

VI-ACCESSORIES

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

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LCM 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 19. 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 20. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

Optional supply/return transitions C1DIFF30B is available for use with the LCM 7.5 ton units and C1DIFF31B is available for the 8.5 and 10 ton units, utilizing optional C1CURB roof mounting frames. LCM 12.5 ton units will use C1DIFF32B with C1CURB roof mounting frame. Transition must be installed in the C1CURB mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

C-C1DAMP Outdoor Air Dampers (all units)

C1DAMP consists of a set of dampers which may be manually C1DAMP10B-2 or motor C1DAMP20B-1 operated to allow up to 25 percent outside air into the system at all times (see figure 21 or 22). Either air damper can be installed in LCM units. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild detergent. It should be sprayed with Filter Handicoater when dry prior to reinstallation. Filter Handicoater is R.P. Products coating no. 418 and is available as Part No. P-8-5069.

D-Supply and Return Diffusers (all units)

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

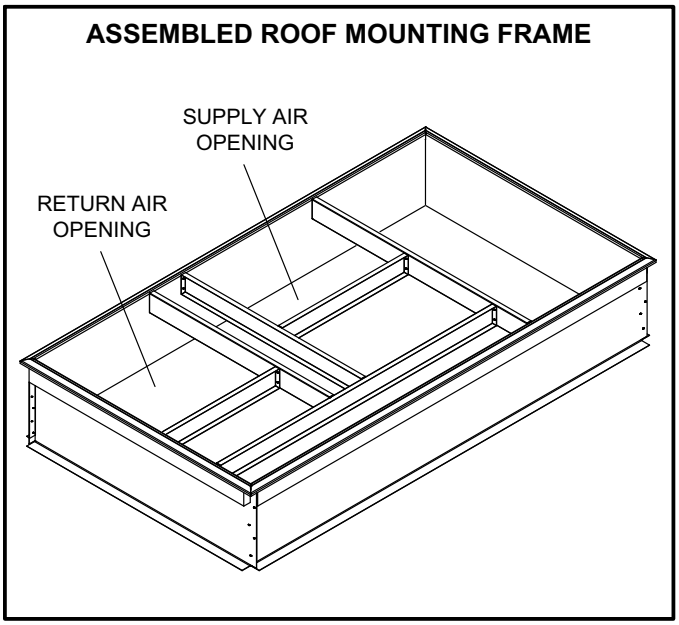


FIGURE 19

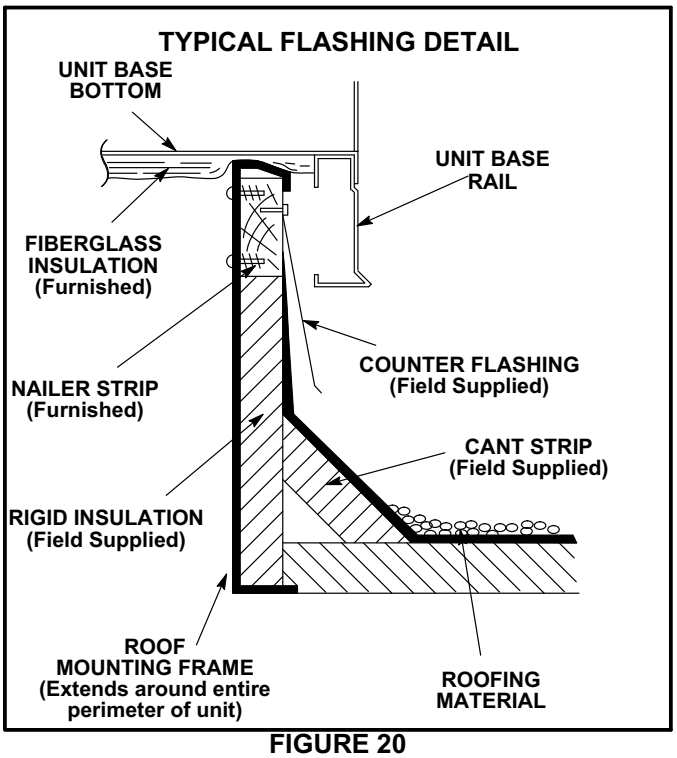


FIGURE 20

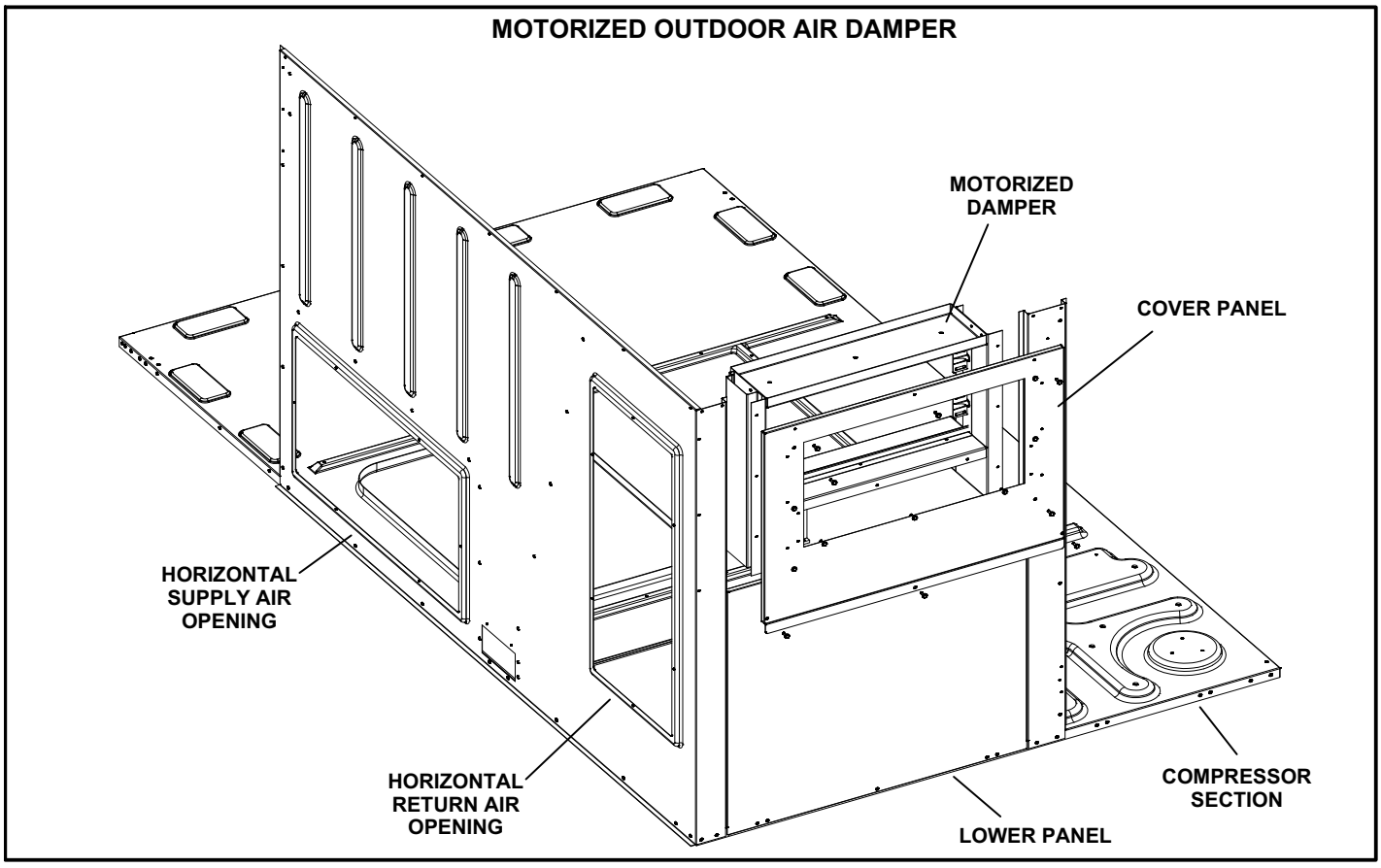


FIGURE 21

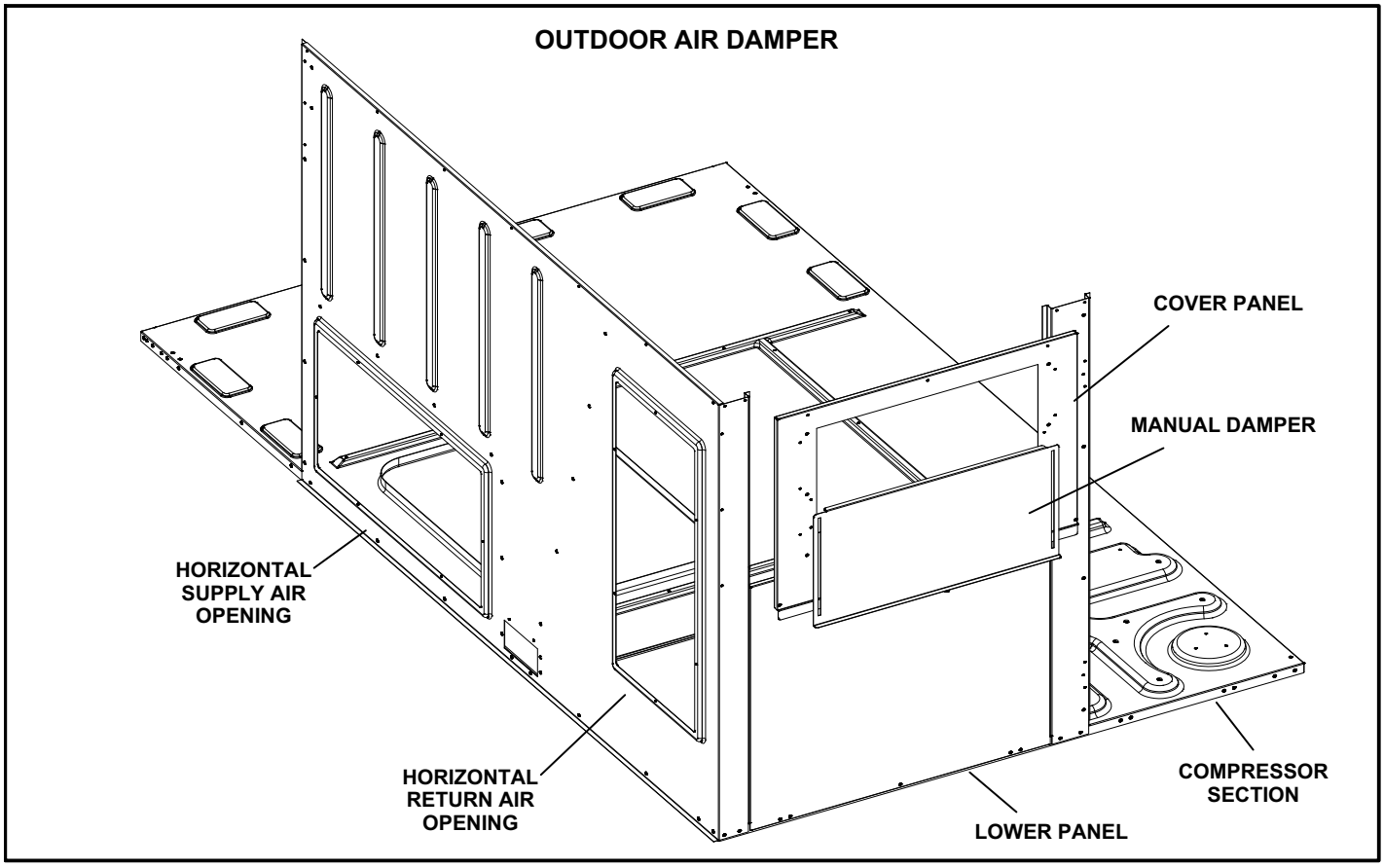


FIGURE 22

E-Economizer E1ECON15 (standard) or E1ECON17 (high performance)

The following is a brief description of standard economizer E1ECON15. For more detail on this or high performance economizer E1ECON17 see economizer installation instruction.

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See figure 24. 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 18 for modes and figure 23 for factory installed sensors. Temperature offset is the default free cooling mode.

NOTE - All free cooling modes of operation will modulate dampers to 55° F (13° C) 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.

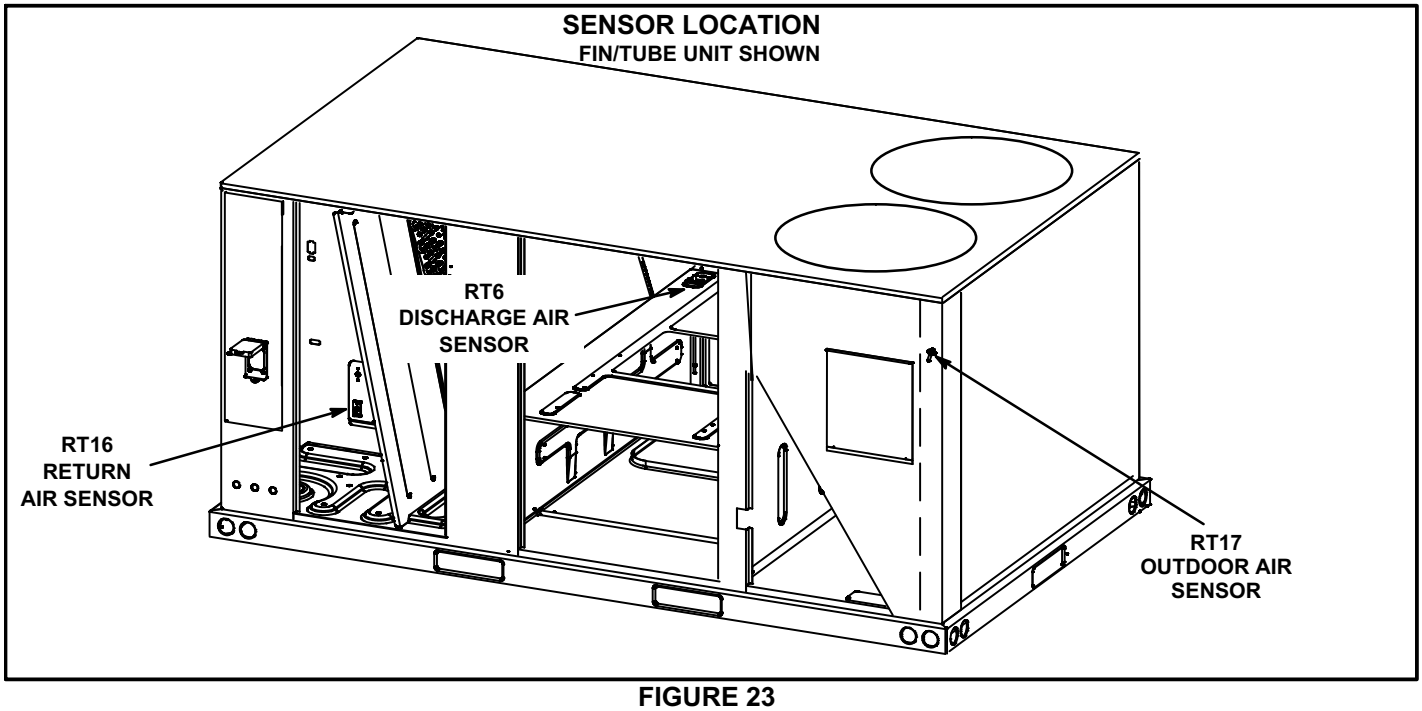


FIGURE 23

TABLE 18
ECONOMIZER MODES AND SETPOINT

Free Cooling Mode	Free Cooling Setpoint	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.

