UNIT INFORMATION

LHT SERIES
13 to 20 ton

100084
Revised 02/2024

Service Literature

LHT156 through 240

The LHT156, 180 and 240 are configure to order units (CTO) with a wide selection of factory installed options.

Optional electric heat is factory- or field-installed. Electric heat operates in single or multiple stages depending on the kW input size. 15kW to 60 kW heat sections are available for the LHT156 and 180 units and 15 kW to 90 kW heat sections are available for the LHT240.

Cooling capacities range from 13 to 20 tons. The LHT 156, 180 & 240 utilize two compressors and six condenser fans.

Multi-Stage Air Volume MSAV® blower option is available. The VFD-driven blower will operate at lower speeds when demand is low and increase to higher speeds when demand is high.

All LHT 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.

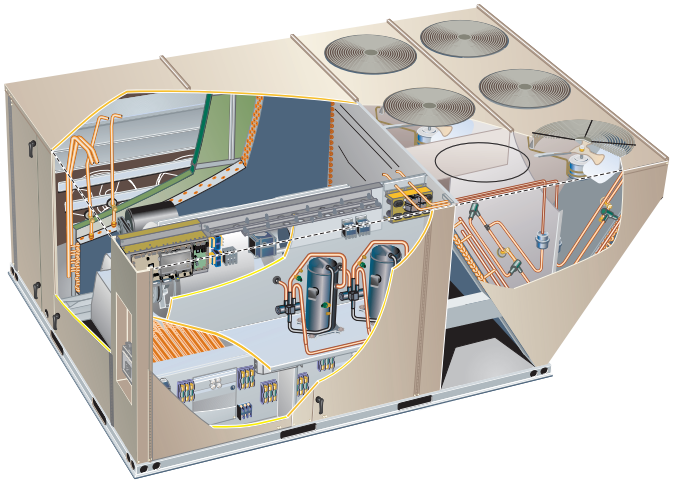
The CORE Control System is designed to accelerate equipment install and service. Standard with all Enlight rooftop units, control system integrates key technologies that lower installation costs, drive system efficiency, and protect your investments.

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 damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier



⚠ WARNING

To prevent serious injury or death:

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

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

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

Table of Contents

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 156	180	240
COOLING SYSTEM					
Condensate Drain Trap	PVC	**22H54**	X	X	X
	Copper	**76W27**	X	X	X
Drain Pan Overflow Switch		**21Z07**	OX	OX	OX
BLOWER - SUPPLY AIR					
Blower Option	MSAV® Multi-Stage Air Volume option (With VFD Bypass Control)	Factory	O	O	
	MSAV® Multi-Stage Air Volume option (Without VFD Bypass Control)	Factory	O	O	
Motors	Belt Drive - 3 hp	Factory	O	O	
	Belt Drive - 5 hp	Factory	O	O	O
	Belt Drive - 7.5 hp	Factory		O	O
	Belt Drive - 10 hp	Factory			O
Drive Kits	Kit #1 535-725 rpm	Factory	O	O	
See Blower Data Tables for usage and selection	Kit #2 710-965 rpm	Factory	O	O	
	Kit #3 685-856 rpm	Factory	O	O	O
	Kit #4 850-1045 rpm	Factory	O	O	O
	Kit #5 945-1185 rpm	Factory	O	O	O
	Kit #6 850-1045 rpm	Factory		O	O
	Kit #7 945-1185 rpm	Factory		O	O
	Kit #8 1045-1285 rpm	Factory		O	O
	Kit #10 1045-1285 rpm	Factory			O
	Kit #11 1135-1365 rpm	Factory			O
	Blower Belt Auto-Tensioner	**24B80**	X	X	X
CABINET					
Combination Coil/Hail Guards		**23U71**	OX	OX	OX
Corrosion Protection		Factory	O	O	O
CONTROLS					
Blower Proving Switch		**21Z10**	OX	OX	OX
Commercial Controls	CPC Einstein Integration	Factory	O	O	O
	LonTalk® Module	**54W27**	OX	OX	OX
	Novar® LSE	Factory	O	O	O
Dirty Filter Switch		**53W68**	OX	OX	OX
Fresh Air Tempering		**21Z08**	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		**22H56**	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		**22H57**	OX	OX	OX

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

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OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 156	180	240
INDOOR AIR QUALITY					
Air Filters					
Healthy Climate® High Efficiency Air Filters 24 x 24 x 2 (Order 6 per unit)	MERV 8	**54W67**	OX	OX	OX
	MERV 13	**52W40**	OX	OX	OX
	MERV 16	**21U42**	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		**44N61**	X	X	X
Indoor Air Quality (CO_2) Sensors					
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**23V86**	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		**87N52**	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**77N39**)		**90N43**	X	X	X
Needlepoint Bipolar Ionization (NPBI)					
Needlepoint Bipolar Ionization (NPBI) Kit		**21U37**	X	X	
		21U38			X
UVC Germicidal Light Kit					
[1] Healthy Climate® UVC Light Kit (110/230v-1ph)		**21A94**	X	X	X
Step-Down Transformers	460V primary, 230V secondary	**10H20**	X	X	X
	575V primary, 230V secondary	**10H21**	X	X	X
ELECTRICAL					
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O
	460V - 3 phase	Factory	O	O	O
	575V - 3 phase	Factory	O	O	O
Disconnect Switch (see Electric Heat Tables for usage,	80 amp	**54W85**	OX	OX	OX
	150 amp	**54W86**	OX	OX	OX
	250 amp	**54W87**	OX	OX	OX
HACR Circuit Breakers		Factory	O	O	O
[2] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V, 575V)	**74M70**	OX	OX	OX
	15 amp factory-wired and powered (208/230V, 460V)	Factory	O	O	O
	[3] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X
	[3] 20 amp non-powered, field-wired (575V)	Factory	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	X

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

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

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

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OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 156	180	240
ELECTRIC HEAT					
15 kW	208/230V-3ph	**22H66**	OX	OX	OX
	460V-3ph	**22H67**	OX	OX	OX
	575V-3ph	**22V35**	OX	OX	OX
30 kW	208/230V-3ph	**22H70**	OX	OX	OX
	460V-3ph	**22H71**	OX	OX	OX
	575V-3ph	**22V37**	OX	OX	OX
45 kW	208/230V-3ph	**22H74**	OX	OX	OX
	460V-3ph	**22H75**	OX	OX	OX
	575V-3ph	**22V39**	OX	OX	OX
60 kW	208/230V-3ph	**22H78**	OX	OX	OX
	460V-3ph	**22H79**	OX	OX	OX
	575V-3ph	**22V41**	OX	OX	OX
90 kW	208/230V-3ph	**22H80**			OX
	460V-3ph	**22H81**			OX
	575V-3ph	**22V42**			OX
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. Order Downflow or Horizontal Barometric Relief Dampers separately.	E1ECON17C-2	**22J18**	OX	OX	OX
Economizer Controls					
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX
Global Control	Sensor Field Provided	Factory	O	O	O
Building Pressure Control		**13J77**	X	X	X
Outdoor Air CFM Control		**13J76**	X	X	X
Barometric Relief Dampers With Exhaust Hood					
Downflow Barometric Relief Dampers		**54W78**	OX	OX	OX
Horizontal Barometric Relief Dampers		**16K99**	X	X	X
OUTDOOR AIR					
Outdoor Air Dampers With Outdoor Air Hood					
Motorized		**22J27**	OX	OX	OX
Manual		**13U05**	X	X	X

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OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 156	180	240
[1] POWER EXHAUST (DOWNFLOW APPLICATIONS ONLY)					
Standard Static, SCCR Rated	208/230V	**22H90**	OX	OX	OX
	460V	**22H91**	OX	OX	OX
	575V	**22V34**	OX	OX	OX
ROOF CURBS					
Hybrid Roof Curbs, Downflow					
8 in. height		**11F58**	X	X	X
14 in. height		**11F59**	X	X	X
18 in. height		**11F60**	X	X	X
24 in. height		**11F61**	X	X	X
Adjustable Pitch Curb					
14 in. height		**43W26**	X	X	X
Standard Roof Curbs, Horizontal - Requires Horizontal Return Air Panel Kit					
26 in. height - slab applications		**11T89**	X	X	X
37 in. height - rooftop applications		**11T96**	X	X	X
Insulation Kit For Standard Horizontal Roof Curbs					
For 26 in. Curb		**73K32**	X	X	X
For 37 in. Curb		**73K34**	X	X	X
Horizontal Return Air Panel Kit					
Required for Horizontal Applications with Roof Curb		**87M00**	X	X	X
CEILING DIFFUSERS					
Step-Down - Order one	RTD11-185S	**13K63**	X	X	
	RTD11-275S	**13K64**			X
Flush - Order one	FD11-185S	**13K58**	X	X	
	FD11-275S	**13K59**			X
Transitions (Supply and Return) - Order one	C1DIFF33C-1	**12X68**	X	X	
	C1DIFF34C-1	**12X70**			X

[1] Field installed Power Exhaust requires Economizer with Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood. Must be ordered separately.

