UNIT INFORMATION

100036

LGM SERIES
7.5 to 12.5 ton
38.1 to 70.3 kW

Service Literature

LGM092U through 1502U

The LGM, 092, 102U, 120U and 150U units are configure to order units (CTO) with a wide selection of factory-installed options. Units are available in 130,000 to 240,000 Btuh. heating inputs. Gas heat sections are designed with aluminized steel tube heat exchangers with stainless steel as an option.

Cooling capacities range from 7.5 to 12.5 tons. Units come standard with a fin tube condenser with two single-speed compressors plumbed in tandem to form a single refrigerant circuit. Units also offer mechanical cooling down to 40°F.

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 LGM 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.

⚠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

⚠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.

⚠CAUTION

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

Table of Contents

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	OX	OX	OX	OX
	Copper	**76W27**	X	X	X	X
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
HEATING SYSTEM						
Bottom Gas Piping Kit		**54W95**	OX	OX	OX	OX
Combustion Air Intake Extensions		**19W51**	X	X	X	X
Gas Heat Input	130,000 Btuh	Factory	O	O	O	O
	180,000 Btuh	Factory	O	O	O	O
	240,000 Btuh	Factory	O	O	O	O
Low Temperature Vestibule Heater	208/230V-3ph	**22A51**	X	X	X	X
	460V-3ph	**22A55**	X	X	X	X
	575V-3ph	**13X65**	X	X	X	X
LPG/Propane Conversion Kits	Standard Heat	**14N22**	X	X	X	X
	Medium Heat	**14N23**	X	X	X	X
	High Heat	**14N25**	X	X	X	X
Stainless Steel Heat Exchanger		Factory	O	O	O	O
Vertical Vent Extension Kit		**42W16**	X	X	X	X
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		**22J65**	X	X		
		13T05			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

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
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**	X	X	X	X
UVC Germicidal Lamps						
[1] Healthy Climate® UVC Light Kit (110//230V-1ph)		**21A93**	X	X	X	X
ELECTRICAL						
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O
HACR Circuit Breakers		Factory	O	O	O	O
[2] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O	O
Disconnect Switch	80 amp	**54W56**	OX	OX	OX	OX
	150 amp	**54W57**	OX	OX	OX	OX
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX
	20 amp non-powered, field-wired (575V only)	**67E01**	OX	OX	OX	OX
Weatherproof Cover for GFI		**10C89**	X	X	X	X

[1] For 460V and 575V units, field installed lamps utilize jumpers to the outdoor fan transformer for voltage needed. See the installation Instructions.
[2] Disconnect Switch is furnished and factory installed with High SCCR option

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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		Factory	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, Downflow						
14 in. height		**54W50**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	**13K61**	X			
	RTD11-135S	**13K62**		X	X	
	RTD11-185S	**13K63**				X
Flush - Order one	FD11-95S	**13K56**	X			
	FD11-135S	**13K57**		X	X	
	FD11-185S	**13K58**				X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X			
	C1DIFF31B-1	**12X66**		X	X	
	C1DIFF32B-1	**12X67**				X

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

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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	**LGM092U4E**	**LGM102U4E**	**LGM120U4E**	**LGM150U4E**
		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	**LGM092U4P**	**LGM102U4P**	**LGM120U4P**	**LGM150U4P**
		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)	12.4	12.4	12.0	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.
Gas Heating Options Available - See page 22			Standard (2 Stage), Medium (2 Stage), High (2 Stage)			
Compressor Type (number)			Variable Capacity Scroll (1) Fixed Capacity Scroll (1)			
Outdoor Coils		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.

SPECIFICATIONS — GAS HEAT

			Heat Input Type	Standard	Medium	High
			Number of Gas Heat Stages	**2**	**2**	**2**
Gas Heating Performance	Input - Btuh	First Stage		84,500	117,000	156,000
		Second Stage		130,000	180,000	240,000
	Output - Btuh	Second Stage		104,000	144,000	192,000
			Temperature Rise Range - °F	15 - 45	30 - 60	40 - 70
			Minimum Air Volume - cfm	2150	2250	2600
			Thermal Efficiency	80%	80%	80%
			Gas Supply Connections	3/4 in. NPT	3/4 in. NPT	3/4 in. NPT.
Recommended Gas Supply Pressure - Nat. / LPG				7 in. w.g. / 11 in. w.g.		
Gas Supply Pressure Range			Min./Max. (Natural)	4.7 - 10.5 in. w.g.		
			Min./Max. (LPG)	10.8 - 13.5 in. w.g.		

HIGH ALTITUDE DERATE

Units may be installed at altitudes up to 2000 feet above sea level without any modification.

At altitudes above 2000 feet, units must be derated to match gas manifold pressures shown in table below.

At altitudes above 4500 feet unit must be derated 2% for each 1000 feet above sea level.

NOTE − This is the only permissible derate for these units.

Gas Heat Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate - Btuh (Natural Gas or LPG/Propane)	
		Natural Gas	LPG/Propane Gas	First Stage	Second Stage
Standard	2001-4500	3.4	9.6	84,500	124,000
Medium	2001-4500	3.4	9.6	117,000	172,000
High	2001-4500	3.4	9.6	156,000	230,000

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 page8 for wet coil and option/accessory air resistance data.

Maximum Static Pressure With Gas Heat - 2.0 in. w.g.
Minimum Air Volume Required For Different Gas Heat Sizes:
Standard - 2150 cfm; Medium - 2250 cfm; High - 2600 cfm

Total Air Volume cfm	Total Static Pressure - in. w.g.													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	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

POWER EXHAUST FAN PERFORMANCE

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

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

Air Volume cfm	Wet Indoor Coil		Gas Heat Exchanger			Economizer	Humiditrol™ + Reheat Coil	Filters			Return Air Adaptor Plate
	092, 102	120, 150	Standard Heat	Medium Heat	High Heat			MERV 8	MERV 13	MERV 16	
1750	0.04	0.04	0.06	0.02	0.02	0.05	0.02	0.01	0.03	0.06	0.00
2000	0.05	0.05	0.07	0.05	0.06	0.06	0.02	0.01	0.03	0.08	0.00
2250	0.06	0.06	0.07	0.07	0.08	0.08	0.02	0.01	0.04	0.09	0.00
2500	0.07	0.07	0.09	0.10	0.11	0.11	0.03	0.01	0.05	0.10	0.00
2750	0.08	0.08	0.09	0.11	0.12	0.12	0.03	0.02	0.05	0.11	0.00
3000	0.10	0.09	0.11	0.12	0.13	0.13	0.03	0.02	0.06	0.12	0.02
3250	0.11	0.10	0.12	0.15	0.16	0.15	0.04	0.02	0.06	0.13	0.02
3500	0.12	0.11	0.12	0.16	0.17	0.15	0.04	0.03	0.07	0.15	0.04
3750	0.14	0.13	0.14	0.19	0.20	0.15	0.05	0.03	0.08	0.16	0.07
4000	0.15	0.14	0.14	0.21	0.22	0.19	0.05	0.04	0.08	0.17	0.09
4250	0.17	0.15	0.14	0.24	0.28	0.19	0.06	0.04	0.09	0.19	0.11
4500	0.19	0.17	0.15	0.26	0.32	0.22	0.07	0.04	0.09	0.20	0.12
4750	0.20	0.18	0.16	0.29	0.37	0.25	0.07	0.05	0.10	0.21	0.16
5000	0.22	0.20	0.16	0.34	0.43	0.29	0.08	0.06	0.10	0.23	0.18
5250	0.24	0.22	0.16	0.37	0.47	0.32	0.08	0.06	0.11	0.24	0.19
5500	0.25	0.23	0.18	0.44	0.54	0.34	0.09	0.07	0.12	0.25	0.22
5750	0.27	0.25	0.19	0.49	0.59	0.45	0.10	0.07	0.12	0.27	0.25
6000	0.29	0.27	0.20	0.54	0.64	0.52	0.10	0.08	0.13	0.28	0.27

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 DATA — 7.5 TON

	Model No.	LGM092U4E/ LGM092U4P		
[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

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 8.5 TON

	Model No.	LGM102U4E/ LGM102U4P		
[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

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 10 TON

	Model No.	LGM120U4E/ LGM120U4P		
[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

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 12.5 TON

	Model No.	LGM150U4E/ LGM150U4P		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1	Rated Load Amps	16.4	7.7	6.2
	Locked Rotor Amps	21	11	12
Compressor 2	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

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.

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

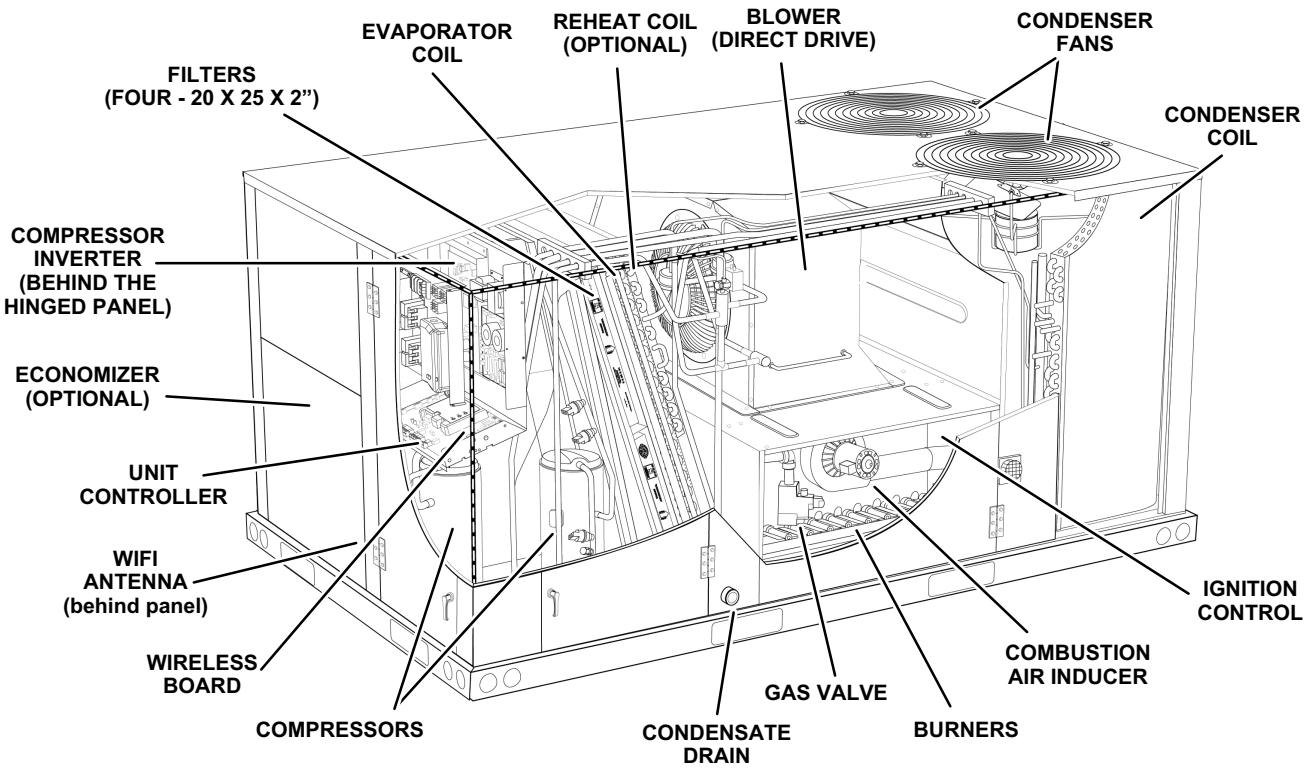
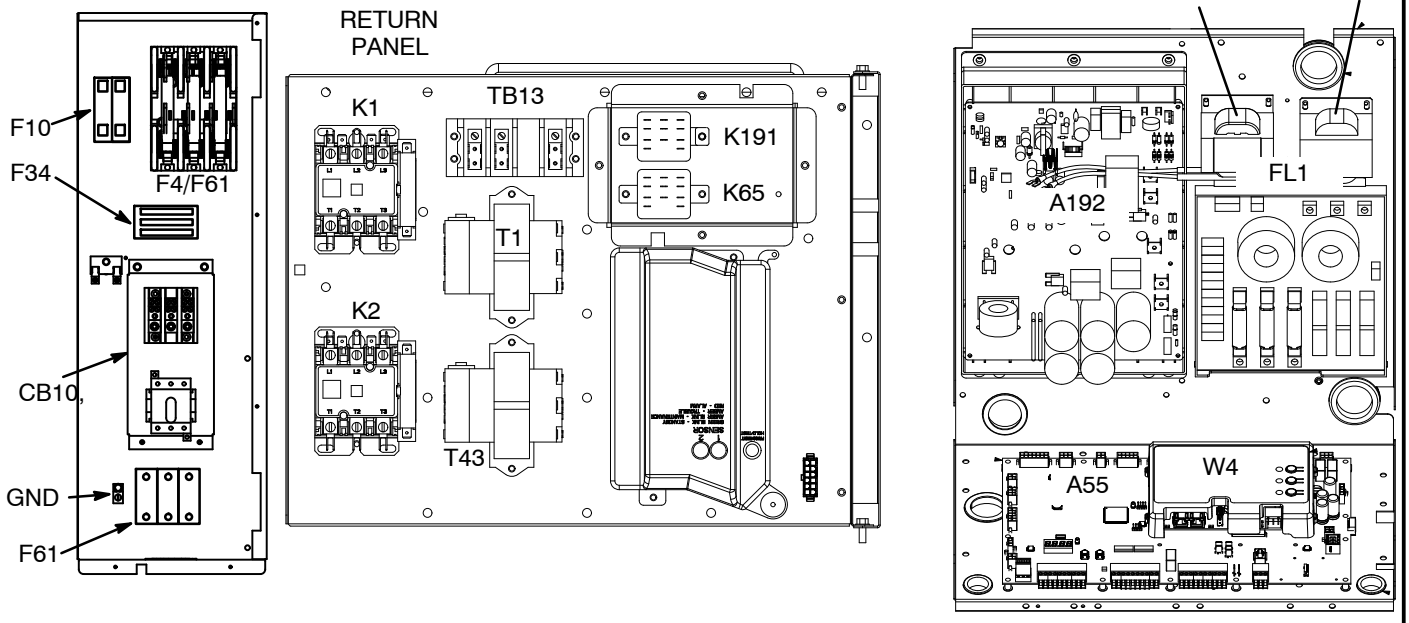


FIGURE 1

CONTROL BOX PARTS ARRANGEMENT



DISCONNECT BOX **HINGED PANEL IN CONTROL AREA** **BEHIND HINGED PANEL**

FIGURE 2

I-UNIT COMPONENTS

⚠WARNING

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

All 7.5 through 12.5 ton units are configure to order units (CTO). The LGM unit components are shown in figure 1 All units come standard with1 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

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface, such as the gas valve or blower deck, before performing any service procedure.

LGM 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.

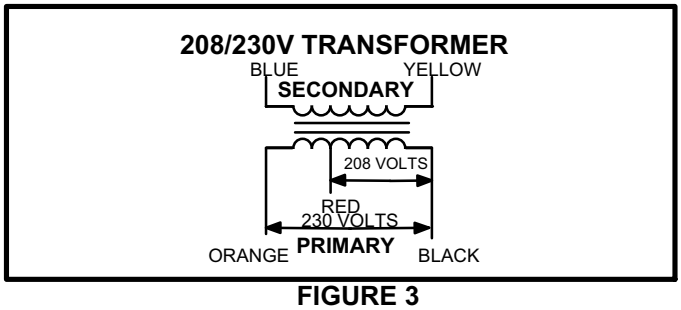


FIGURE 3

3-C. A. I. Transformers T3 all 575V units

All LGM (J) voltage units use transformer T3. The auto voltage to 230VAC transformer is mounted in the control box behind the hinged panel to the right of the A192 Inverter for Compressor Circuit 1. See Figure 2 The transformer has an output rating of 0.5A. T3 transformer supplies 230 VAC power to combustion air blower motor (B6).

4-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.

5-Burner Controls A3

A3 controls gas heat section burner controls. Burner controls are factory set and are not adjustable. The control makes three attempts at ignition and then locks out the system if ignition is not obtained after the third trial. Reset after lockout requires only breaking and remaking thermostat demand. The control shuts off gas flow immediately in the event of a gas or power failure. Upon restoration of gas and power, the control will restart the ignition sequence and continue until flame is established or system locks out. For a more detailed description see the Gas Heat Components section.

6-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 LGM 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.

7-Unit Controller A55

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

8-Terminal Block TB13

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

9-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.

10-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.

11-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.

12-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

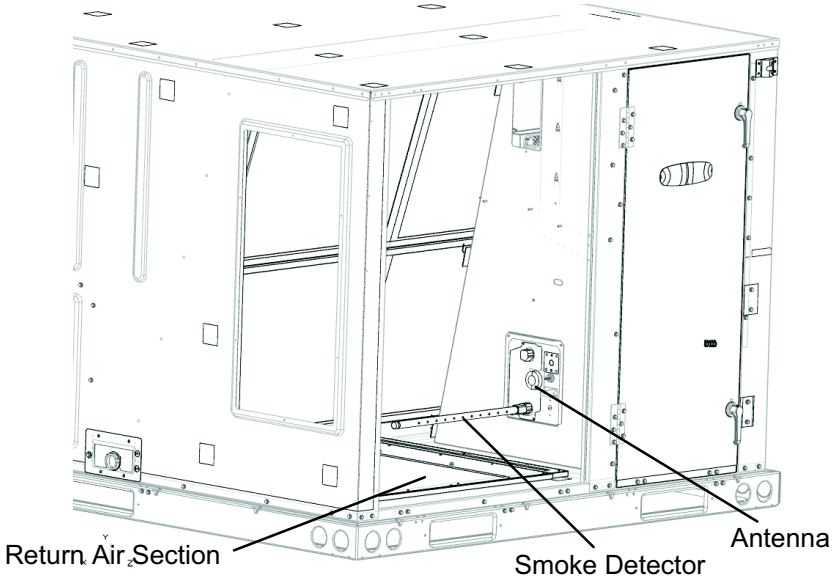


FIGURE 4

Cable Routing

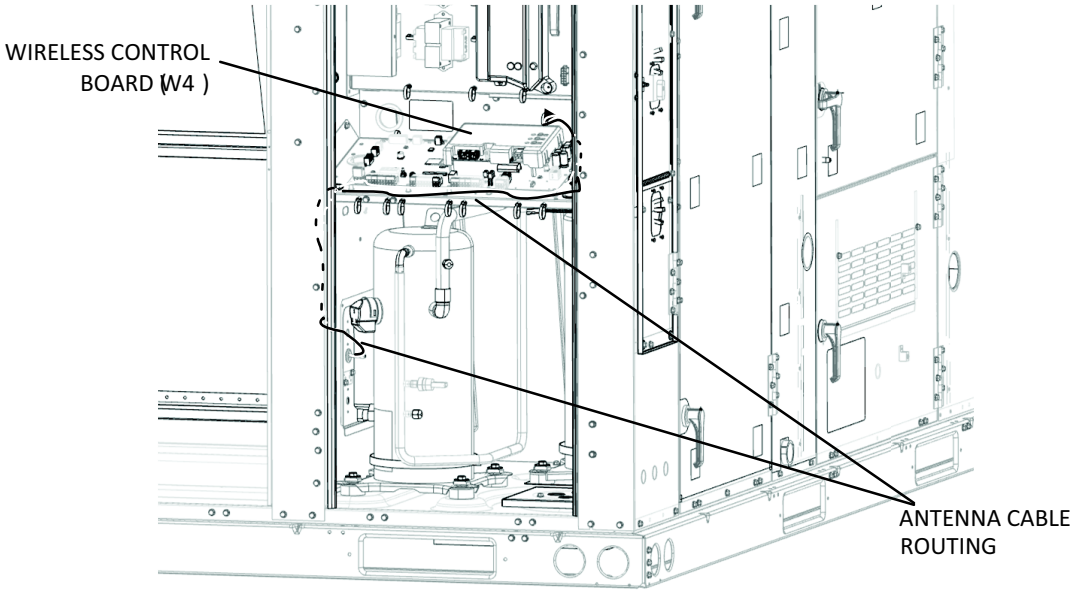


FIGURE 5

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.