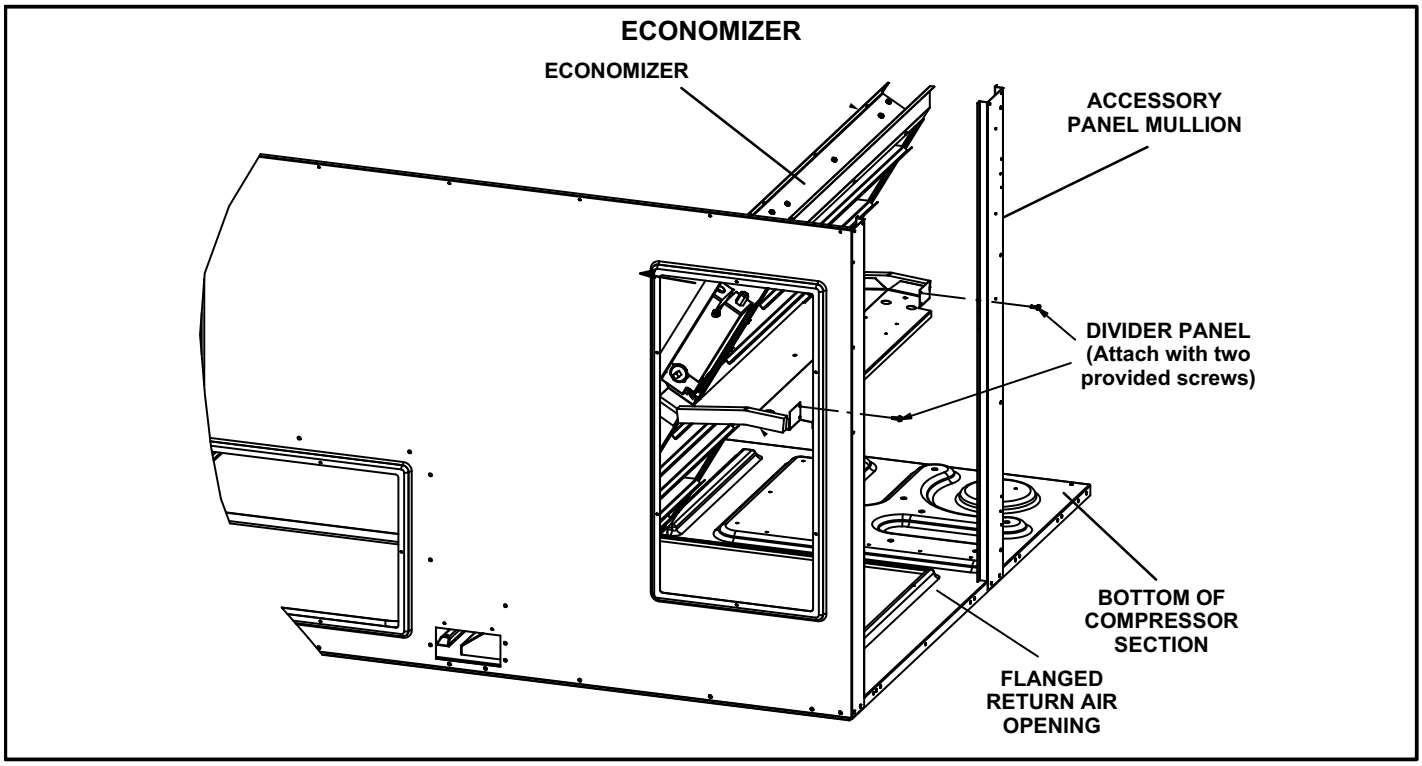


FIGURE 24

F-Gravity Exhaust Dampers

LAGEDH03/15 dampers (figure 25) are used in downflow and horizontal air discharge applications. Horizontal gravity exhaust dampers are installed in the return air plenum . The dampers must be used any time an economizer or power exhaust fans are applied to LCM units.

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

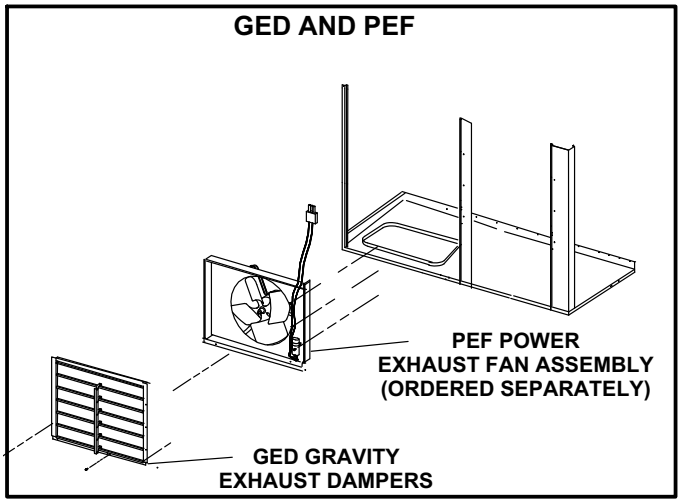


FIGURE 25

G-K1PWRE10B Power Exhaust Fans

Power exhaust fans are used in downflow applications only. Fan requires optional down flow gravity exhaust dampers and economizer. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. Figure 26 shows the location of the LAPEF. See installation instructions for more detail.

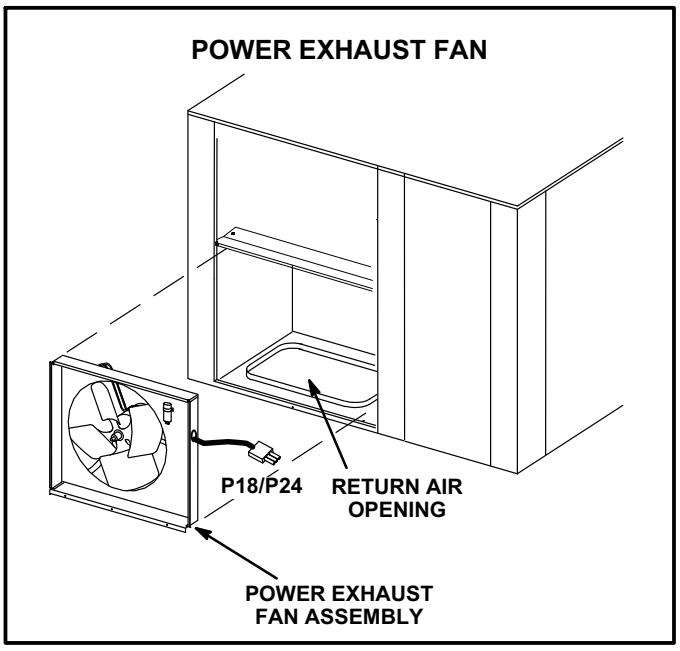


FIGURE 26

H-Control Systems

The A55 Unit Controller provides all control function for the rooftop unit. Default operation requires a standard room thermostat or direct digital controller (DDC). The A55 can also control the unit from a zone temperature sensor. The A55 Unit Controller is a network controller when daisy-chained to the L Connection® Network Control System. For ease of configuration, the A55 can be connected to a PC with Unit Controller PC software installed.

I-Smoke Detectors A17 and A64

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

J-Blower Proving Switch S52

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

K-Dirty Filter Switch S27

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

L-Drain Pan Overflow Switch S149 (optional)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.O. overflow switch is controlled by K220 and DL46 relays, located in the unit control panel. When the overflow switch closes, 24VAC power is interrupted and after a five-second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

M-Factory Installed-Hot Gas Reheat (option)

General

Hot Gas Reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See figure 27 for reheat refrigerant routing and figure 28 for standard cooling refrigerant routing.