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SPECIFICATIONS

General Data		Nominal Tonnage	13 Ton	15 Ton	20 Ton
		Model Number	LHT156H4M	LHT180H4M	LHT240H4M
		Efficiency Type	High	High	High
		Blower Type	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume
Cooling Performance		Gross Cooling Capacity - Btuh	154,000	181,000	232,000
		[1] Net Cooling Capacity - Btuh	150,000	176,000	224,000
		[1] AHRI Rated Air Flow - cfm	4500	5500	7000
		Total Unit Power - kW	12.3	15.8	20.1
		[1] IEER (Btuh/Watt)	15.7	15.5	15.5
		[1] EER (Btuh/Watt)	12.1	11.1	11.1
Refrigerant Charge		Refrigerant Type	R-410A	R-410A	R-410A
		Circuit 1	21 lbs. 0 oz.	22 lbs. 12 oz.	22 lbs. 8 oz.
		Circuit 2	21 lbs. 0 oz.	21 lbs. 12 oz.	21 lbs. 8 oz.
Heating Performance		[1] Total High Heat Capacity - Btuh	144,000	174,000	224,000
		Total Unit Power - kW	12.4	15.0	19.3
		[1] C.O.P.	3.40	3.40	3.40
		[1] Total Low Heat Capacity - Btuh	80,000	96,000	128,000
		Total Unit Power (kW)	11.1	13.4	17.9
		[1] C.O.P.	2.10	2.10	2.10
Electric Heat (kW) Available - See page 18			15, 30, 45, 60 kW	15, 30, 45, 60 kW	15, 30, 45, 60, 90 kW
Compressor Type (number)			Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils		Net face area (total) - sq. ft.	55.1	55.1	55.1
		Number of rows	2	2	2
		Fins per inch	20	20	20
Outdoor Coil Fans		Motor - (No.) horsepower	(6) 1/3	(6) 1/3	(6) 1/3
		Motor rpm	1075	1075	1075
		Total Motor watts	2150	2150	2150
		Diameter - (No.) in.	(6) 24	(6) 24	(6) 24
		Number of blades	3	3	3
		Total Air volume - cfm	16,300	16,300	16,300
Indoor Coils		Net face area (total) - sq. ft.	21.4	21.4	21.4
		Tube diameter - in.	3/8	3/8	3/8
		Number of rows	4	4	4
		Fins per inch	14	14	14
		Drain connection - No. and size	(1) 1in. FPT	(1) 1in. FPT	(1) 1in. FPT
		Expansion device type	Balance Port Thermostatic Expansion Valve (removable element head)		
[2] Indoor Blower and Drive Selection		Nominal motor output	3 hp, 5 hp	3 hp, 5 hp, 7.5 hp	5 hp, 7.5 hp, 10 hp
		Max. usable motor output (US)	3.45 hp, 5.75 hp	3.45 hp, 5.75 hp, 8.62 hp	5.75 hp, 8.62 hp, 11.5 hp
		Motor - Drive kit number	3 hp Kit 1 535-725 rpm Kit 2 710-965 rpm 5 hp Kit 3 - 685-856 rpm Kit 4 850-1045 rpm Kit 5 945-1185 rpm	3 hp Kit 1 535-725 rpm Kit 2 710-965 rpm 5 hp Kit 3 - 685-856 rpm Kit 4 850-1045 rpm Kit 5 945-1185 rpm 7.5 hp Kit 6 850-1045 rpm Kit 7 945-1185 rpm Kit 8 1045-1285 rpm	5 hp Kit 3 685-856 rpm Kit 4 850-1045 rpm Kit 5 945-1185 rpm 7.5 hp Kit 6 850-1045 rpm Kit 7 945-1185 rpm Kit 8 1045-1285 rpm 10 hp Kit 7 945-1185 rpm Kit 10 1045-1285 rpm Kit 11 1135-1365 rpm
		Blower wheel nominal D x W - in.	(2) 15 x 15 in.	(2) 15 x 15 in.	(2) 15 x 15
Filters		Type of filter	MERV 4, Disposable		
		Number and size - in.	(6) 24 x 24 x 2		
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase		

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

[1] AHRI Certified to AHRI Standard 340/360:
Cooling Ratings - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.
High Temperature Heating Ratings - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.
Low Temperature Heating Ratings - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

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

NOTE – Motor service factor limit - 1.0.

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL & AIR FILTERS IN PLACE

FOR ALL UNITS ADD:

1 - Wet indoor coil air resistance of selected unit.
2 - Any factory installed options air resistance (electric heat, Economizer, etc.)
3 - Any field installed accessories air resistance (electric heat, duct resistance, diffuser, etc.)

Then determine from blower table blower motor output and drive required.
See page 8 for wet coil, option/accessory air resistance data, and factory installed drive kit specifications.
See page 9 for minimum air volume required for use with optional electric heat.

Air Volume cfm	TOTAL STATIC PRESSURE - Inches Water Gauge (Pa)																									
	0.20		0.40		0.60		0.80		1.00		1.20		1.40		1.60		1.80		2.00		2.20		2.40		2.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2750	385	0.30	505	0.50	600	0.70	680	0.90	755	1.10	820	1.30	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3000	395	0.35	515	0.55	610	0.75	685	1.00	760	1.20	825	1.45	885	1.70	---	---	---	---	---	---	---	---	---	---	---	---
3250	405	0.40	520	0.60	615	0.85	695	1.10	765	1.30	830	1.60	890	1.85	950	2.10	---	---	---	---	---	---	---	---	---	---
3500	415	0.45	530	0.70	620	0.95	700	1.20	775	1.45	840	1.70	900	2.00	955	2.25	1005	2.55	---	---	---	---	---	---	---	---
3750	425	0.50	540	0.75	630	1.05	710	1.30	780	1.60	845	1.85	905	2.15	960	2.45	1010	2.70	1060	3.00	1110	3.30	---	---	---	---
4000	435	0.55	545	0.85	635	1.10	715	1.40	785	1.70	850	2.00	910	2.30	965	2.60	1020	2.90	1070	3.25	1115	3.55	1160	3.85	1205	4.15
4250	445	0.60	555	0.90	645	1.25	725	1.55	795	1.85	855	2.15	915	2.45	970	2.80	1025	3.10	1075	3.45	1120	3.75	1165	4.10	1210	4.45
4500	455	0.70	565	1.00	655	1.35	730	1.65	800	2.00	865	2.35	925	2.65	980	3.00	1030	3.30	1080	3.65	1130	4.05	1175	4.35	1215	4.70
4750	470	0.75	575	1.10	660	1.45	740	1.80	810	2.15	870	2.50	930	2.85	985	3.20	1040	3.55	1085	3.90	1135	4.25	1180	4.65	1225	5.00
5000	480	0.85	585	1.25	670	1.60	750	1.95	815	2.30	880	2.70	940	3.05	995	3.40	1045	3.80	1095	4.15	1140	4.50	1185	4.90	1230	5.30
5250	495	0.95	595	1.35	680	1.70	755	2.10	825	2.50	890	2.90	945	3.25	1000	3.65	1050	4.00	1100	4.40	1150	4.80	1195	5.20	1235	5.60
5500	505	1.05	605	1.45	690	1.85	765	2.25	835	2.65	895	3.05	955	3.45	1010	3.85	1060	4.25	1110	4.70	1155	5.10	1200	5.50	1240	5.90
5750	520	1.15	615	1.60	700	2.00	775	2.45	840	2.85	905	3.25	960	3.65	1015	4.10	1065	4.50	1115	4.95	1160	5.35	1205	5.80	1250	6.25
6000	530	1.30	630	1.75	710	2.15	785	2.60	850	3.05	910	3.45	970	3.90	1025	4.35	1075	4.80	1120	5.20	1170	5.65	1215	6.10	1255	6.55
6250	545	1.40	640	1.90	720	2.35	795	2.80	860	3.25	920	3.70	975	4.15	1030	4.60	1080	5.05	1130	5.50	1175	5.95	1220	6.45	1265	6.90
6500	560	1.55	650	2.05	730	2.50	805	3.00	870	3.45	930	3.95	985	4.40	1040	4.85	1090	5.35	1140	5.85	1185	6.30	1225	6.75	1270	7.25
6750	570	1.70	665	2.20	745	2.70	815	3.20	880	3.70	940	4.20	995	4.65	1045	5.10	1095	5.60	1145	6.10	1190	6.60	1235	7.10	1275	7.60
7000	585	1.85	675	2.35	755	2.90	825	3.40	890	3.95	950	4.45	1005	4.95	1055	5.40	1105	5.95	1155	6.45	1200	6.95	1240	7.45	1285	8.00
7250	600	2.00	690	2.60	765	3.10	835	3.65	900	4.15	955	4.65	1015	5.25	1065	5.75	1115	6.25	1160	6.75	1205	7.30	1250	7.85	1290	8.35
7500	615	2.20	700	2.75	775	3.30	845	3.85	910	4.45	965	4.95	1020	5.50	1075	6.05	1125	6.60	1170	7.15	1215	7.65	1260	8.25	1300	8.75
7750	630	2.40	715	3.00	790	3.55	855	4.10	920	4.70	975	5.25	1030	5.80	1080	6.35	1130	6.90	1180	7.50	1225	8.05	1265	8.60	1305	9.15
8000	640	2.55	725	3.20	800	3.80	865	4.35	930	4.95	985	5.50	1040	6.10	1090	6.70	1140	7.25	1185	7.85	1230	8.40	1275	9.00	1315	9.60
8250	655	2.80	740	3.40	810	4.00	880	4.65	940	5.25	995	5.85	1050	6.45	1100	7.05	1150	7.65	1195	8.25	1240	8.85	1280	9.40	1325	10.05
8500	670	3.00	750	3.65	825	4.30	890	4.90	950	5.55	1005	6.15	1060	6.80	1110	7.40	1160	8.05	1205	8.65	1250	9.25	1290	9.85	1330	10.45
8750	685	3.25	765	3.90	835	4.55	900	5.20	960	5.85	1015	6.45	1070	7.15	1120	7.75	1165	8.35	1215	9.05	1255	9.65	1300	10.30	1340	10.90
9000	700	3.50	780	4.20	850	4.85	910	5.50	970	6.15	1025	6.80	1080	7.50	1130	8.15	1175	8.75	1220	9.40	1265	10.10	1310	10.80	1350	11.40
9250	715	3.75	790	4.45	860	5.15	925	5.85	985	6.55	1040	7.20	1090	7.85	1140	8.55	1185	9.20	1230	9.85	1275	10.55	1315	11.20	---	---
9500	730	4.00	805	4.75	875	5.45	935	6.15	995	6.90	1050	7.60	1100	8.25	1150	8.95	1195	9.60	1240	10.30	1285	11.05	---	---	---	---
9750	745	4.30	820	5.05	885	5.75	950	6.55	1005	7.20	1060	7.95	1110	8.65	1160	9.40	1205	10.05	1250	10.80	1295	11.50	---	---	---	---
10,000	760	4.60	835	5.40	900	6.15	960	6.85	1015	7.60	1070	8.35	1120	9.05	1170	9.80	1215	10.50	1260	11.25	---	---	---	---	---	---
10,250	775	4.90	845	5.65	910	6.45	970	7.20	1030	8.00	1080	8.75	1135	9.55	1180	10.25	1225	11.00	---	---	---	---	---	---	---	---
10,500	790	5.20	860	6.00	925	6.85	985	7.65	1040	8.40	1095	9.20	1145	10.00	1190	10.70	1235	11.45	---	---	---	---	---	---	---	---
10,750	805	5.55	875	6.40	940	7.25	1000	8.05	1055	8.85	1105	9.65	1155	10.45	1200	11.20	---	---	---	---	---	---	---	---	---	---
11,000	820	5.90	890	6.80	950	7.60	1010	8.45	1065	9.30	1115	10.05	1165	10.90	---	---	---	---	---	---	---	---	---	---	---	---

BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range
3	3.45	1	535 - 725
3	3.45	2	710 - 965
5	5.75	3	685 - 856
5	5.75	4	850 - 1045
5	5.75	5	945 - 1185
7.5	8.63	6	850 - 1045
7.5	8.63	7	945 - 1185
7.5	8.63	8	1045 - 1285
10	11.50	7	945 - 1185
10	11.50	10	1045 - 1285
10	11.50	11	1135 - 1365

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

NOTE – Motor service factor limit - 1.0.

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE

Air Volume cfm	Wet Indoor Coil	Electric Heat	Economizer	Filters			Horizontal Roof Curb
	in. w.g.	in. w.g.	in. w.g.	MERV 8	MERV 13	MERV 16	in. w.g.
3250	.03	- - -	- - -	.01	.04	0.07	.04
3500	.03	- - -	- - -	.01	.04	0.08	.05
3750	.03	- - -	- - -	.01	.04	0.08	.05
4000	.04	- - -	- - -	.01	.04	0.09	.06
4250	.04	- - -	- - -	.01	.05	0.10	.07
4500	.05	- - -	- - -	.01	.05	0.10	.07
4750	.05	- - -	- - -	.02	.05	0.11	.08
5000	.05	- - -	- - -	.02	.06	0.12	.08
5250	.06	- - -	- - -	.02	.06	0.12	.09
5500	.07	- - -	- - -	.02	.06	0.13	.10
5750	.07	- - -	- - -	.02	.07	0.14	.11
6000	.08	.01	- - -	.03	.07	0.14	.11
6250	.08	.01	.01	.03	.07	0.15	.12
6500	.09	.01	.02	.03	.08	0.16	.13
6750	.10	.01	.03	.03	.08	0.17	.14
7000	.10	.01	.04	.04	.08	0.17	.15
7250	.11	.01	.05	.04	.09	0.18	.16
7500	.12	.01	.06	.04	.09	0.19	.17
8000	.13	.02	.09	.05	.10	0.21	.19
8500	.15	.02	.11	.05	.10	0.22	.21
9000	.16	.04	.14	.06	.11	0.24	.24
9500	.18	.05	.16	.07	.12	0.25	.26
10,000	.20	.06	.19	.07	.12	0.27	.29
10,500	.22	.09	.22	.08	.13	0.29	.31
11,000	.24	.11	.25	.09	.14	0.30	.34

BLOWER DATA

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

Electric Heat kW	Minimum cfm
15	6000
30	6000
45	6000
60	6000
90	6000

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0.00	8630
0.05	8210
0.10	7725
0.15	7110
0.20	6470
0.25	5790
0.30	5060
0.35	4300
0.40	3510
0.45	2690
0.50	1840

CEILING DIFFUSER AIR RESISTANCE - in. w.g.

Air Volume cfm	Step-Down Diffuser						Flush Diffuser	
	RTD11-185S			RTD11-275S			FD11-185S	FD11-275S
	2 Ends Open	1 Side/2 Ends Open	All Ends & Sides Open	2 Ends Open	1 Side/2 Ends Open	All Ends & Sides Open		
5000	.51	.44	.39	- - -	- - -	- - -	.27	- - -
5200	.56	.48	.42	- - -	- - -	- - -	.30	- - -
5400	.61	.52	.45	- - -	- - -	- - -	.33	- - -
5600	.66	.56	.48	- - -	- - -	- - -	.36	- - -
5800	.71	.59	.51	- - -	- - -	- - -	.39	- - -
6000	.76	.63	.55	.36	.31	.27	.42	.29
6200	.80	.68	.59	- - -	- - -	- - -	.46	- - -
6400	.86	.72	.63	- - -	- - -	- - -	.50	- - -
6500	- - -	- - -	- - -	.42	.36	.31	- - -	.34
6600	.92	.77	.67	- - -	- - -	- - -	.54	- - -
6800	.99	.83	.72	- - -	- - -	- - -	.58	- - -
7000	1.03	.87	.76	.49	.41	.36	.62	.40
7200	1.09	.92	.80	- - -	- - -	- - -	.66	- - -
7400	1.15	.97	.84	- - -	- - -	- - -	.70	- - -
7500	- - -	- - -	- - -	.51	.46	.41	- - -	.45
7600	1.20	1.02	.88	- - -	- - -	- - -	.74	- - -
8000	- - -	- - -	- - -	.59	.49	.43	- - -	.50
8500	- - -	- - -	- - -	.69	.58	.50	- - -	.57
9000	- - -	- - -	- - -	.79	.67	.58	- - -	.66
9500	- - -	- - -	- - -	.89	.75	.65	- - -	.74
10,000	- - -	- - -	- - -	1.00	.84	.73	- - -	.81
10,500	- - -	- - -	- - -	1.10	.92	.80	- - -	.89
11,000	- - -	- - -	- - -	1.21	1.01	.88	- - -	.96

CEILING DIFFUSER AIR THROW DATA - ft.

Model No.	Air Volume cfm	[1] Effective Throw Range - ft.		Model No.	Air Volume cfm	[1] Effective Throw Range - ft.	
		RTD11-185S Step-Down	FD11-185S Flush			RTD11-275S Step-Down	FD11-275S Flush
156, 180	5600	39 - 49	28 - 37	240	7200	33 - 38	26 - 35
	5800	42 - 51	29 - 38		7400	35 - 40	28 - 37
	6000	44 - 54	40 - 50		7600	36 - 41	29 - 38
	6200	45 - 55	42 - 51		7800	38 - 43	40 - 50
	6400	46 - 55	43 - 52		8000	39 - 44	42 - 51
	6600	47 - 56	45 - 56		8200	41 - 46	43 - 52
					8400	43 - 49	44 - 54
					8600	44 - 50	46 - 57
					8800	47 - 55	48 - 59

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

ELECTRICAL/ELECTRIC HEAT DATA

	Model No.	LHT156H4					
[1] Voltage - 60Hz		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Compressor 1 (Non-Inverter)	Rated Load Amps	17.6		8.5		6.3	
	Locked Rotor Amps	136		66.1		55.3	
Compressor 2 (Non-Inverter)	Rated Load Amps	22.4		10.6		7.7	
	Locked Rotor Amps	149		75		54	
Outdoor Fan Motors (6)	Full Load Amps (6 Non-ECM)	2.4		1.3		1	
	Total	14.4		7.8		6	
Power Exhaust (2) 0.33 HP	Full Load Amps	2.4		1.3		1	
	Total	4.8		2.6		2	
Service Outlet 115V GFI (amps)		15		15		20	
Indoor Blower Motor	Horsepower	3	5	3	5	3	5
	Full Load Amps	10.6	16.7	4.8	7.6	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	90	90	40	45	30	35
	With (2) 0.33 HP Power Exhaust	90	100	45	50	35	35
[3] Minimum Circuit Ampacity (MCA)	Unit Only	71	77	35	38	26	29
	With (2) 0.33 HP Power Exhaust	76	82	37	40	28	31

ELECTRIC HEAT DATA

	Electric Heat Voltage		208V	240V	208V	240V	480V	480V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	[4] 110	125	125	125	60	60	45	50
		30 kW	[4] 150	175	175	175	80	90	70	70
		45 kW	[4] 200	225	[4] 200	225	110	110	80	90
		60 kW	[4] 200	225	225	225	110	110	90	90
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	110	116	116	122	57	60	44	47
		30 kW	149	161	155	167	80	83	62	65
		45 kW	188	206	194	213	103	105	80	83
		60 kW	196	215	202	222	107	110	84	86
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	125	125	[4] 125	150	60	70	50	50
		30 kW	175	175	175	175	90	90	70	70
		45 kW	[4] 200	225	[4] 200	225	110	110	90	90
		60 kW	225	225	[4] 225	250	110	125	90	90
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	115	121	121	127	60	63	46	49
		30 kW	154	166	160	172	83	85	64	67
		45 kW	193	211	199	217	105	108	82	85
		60 kW	201	220	207	226	110	112	86	88