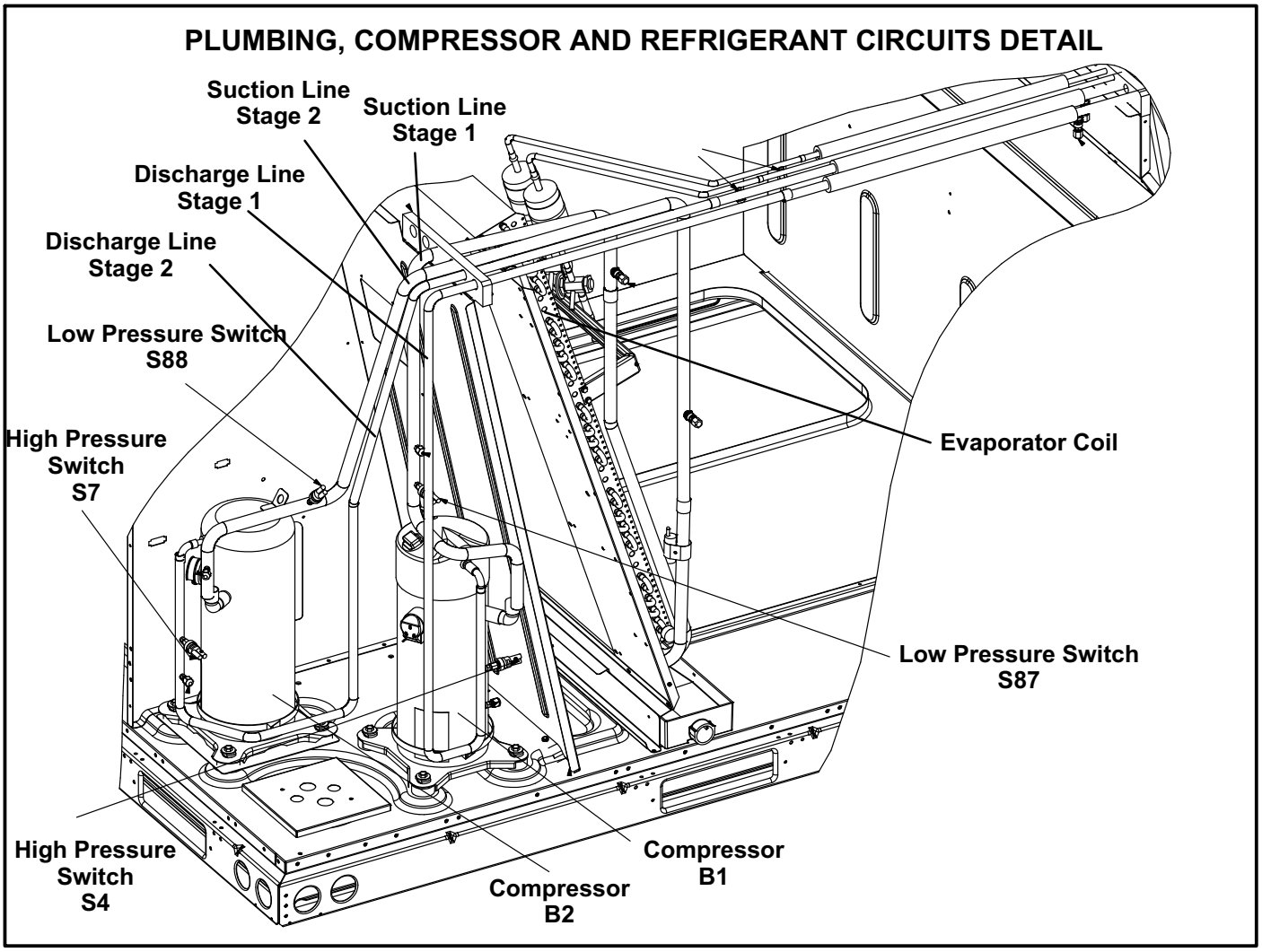


FIGURE 6

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 the use of temperature sensors that are located in the evaporator and condenser coils. See sub section 10 for more details on location of of the thermistors (temperature sensors) for added compressor reliability.

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

1-Compressors B1, B2

Units are equipped with one variable speed scroll and one fixed scroll compressor each operating on a separate cooling circuit. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠WARNING

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

Each compressor is energized by a corresponding compressor contactor, , however contactor (K1) provides power to the compressor inverter (A192) which then controls compressor according to signal from unit controller (A55).

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

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

⚠IMPORTANT

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

2-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

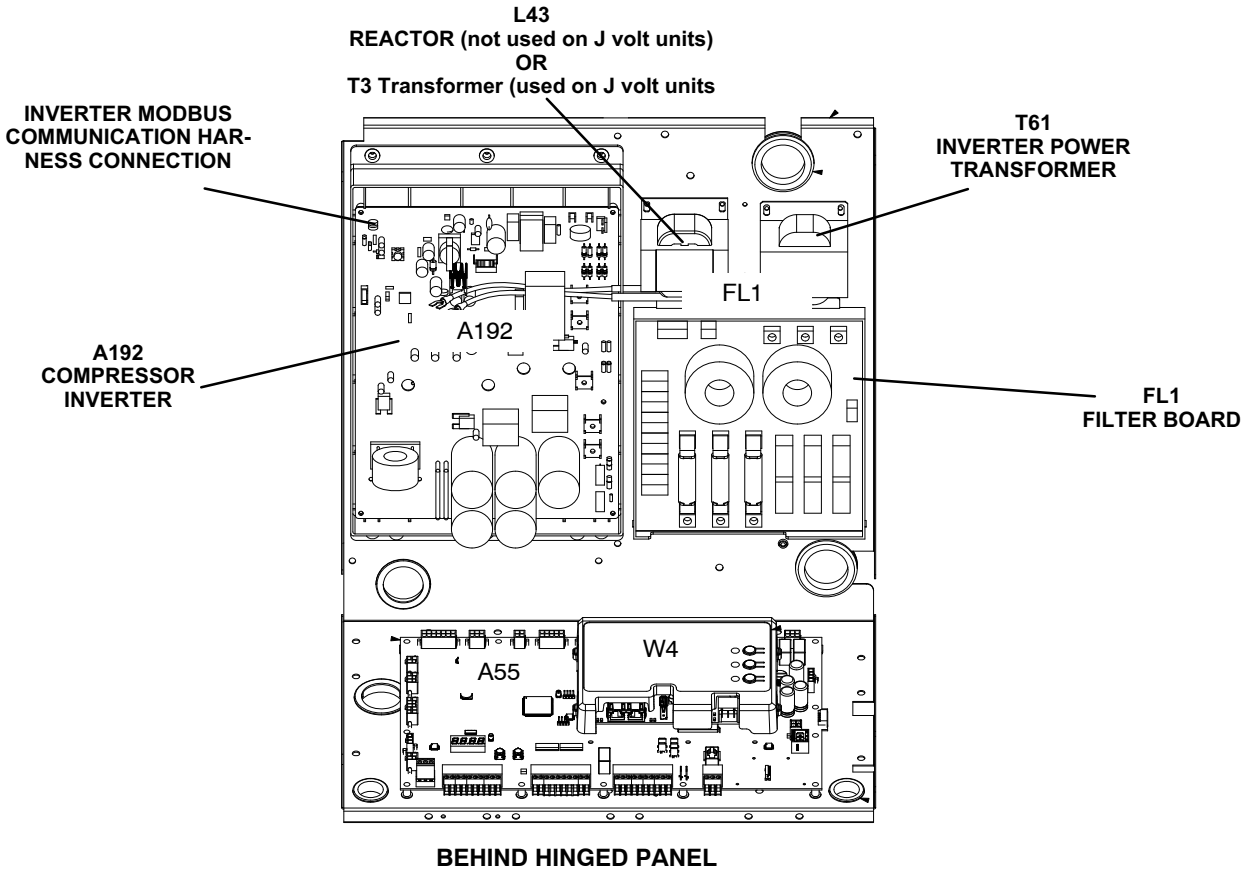


FIGURE 7

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.

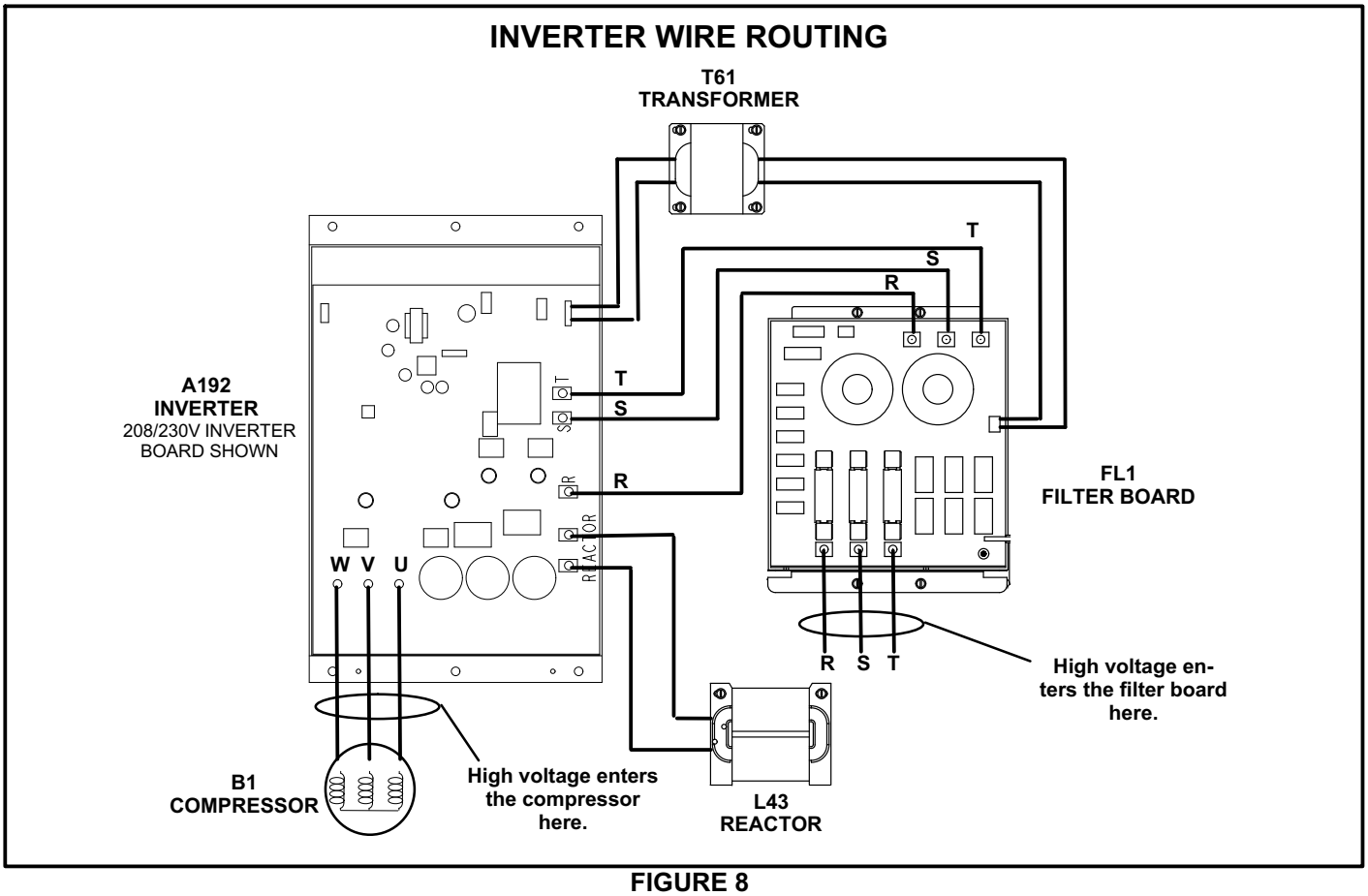


FIGURE 8

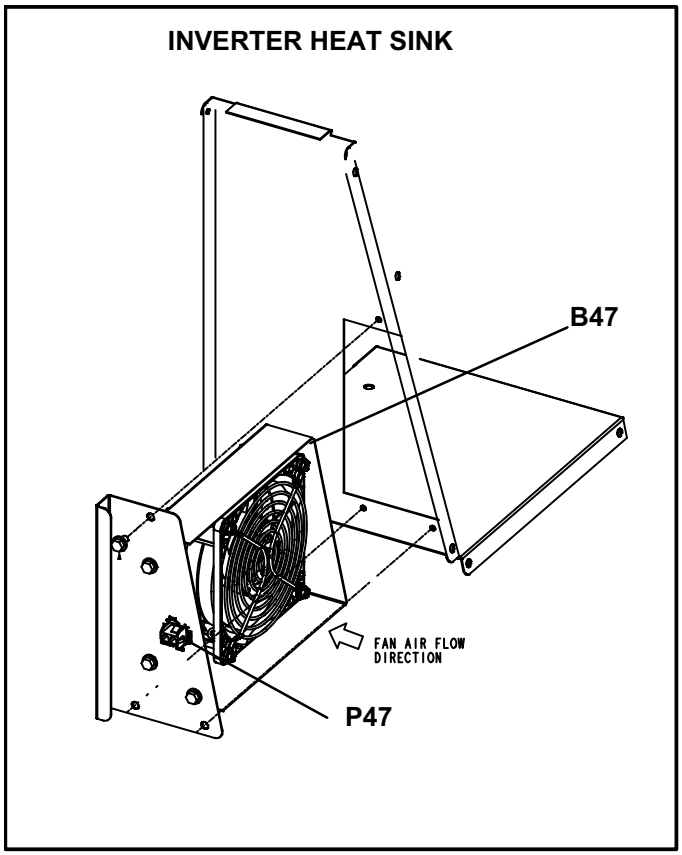


FIGURE 9

3-Crankcase Heaters HR1, HR2

All LGM units use insertion type heaters. Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor size. Power to crankase heater (HR1) is controlled through the K191 relay and power to HR2 controlled by auxiliary contact on K2 compressor contactor that is normally closed.

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

LGM units have a filter drier located in the liquid line of each refrigerant circuit. See figure 6. 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 and B5

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

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)