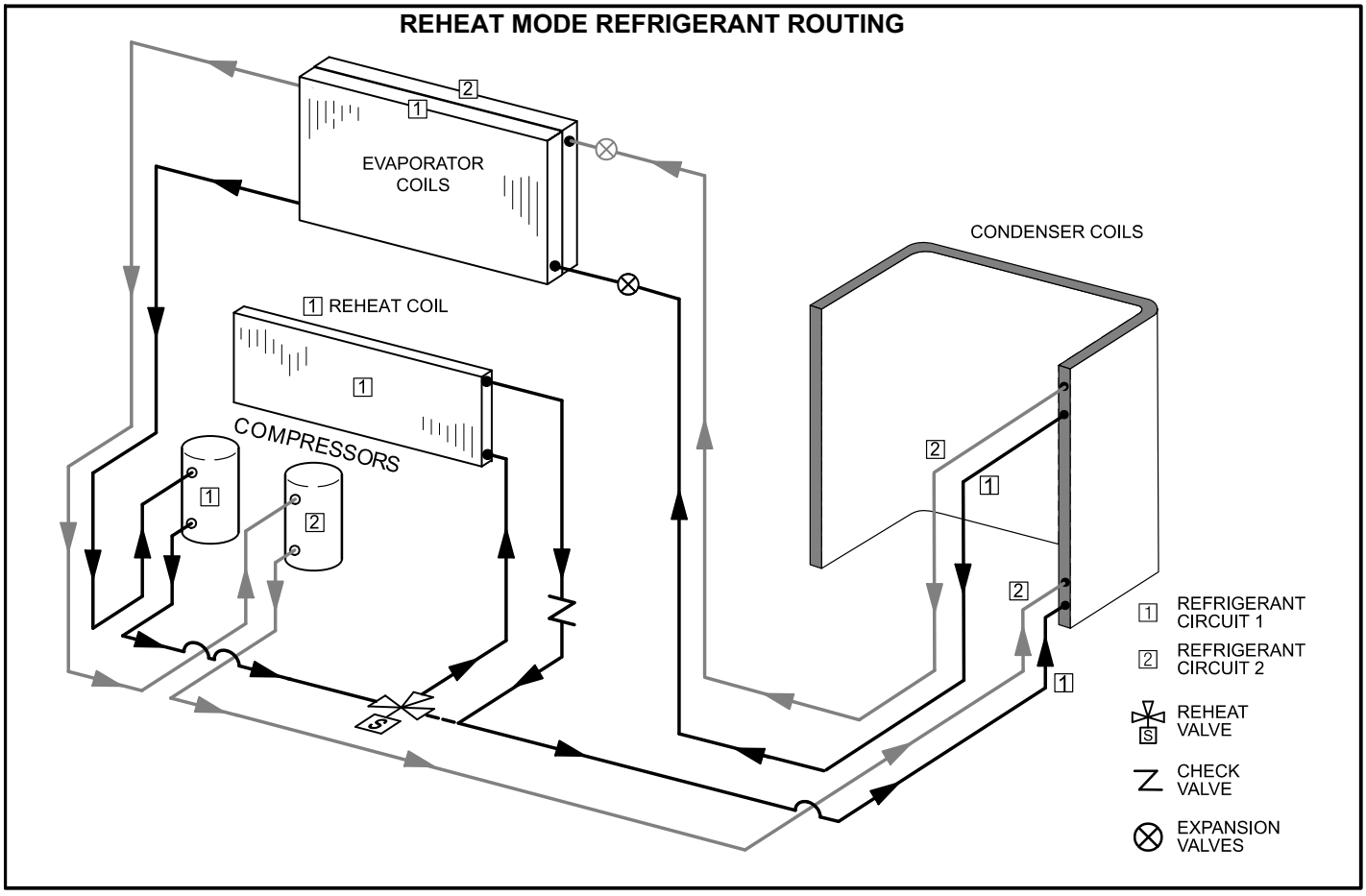


FIGURE 27

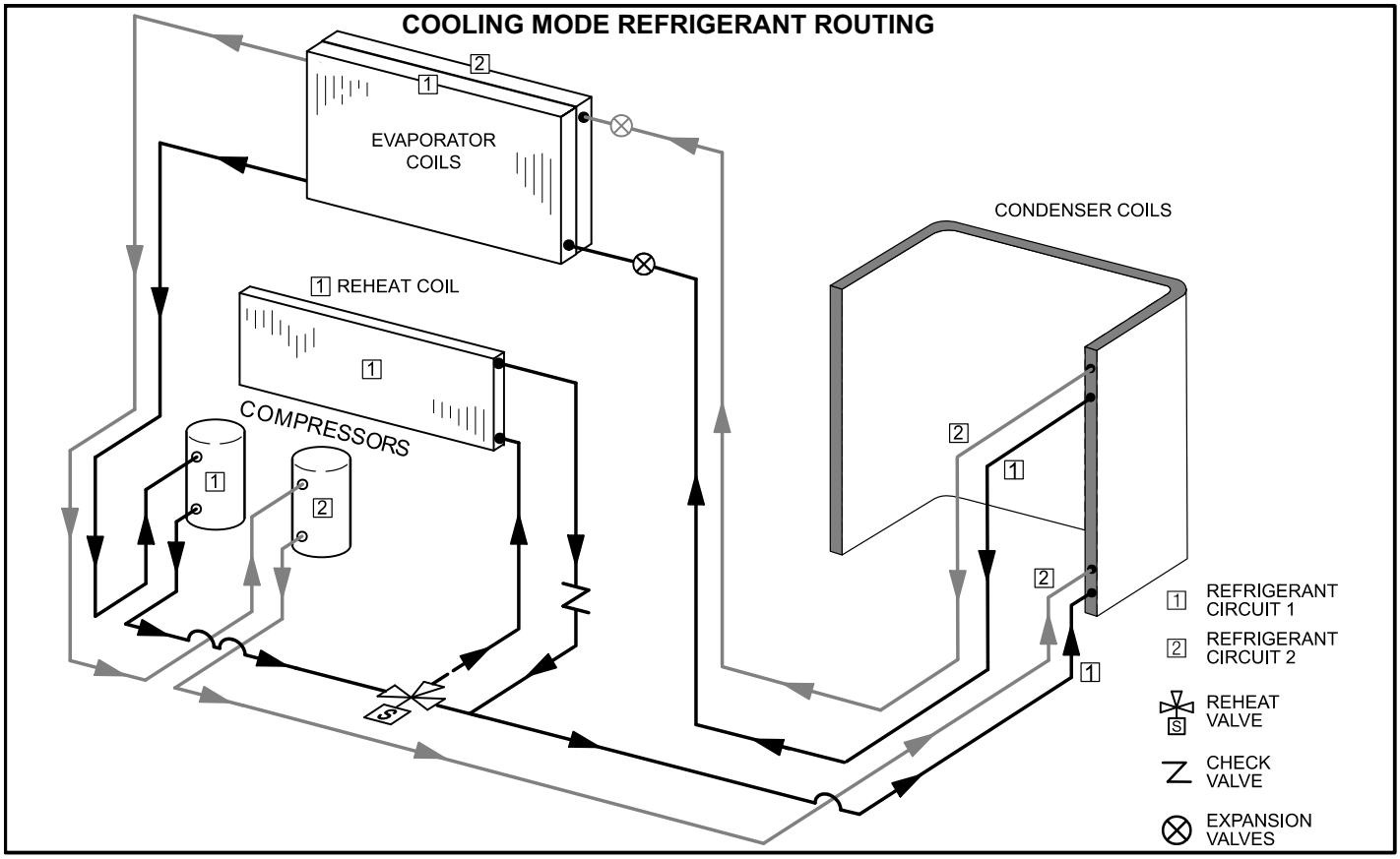


FIGURE 28

L14 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14 reheat valve is energized (Unit Controller P269-3) and refrigerant is routed to the reheat coil.

Reheat Setpoint

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

Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes. The reheat deadband can be adjusted at *Settings - Control* menu.

Check-Out

Test Hot Gas Reheat operation using the following procedure.

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

2 Make sure unit is in local thermostat mode.

3 Select Unit Controller *Service - Test.*

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

4 Deselect Unit Controller *Service - Test.*

Compressor 1 (reheat) and blower should de-energize.

Default Reheat Operation

TABLE 19
Reheat Operation - Two Cooling Stages - Default

T'stat and Humidity Demands	Operation
Reheat Only	Compressor 1 Reheat
Reheat & Y1	Compressor 1 & 2 Enhanced Dehumidification at Low CFM
Reheat & Y1 & Y2	Compressor 1 & 2 Enhanced Dehumidification at High CFM

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

VII-Direct Drive Supply Air Inverter

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

A-Set Blower Speed

1 Use table 20 to fill in field-provided, design specified blower CFM.

TABLE 20
Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Low	
Ventilation	

2 Use the following menu to enter the blower design specified CFM into the Unit Controller. ***Don't press "SAVE" until all CFM are entered.*** Make sure blower CFM is within limitations shown in table 21. Refer to the Unit Controller manual provided with unit.

SETUP > TEST & BALANCE > BLOWER

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

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

4 Measure the static pressure as shown in the *Blower Start-Up* section. Use the static pressure, target CFM and blower tables to determine the RPM needed. Values in the blower table reflect the static pressures taken in locations shown in figure NO TAG.

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

6 Press SAVE followed by MAIN MENU.

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

B-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set. The Unit Controller will open the dampers to "Min OCP Blwr Low" when blower CFM is BELOW a "midpoint" CFM. The Unit Controller will open the damper to "Min OCP Blwr High" when blower CFM is at or ABOVE the "midpoint" CFM.

The Unit Controller will calculate the "midpoint" CFM.

Set Minimum Position 1

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

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

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

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

Set Minimum Position 2

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

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

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

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

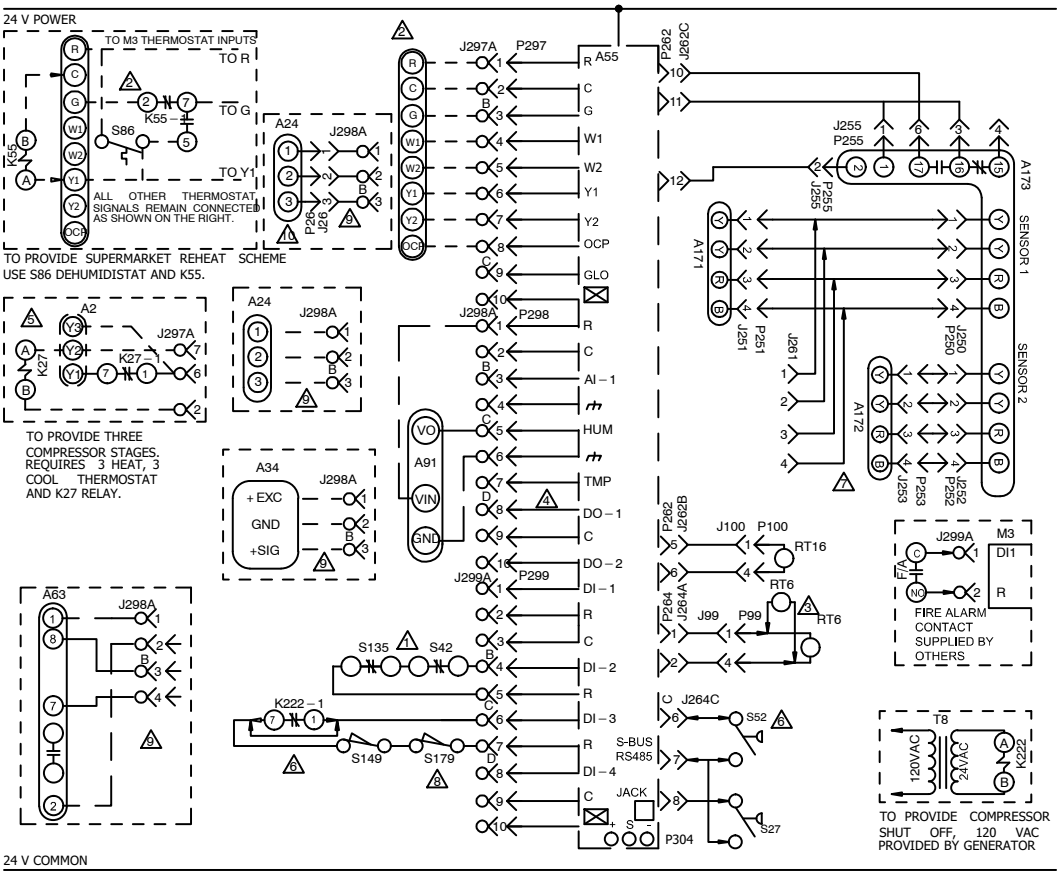
TABLE 21
MINIMUM AND MAXIMUM CFM
0942U, 102U, 120U, 150U