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 15 TON

		Model No.	LHT180H4								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		25.3			9.6			8.4		
	Locked Rotor Amps		184			84			60		
Compressor 2 (Non-Inverter)	Rated Load Amps		25			12.2			9		
	Locked Rotor Amps		164			100			78		
Outdoor Fan Motors (6)	Full Load Amps (6 Non-ECM)		2.4			1.3			1		
	Total		14.4			7.8			6		
Power Exhaust (2) 0.33 HP	Full Load Amps		2.4			1.3			1		
	Total		4.8			2.6			2		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor	Horsepower		3	5	7.5	3	5	7.5	3	5	7.5
	Full Load Amps		10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		100	110	110	45	50	50	35	40	40
	With (2) 0.33 HP Power Exhaust		110	110	125	50	50	50	40	40	45
[3] Minimum Circuit Ampacity (MCA)	Unit Only		82	88	96	38	41	44	30	32	35
	With (2) 0.33 HP Power Exhaust		87	93	101	41	43	47	32	34	37

ELECTRIC HEAT DATA

	Electric Heat Voltage		208V	240V	208V	240V	208V	240V	480V	480V	480	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	[4] 125	150	150	150	150	150	70	70	70	50	50	60
		30 kW	175	175	[4] 175	200	[4] 175	200	90	90	90	70	70	80
		45 kW	[4] 200	225	225	225	[4] 225	250	110	110	125	90	90	90
		60 kW	[4] 225	250	[4] 225	250	[4] 225	250	110	125	125	90	90	100
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	121	127	127	133	135	141	61	63	67	48	50	53
		30 kW	160	172	166	178	174	186	83	86	89	66	68	71
		45 kW	199	217	205	224	213	231	106	108	112	84	86	89
		60 kW	207	226	213	233	221	240	110	113	116	88	90	93
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	150	150	150	150	150	150	70	70	70	50	60	60
		30 kW	[4] 175	200	[4] 175	200	200	200	90	90	100	70	70	80
		45 kW	225	225	[4] 225	250	[4] 225	250	110	125	125	90	90	100
		60 kW	[4] 225	250	[4] 225	250	250	250	125	125	125	90	100	100
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	126	132	132	138	140	146	63	66	69	50	52	55
		30 kW	165	177	171	183	179	191	86	88	92	68	70	73
		45 kW	204	222	210	228	218	236	108	111	114	86	88	91
		60 kW	212	231	218	237	226	245	113	116	119	90	92	95

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 20 TON

	Model No.	LHT240H4								
[1] Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps	32.6			14.8			11.1		
	Locked Rotor Amps	240			130			93.7		
Compressor 2 (Non-Inverter)	Rated Load Amps	31.1			13			11		
	Locked Rotor Amps	255			123			93.7		
Outdoor Fan Motors (6)	Full Load Amps (6 Non-ECM)	2.4			1.3			1		
	Total	14.4			7.8			6		
Power Exhaust (2) 0.33 HP	Full Load Amps	2.4			1.3			1		
	Total	4.8			2.6			2		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	5	7.5	10	5	7.5	10	5	7.5	10
	Full Load Amps	16.7	24.2	30.8	7.6	11	14	6.1	9	11
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	125	125	125	60	60	60	45	50	50
	With (2) 0.33 HP Power Exhaust	125	125	150	60	60	70	50	50	50
[3] Minimum Circuit Ampacity (MCA)	Unit Only	103	111	118	47	51	54	37	40	42
	With (2) 0.33 HP Power Exhaust	108	116	122	50	53	56	39	42	44

ELECTRIC HEAT DATA

	Electric Heat Voltage		208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	150	150	[4]150	175	175	175	70	80	80	60	60	60
		30 kW	200	200	[4]200	225	[4]200	225	100	100	100	80	80	80
		45 kW	[4]225	250	250	250	[4]250	[4]300	125	125	125	100	100	100
		60 kW	250	250	[4]250	[4]300	[4]250	[4]300	125	125	150	100	100	110
		90 kW	[4]300	[4]350	[4]300	[4]350	350	[4]350	175	175	175	125	150	150
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	143	149	150	156	157	163	70	73	76	56	58	60
		30 kW	182	194	189	201	196	208	93	96	99	74	76	78
		45 kW	221	239	228	246	235	253	115	118	121	92	95	97
		60 kW	229	248	236	255	243	262	120	123	126	95	98	100
		90 kW	291	320	299	327	305	334	156	159	162	124	127	129
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	[4]150	175	175	175	175	175	80	80	80	60	60	70
		30 kW	200	200	[4]200	225	225	225	100	100	110	80	80	80
		45 kW	250	250	[4]250	[4]300	[4]250	[4]300	125	125	125	100	100	100
		60 kW	[4]250	[4]300	[4]250	[4]300	[4]250	[4]300	125	150	150	100	110	110
		90 kW	[4]300	[4]350	350	[4]350	350	[4]350	175	175	175	150	150	150
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.33 HP Power Exhaust	**15 kW**	147	153	155	161	161	167	73	76	79	58	60	62
		30 kW	186	198	194	206	201	213	95	99	102	76	78	80
		45 kW	226	244	233	251	240	258	118	121	124	94	97	99
		60 kW	233	253	241	260	247	267	122	126	129	97	100	102
		90 kW	296	325	303	332	310	339	158	162	165	126	129	131

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRIC HEAT CAPACITIES

Volts Input	15 kW			30 kW			45 kW			60 kW			90 kW		
	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages
208	11.3	38,600	1	22.5	76,800	1	33.8	115,300	2	45.0	153,600	2	67.6	230,700	2
220	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
230	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
240	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
440	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
460	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
480	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
550	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
575	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
600	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2

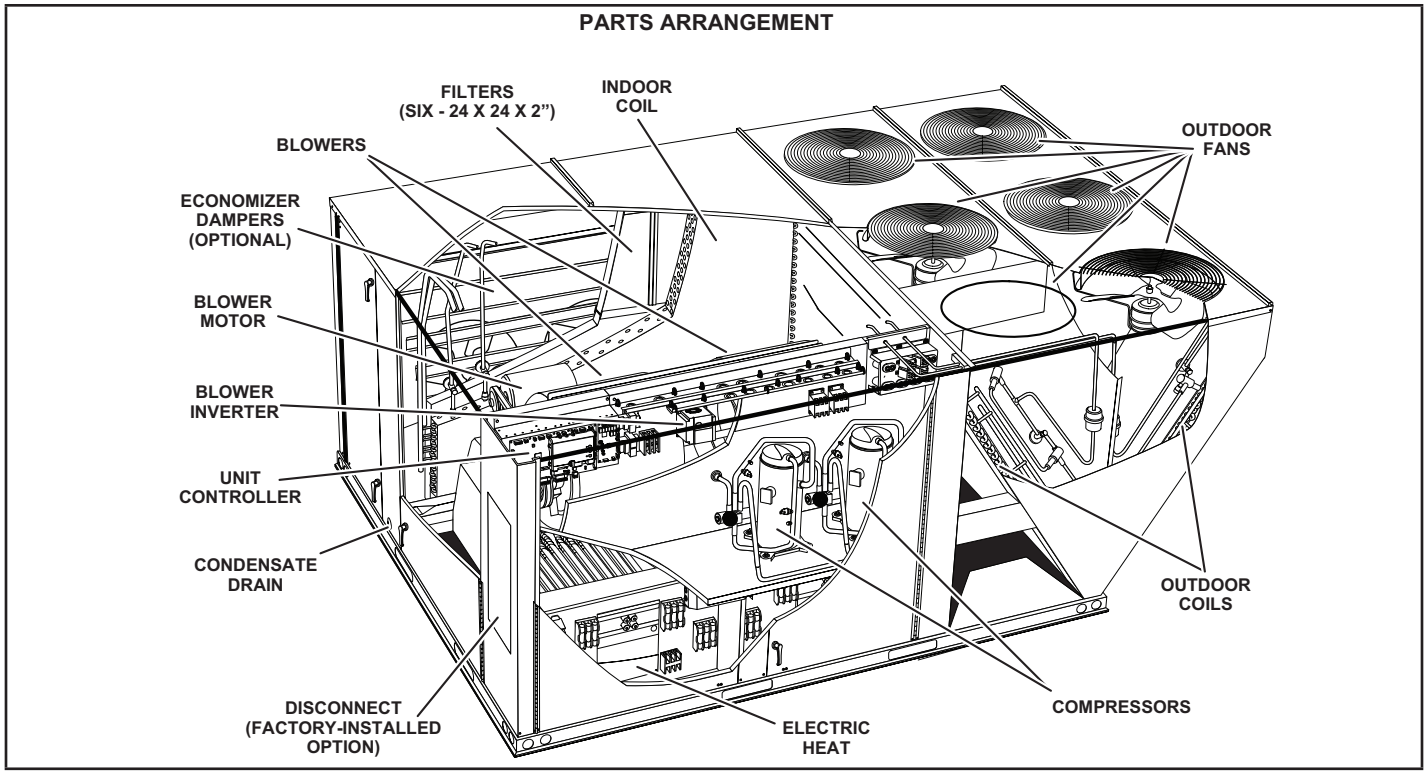


FIGURE 1

I-UNIT COMPONENTS

All 13 through 20 ton units are configure to order units (CTO). Unit components are shown in figure 1. All units come standard with hinged unit panels. The unit panels may be held open with the door rod located inside the unit. All L1, L2 and L3 wiring is color coded; L1 is red, L2 is yellow and L3 is blue.