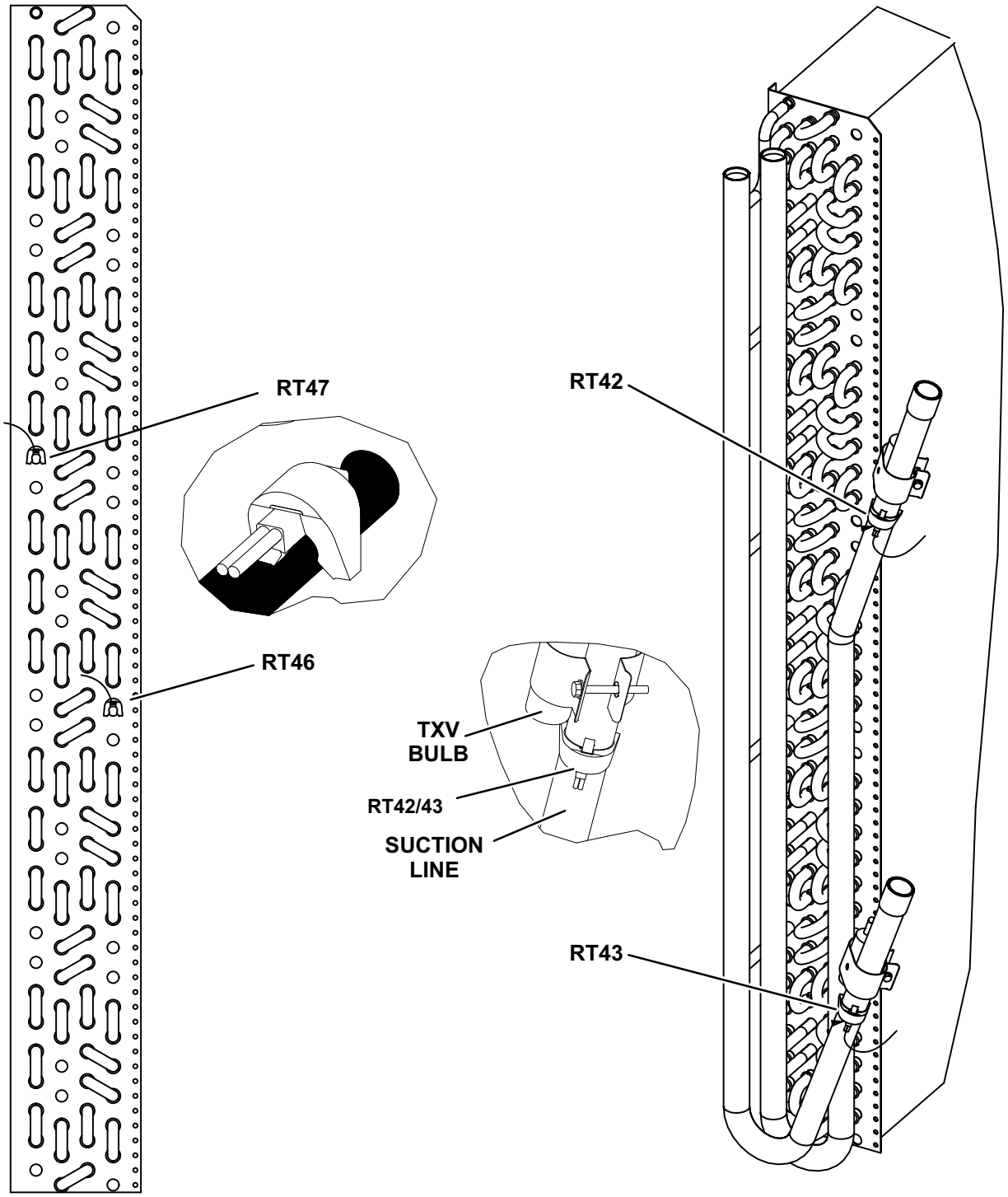


FIGURE 10

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

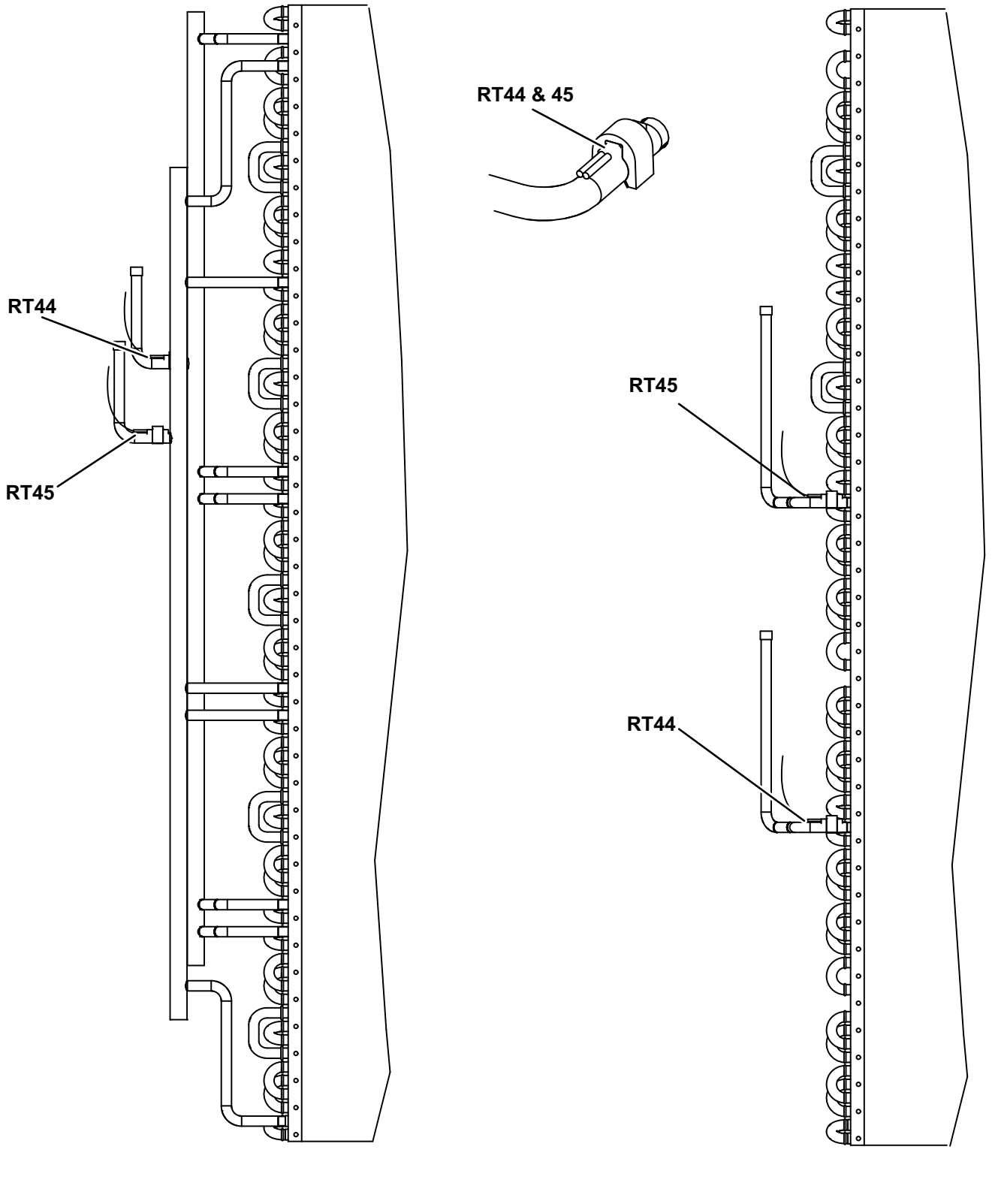


FIGURE 11

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

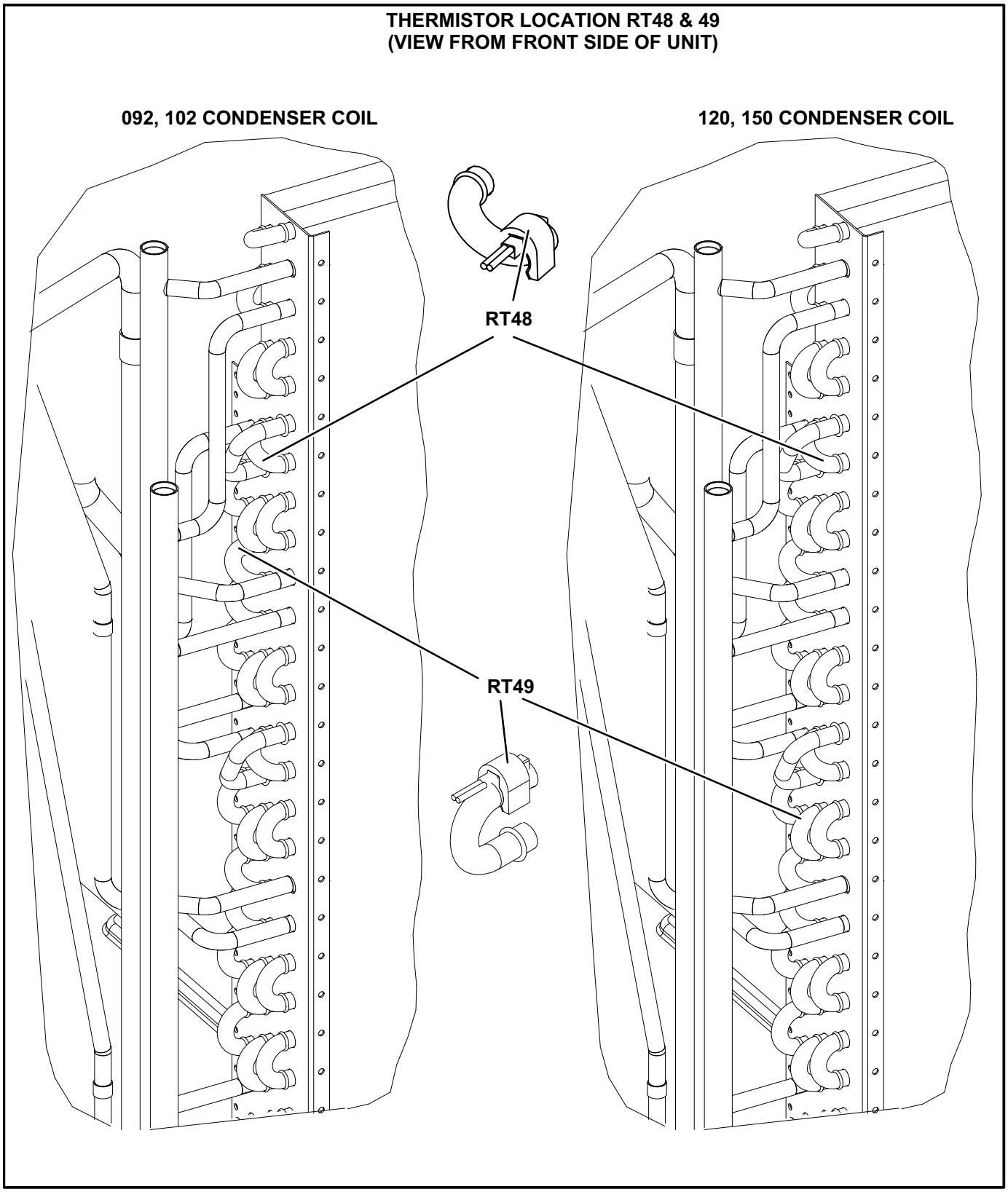


FIGURE 12

C-Blower Compartment

Units are equipped with variable speed, direct drive blowers. The installer is able to enter the design-specified supply air CFM into the Unit Controller for optimal efficiency. The Unit Controller calibrates the supply air volume which eliminates the need to manually take duct static measurements. Refer to *C-Adjusting Unit CFM - Ultra High Efficiency Direct Drive Blowers.*

⚠IMPORTANT

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

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

A-Blower Operation

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

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

⚠WARNING

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

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

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

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

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

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

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

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

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.

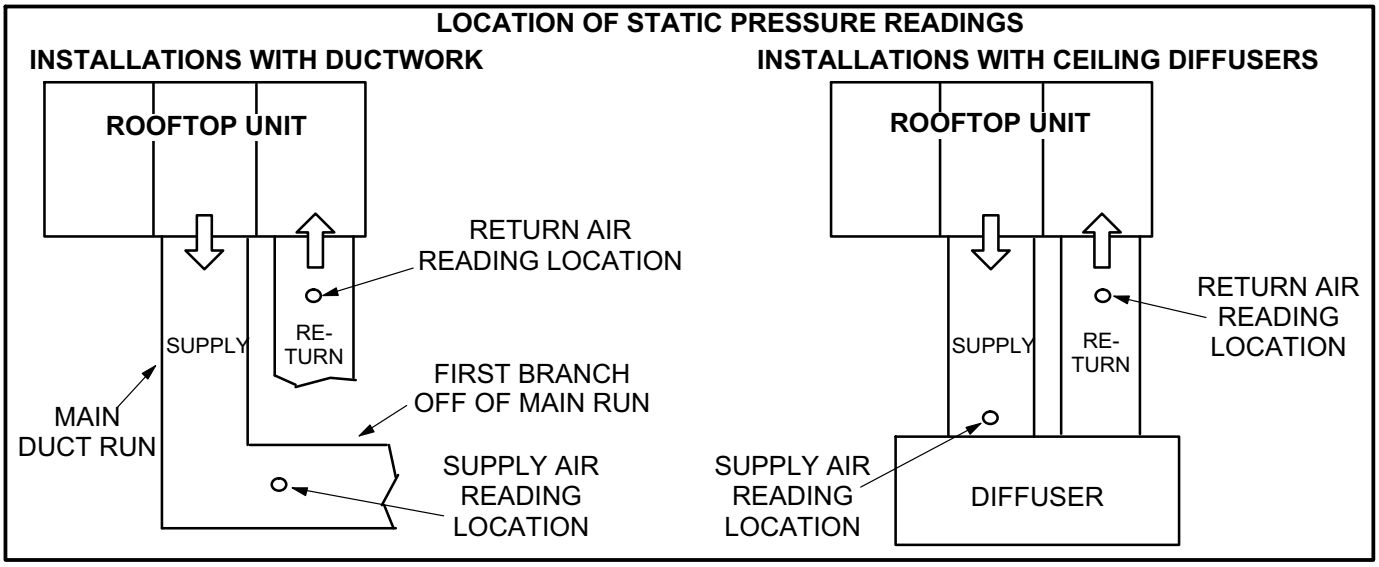


FIGURE 13

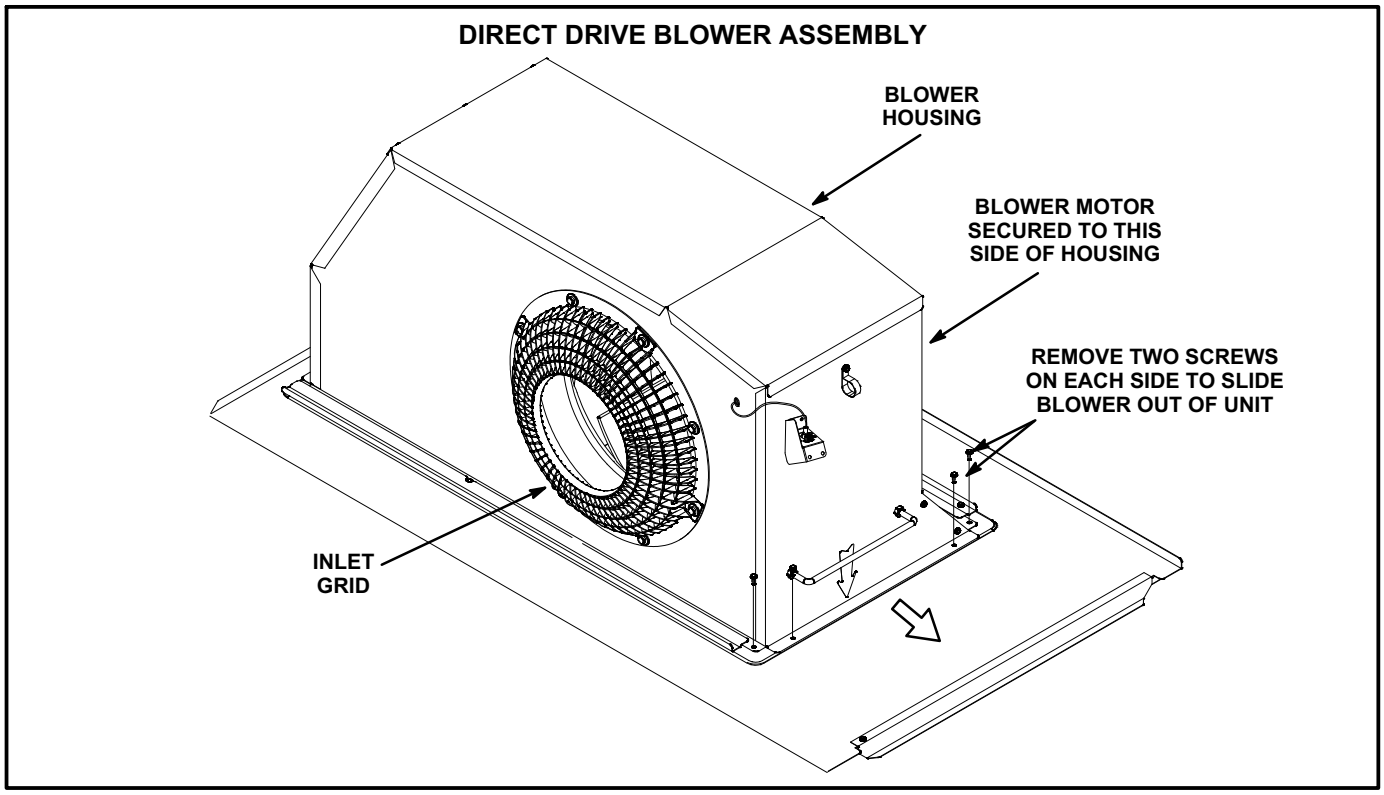


FIGURE 14

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	

TABLE 8
MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENTS					
	Motor Pulley		Blower Pulley		Belt	
	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
A01	1VP34x7/8	31K6901	AK54 x 1	100244-19	A40	100245-17
A02	1VP34x7/8	31K6901	AK49 x 1	100244-18	A39	100245-16
A03	1VP34x7/8	31K6901	AK44 x 1	100244-16	A39	100245-16
A05	1VP34x7/8	31K6901	AK41 x 1	100244-15	A39	100245-16
A06	1VP44x7/8	P-8-1488	AK51 x 1	18L2201	A41	100245-18
A07	1VP50x7/8	P-8-2187	AK54 x 1	100244-19	AX43	73K8201
AA01	1VP34x7/8	31K6901	AK69 x 1	37L4701	AX51	13H0101
AA02	1VP40x7/8	79J0301	BK80H[1]	100788-03	A53	P-8-4951
AA03	1VP40x7/8	79J0301	AK59 x 1	31K6801	A50	100245-29
AA04	1VP44x7/8	P-8-1488	AK59 x 1	31K6801	AX51	13H0101
A01T[2]	1VP34x7/8	31K6901	AK54 x 1	100244-19	A41	100245-18
A02T[2]	1VP34x7/8	31K6901	AK49 x 1	100244-18	A40	100245-17
A03T[2]	1VP34x7/8	31K6901	AK44 x 1	100244-16	A40	100245-17
A05T[2]	1VP34x7/8	31K6901	AK41 x 1	100244-15	A41	100245-18
A06T[2]	1VP44x7/8	P-8-1488	AK51 x 1	18L2201	A41	100245-18
A07T[2]	1VP50x7/8	P-8-2187	AK54 x 1	100244-19	AX43	73K8201
AA01T[2]	1VP34x7/8	31K6901	AK69 x 1	37L4701	A50	100245-29
AA02T[2]	1VP40x7/8	79J0301	BK80H*	100788-03	A52	100245-30
AA03T[2]	1VP40x7/8	79J0301	AK59 x 1	31K6801	A49	100245-32
AA04T[2]	1VP44x7/8	P-8-1488	AK59 x 1	31K6801	A50	100245-29

NOTES: [1] Requires split taper bushing, Browning no. H1; OEM no. 100073-04 [2] Includes tension assembly, Fenner no. FS0590; OEM no. 101994-02

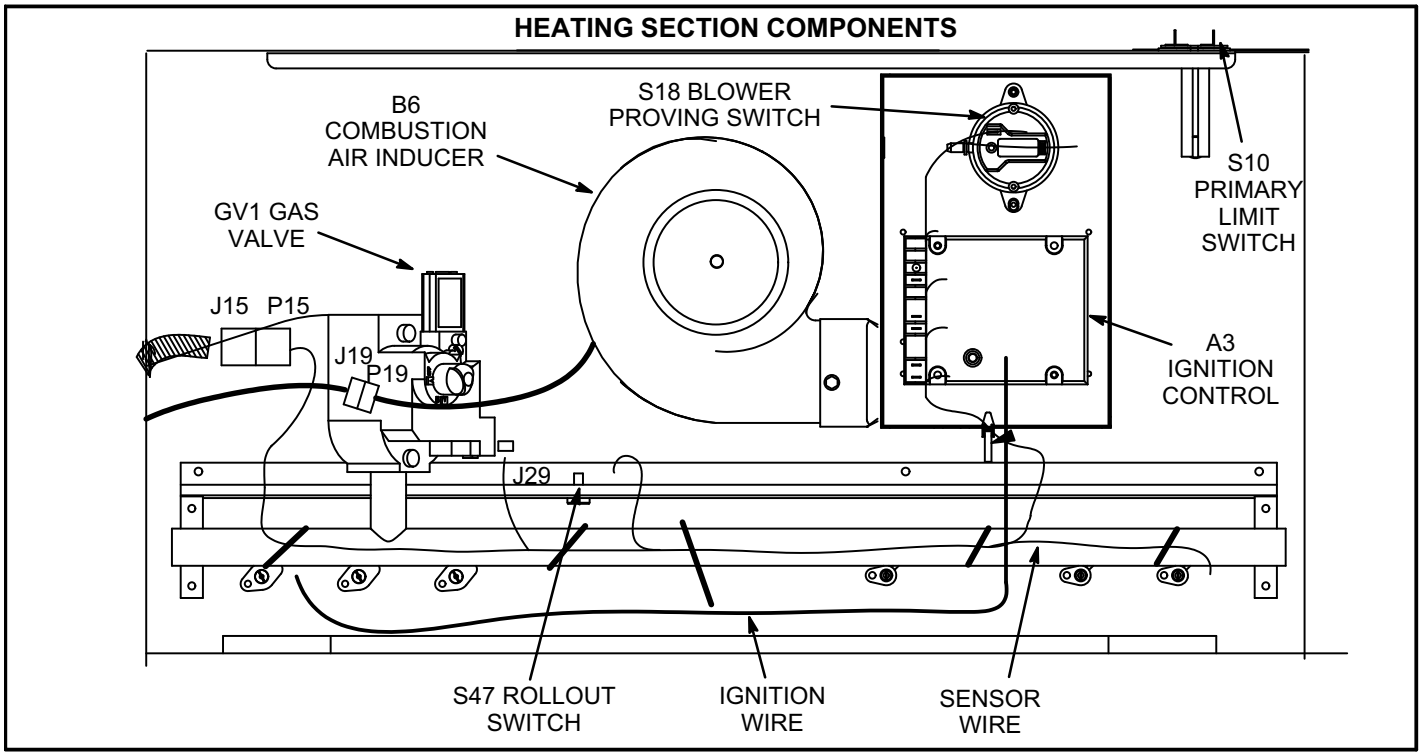


FIGURE 15

D-GAS HEAT COMPONENTS

See SPECIFICATIONS tables or unit nameplate for Btuh capacities. Units are equipped with two identical gas heat sections (gas heat section one and gas heat section. Flexible pipe will feed supply gas to both sections. If for service the flexible connection must broken, hand tighten then turn additional 1/4" with a wrench for metal to metal seal (do not overtighten).

NOTE - Do not use thread sealing compound on flex pipe flare connections.

1-Control Box Components A3, A12, A55

⚠WARNING

Shock hazard. Spark related components contain high voltage which can cause personal injury or death. Disconnect power before servicing. Control is not field repairable. Unsafe operation will result. If control is inoperable, simply replace the entire control.

Burner Ignition Control A3, A12

The ignition controls are located in the heat section areas below the compressors. The controls are manufactured UTEC. See table 9 for LED codes.

The ignition control provides three main functions: gas valve control, ignition and flame sensing. The unit will usually ignite on the first attempt; however, the ignition attempt sequence provides three trials for ignition before locking out. The lockout time for the control is 5 minutes. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires breaking and remaking power to the ignition control. See figure 16 for a normal ignition sequence and figure 17 for the ignition attempt sequence with retrials (nominal timings given for simplicity). Specific timings for the ignition controls are shown in figure 18.