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM*
LGM092/150	Std. , Med.	2225
LGM092/150	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCM092	7.5	1750
LCM092	0, 15, 22.5, 30, 45	2750
LCM120, 150	15, 22.5, 30, 45	2750
LCM120, 150	0, 60	3500
Cooling Low Minimum CFM - 160 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGM/LCM092	Low	1200
LGM/LCM120	Low	1600
LGM/LCM150	Low	2000
Cooling High Minimum CFM - 220 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGM/LCM092	High	1650
LGM/LCM120	High	2200
LGM/LCM150	High	2750
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGM/LCM092	NA	1125
LGM/LCM120	NA	1500
LGM/LCM150	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGM/LCM092	High	3600
LGM/LCH120	High	4800
LGM/LCH150	High	6000

*Rounded to nearest 25 CFM.

VIII-Wiring Diagrams and Sequence of Operation

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



DESCRIPTION	
KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A24	CONTROL, OUTDOOR AIR CFM FLOW
A34	DIFFERENTIAL PRESSURE TRANSDUCER
A55	CONTROL BOARD, MAIN
A63	SENSOR, CO2 (IAQ) OPTIONAL
A91	SENSOR, HUMIDITY
A171	SENSOR ONE, SMOKE, RETURN AIR
A172	SENSOR TWO, SMOKE, SUPPLY AIR
A173	MODULE, CONTROL SMOKE DETECTION
J26	JACK, AIR FLOW CONTROL
J99	JACK, RT16 RETURN AIR SENSOR
J100	JACK, RT6 SUPPLY AIR SENSOR
J250	JACK, SMOKE DETECTOR ONE
J251	JACK, SMOKE DETECTOR ONE
J252	JACK, SMOKE DETECTOR TWO
J253	JACK, SMOKE DETECTOR TWO
J255	JACK, MODULE, CONTROL SMOKE DETECTION
J261	JACK, SUPPLY SMOKE DETECTOR JUMPER
J262	JACK, ECONOMIZER
J264	JACK, BLOWER DECK
J297	JACK, THERMOSTAT – DDC INTERFACE
J298	JACK, IAQ INTERFACE
J299	JACK, SAFETY INTERFACE
K27, –1	RELAY, TRANSFER
K55, –1	RELAY, BLOWER
K222, –1	RELAY, COMPRESSOR LOCKOUT
P26	PLUG, AIR FLOW CONTROL
P99	PLUG, RT16 RETURN AIR SENSOR
P100	PLUG, RT6 SUPPLY AIR SENSOR
P250	PLUG, SMOKE DETECTOR ONE
P251	PLUG, SMOKE DETECTOR ONE
P252	PLUG, SMOKE DETECTOR TWO
P253	PLUG, SMOKE DETECTOR TWO
P255	PLUG, MODULE, CONTROL SMOKE DETECTION
P262	PLUG, ECONOMIZER
P264	PLUG, BLOWER DECK
P297	PLUG, THERMOSTAT – DDC INTERFACE
P298	PLUG, IAQ INTERFACE
P299	PLUG, SAFETY INTERFACE
P304	PLUG, SYS BUS
RT6	SENSOR, SUPPLY AIR TEMP
RT16	SENSOR, RETURN AIR TEMP
S27	SWITCH, FILTER
S52	SWITCH, AIRFLOW
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S86	SWITCH, DEHUMIDISTAT
S135	OVERLOAD, BLOWER MOTOR SUPPLY
S149	SWITCH, OVERFLOW ONE
S179	SWITCH, OVERFLOW TWO
T8	TRANSFORMER, 120 V GENERATOR POWERED

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

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. REMOTE LOCATION OF RT6
4. P298-8 (DO-1) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
5. THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE BOARD (A55).
6. PRODIGY SETTINGS MUST BE MODIFIED WHEN K222, S42, S52, S149 OR S179 ARE INSTALLED
7. CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
8. S179, OVERFLOW SWITCH USED ON LGM/LCH 420-600 UNITS ONLY
9. A63, A34 & A24 ARE MUTUALLY EXCLUSIVE
10. FACTORY INSTALLED OPTION FOR LGM/LCH 242-600 UNITS ONLY

08/17	WIRING DIAGRAM 537108-03	08/17
ACCESSORIES		
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT FOR ENERGENCE		
SECTION C		REV. 3
Supersedes	New Form No. 537108-03	

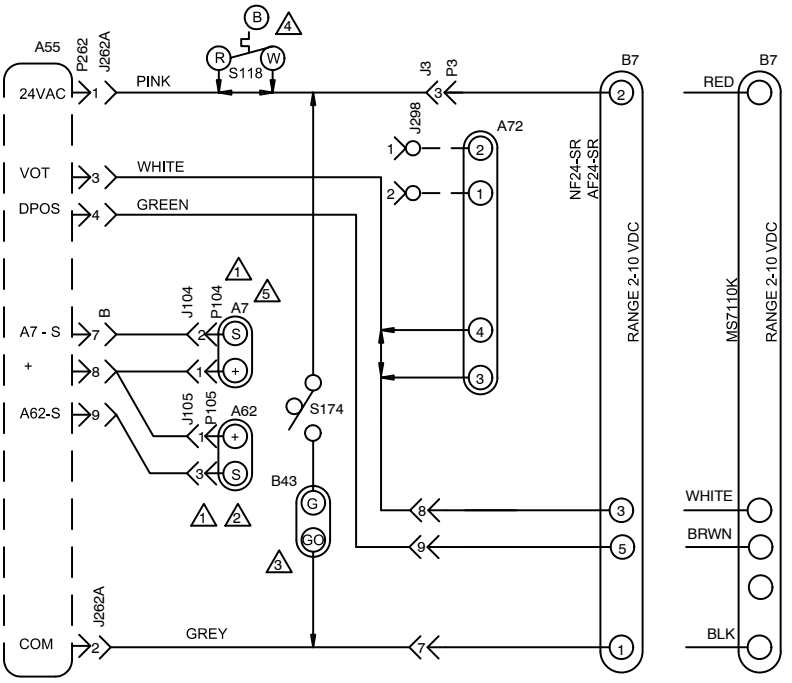
1 The A55 Unit Controller energizes the thermostat components with 24VAC via J/P297-1.

2 The A55 Unit Controller proves the optional N.O. filter switch S27 (indicates dirty filter when closed) and optional N.O. air flow switch S52 (indicates no air [i.e. broken belt] system shuts down).

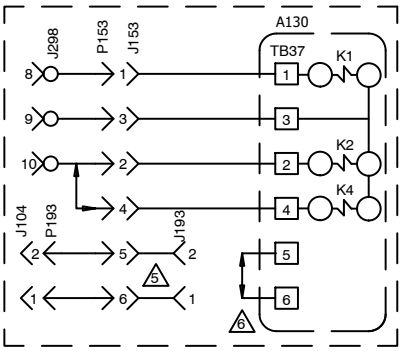
3 The A55 Unit Controller receives data from the supply and return smoke detectors A171 and A172, blower motor overload relay S42, discharge sensor RT6 and return air sensor RT16.

4 The A55 Unit Controller receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP) and the CO_2 sensor A63 (if economizer is used). A55 energizes the appropriate components.