⚠ 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.

ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures

⚠ CAUTION

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

A-Control Box Components

Control box components are shown in FIGURE 3 and FIGURE 4. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48

Units with higher SCCR rating may be equipped with an disconnect switch S48. Other factory or field installed optional circuit breakers may be used, such as CB10. S48 and CB10 are toggle or twist-style 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 two primary voltage taps as shown in FIGURE 2, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

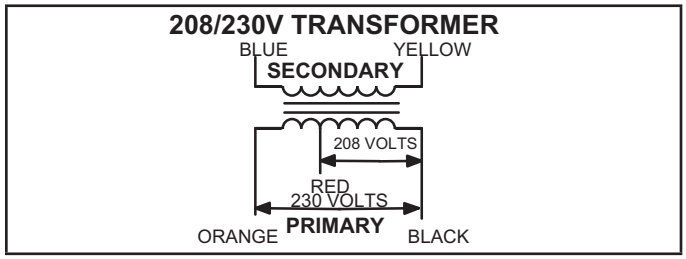


FIGURE 2

3-Contactor Transformer T18

T18 is a single line voltage to 24VAC transformer used in all LHT 13 to 20 ton units. Transformer T18 is protected by a 3.5 amp circuit breaker (CB18). T18 is identical to transformer T1. The transformer supplies 24VAC power to the contactors.

Components Arrangement

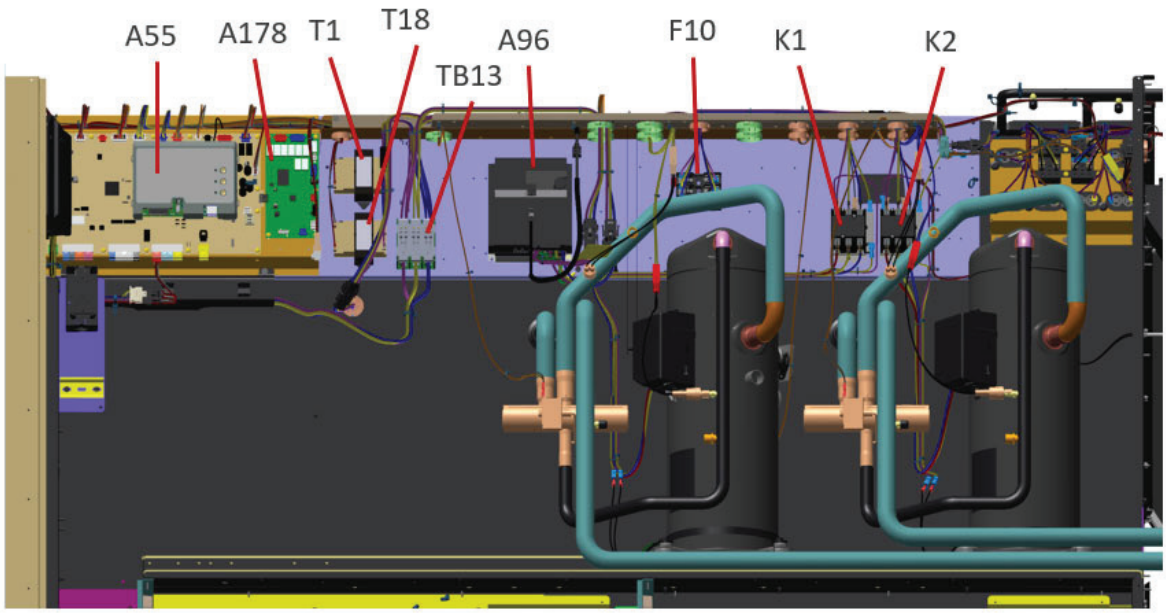


FIGURE 3

Components Arrangement

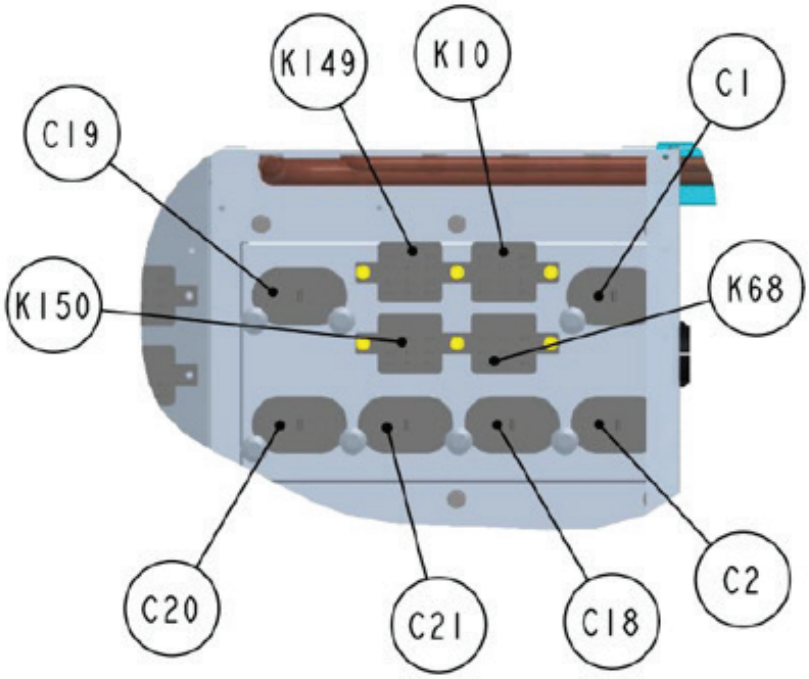


FIGURE 4

4-Terminal Block TB13

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

5-Outdoor Fan Motor Fuse Block & Fuses

F10 Power Exhaust Fan Motor Fuse Block and Fuses F6. STD SCCR 240V, 300V and higher rated SCCR units have three line voltage fuses F10 provide overcurrent protection to all condenser fans. Two line voltage fuses F6 provide overcurrent protection to the two optional power exhaust fans. The fuses are rated at 30A in all 208/230V units but 10A in the 208/230V 240U and 300U models.

6-Compressor Contactor K1 and K2

All compressor contactors are three-pole-double-break contactors with 24VAC coils. In all units, K1 (energized by A55) energizes compressors B1 in response to first stage cool demand, and K2 (energized by A55) energizes B2 in response to second stage cool demand.

7-Blower Contactor K3

Blower contactor K3, used in all units, is a three-pole-double-break contactor with a 24VAC coil used to energize the indoor blower motor B3 in response to blower demand. K3 is energized by Unit Controller (A55). Optional Staged-Blower units which are not equipped with a bypass option will not have a K3.

8-Ultraviolet Germicidal Lamp (UVC) Transformer T49

UVC transformer T49 is used in 460V and 575V units 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.

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.

9-Power Exhaust Relay K65 & K231 (PED units)

Power exhaust relays K65 and K231 are N.O. DPDT relays with a 24VAC coil. The relay are used in units equipped with the optional power exhaust dampers. K65 and K231 are energized by the A55 Unit Controller, after the economizer dampers reach 50% open (adjustable in ECTO). When K65 closes, exhaust fan B10 is energized and when K231 closes B11 is energized.

10-Variable Frequency Drive A96 (optional)

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

11-VFD Power To Motor Contactor K202 (optional)

Contactor is used in Staged-Blower units equipped with a VFD bypass option. The three pole 40 amp contactor with a 24VAC coil is energized by the A55 Unit Controller. K202 allows power from the VFD to the B3 blower motor in response to blower demand.

12-Inverter Start Forward Rotation Relay K203 (optional)

Relay is used in optional Staged-Blower units and is a three-pole double-throw relay with a 24VAC coil. K203 is energized by the A55 Unit Controller and provides input to the A96 VFD to start blower forward rotation. K203 also de-energizes K3 allowing A96 to control B3 blower.

13-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.

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.

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

15-Second-Stage Power Exhaust Relay K231 (Staged-Blower units equipped with power exhaust)

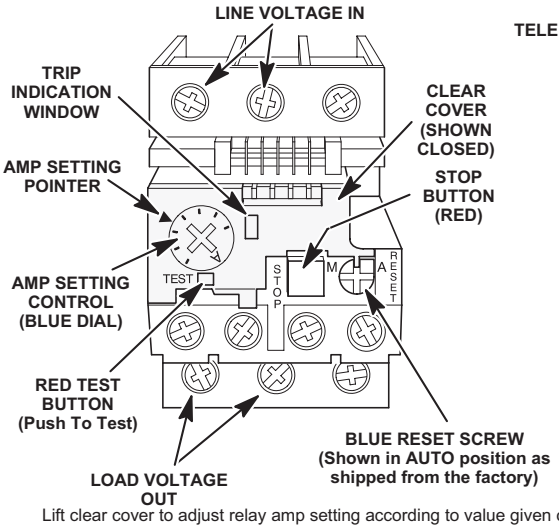
The second power exhaust fan is controlled by K231. A133 will enable K231 only when the blower reaches 70% of full speed (adjustable ECTO). This prevents a negative building pressure when the blower is operating in low speed. Refer to the Unit Controller manual and ECTO labels on the unit.

15-Fuse F61 (Higher SCCR units only)

Fuse F61 is used on units with higher SCCR rating. F61 provides overcurrent protection to compressor and other cooling components. F61 and S48 are located inside a sheet metal enclosure in the unit left front corner mullion.