TABLE 9

UTEC	
LED Flashes	Indicates
Slow Flash	Control ok, no call for heat
Fast Flash	Control ok, call for heat present.
Steady Off	Internal control fault or no power
Steady On Failure	Control internal failure
1 Flash	Rollout switch open
2 Flashes	Limit open or lockout from to many tries during a single heat demand
3 Flashes	Pressure switch open with inducer on/ open during 5 minute inducer off time.
4 Flashes	Ignition lockout from no flame detected or from too many flame losses.
5 Flashes	Flame sensed out of sequence
6 Flashes	Pressure switch closed with inducer off
7 Flashes	Gas valve relay failure
8 Flashes	Lockout due to too many pressure switch openings during one heat demand

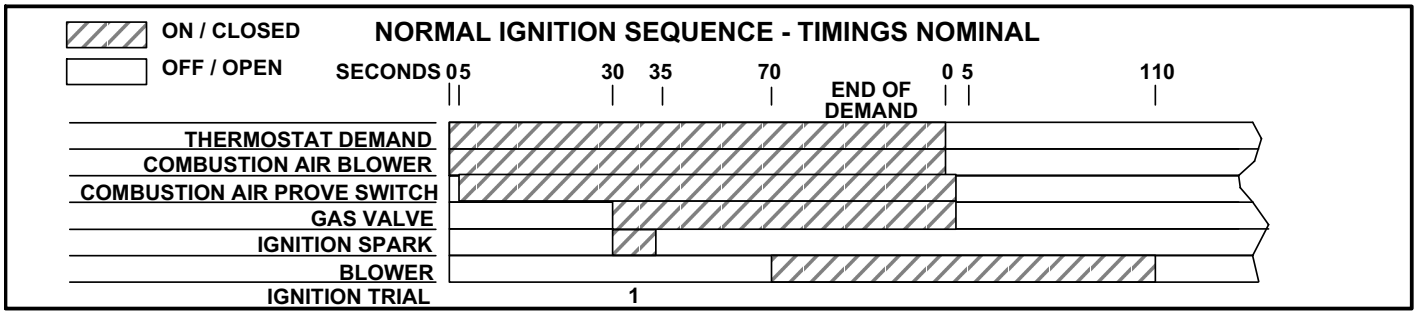


FIGURE 16

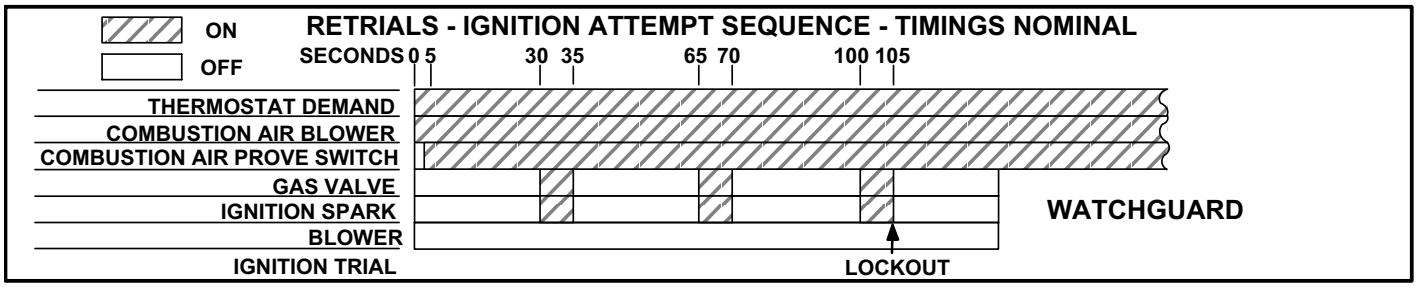


FIGURE 17

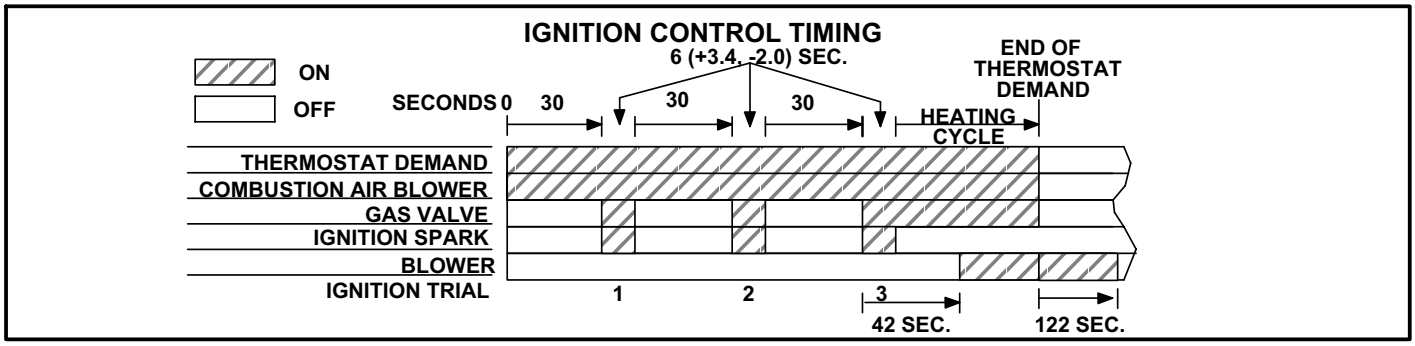


FIGURE 18

Flame rectification sensing is used on all units. Loss of flame during a heating cycle is indicated by an absence of flame signal (0 microamps). If this happens, the control will immediately restart the ignition sequence and then lock out if ignition is not gained after the third trial. See System Service Checks section for flame current measurement.

The control shuts off gas flow immediately in the event of a power failure. Upon restoration of gas and power, the control will restart the ignition sequence and continue until flame is established or system locks out.

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air blower to vent exhaust gases from the burners. When the combustion air blower is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air blower is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates gas valve, the spark electrode and the flame sensing electrode. Sparking stops immediately after flame is sensed. The combustion air blower continues to operate throughout the heating demand. If the flame fails or if the burners do not ignite, the ignition control will attempt to ignite the burners up to two more times. If ignition cannot be obtained after the third attempt, the control will lock out. The ignition control is not adjustable.

2-Heat Exchanger (Figures 19 and 20)

The LGM units use aluminized steel inshot burners with matching tubular aluminized (stainless steel is an option) steel heat exchangers and two-stage redundant gas valves. Units are equipped with one eleven tube/burner for high heat and one six tube/burner for standard heat. Burners use a burner venturi to mix gas and air for proper combustion. Combustion takes place at each tube entrance. As hot combustion gases are drawn upward through each tube by the combustion air blower, exhaust gases are drawn out the top and fresh air/gas mixture is drawn in at the bottom. Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blowers, controlled by the A55 Unit Controller, force air across all surfaces of the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange.

The gas valves accomplish staging by allowing more or less gas to the burners as called for by heating demand.

3-Gas Heat Exchanger Inserts (some units)

Inserts are installed on standard (130,000Btuh) and high (240,000 Btuh) heat exchangers. Medium heat exchangers do not require inserts. See figure 21. Inserts are used to maintain even temperature distribution through the heat exchanger. Temperature distribution can vary depending on supply air flow, number of heat exchanger tubes and the blower deck opening.

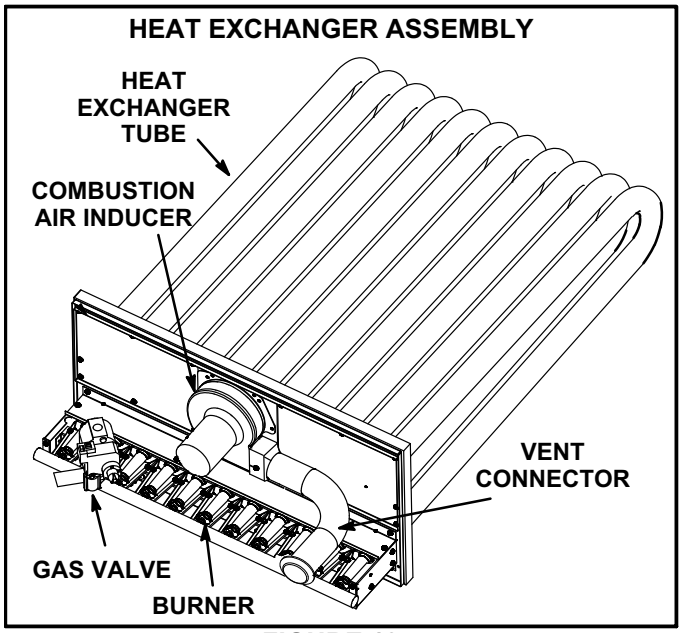


FIGURE 19

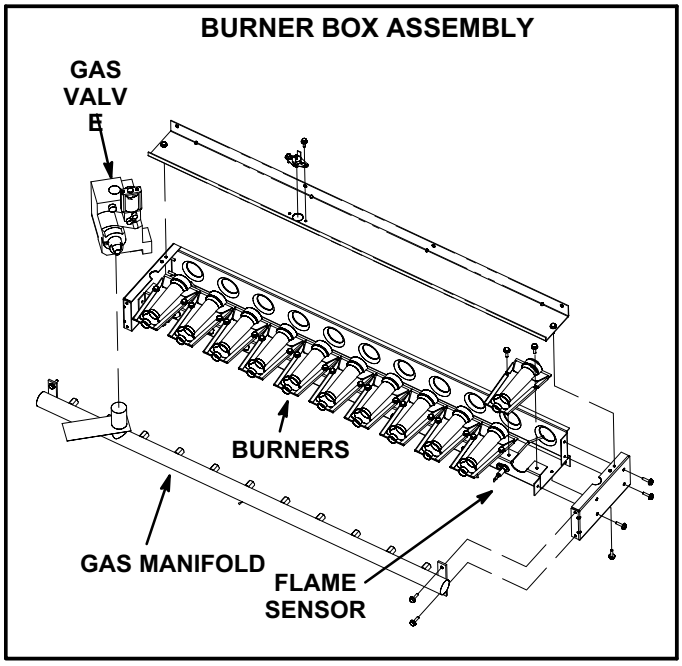


FIGURE 20

4-Burner Assembly (Figure 22)

The burners are controlled by the spark electrode, flame sensing electrode, gas valve and combustion air blower. The spark electrode, flame sensing electrode and gas valve are directly controlled by ignition control. Ignition control and combustion air blower is controlled by A55 Unit Controller.

Burners

All units use inshot burners (see figure 22). Burners are factory set and do not require adjustment. A peep hole with cover is furnished in the heating access panel for flame viewing. Always operate the unit with the access panel in place.

Burners can be removed individually for service. Burner maintenance and service is detailed in the SERVICE CHECKS section of this manual.

INSERT LOCATION - DIRECT DRIVE ONLY
(Some Units)

STANDARD HEAT (130,000BTUH)

HIGH HEAT (240,000 BTUH)

Note - No inserts on medium heat.

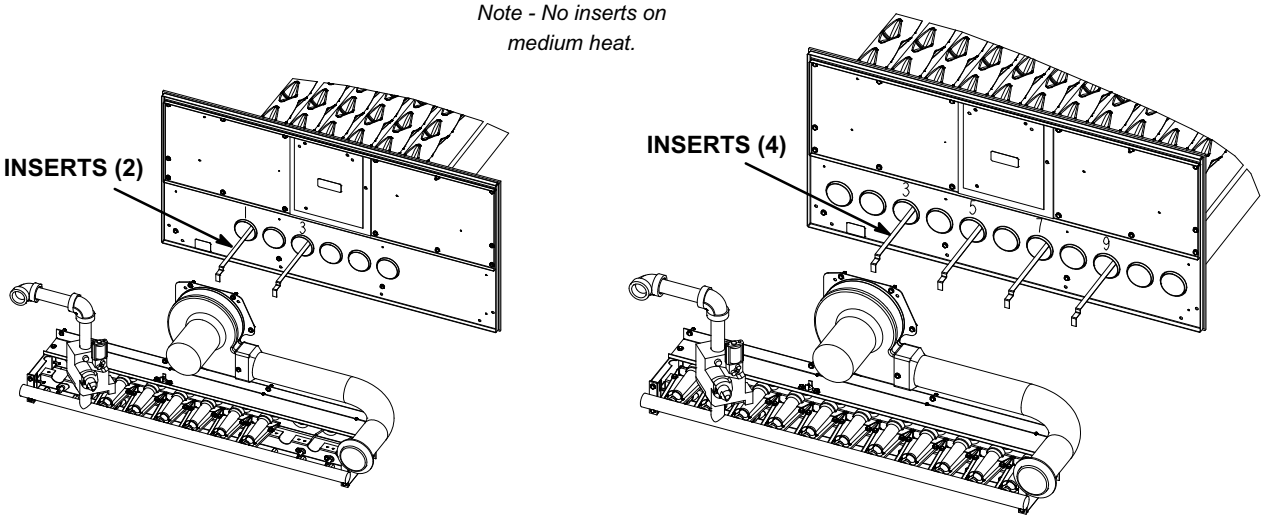


FIGURE 21

TYPICAL GAS BURNER ASSEMBLY

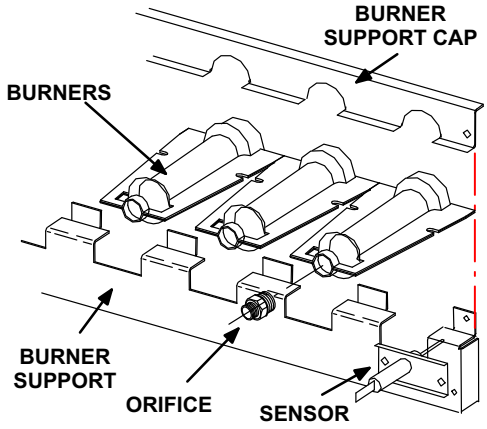


FIGURE 22

Orifice

Each burner uses an orifice (two types figure 23) which is precisely matched to the burner input. **Install only the orifices with the same threads.** The orifice is threaded into the burner manifold. The burner is supported by the orifice and will easily slide off for service.

NOTE-Do not use thread sealing compound on the orifices. Using thread sealing compound may plug the orifices.

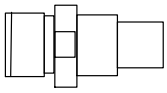
Each orifice and burner are sized specifically to the unit. Refer to ProductZone@www.davenet.com for correct sizing information.

5-Primary High Temperature Limits S10

S10 is the primary high temperature limit and is located on the blower deck to the right of the blower housing.

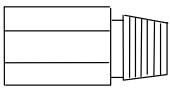
Primary limit S10 is wired to the A3 ignition control which energizes burner 1 control (A3). Its N.C. contacts open to de-energize the ignition control when excessive temperature is reached in the blower compartment. The A55 unit controller will energize the B4 blower when ever it senses that the S10 limit has been opened. If the limit trips the blower will be energized. Limit settings are factory set and cannot be adjusted. If limit must be replaced, the same type and set point must be used.

ORIFICE WITH STRAIGHT THREADS



Tighten to 14 ± .5 ft/lbs
Do not over-tighten.

ORIFICE WITH PIPE THREADS



Tighten to 6.25 ± .5 ft.lbs.
Do not over-tighten.

FIGURE 23

6-Flame Roll-out Limit S47

Flame roll-out limit S47 is a SPST N.C. high temperature limit located as shown in figure 15. S47 is wired to the A3 ignition controller. When S47 senses flame roll-out (indicating a blockage in the combustion air passages), the flame roll-out limit trips and the ignition control immediately closes the gas valve.

Limit S47 in standard heat units is factory preset to open at 250°F ± 12°F (121.1°C ± 6.7°C) on a temperature rise. All flame roll-out limits are manual reset.

7-Combustion Air Prove Switch S18

S18 is a SPST N.O. switch which monitors combustion air inducer operation. See figure 15 for location. Switch S18 is wired to the A3 ignition control.

The switch closes on a *negative* pressure fall. This negative pressure fall and switch actuation allows the ignition sequence to continue (proves, by closing, that the combustion air inducer is operating before allowing the gas valve to open.) The combustion air prove switch is factory set and not adjustable. The switch will automatically open on a pressure rise (less negative pressure). S18 closes at 0.25 ± 5 in.w.c. (62.3 ± 12.4 Pa) and opens at 0.10 ± 5 in.w.c. (24.8 ± 12.4Pa)

8-Combustion Air Inducer B6

The combustion air inducer provides fresh air to the burner while clearing the combustion chamber of exhaust gases. See figure 15 for the inducer location. The inducer is energized by the A3 ignition control via an on board mounted relay.

The inducer uses a 208/230V single-phase PSC motor and a 4.81in. x 1.25in. (122mm x 32mm) blower wheel. The motor operates at 3200RPM and is equipped with auto-reset overload protection. Blower is supplied by various manufacturers. Ratings may vary by manufacturer. Specific blower electrical ratings can be found on the unit rating plate. Unit with main voltage of 460VAC (G) will use a 460VAC Combustion Air Inducer B6. 240VAC (Y) and 575VAC (J) use a 230V Combustion Air Inducer

All combustion air blower motors are sealed and cannot be oiled. The blower cannot be adjusted but can be disassembled for cleaning.

9-Combustion Air Motor Capacitor C3

Combustion air inducer B6 requires a run capacitor rated at 3 MFD and 370VAC.

10-Gas Valves GV1

Gas valve GV1 is a two-stage redundant valve. Units are equipped with valves manufactured by White-Rodgers or Honeywell. On both valves first stage (low fire) is quick opening (on and off in less than 3 seconds). On the White-Rodgers valve second stage is slow opening (on to high fire pressure in 40 seconds and off to low fire pressure in 30 seconds). On the Honeywell second stage is quick opening. On a call for first stage heat (low fire), the valve is energized by the ignition control simultaneously with the spark electrode. On a call for second stage heat (high fire), the second stage operator is energized directly from A3 ignition controller. The White-Rodgers valve is adjustable for high fire only. Low fire is not adjustable. The Honeywell valve is adjustable for both low fire and high fire. A manual shut-off knob is provided on the valve for shut-off. Manual shut-off knob immediately closes both stages without delay. Figure 24 shows gas valve components. Table 10 shows factory gas valve regulation for LGM units.

TABLE 10

GAS VALVE REGULATION FOR LGM UNITS

Maximum Inlet Pressure	Operating Pressure (outlet) Factory Setting			
	Natural		L.P	
	Low	High	Low	High
13.0"W.C. 3232Pa	1.6±0.2"W.C. 398±50Pa	3.7±0.3"W.C. 920±75Pa	5.5±0.3"W.C. 1368±75Pa	10.5±0.5"W.C 2611±7124Pa

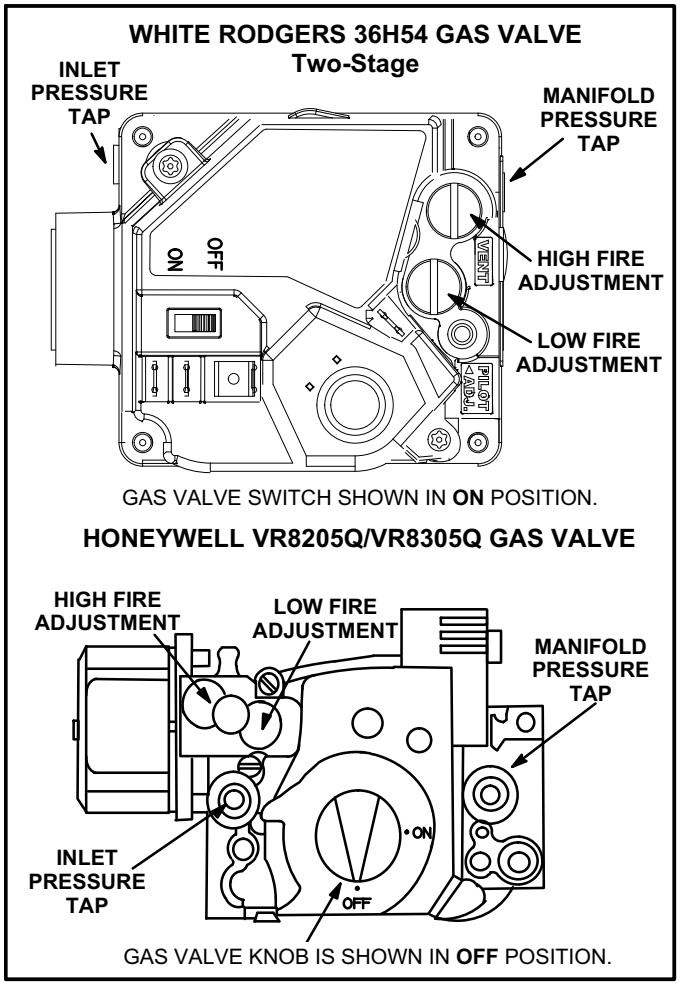


FIGURE 24

11-Spark Electrodes

An electrode assembly is used for ignition spark. Two identical electrodes are used (one for each gas heat section). The electrode is mounted through holes on the left-most end of the burner support. The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

During ignition, spark travels through the spark electrode (figure 25) and ignites the left burner. Flame travels from burner to burner until all are lit.

The spark electrode is connected to the ignition control by a 8 mm silicone-insulated stranded high voltage wire. The wire uses 1/4" (6.35 mm)female quick connect on the electrode end and female spark plug-type terminal on the ignition control end.