ECONOMIZER



DESCRIPTION	
KEY	COMPONENT
A7	SENSOR, SOLID STATE ENTHALPY
A130	CONTROL, ERS
A55	CONTROL, MAIN PANEL LENNOX
A62	SENSOR, ENTHALPY INDOOR
A72	CONTROL, REMOTE MIN POS (OPT)
B7	MOTOR, DAMPER ECONOMIZER
B43	MOTOR, EXHAUST DAMPER
J3	JACK, UNIT ECONOMIZER
J104	JACK, SENSOR OUTDOOR ENTHALPY
J105	JACK, SENSOR RETURN AIR ENTHALPY
J153	JACK, ENTHALPY / DAMPER MOTOR
J193	JACK, ENTHALPY SENSOR
J298A	JACK, IAQ INTERFACE
J262A	JACK, DAMPER MOTOR
J262B	JACK, ENTHALPY SENSORS
P3	PLUG, ECONOMIZER BYPASS
P153	PLUG, ENTHALPY / DAMPER MOTOR
P193	PLUG, ENTHALPY SENSOR
P262	PLUG, ECONOMIZER OUTPUT
S118	THERMOSTAT, DESICANT DEFROST
S174	SWITCH, EXHAUST DAMPER



ENERGY RECOVERY WHEEL HOOK UP

1. DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL
2. FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR
3. OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED

NOTE - THIS DIAGRAM USED ONLY WHEN ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPERS ARE INSTALLED.

4. S118 USED ON 35 TO 50 TON ENERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW)
5. REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF THE ERW ROOFTOP UNIT
6. REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

WIRING DIAGRAM	04/18
ACCESSORIES	
ENERGENCE/STRATEGOS SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERYSYSTEM OPTION	
SECTION D	REV 3
Supersedes	New Form No. 537189-01

POWER:

1 A55 Unit Controller energizes the economizer components with 24VAC.

OPERATION:

2 The A55 Unit Controller along with outdoor enthalpy sensor A7 and indoor enthalpy sensor A62 (if differential enthalpy is used) powers the damper motor B7.

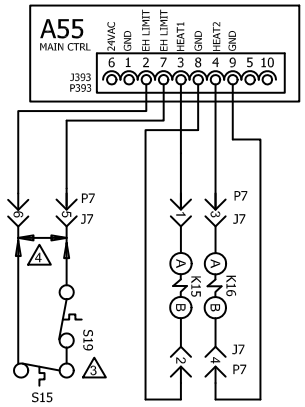
3 A55 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4 The damper actuator provides 2 to 10 VDC position feedback.

ELECTRIC HEAT FOR LCM092/150 G Voltage

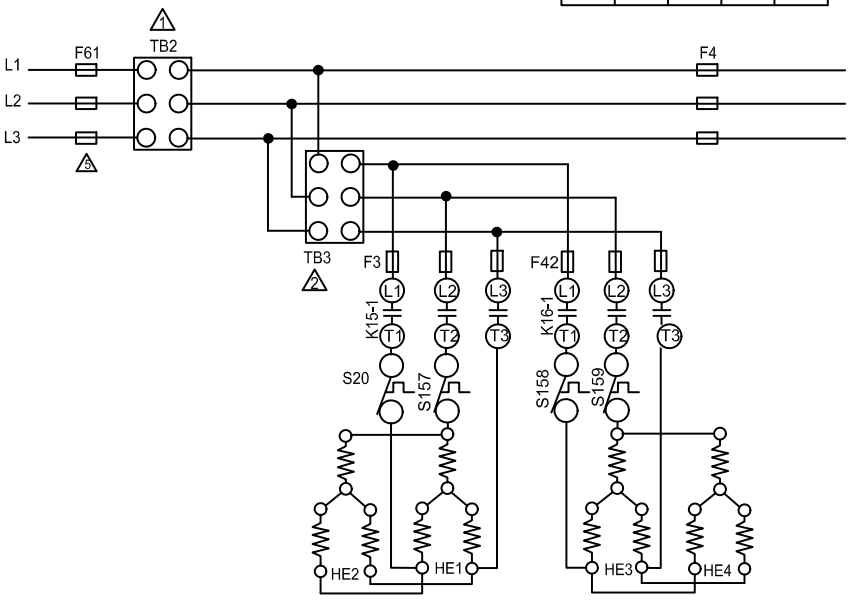
J/P	JACK/PLUG DESCRIPTION
7	ELECTRIC HEAT SUB BASE KIT
271	HEATING SENSORS STG 1

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. 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

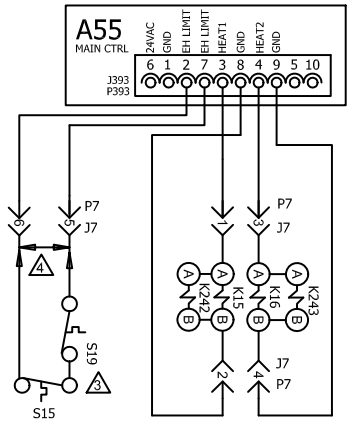


1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS
3. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY
4. REMOVE JUMPER PLUG WHEN FIELD INSTALLATING ELECTRIC HEAT
5. F61 USED ON UNITS WITH SCCR OPTION

DENOTES OPTIONAL COMPONENTS

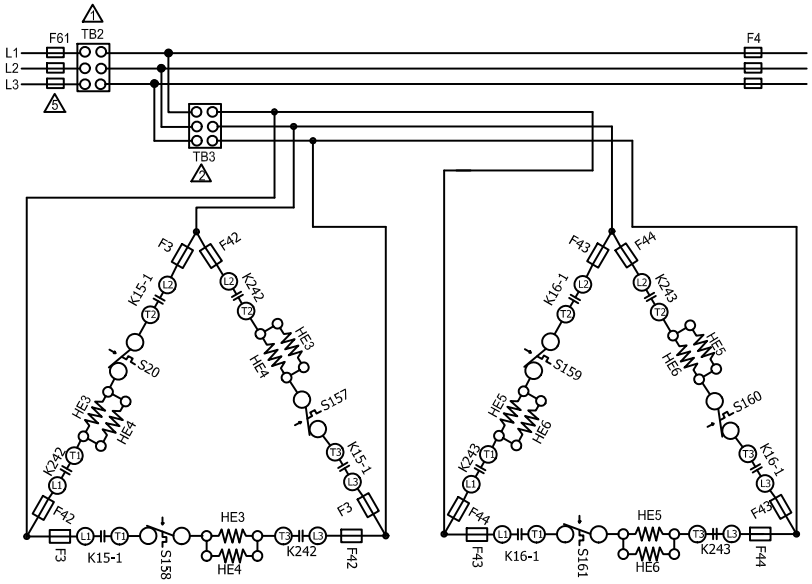
2020/10	WIRING DIAGRAM 538121-01	10/20
HEATING-ELECTRIC		
7.5, 15, 22.5, 30, 45, 60 - G		
	SECTION A	REV. 0
Supersedes	New Form No. 538121-01	

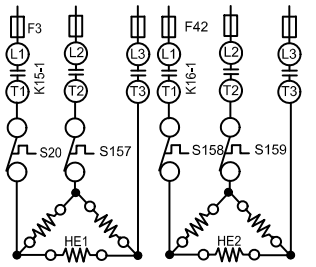
ELECTRIC HEAT FOR LCM092/150 Y Voltage



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

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





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

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

DENOTES OPTIONAL COMPONENTS

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

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

G and J Voltage

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

First Stage Heat:

2 Heating demand initiates at W1 in the thermostat.

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

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

Second Stage Heat:

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

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

7 A55 energizes contactor K16.

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

Y Voltage

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

First Stage Heat:

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

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

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

2 ***60KW*** - Heating demand initiates at W1 in the thermostat.

3 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S157, contactor K242 is energized.

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

Second Stage Heat:

5 ***22.5 - 45 KW*** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

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

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

5 ***60KW*** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.

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

7 N.O. K16 contacts close energizing HE5 and HE6.

Sequence of Operation LGM/LCM092U/150U

Power:

1. Line voltage through the TB13 terminal block 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, supply air inverter control, condenser fan relays and exhaust fan relays.

Blower Operation:

Refer to Direct Drive blower diagram and sequence of operation.

Economizer Operation:

3. A55 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).
4. N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.

1st Stage Cooling (compressor B1 or B2)

5. A55 receives a Y1 thermostat demand.
6. After A55 proves N.C. low pressure switches S87, S88 and N.C. high pressure switches S4, S7 compressor contactor K1 or K2 are energized. *Note - A55 logic (using input from RT42, RT43, RT44, RT45, RT46, RT47 , RT48 and RT49 temperature sensors) determines which contactor is energized.*
7. N.O. contacts K1-1 or K2-1 close energizing compressor B1 or B2.

   At the same time A55 energizes:

   Both condenser fans, B4, B5 on **LOW** speed.
8. N.C. K191-1 compressor 1 crankcase heater contacts or N.C. K2 compressor 2 crankcase heater contacts open and de-energize compressor crankcase heater HR1 or HR2.

2nd Stage Cooling (compressor B1 and B2 are energized)

9. A55 receives a Y2 thermostat demand.
10. The K1 or K2 compressor contactor which was not energized will close.
11. N.O. K1-1 or K2-1 relay contacts which were not energized will close. The corresponding B1 or B2 compressor will operate in tandem with the other compressor.