16-Blower Motor Overload Relay S42

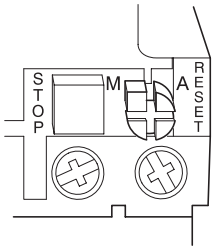
The relay (S42) is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts open to de-energize pin #1 in plug P299 of the A55 Unit Controller. A55 de-energizes all outputs. Units will be equipped with a relay manufactured by Telemecanique FIGURE 5 or Siemens FIGURE 6.



TELEMECANIQUE OVERLOAD RELAY

DETAIL SHOWING RESET BUTTON ADJUSTED TO MANUAL POSITION

Lift clear cover and turn adjustment screw counterclockwise. Reset screw will pop out when pointer is in M (manual position). Close cover to lock reset screw into position.



Lift clear cover to adjust relay amp setting according to value given on the blower motor nameplate. Proper relay amp setting equals motor nameplate FLA X service factor of 1.15 X .95.

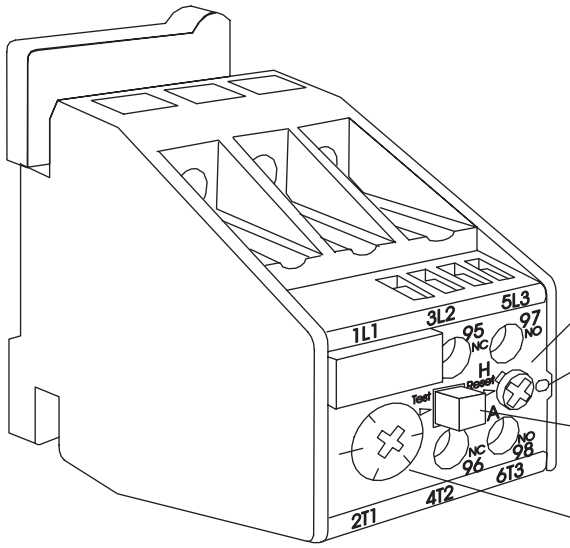
Cover must also be lifted to adjust control mode from automatic reset to manual reset (see detail above) and to test the control.

Control must be in the manual reset mode to perform a test. Use a pointed object to press the small red test button. A yellow marker should appear in the trip indication window to the right of the amp setting control. Press the blue reset screw to reset the relay.

The red STOP button opens the normally closed contacts which power the blower motor. This button stops blower motor operation as long as it is pressed in.

FIGURE 5

SIEMENS OVERLOAD RELAY



BLUE RESET BUTTON IN FACTORY-SET AUTO MODE (Turn clockwise to H for manual reset)

GREEN TRIP INDICATOR (Flush with surface -- not tripped; Above surface -- tripped)

RED TEST BUTTON

AMP ADJUSTMENT DIAL

Adjust relay amp setting according to value given on the blower motor nameplate. Proper relay amp setting equals motor nameplate FLA X service factor of 1.15 X .95.
Use small slotted screwdriver to adjust control mode from automatic reset (A) to manual reset (H).
Control must be in the manual reset mode (H) to perform a test. Press the red test button. Green trip indicator should pop out. Press the blue reset screw to reset the relay.

FIGURE 6

Compressor Detail
B1, B2

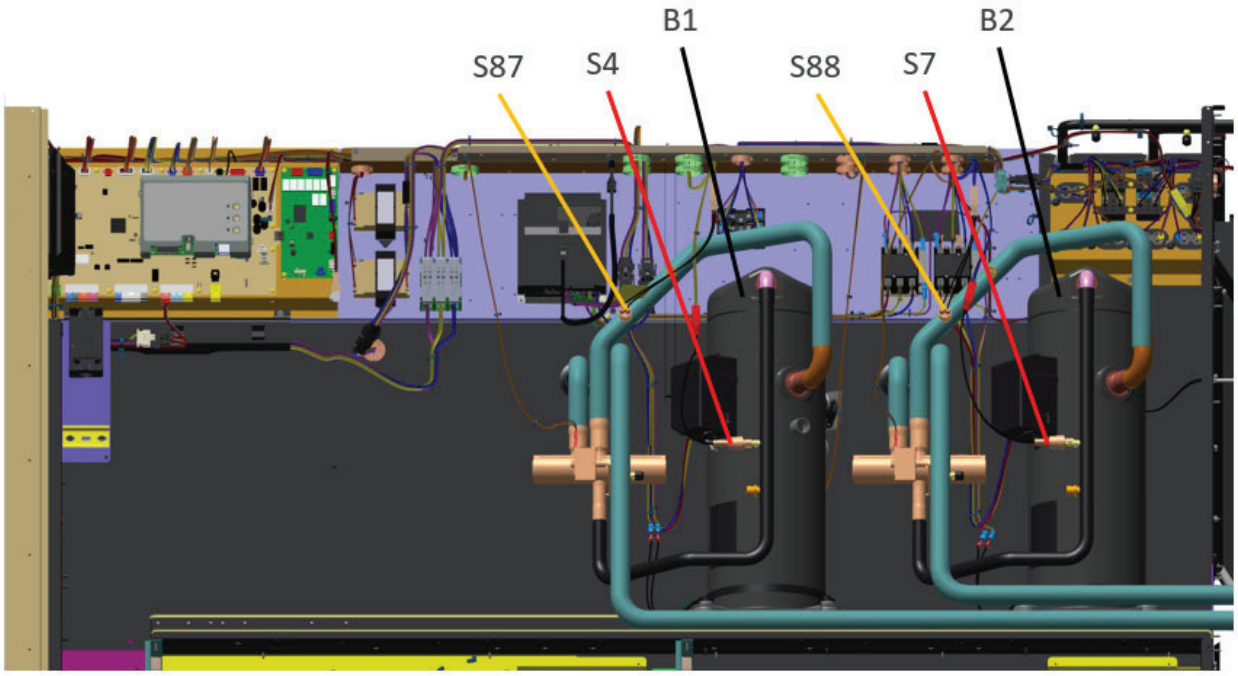


FIGURE 7

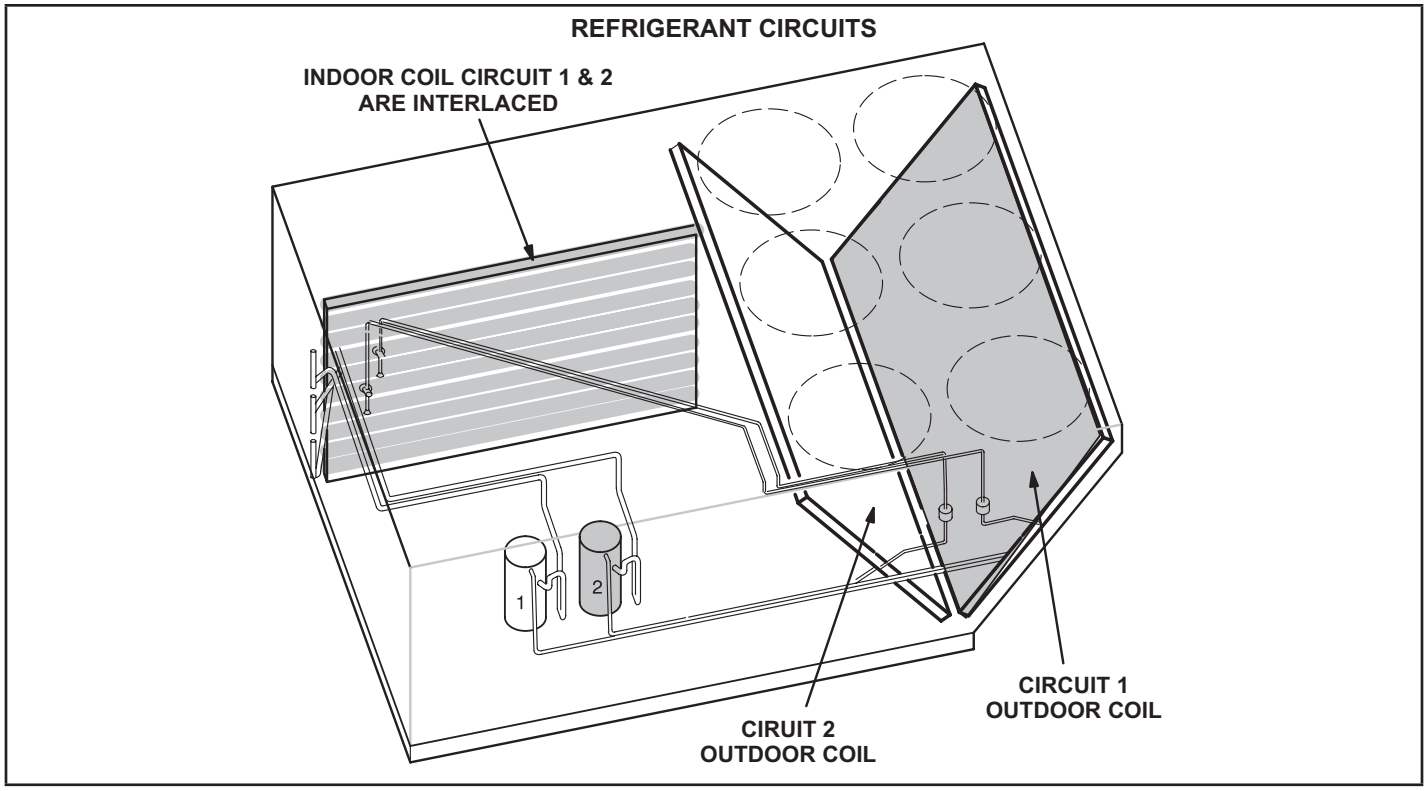


FIGURE 8

B-Cooling Components

Units use independent cooling circuits consisting of one compressor, one condenser coil, and one evaporator coil per circuit.