NOTE-IN ORDER TO MAXIMIZE SPARK ENERGY TO ELECTRODE, HIGH VOLTAGE WIRE SHOULD TOUCH UNIT CABINET AS LITTLE AS POSSIBLE.

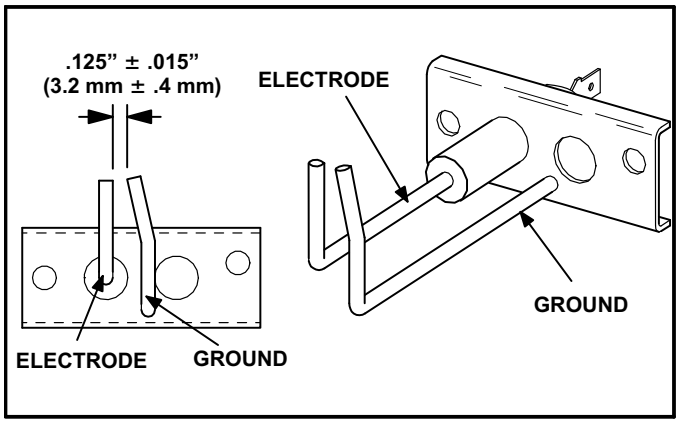


FIGURE 25

12-Flame Sensors

A flame sensor is located on the right side of each burner support. The sensor is mounted through a hole in the burner support and the tip protrudes into the flame envelope of the right most burner. The sensor assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

When flame is sensed by the flame sensor (indicated by microamp signal through the flame) sparking stops immediately. During operation, flame is sensed by current passed along the ground electrode (located on the spark electrode), through the flame and into the sensing electrode. The ignition control allows the gas valve to stay open as long as a flame signal (current passed through the flame) is sensed.

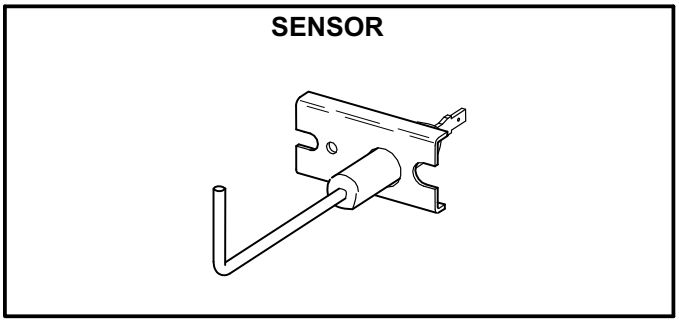


FIGURE 26

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:

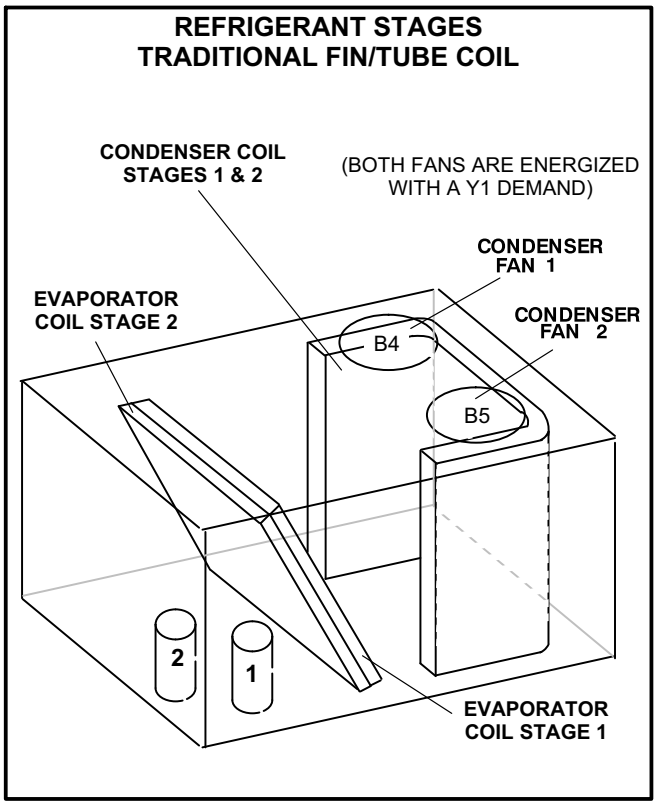


FIGURE 27

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 11 through 18 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 11 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 12 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 13 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 14 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 15 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 16 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 17 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 18 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 19 for subcooling temperatures. A subcooling temperature greater than this value indicates an overcharge. A subcooling temperature less than this value indicates an undercharge.

TABLE 19
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-START-UP - OPERATION

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

A-Preliminary and Seasonal Checks

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

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

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

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

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

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

B-Cooling Start-up See Figure 28

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.

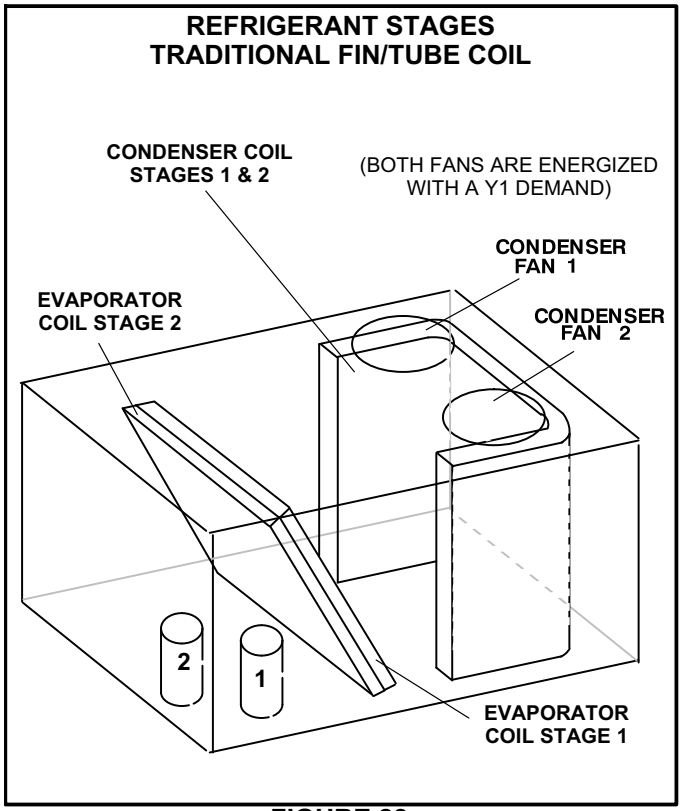


FIGURE 28

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.

C-Heating Start-up

FOR YOUR SAFETY READ BEFORE LIGHTING

⚠WARNING

Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

⚠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.

BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

⚠IMPORTANT

Units equipped with a Hot Gas Reheat system MUST be charged in standard cooling mode.

In case of a safety shutdown, move thermostat switch to **OFF** and return the thermostat switch to **HEAT** to reset ignition control.

Placing Furnace In Operation
Gas Valve Operation for White Rodgers 36C and Honeywell VR8205Q/VR8305Q (figure 29)

1- Set thermostat to lowest setting.

2- Turn off all electrical power to appliance.

3- This appliance is equipped with an ignition device which automatically lights the burner. Do **not** try to light the burner by hand.

4- Open or remove the heat section access panel.

5- Turn the knob on the gas valve clockwise ↷ to **"OFF"**. Depress 36C knob slightly. Do not force.

6- Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas, go to the next step.

7- Turn the knob on the gas valve counterclockwise ↶ to **"ON"**. Do not force.

8- Close or replace the heat section access panel.

9- Turn on all electrical power to appliance.

10- Set thermostat to desired setting.

11- The combustion air inducer will start. The burners will light within 40 seconds.

12- If the appliance does not light the first time (gas line not fully purged), it will attempt up to two more ignitions before locking out.

13- If lockout occurs, repeat steps 1 through 10.

14- If the appliance will not operate, follow the instructions "Turning Off Gas to Appliance" and call your service technician or gas supplier.

Turning Off Gas to Appliance

1- If using an electromechanical thermostat, set to the lowest setting.

2- Before performing any service, turn off all electrical power to the appliance.

3- Open or remove the heat section access panel.

4- Turn the knob on the gas valve clockwise ↷ to **"OFF"**. Depress 36C knob slightly. Do not force.

D-Safety or Emergency Shutdown

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

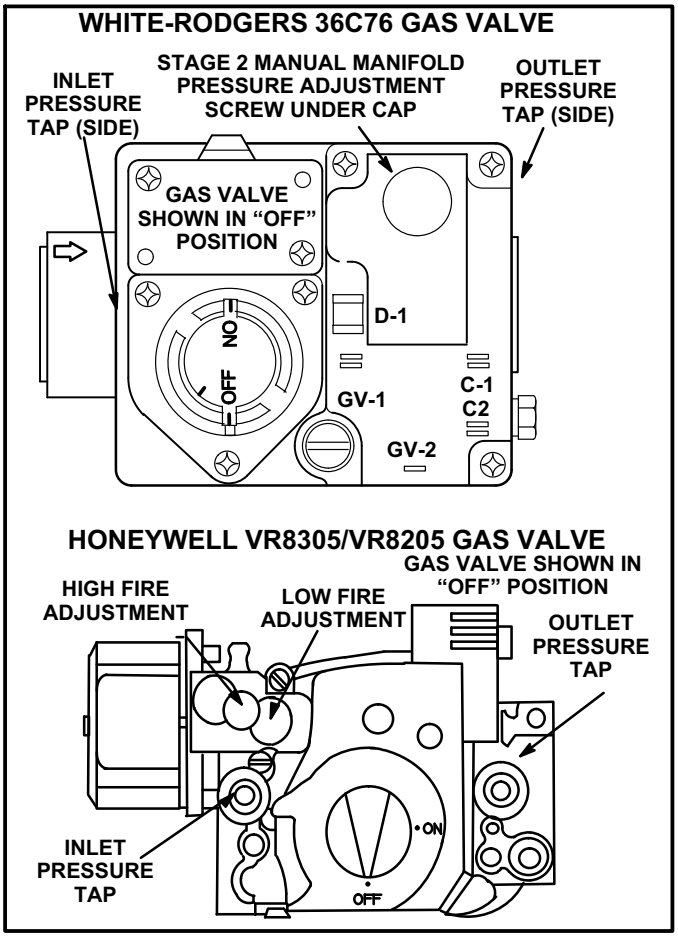


FIGURE 29

V- SYSTEMS SERVICE CHECKS

⚠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.

A-Heating System Service Checks

All LGM units are ETL/CSA design certified without modification.

Before checking piping, check with gas company or authorities having jurisdiction for local code requirements. Refer to the LGM installation instruction for more information.

1-Gas Piping

Gas supply piping must not allow more than 0.5”W.C. (124.3 Pa) drop in pressure between the gas meter and the unit. Supply gas pipe must not be smaller than the unit gas connection. Refer to installation instructions for details.

2-Testing Gas Piping

NOTE-In case emergency shutdown is required, turn off the main manual shut-off valve and disconnect the main power to the unit. These controls should be properly labeled by the installer.

When pressure testing gas lines, the gas valve must be disconnected and isolated. **Gas valves can be damaged if subjected to more than 0.5 psig [14”W.C. (3481 Pa)]**. See figure 30.

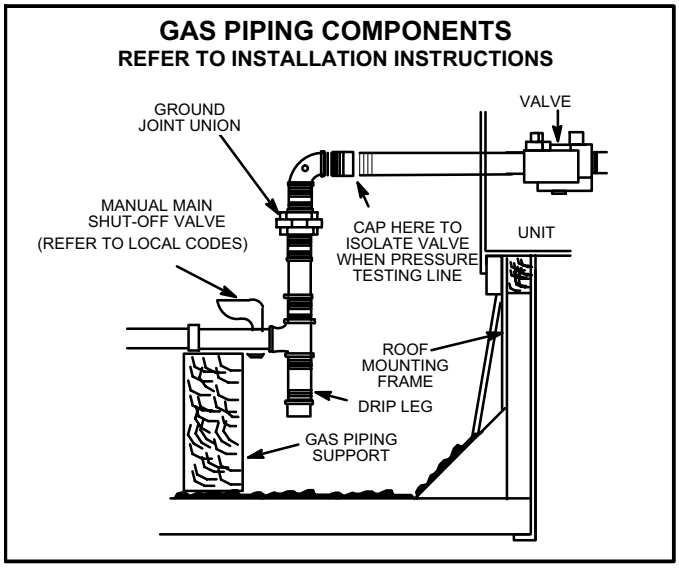


FIGURE 30

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping. The use of specialty Gas Leak Detector is strongly recommended.

Do not use matches, candles, flame or any other source of ignition to check for gas leaks.

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap located on unit gas valve GV1 and or GV3. Test supply gas pressure with unit firing at maximum rate (both stages energized). Make sure the reading falls within the range of the following values. Low pressure may result in erratic operation or “underfire.” High pressure can result in permanent damage to the gas valve or “overfire.” For natural gas units, operating pressure at the unit gas connection must be between 4.7”W.C. and 10.5”W.C. (1168 Pa and 2610 Pa). For L.P. gas units, operating pressure at the unit gas connection must be between 10.8”W.C. and 13.5”W.C. (2685.3 Pa and 3356.7 Pa).

On multiple unit installations, each unit should be checked separately while operating at maximum rate, beginning with the one closest to the supply gas main and progressing to the one furthest from the main. Multiple units should also be tested with and without the other units operating. Supply pressure must fall within the range listed in the previous paragraph.

4-Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move test gauge to the outlet pressure tap located on unit gas valve GV1 and or GV3. See figure 29 for location of pressure tap on the gas valve.

The manifold pressure is factory set and should not require adjustment. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. See figure 29 for location of gas valve (manifold pressure) adjustment screw.

All gas valves are factory regulated. The gas valve should completely and immediately cycle off in the event of gas or power failure. The manual shut-off knob can be used to immediately shut off gas supply.

⚠CAUTION

For safety, connect a shut-off valve between the manometer and the gas tap to permit shut off of gas pressure to the manometer.

Manifold Adjustment Procedure

1- Connect test gauge to the outlet pressure tap on the gas valve. Start the unit (call for second stage heat) and allow five minutes for the unit to reach steady state.

2- While waiting for the unit to stabilize, notice the flame. The flame should be stable without flashback and should not lift from the burner heads. Natural gas should burn basically blue with some clear streaks. L.P. gas should burn mostly blue with some clear yellow streaks.

3- After allowing the unit to stabilize for five minutes, record the manifold pressure and compare to the values given in table 10.

⚠ CAUTION

Disconnect heating demand as soon as an accurate reading has been obtained.

5-Proper Gas Flow

To check for proper gas flow to burners, determine Btuh input from unit rating plate or the gas heating capacity in the SPECIFICATIONS tables. Divide this input rating by the Btuh per cubic foot of available gas. Result is the number of cubic feet per hour required. Determine the flow of gas through gas meter for two minutes and multiply by 30 to get hourly flow of gas to the burners.

NOTE - To obtain accurate reading, shut off all other gas appliances connected to meter.

6-Inshot Burner

Burners are factory set for maximum air and cannot be adjusted. Always operate unit with access panel in place. A peep hole is furnished in the heating access panel for flame viewing. Natural gas should burn basically blue with some clear streaks. L.P. gas should burn mostly blue with some clear yellow streaks.

Figure 31 shows how to remove burner assembly.

1- Turn off power to unit and shut off gas supply.

2- Remove screws holding the burner support cap.

3- Slide each burner off its orifice.

4- Clean and reassemble (reverse steps 1-3).

5- Be sure to secure all wires and check plumbing.

6- Turn on power to unit. Follow lighting instructions attached to unit and operate unit in heating mode. Check burner flames. They should be blue with yellow streaks.

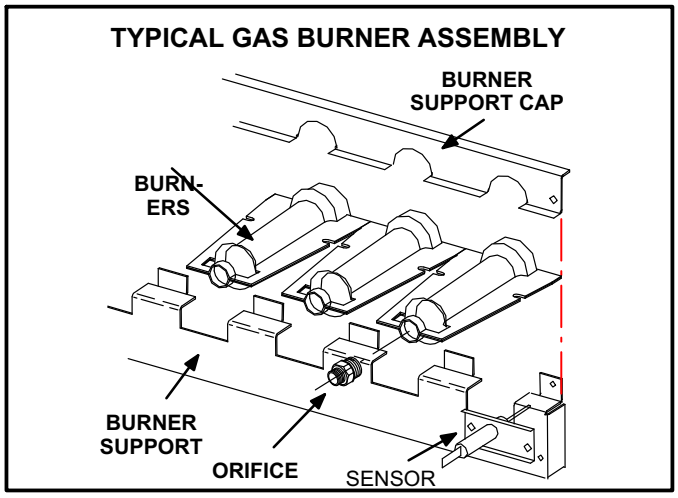


FIGURE 31

7-Spark Electrode Gap

The spark electrode assembly can be removed for inspection by removing two screws securing the electrode assembly and sliding it out of unit.

For proper unit operation, electrodes must be positioned and the spark gap set correctly.

Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125" ± 0.015" (3.2 mm ± .4 mm). See figure 25.

8-Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1- Turn off gas and electric power.

2- Remove access panel(s) and unit center mullion.

3- Remove gas valve, manifold assembly and burners.

4- Remove combustion air inducer and flue box. Pay careful attention to the order in which gaskets and orifice are removed.

5- Support heat exchanger (to prevent it from falling when final screws are removed.)

6- Remove screws supporting heat exchanger.

7- To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. to ensure proper operation.

9-Flame Sensing

Flame current is an electrical current which passes from the ignition control through the sensor electrode during unit operation. The current passes from the sensor through the flame to the ground electrode (located on the flame electrode) to complete a safety circuit. The electrodes should be located so the tips are at least 1/2" (12.7 mm) inside the flame envelope. Do not bend electrodes. To measure flame current, follow the procedure on the following page:

NOTE-Electrodes are not field adjustable. Any alterations to the electrode may create a hazardous condition that can cause property or personal injury.

1- Disconnect power to unit.

2- Remove lead from sensing electrode and install a 0-50DC microamp meter in series between the sensing electrode and the sensing lead.

3- Reconnect power and adjust thermostat for heating demand.

4- When flame is established, compare reading to table 20. Do not bend electrodes.

5- Disconnect power to unit before disconnecting meter. Make sure sensor wire is securely reconnected before reconnecting power to unit.

TABLE 20

Manufacturer	Nominal Signal Microamps	Drop Out
JOHNSON	0.5 - 1.0	.09

NOTE-If the meter scale reads 0, the leads are reversed. Disconnect power and reconnect leads for proper polarity.

10-Combustion Air Inducer

The combustion air inducer is factory set and is not field adjustable. However, operation should be monitored to ensure proper operation. The combustion air inducer is used to draw fresh air into the combustion chamber while simultaneously expelling exhaust gases. The inducer operates throughout the heating cycle.

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air inducer is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates the first stage operator of the gas valve (low fire), the spark and the flame sensing electrode. Sparking stops immediately after flame is sensed.

B-Cooling System Service Checks

LGM units are factory charged and require no further adjustment; however, charge should be checked periodically. See section III- CHARGING.

VI-MAINTENANCE

A-Filters

LGM units use four 20 x 25 x 2” pleated throw-away type filters. Filters may be accessed through the economizer / filter access door. Filters should be checked monthly (or more frequently in severe use) and cleaned or replaced regularly. Take note of the “AIR FLOW DIRECTION” marking on the filter frame when re-installing.

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

B-Lubrication

All motors and blower wheels used in LGM units are prelubricated; no further lubrication is required.

C-Supply Air Blower Wheel

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

D-Evaporator Coil

Inspect and clean coil at beginning of each season. Clean using mild detergent or commercial coil cleanser. Check condensate drain pan and line, if necessary. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet. Check connecting lines and coil for evidence of oil and refrigerant leaks.

E-Condenser Coil

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

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

Slab Coils -

Clean condenser coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. Check connecting lines and coil for evidence of oil and refrigerant leaks.

NOTE-If owner complains of insufficient cooling, the unit should be gauged and refrigerant charge checked. Refer to Gauge Manifold Attachment and Charging sections in this manual.

F-Electrical

1- Check all wiring for loose connections.