    At the same time A55 energizes:

    Both condenser fans, B4 and B5 on **HIGH** speed.

    The K191 or K2 crankcase heater relay which was not energized will close, de-energize the corresponding crankcase heater HR1 or HR2.

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, T4 transformer (575v units only), 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 NO TAG 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 NO TAG 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

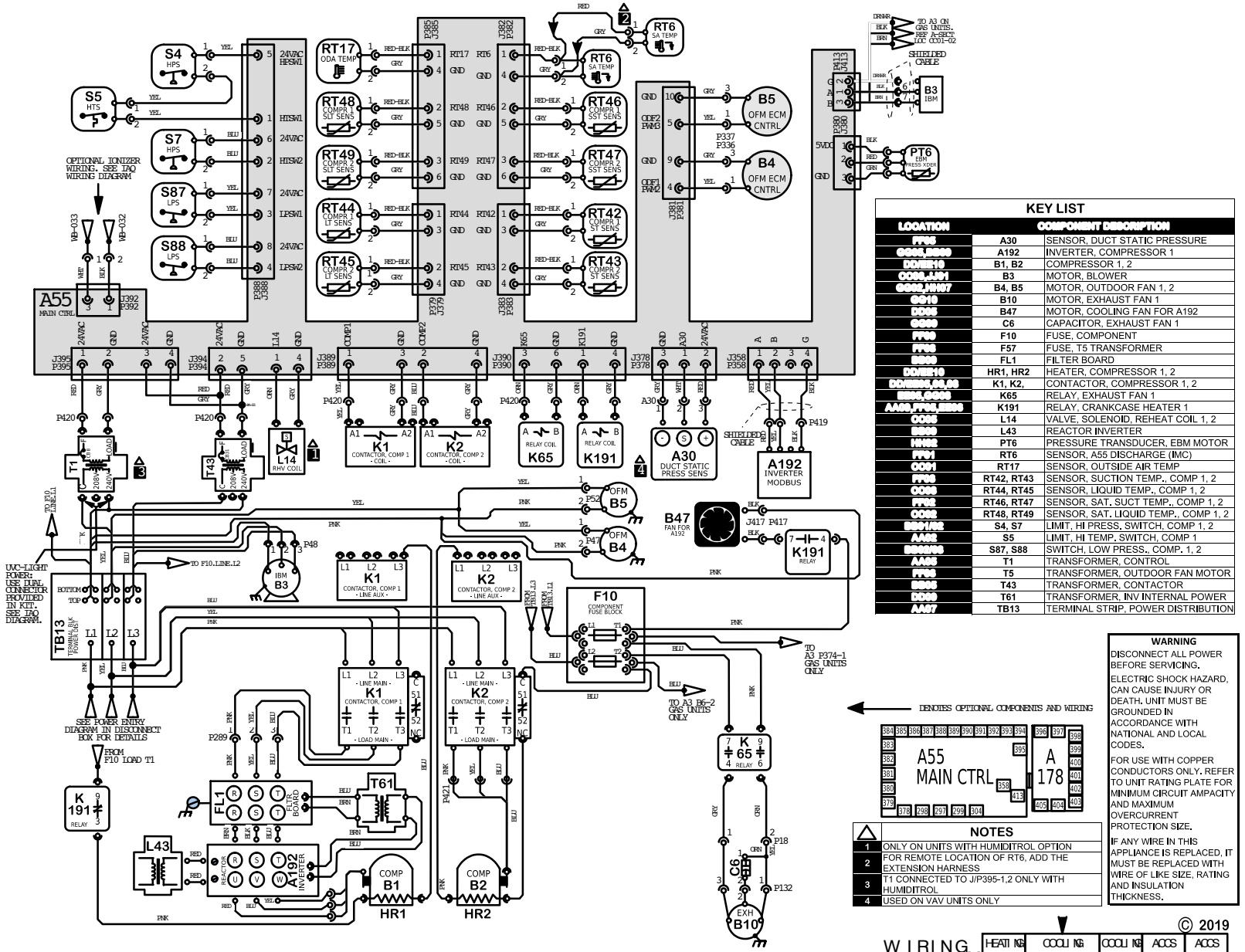
4- Main Menu > Service > Test > Blower

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.

LGM/LCM092U/150U Y Voltage



KEY LIST

LOCATION		COMPONENT DESCRIPTION
A30	A30	SENSOR, DUCT STATIC PRESSURE
A192	A192	INVERTER, COMPRESSOR 1
B1, B2	B1, B2	COMPRESSOR 1, 2
B3	B3	MOTOR, BLOWER
B4, B5	B4, B5	MOTOR, OUTDOOR FAN 1, 2
B10	B10	MOTOR, EXHAUST FAN 1
B47	B47	MOTOR, COOLING FAN FOR A192
C6	C6	CAPACITOR, EXHAUST FAN 1
F10	F10	FUSE, COMPONENT
F57	F57	FUSE, T5 TRANSFORMER
FL1	FL1	FILTER BOARD
HR1, HR2	HR1, HR2	HEATER, COMPRESSOR 1, 2
K1, K2,	K1, K2,	CONTACTOR, COMPRESSOR 1, 2
K65	K65	RELAY, EXHAUST FAN 1
K191	K191	RELAY, CRANKCASE HEATER 1
L14	L14	VALVE, SOLENOID, REHEAT COIL 1, 2
L43	L43	REACTOR INVERTER
PT6	PT6	PRESSURE TRANSDUCER, EBM MOTOR
RT6	RT6	SENSOR, A55 DISCHARGE (IMC)
RT17	RT17	SENSOR, OUTSIDE AIR TEMP
RT42, RT43	RT42, RT43	SENSOR, SUCTION TEMP., COMP 1, 2
RT44, RT45	RT44, RT45	SENSOR, LIQUID TEMP., COMP 1, 2
RT46, RT47	RT46, RT47	SENSOR, SAT. SUCT TEMP., COMP 1, 2
RT48, RT49	RT48, RT49	SENSOR, SAT. LIQUID TEMP., COMP 1, 2
S4, S7	S4, S7	LIMIT, HI PRESS. SWITCH, COMP 1, 2
S5	S5	LIMIT, HI TEMP. SWITCH, COMP 1
S87, S88	S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
T1	T1	TRANSFORMER, CONTROL
T5	T5	TRANSFORMER, OUTDOOR FAN MOTOR
T43	T43	TRANSFORMER, CONTACTOR
T61	T61	TRANSFORMER, INV INTERNAL POWER
TB13	TB13	TERMINAL STRIP, POWER DISTRIBUTION

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

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

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

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

NOTES

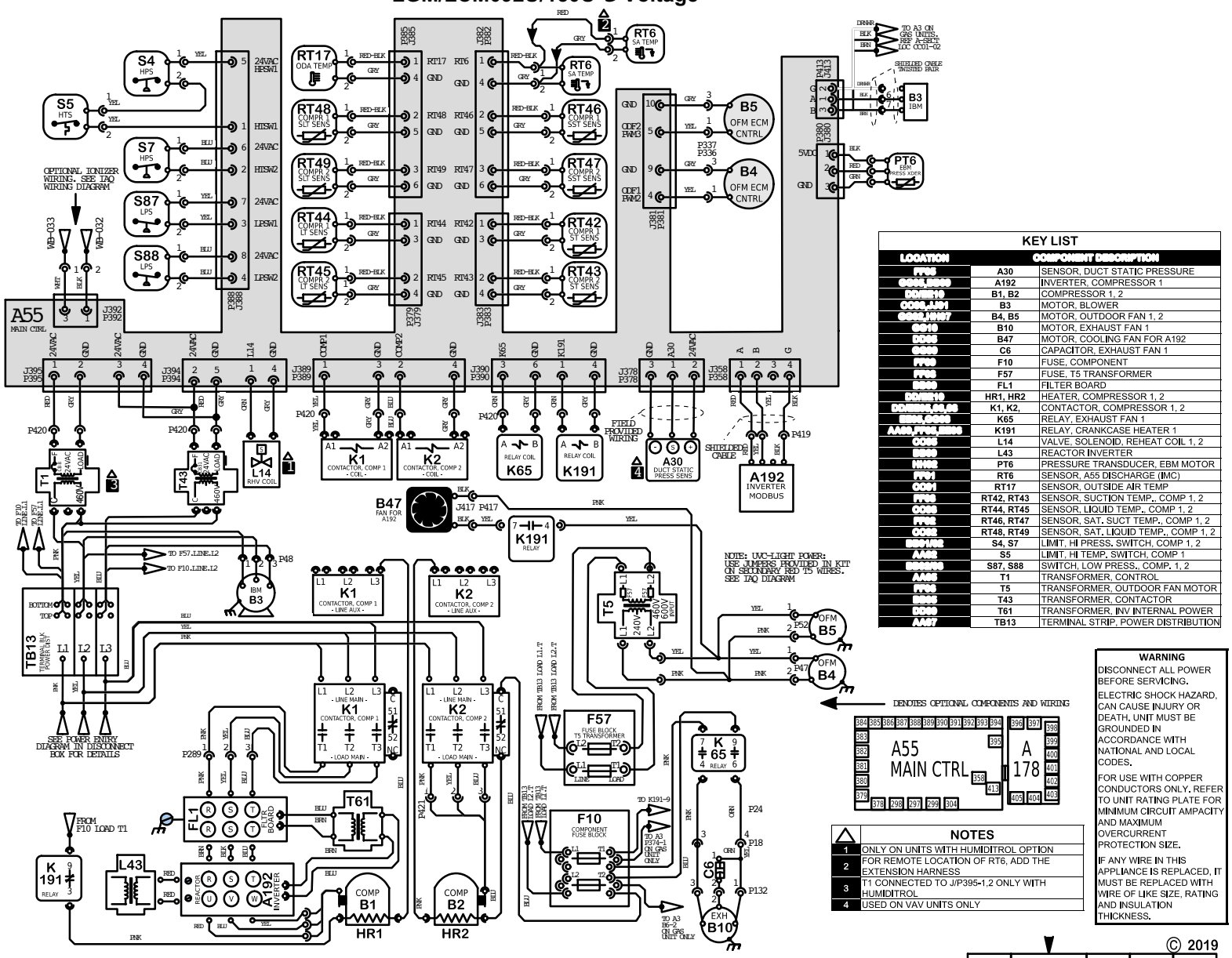
1	ONLY ON UNITS WITH HUMIDITROL OPTION
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	T1 CONNECTED TO J/P395-1,2 ONLY WITH HUMIDITROL
4	USED ON VAV UNITS ONLY