Six draw-through type condenser fans are used in LHT156, 180 & 240.

Cooling may be supplemented by a factory- or field-installed economizer. All units intertwined evaporators. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a crankcase heater, high pressure switch and low pressure switch.

1-Compressors B1 and B2

All units use scroll compressors. All units use 2 compressors, the first stage compressor is a 2-speed and the second stage compressor is fixed speed. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

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

⚠ IMPORTANT

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

2-Crankcase Heaters HR1 and HR2

All LHT units use insertion type heaters. Heater HR1 is installed around compressor B1 and HR2 compressor B2.

3-High Pressure Switches S4 and S7

The high pressure switches is an auto-reset SPST N.C. switch which opens on a pressure rise. All units are equipped with this switch. The switch is located in the compressor discharge line and is wired in series with the compressor contactor coil through A55 unit controller or A178 compressor 3 and 4 controller.

S4 and S7 are is wired in series with B1 and B2 compressor contactors.

When discharge pressure rises to 640 ± 10 psig (indicating a problem in the system) the switch opens and the respective compressor(s) is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 20 psig the pressure switch will close re-energizing the compressor(s).

Main control A55 has a three-strike counter before locking out. This means the control allows three high pressure trips per one thermostat demand. The control can be reset by breaking and remaking the thermostat demand or manually resetting the control

4-Low Pressure Switches S87 and 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. See FIGURE 7.

S87 and S88 (compressor one and two) are wired in series with the contactor coils through the A55 Unit Controller

The 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 a single thermostat demand, before the compressor(s) 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 (indicating low pressure), the switch opens and the compressor(s) is de-energized. The switch automatically resets when pressure in the suction line rises to 90 $\pm$ 5 psig.

5-Defrost Control

The defrost control ensures that the heat pump outdoor coil does not ice excessively during the heating mode. The defrost control uses input from the coil and ambient sensor to initiate demand defrost cycles from the M4 Board. If the system fails to calibrate or obtain readings for demand defrost, defrost will run-time at field setting. Low gas heat (LHT) or electric heat (LHT) is energized during defrost.

6-Filter Drier (all units)

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

7-Condenser Fans

B4, B5, B21, B22, B23 and B24 (All Units)

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

8-Reversing Valve

A refrigerant reversing valve with a 24 volt solenoid coil is used to reverse refrigerant flow during unit operation in all LHT units. The reversing valve is connected in the vapor line of the refrigerant circuit. The reversing valve coil is energized during cooling demand and during defrost. Reversing valve L1 & L2 are controlled by the A55 Control board in response to a cooling demand or by defrost.

9-Temperature Thermistor

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

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

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See FIGURE 9 for indoor coil location and FIGURE 10 for outdoor coil location.

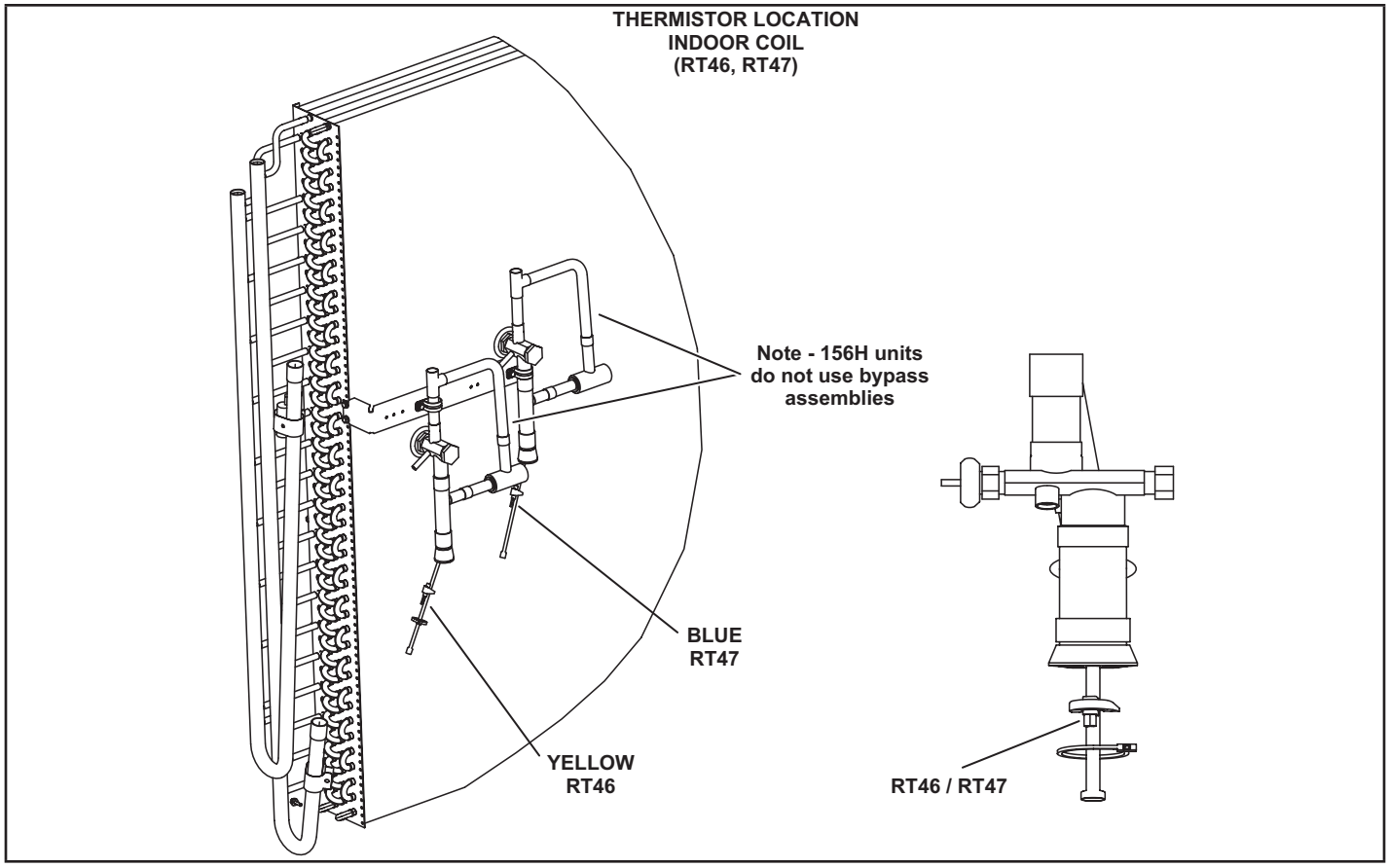


FIGURE 9

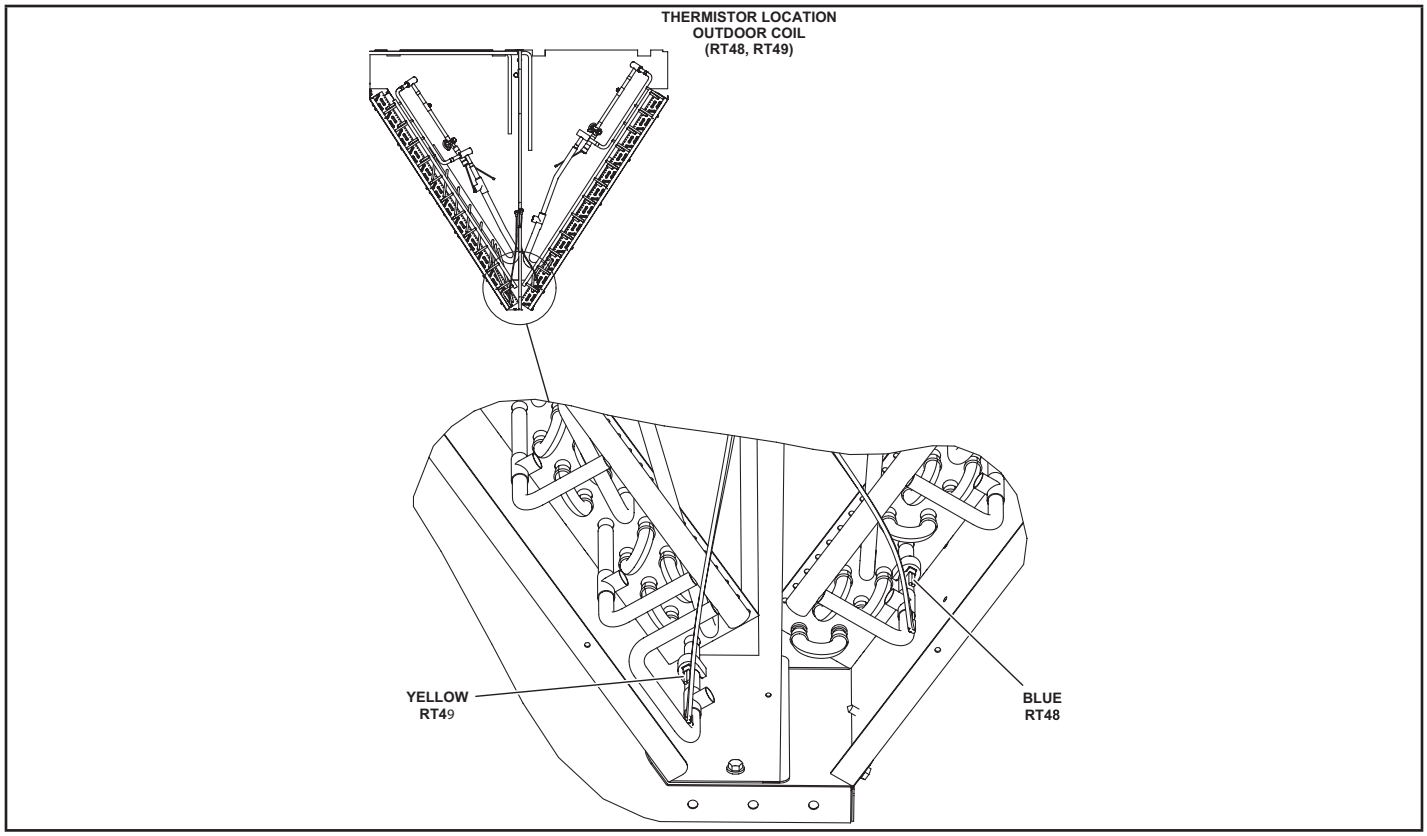


FIGURE 10

C-Blower Compartment

The blower compartment is located between the evaporator coil and the compressor / control section on the opposite side of the condenser coil. The blower assembly is accessed by disconnecting the blower motor wiring (and all other plugs) and removing the screws on either side of the sliding base. The base pulls out as shown in FIGURE 12.