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

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

4- Check crankcase heater temperatures to ensure they are operating.

5- Check compressor sump thermistors to ensure they are making contact with compressor shell (ultra high efficiency units only).

VII-ACCESSORIES

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

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, a C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LGM 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 32. 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 33. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

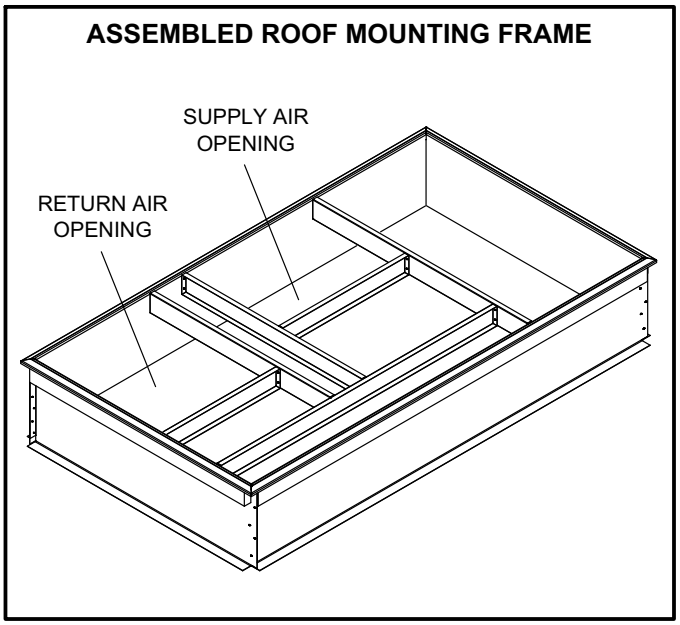


FIGURE 32

B-LP / Propane Kit

Natural to LP /propane kit includes a spring kit and three stickers. In addition, the LP kit contains either six, nine, or eleven burner orifices. For more detail refer to the natural to LP gas changeover kit installation instructions.

C-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.

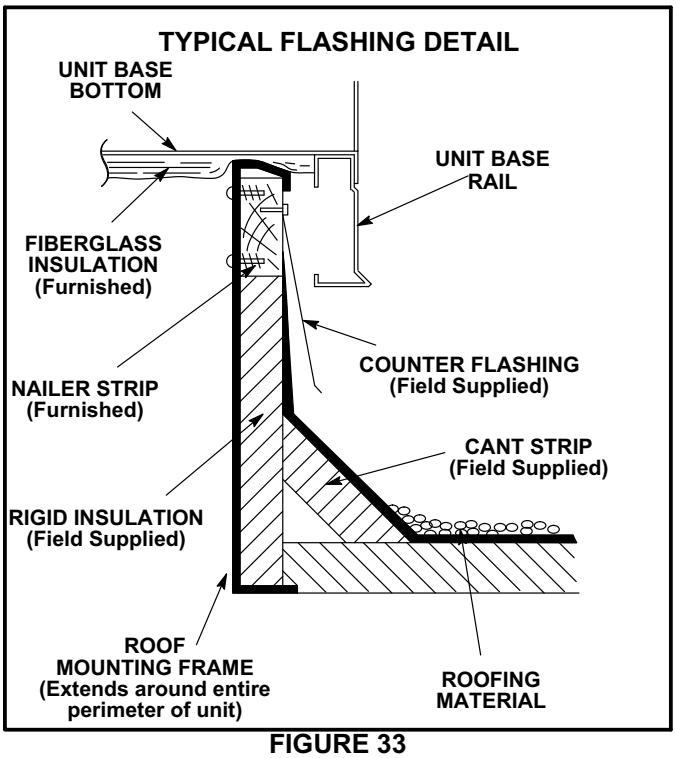


FIGURE 33

D-Transitions

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

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

LAOAD(M) consists of a set of dampers which may be manually or motor (M) operated to allow up to 25 percent outside air into the system at all times (see figure 34 or 35). Either air damper can be installed in LGM units. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild detergent. It should be sprayed with Filter Handicoater when dry prior to re-installation.

F-Supply and Return Diffusers (all units)

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

G-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.

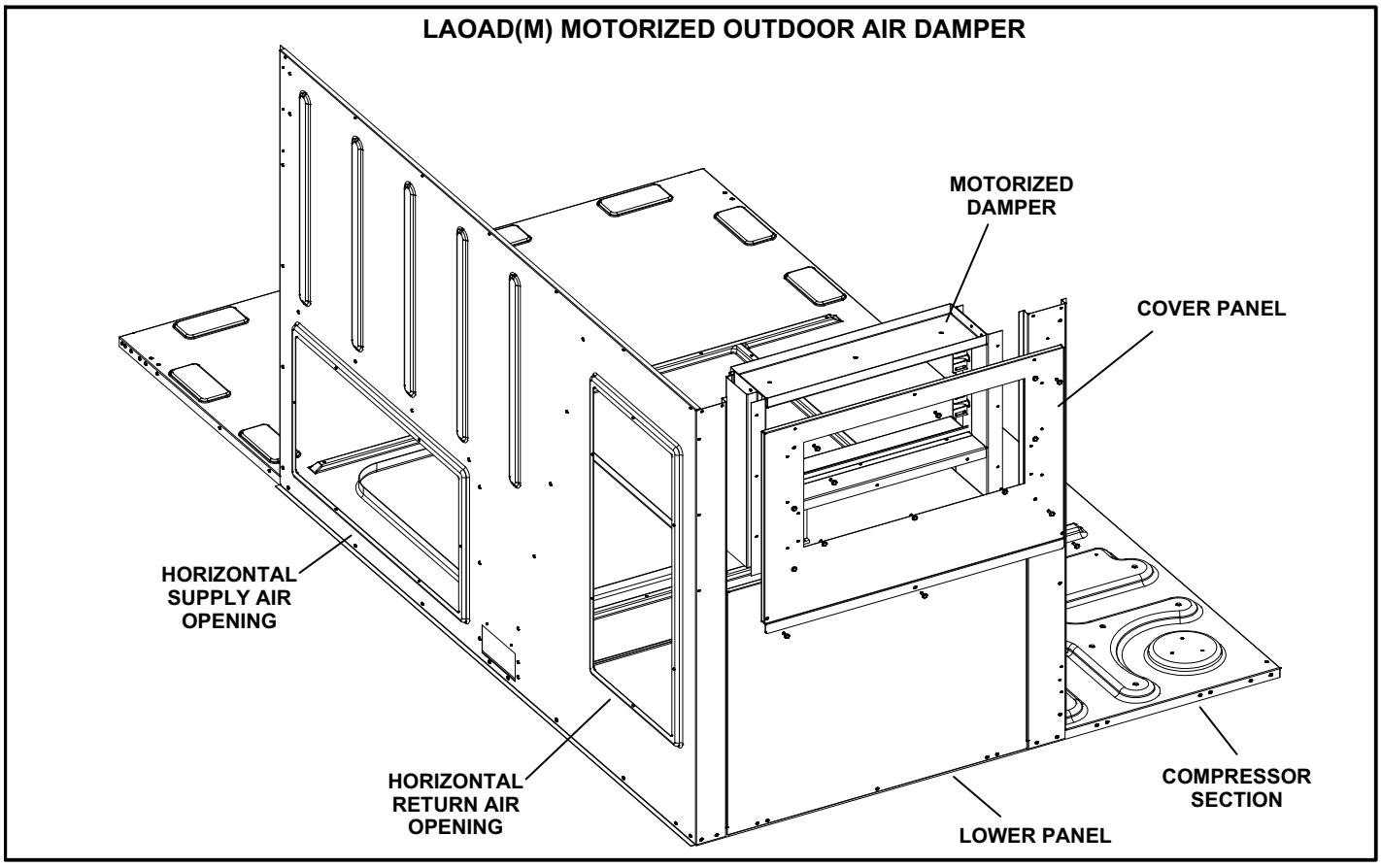


FIGURE 34

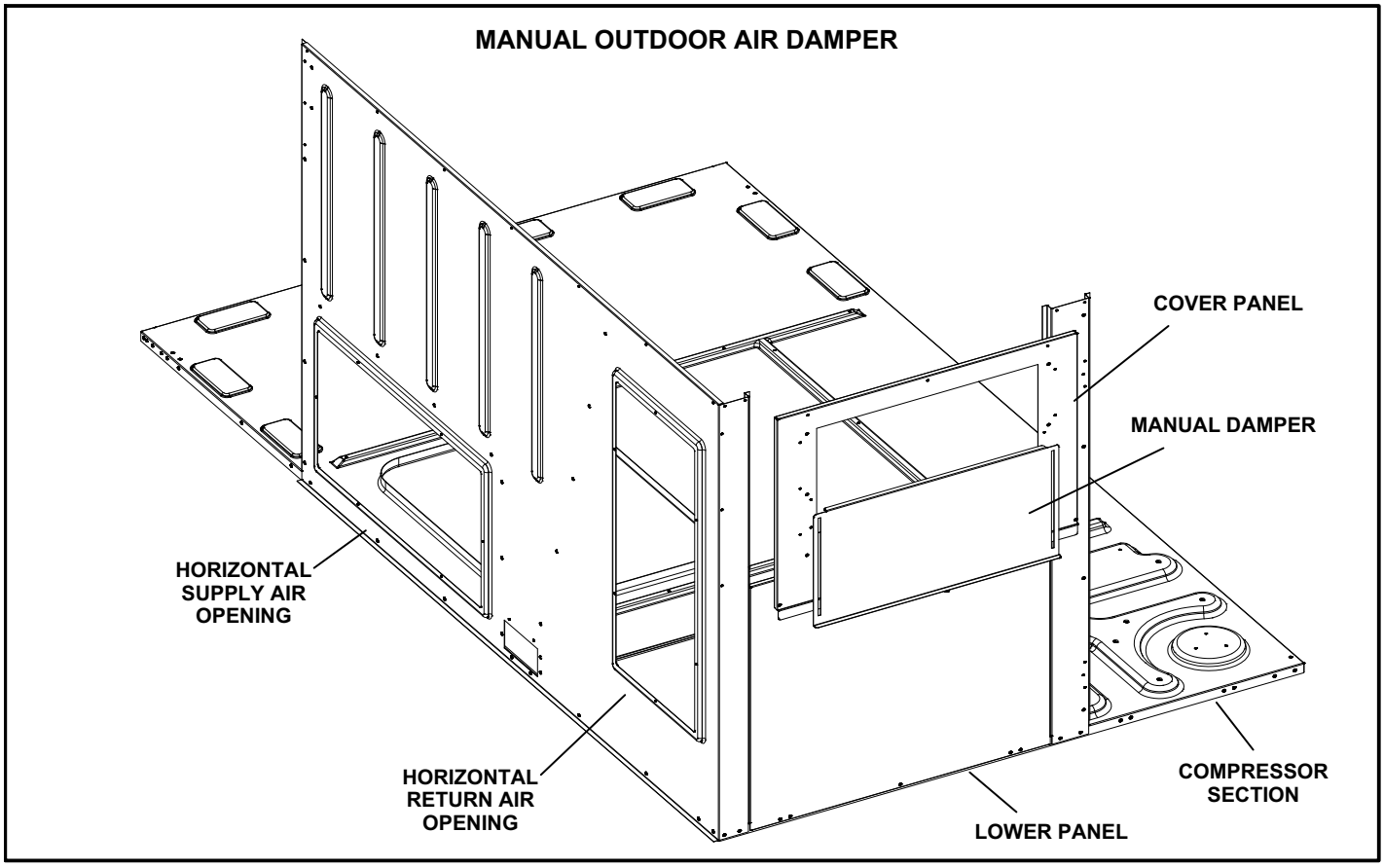


FIGURE 35

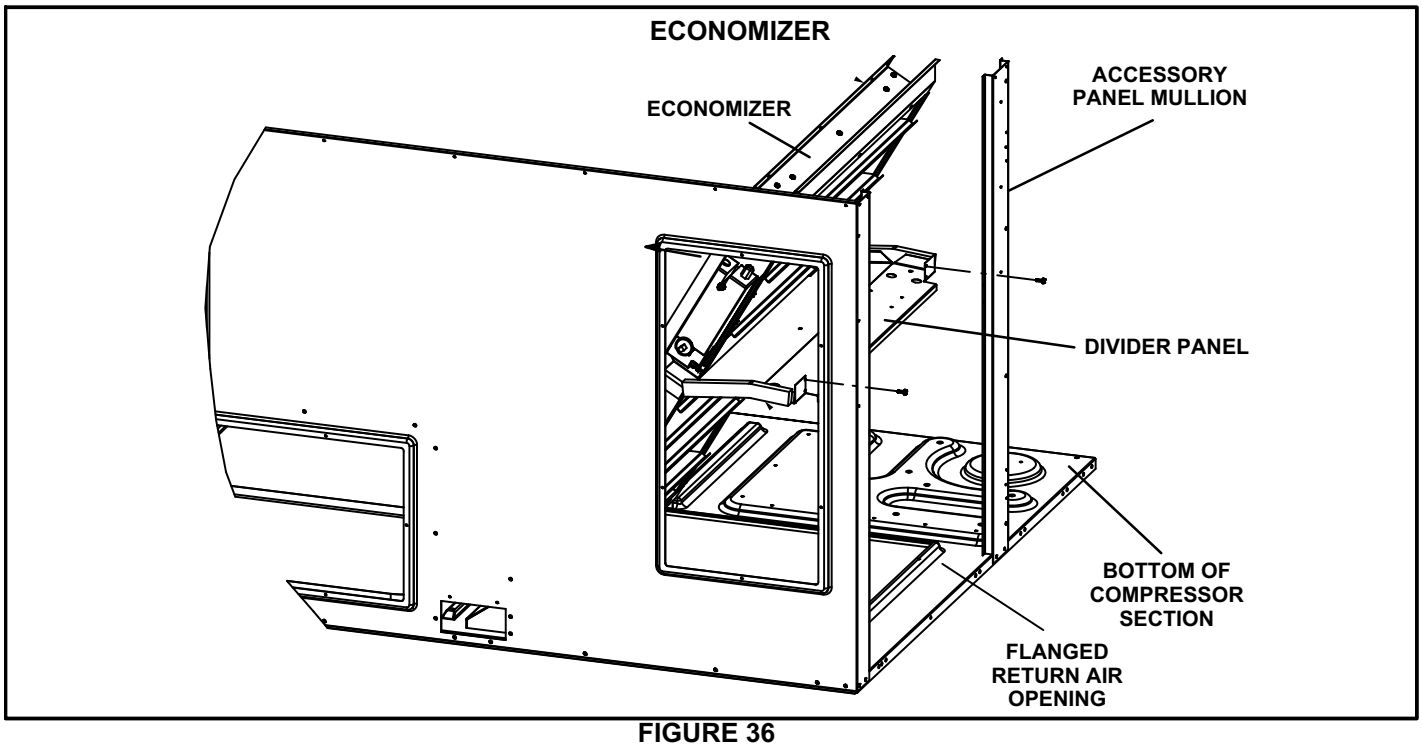


FIGURE 36

H-Economizer (all units)

(Field or Factory Installed)

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See figure 36. 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 21 for modes. See figure 37 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.

TABLE 21
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.

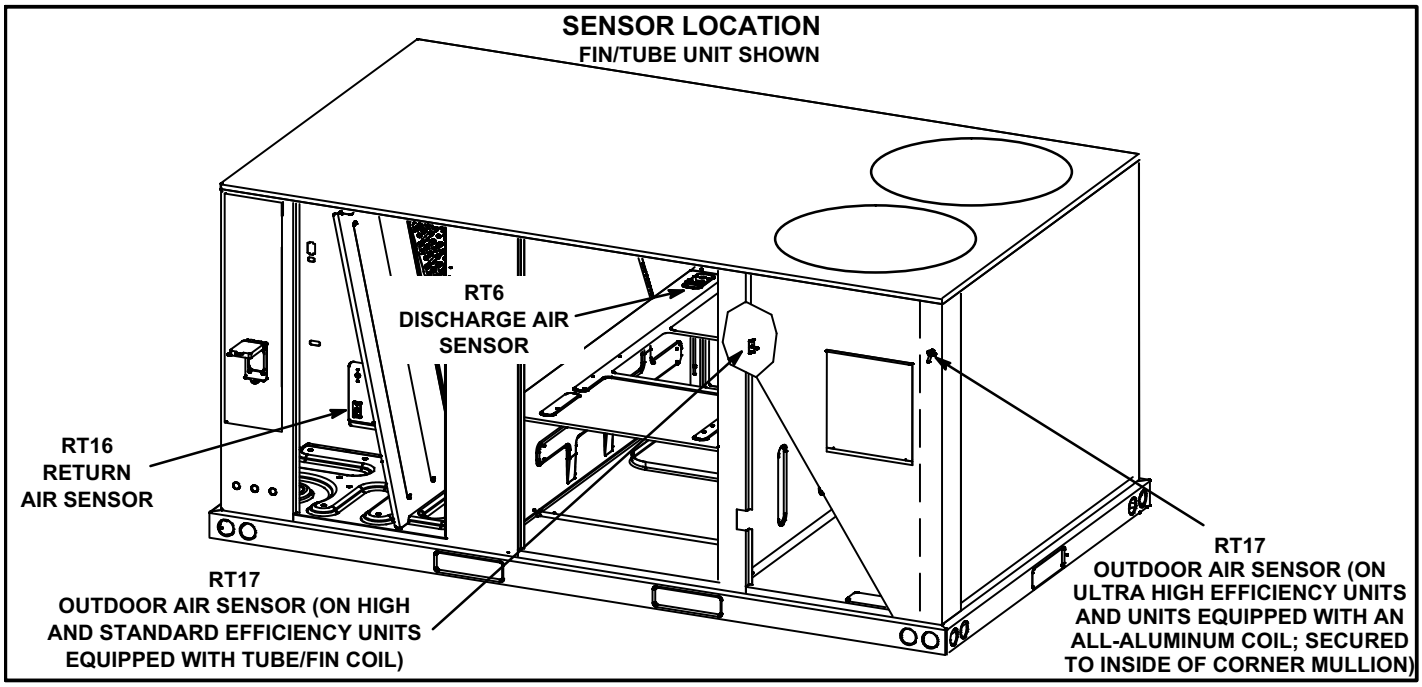


FIGURE 37

I-Gravity Exhaust Dampers

LAGEDH03/15 dampers (figure 38) 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 LGM 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.

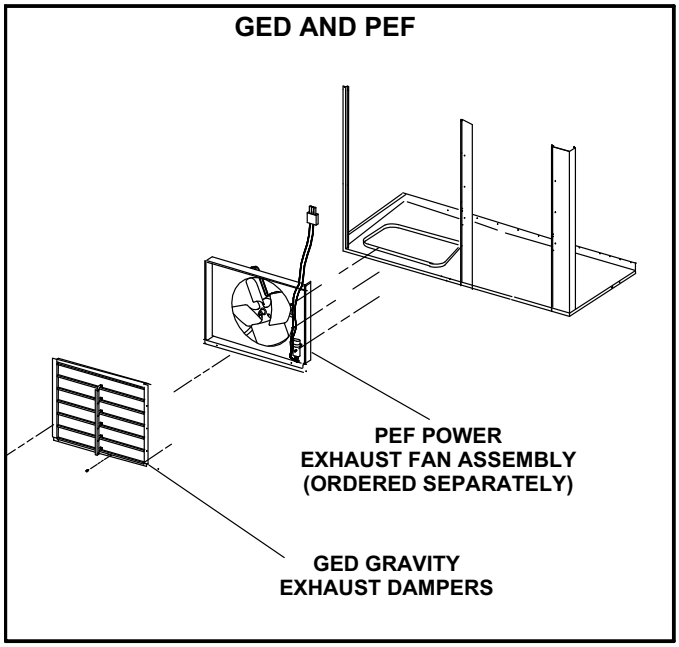


FIGURE 38

J-LAPEF Power Exhaust Fans

Power exhaust fans are used in downflow applications only. Fan requires optional down flow gravity exhaust dampers and LAREMD economizer. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. Figure 39 shows the location of the LAPEF. See installation instructions for more detail.