WIRING DIAGRAM FLOW

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

538147-10 Rev: 1 ...

LGM/LCM092U/150U 3 Voltage



KEY LIST

LOCATION		COMPONENT DESCRIPTION
[illegible]	A30	SENSOR, DUCT STATIC PRESSURE
[illegible]	A192	INVERTER, COMPRESSOR 1
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5	MOTOR, OUTDOOR FAN 1, 2
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	B47	MOTOR, COOLING FAN FOR A192
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	FL1	FILTER BOARD
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2,	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	K191	RELAY, CRANKCASE HEATER 1
[illegible]	L14	VALVE, SOLENOID, REHEAT COIL 1, 2
[illegible]	L43	REACTOR INVERTER
[illegible]	PT6	PRESSURE TRANSDUCER, EBM MOTOR
[illegible]	RT6	SENSOR, A55 DISCHARGE (IMC)
[illegible]	RT17	SENSOR, OUTSIDE AIR TEMP
[illegible]	RT42, RT43	SENSOR, SUCTION TEMP., COMP 1, 2
[illegible]	RT44, RT45	SENSOR, LIQUID TEMP., COMP 1, 2
[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]	S5	LIMIT, HI TEMP. SWITCH, COMP 1
[illegible]	S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
[illegible]	T1	TRANSFORMER, CONTROL
[illegible]	T5	TRANSFORMER, OUTDOOR FAN MOTOR
[illegible]	T43	TRANSFORMER, CONTACTOR
[illegible]	T61	TRANSFORMER, INV INTERNAL POWER
[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

NOTES

1	ONLY ON UNITS WITH HUMIDITROL OPTION
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	T1 CONNECTED TO J/P395-1,2 ONLY WITH HUMIDITROL
4	USED ON VAV 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.

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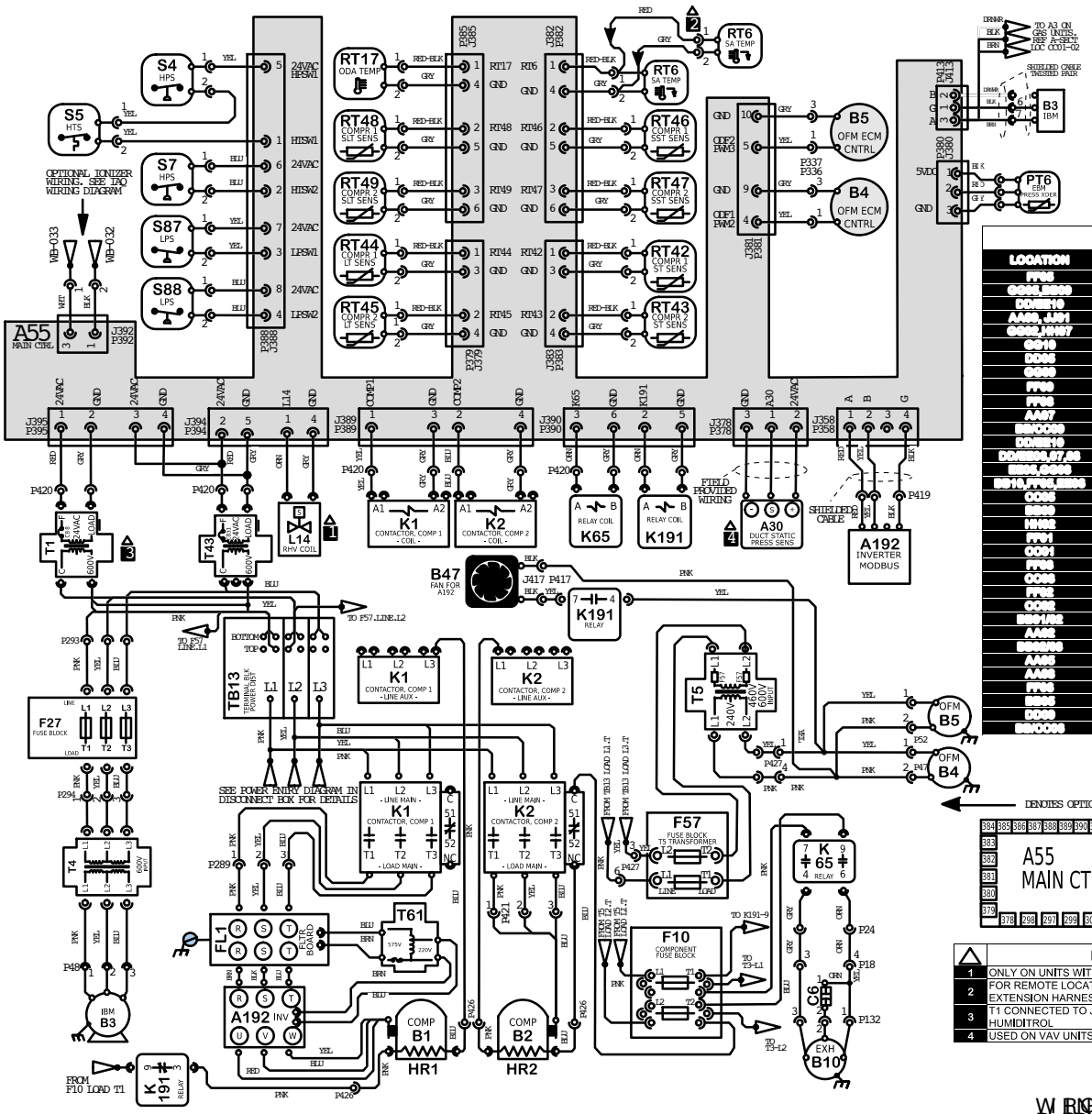
WIRING DIAGRAM FLOW

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

LGM/LCM092U/150U J Voltage



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
[illegible]	A30	SENSOR, DUCT STATIC PRESSURE
[illegible]	A192	INVERTER, COMPRESSOR 1
[illegible]	B1, B2	COMPRESSOR 1, 2
[illegible]	B3	MOTOR, BLOWER
[illegible]	B4, B5	MOTOR, OUTDOOR FAN 1, 2
[illegible]	B10	MOTOR, EXHAUST FAN 1
[illegible]	B47	MOTOR, COOLING FAN FOR A192
[illegible]	C6	CAPACITOR, EXHAUST FAN 1
[illegible]	F10	FUSE, COMPONENT
[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	F27	FUSE, T4 TRANSFORMER
[illegible]	FL1	FILTER BOARD
[illegible]	HR1, HR2	HEATER, COMPRESSOR 1, 2
[illegible]	K1, K2,	CONTACTOR, COMPRESSOR 1, 2
[illegible]	K65	RELAY, EXHAUST FAN 1
[illegible]	K191	RELAY, CRANKCASE HEATER 1
[illegible]	L14	VALVE, SOLENOID, REHEAT COIL 1, 2
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[illegible]	T1	TRANSFORMER, CONTROL
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DENOTES OPTIONAL COMPONENTS AND WIRING

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WIRING DIAGRAM FLOW

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

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