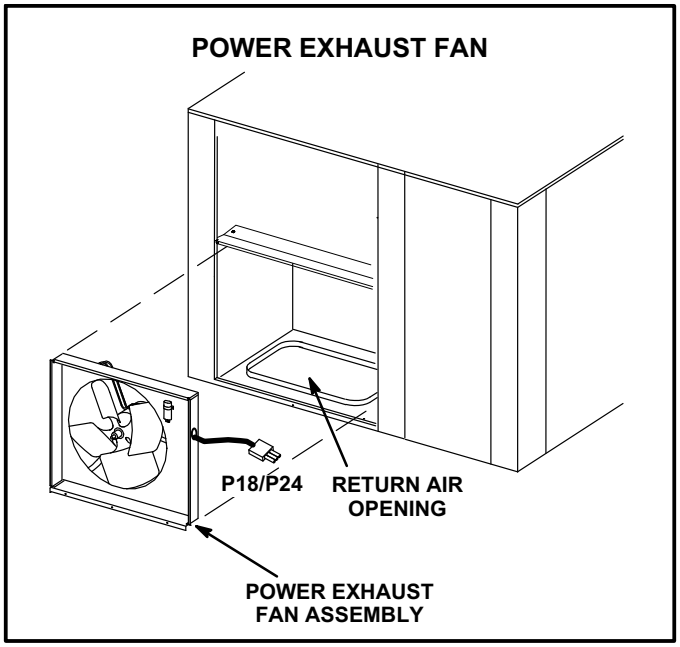


FIGURE 39

K-Optional Cold Weather Kit (Canada only)

Electric heater is available to automatically control the minimum temperature in the gas burner compartment. Heater is C.G.A. certified to allow cold weather operation of unit down to -60° F (-50° C).

The kit includes the following parts:

1- A heater assembly is installed on the vestibule of the heating compartment. Included in the box are the following:

   a - Electric strip heat (HR6).

   b - Thermostat switch (S59) is an auto-reset SPST N.C. switch which opens on a temperature drop. The switch is wired in series with 24v power and the combustion air blower switch. When the temperature drops below -30° F (-35° C) the switch opens and the gas heat section is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (-12° C).

   c - Thermostat switch (S60) is an auto-reset SPST N.C. switch which opens on a temperature rise. The switch is wired in series with HR6. When the temperature rises above 20° F (-7° C) the switch opens and the electric heater is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (23.3° C).

   d -Thermostat switch (S61) is an auto-reset SPST N.O. switch which closes on a temperature drop. The switch is wired in series with HR6. When temperature drops below 20° F (-7° C) the switch closes and electric heater is energized. The switch automatically opens when heating compartment temperature reaches 76° F (24° C).

2- K125 heat shutoff relay de-energizes HR6 heaters when S60 or S61 thermostat switches open. K125 must be installed in the control section.

3- Wire harness is routed between the heat section components and the unit control box. Follow instructions provided with kit for wire connections.

L-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.

M-Indoor Air Quality (CO_2) Sensor A63

The indoor air quality sensor monitors CO_2 levels and reports the levels to the A55 Unit Controller. The board adjusts the economizer dampers according to the CO_2 levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment. Wiring for the indoor air quality switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

N-Drain Pan Overflow Switch S149(optional)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan.

The N.C. overflow switch is connected to the M2 Unit Controller (A55) through DI-3. When the switch opens, the Unit Controller will shut off the unit. After a five-minute time out, the Unit Controller will verify the overflow switch position and restart the unit (if the switch has closed). The Unit Controller has a three-strike counter before the unit locks out. This means the Unit Controller will allow the overflow switch to open three times per thermostat demand. If the unit locks out, a reset of the Unit Controller is required after the switch has closed to restore unit operation.

O-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.

P-Factory Installed-Hot Gas Reheat (optional)

General

Hot Gas Reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See figure 40 for reheat refrigerant routing and figure 41 for standard cooling refrigerant routing.

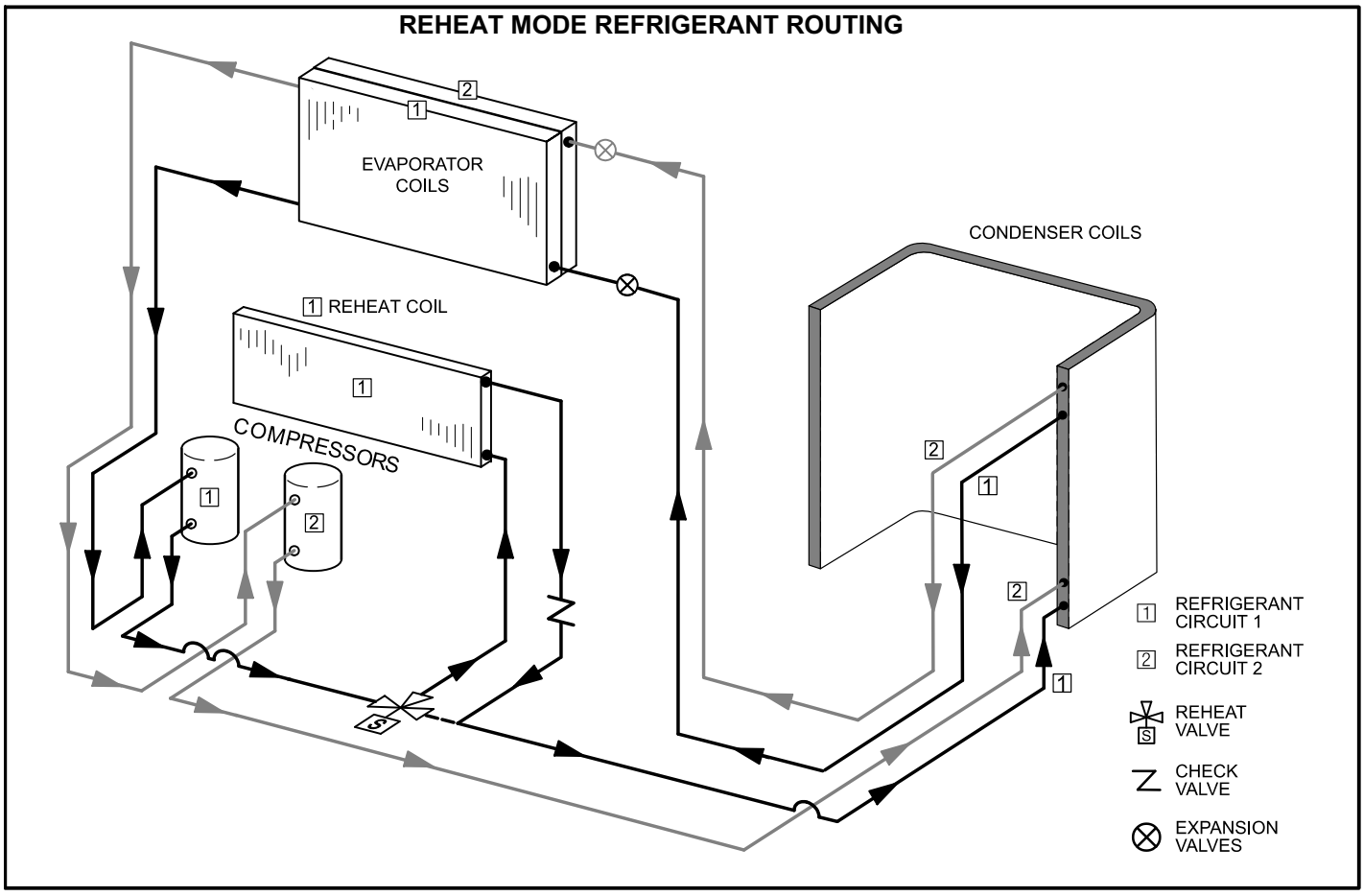


FIGURE 40

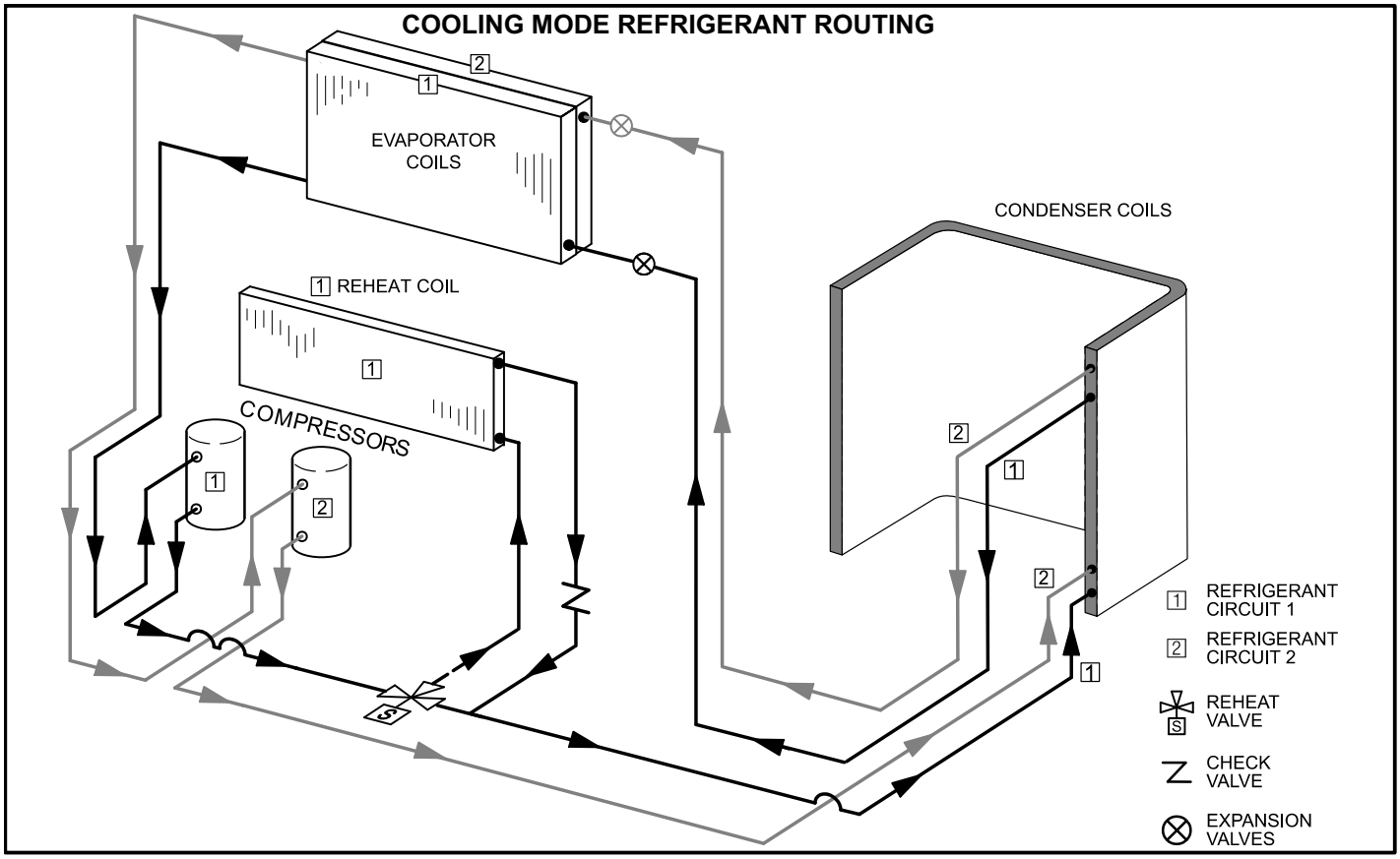


FIGURE 41

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 22
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.

VIII-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 23 to fill in field-provided, design specified blower CFM.

TABLE 23
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 24. 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 13.

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.

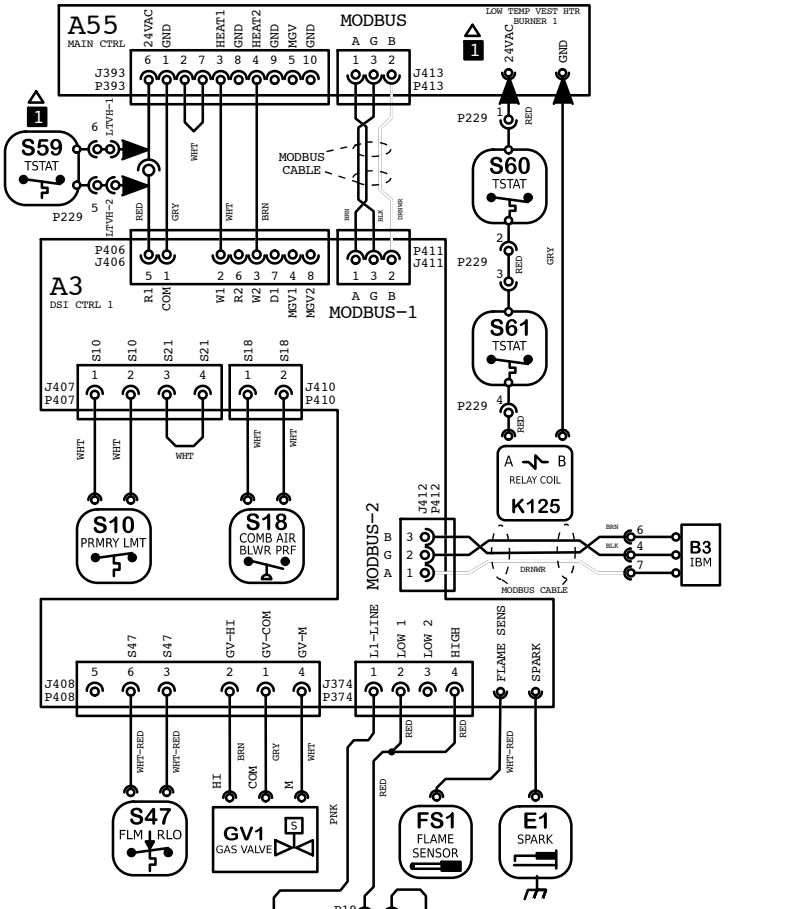
Note - Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.

TABLE 24
MINIMUM AND MAXIMUM CFM

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.

GAS HEAT FOR LGM092/150 UNITS
Y and G Voltage



KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
A3	A3	CONTROL BOARD, DSI BURNER
A55	A55	CONTROL BOARD, MAIN
B3	B3	MOTOR, BLOWER
B6	B6	MOTOR, COMBUSTION AIR IND., BURNER
C3	C3	CAPACITOR, CAI MOTOR
E1	E1	IGNITER, SPARK, BURNER
FS1	FS1	SENSOR, FLAME, BURNER
GV1	GV1	VALVE, GAS, BURNER
HR6	HR6	HEATER, -50C LOW TEMP VEST, BURNER
K125	K125	RELAY, LOW TEMP VEST HEATER, BURNER
S10	S10	LIMIT, PRIMARY, BURNER
S18	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
S47	S47	SWITCH, FLAME ROLLOUT, BURNER
S59	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
S60	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
S61	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES
1 - 50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

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

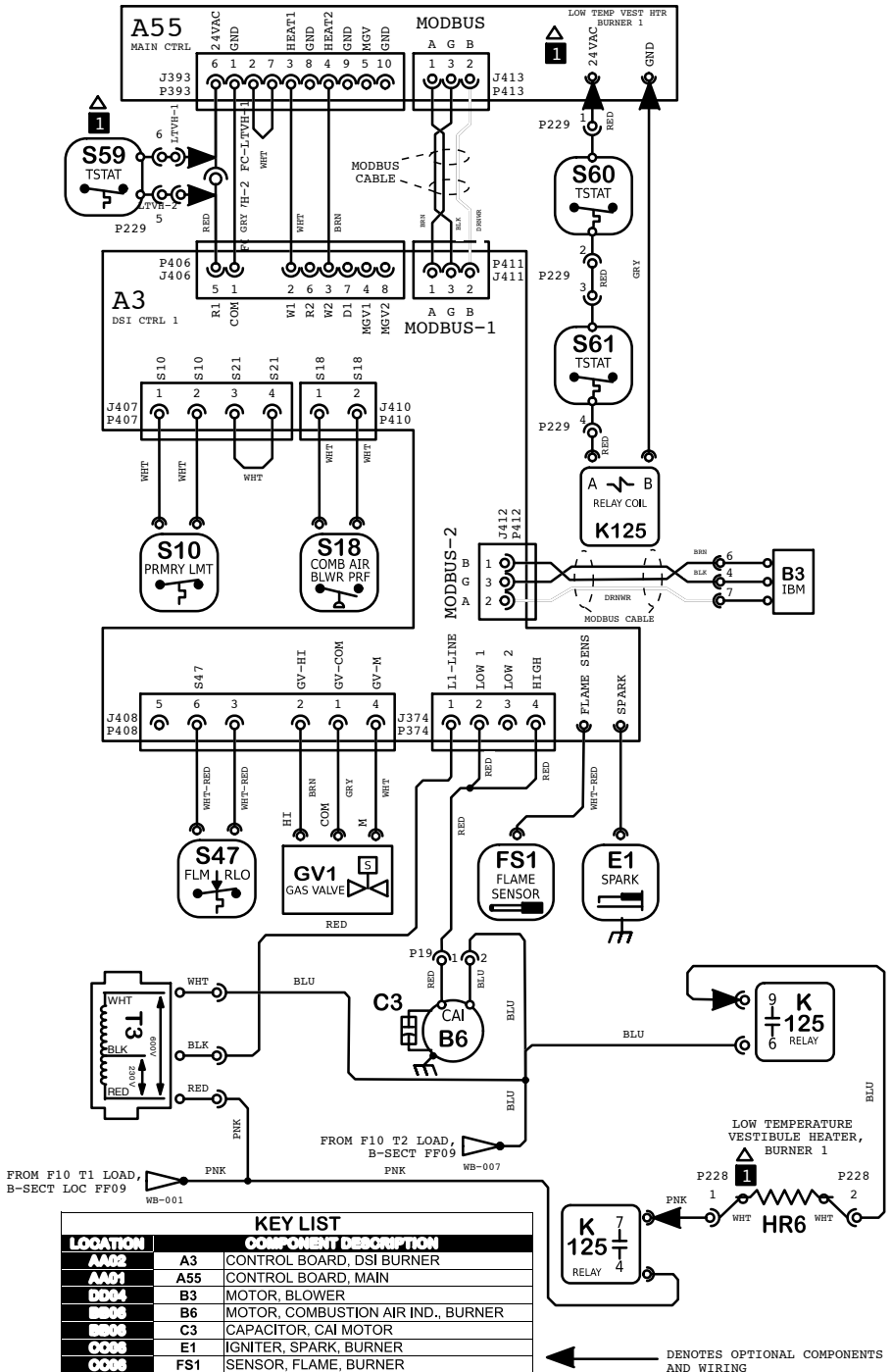
WIRING DIAGRAM FLOW

Model: LGM Series RTU – Gas Heat
130k, 180k, 240k BtuH

Voltage: 208/240/3/60(Y),460/3/60(G)

Form No:538149-01 Rev:1

GAS HEAT FOR LGM092/150 UNITS
J Voltage



KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
AA02	A3	CONTROL BOARD, DSI BURNER
AA01	A55	CONTROL BOARD, MAIN
DD04	B3	MOTOR, BLOWER
BB06	B6	MOTOR, COMBUSTION AIR IND., BURNER
BB06	C3	CAPACITOR, CAI MOTOR
CC06	E1	IGNITER, SPARK, BURNER
CC06	FS1	SENSOR, FLAME, BURNER
BB06	GV1	VALVE, GAS, BURNER
DD06	HR6	HEATER, -50C LOW TEMP VEST, BURNER
CC06/DD06	K125	RELAY, LOW TEMP VEST HEATER, BURNER
AA04	S10	LIMIT, PRIMARY, BURNER
BB04	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
AA05	S47	SWITCH, FLAME ROLLOUT, BURNER
AA01	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
CC02	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
CC06	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER
AA06/AA07	T3	TRANSFORMER, COMBUSTION AIR BLOWER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES
1 - 50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

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

WIRING DIAGRAM FLOW

Model: LGM Series RTU – Gas Heat … 130k, 180k, 240k BtuH

Voltage: 575/3/60 (J)

Supersedes: XXXXXX-XX Form No: 538173-01 Rev: 0

GAS HEAT SEQUENCE OF OPERATION LGM092/150

First Stage Heat:

1- Heating demand initiates at W1 in the thermostat.

2- 24VAC is routed through the A55 unit controller to A3 Ignition Control. The Ignition control then routes the 24VAC to the N.C. primary limit S10. The A3 Ignition control energizes the combustion air blower B6.

3- After the combustion air blower B6 has reached full speed, the combustion air proving switch S18 contacts close. The A3 routes 24VAC through N.C. burner flame roll-out switch S47 and the closed contacts of combustion air proving switch S18 to energize the ignition module A3.

4- After a 30 second delay A3 energizes the ignitor and LO terminal (low fire) of gas valve GV1.

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 Unit Controller.

7- A55 provides the 24VAC to the A3 Ignition control. This is routed to the HI Terminal (high fire) of gas valve GV1.

End of Second Stage Heat:

8- Heating demand is satisfied. Terminal W2 (high fire) is de-energized.

9- Terminal HI of GV1 is de-energized by A3 control module.

End of First Stage Heat:

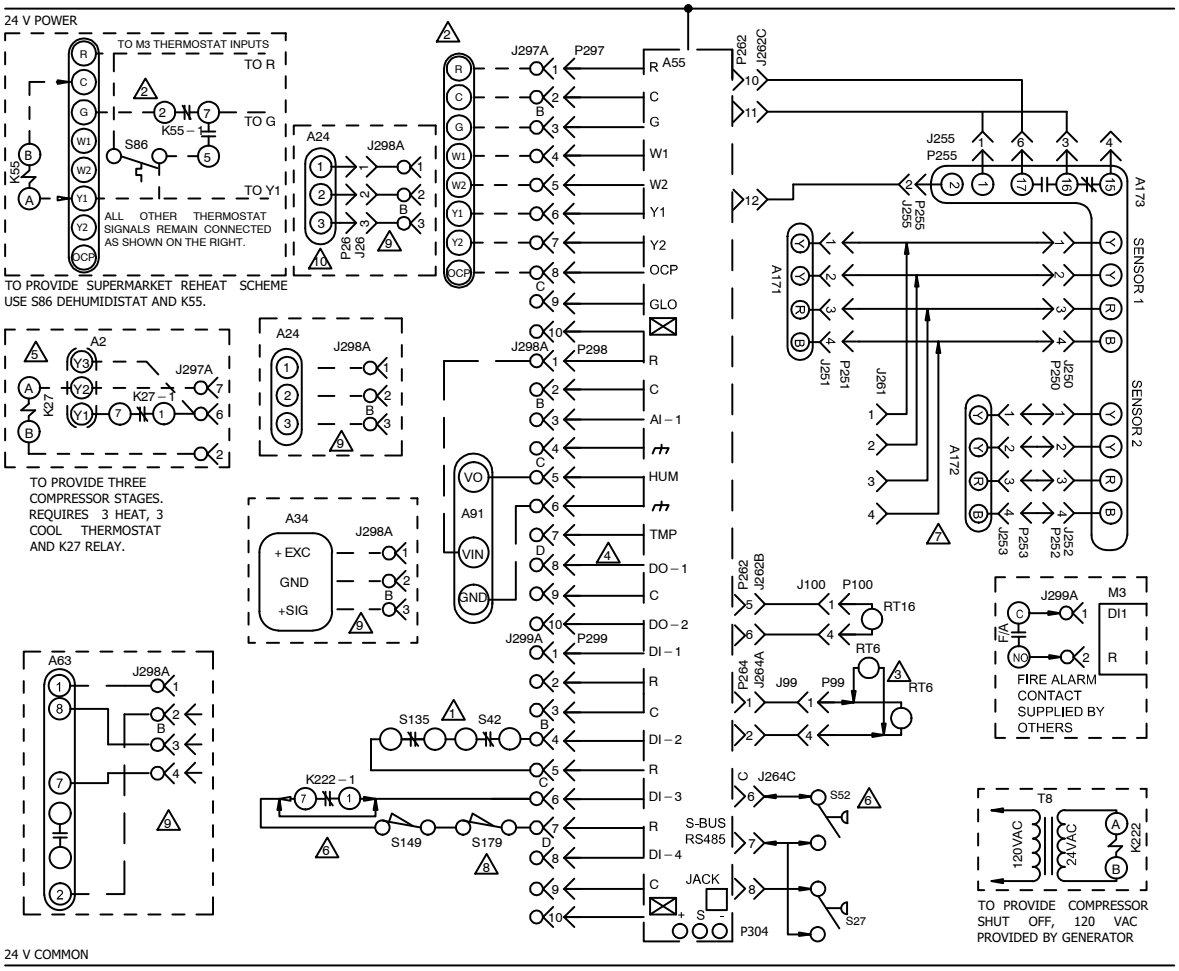
10- Heating demand is satisfied. Terminal W1 (low fire) is de-energized.

11- Ignition A3 is de-energized by control module A55 in turn de-energizing terminal LO of GV1. Combustion air blower relay K13 located in the A3 ignition control is also de-energized.

Optional Low Ambient Kit:
(C.G.A. -50° C Low Ambient Kit)

12- Line voltage (or transformer T20 in 460V and 575V only) is routed through the low ambient kit fuses F20 and N.C. low ambient kit thermostats S60 and S61,to energize low ambient kit heater HR6.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



DESCRIPTION	
KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A24	CONTROL, OUTDOOR AIR CFM FLOW
A34	DIFFERENTIAL PRESSURE TRANSDUCER
A55	CONTROLBOARD, 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	

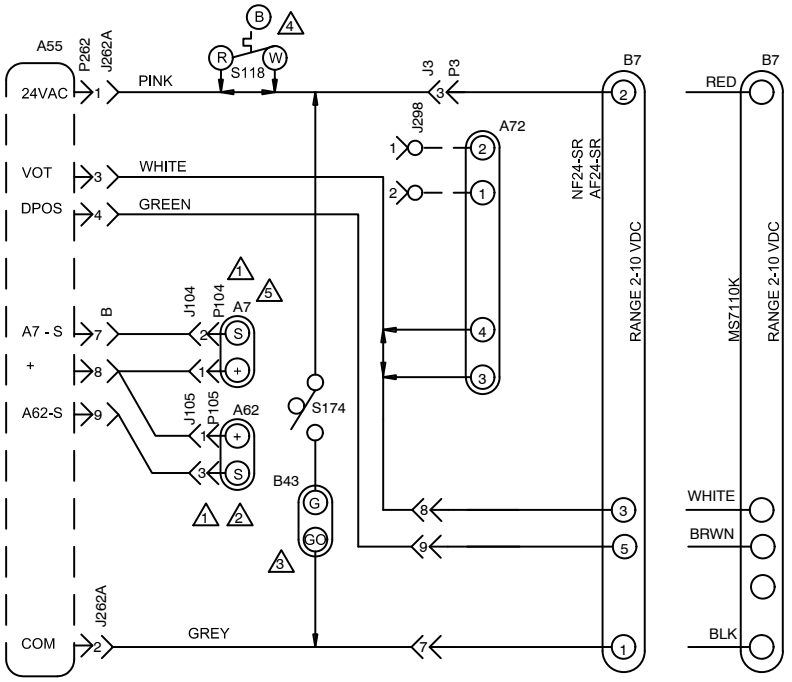
1- The A55 Unit Controller energizes the thermostat components with 24VAC via J/P297-1.

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.

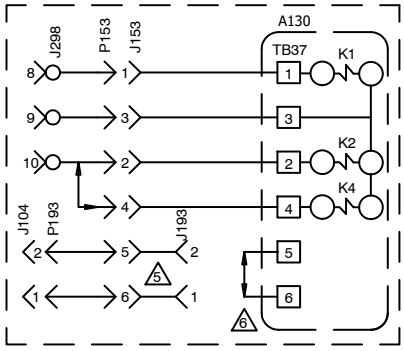
4- The A55 Unit Controller receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP) and the CO_2 sensor A63 (if economizer is used). A55 energizes the appropriate components.

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

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



ENERGY RECOVERY WHEEL HOOK UP

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.

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 7 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

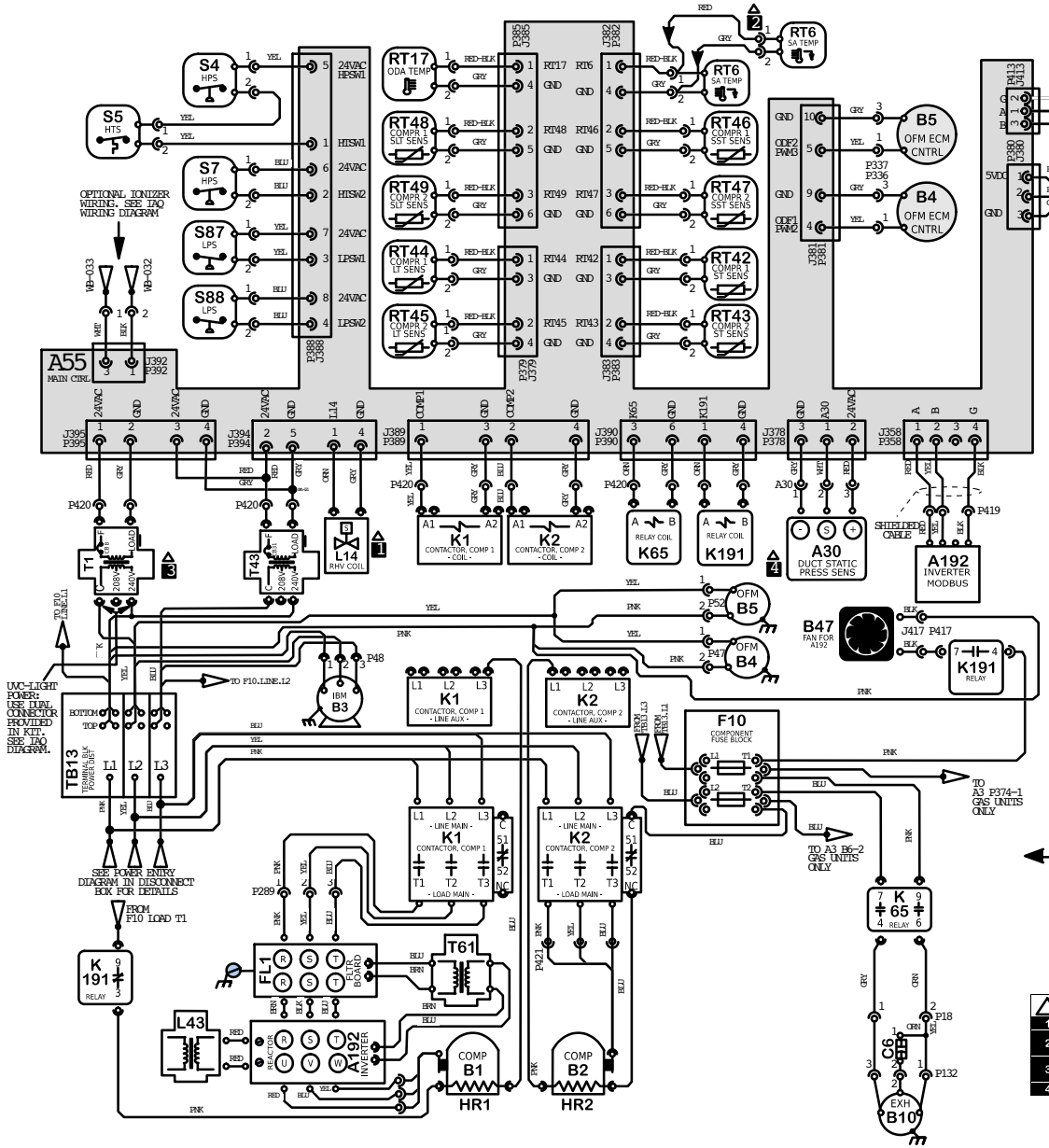
4- Main Menu > Service > Test > Blower

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/LCM192U/150U Y 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.

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

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

WIRING DIAGRAM FLOW

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

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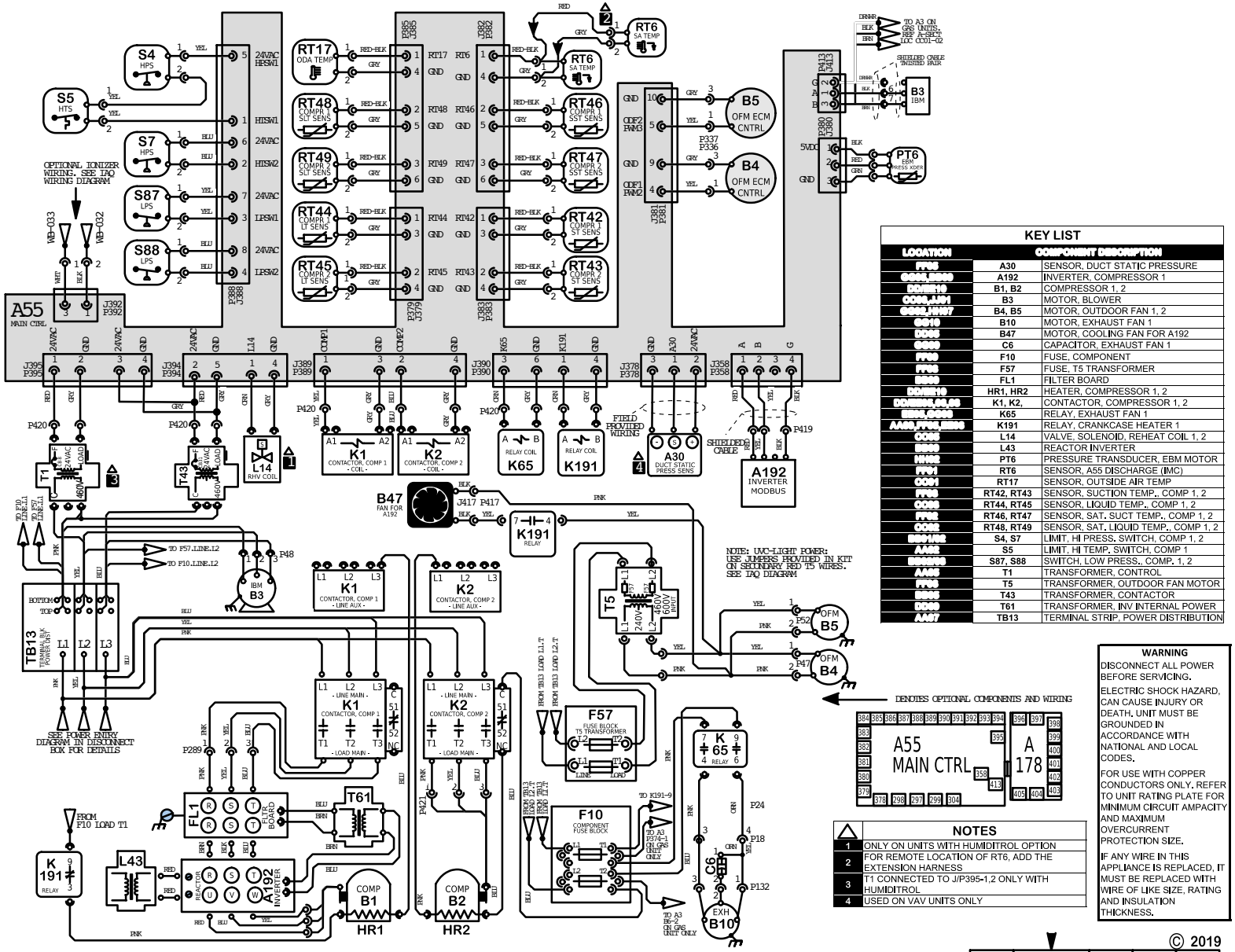
LGM/LCM092U/150U 3G Voltage



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[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	FL1	FILTER BOARD
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[illegible]	K191	RELAY, CRANKCASE HEATER 1
[illegible]	L14	VALVE, SOLENOID, REHEAT COIL 1, 2
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[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
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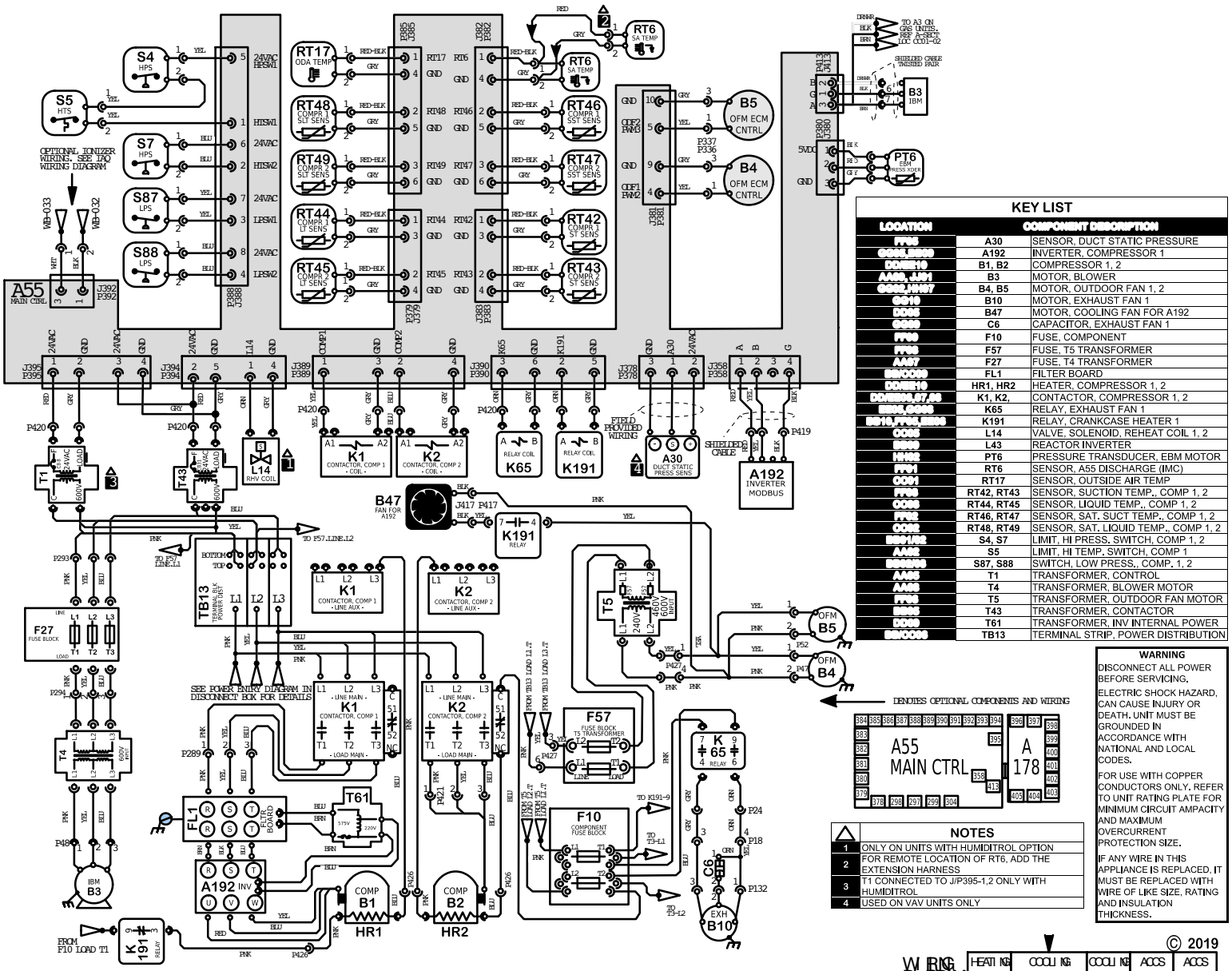
WIRING DIAGRAM FLOW

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

LGM/LCM092U/150U J Voltage



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[illegible]	F57	FUSE, T5 TRANSFORMER
[illegible]	F27	FUSE, T4 TRANSFORMER
[illegible]	FL1	FILTER BOARD
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[illegible]	TB13	TERMINAL STRIP, POWER DISTRIBUTION

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WIRING DIAGRAM FLOW

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538146-10 Rev 0