1-Blower Wheels

All units have two 15 in. x 15 in. blower wheels. Both wheels are driven by one motor.

2-Indoor Blower Motor B3

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

OPERATION / ADJUSTMENT

Supply Air Staged Units - The blower rotation will always be correct on units equipped with an inverter. Checking blower rotation is not a valid method of determining voltage phasing for incoming power. **Supply Air Staged Units and Units Equipped With Optional Voltage or Phase Detection -** 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 this mobile service app (the QR is located in the control area) menu:

SERVICE > TEST > BLOWER

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

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.

⚠ IMPORTANT

Three Phase Scroll Compressor Voltage Phasing

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

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

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

3-Disconnect all remote electrical power supplies.

4-Reverse any two field-installed wires connected to the line side of S48 disconnect or TB13 terminal strip. Do not reverse wires at blower contactor.

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

***Supply air inverter blower motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the blower is rotating incorrectly.**

⚠ 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.

B-Blower Access

1 - Disconnect jack/plug connector to blower motor. Also disconnect jack/plug connector heating limit switches on gas units.

2 - Remove screws on either side of blower assembly sliding base. See FIGURE 12.

3 - Pull base toward outside of unit.

C-Determining Unit CFM

IMPORTANT - *Multi-staged supply air units are factory-set to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Refer to the field-provided, design specified CFM for all modes of operation. Use the following procedure to adjust motor pulley to deliver the highest CFM called for in the design spec. See Inverter Start-Up section to set blower CFM for all modes once the motor pulley is set.*

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

2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 11.

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

3 - See table of contents for Blower Data and or Optional Accessories. Use static pressure and RPM readings to determine unit CFM.

4 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 12. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 4.

TABLE 4

MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Min Turns Open	Max Turns Open
A Section	No Minimum	5
B Section	1*	6

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

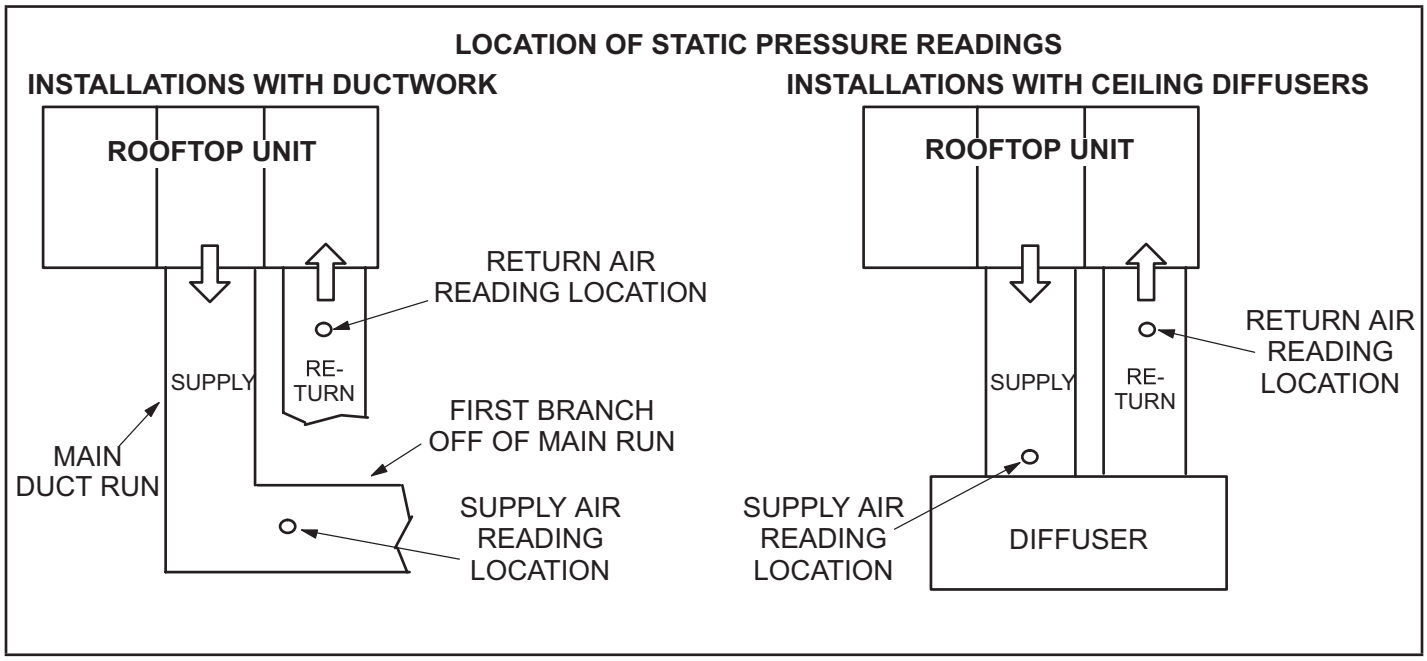


FIGURE 11

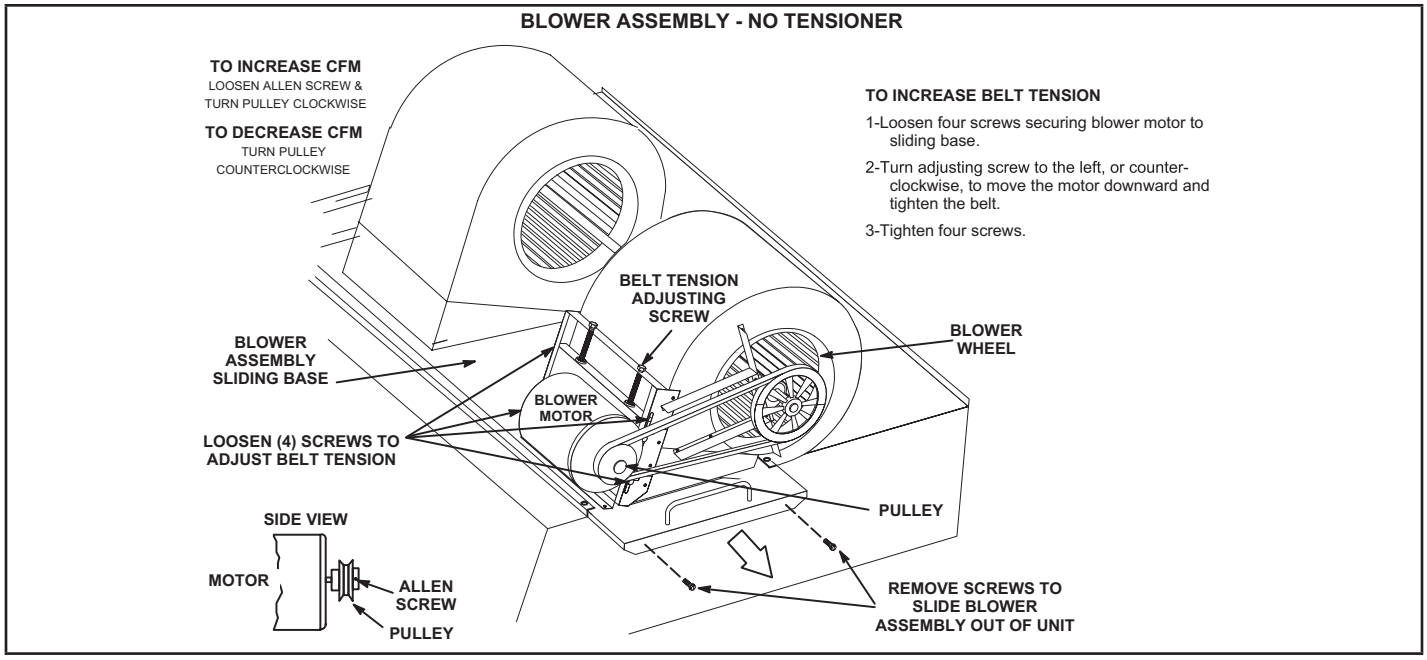


FIGURE 12

D-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat into pulley grooves. Make sure blower and motor pulley are aligned. See FIGURE 13 for blowers not equipped with a tensioner and FIGURE 14 for units equipped with an optional belt tensioner.

Blowers Without Belt Tensioner

1 - Loosen four screws securing blower motor to sliding base. See FIGURE 12.

2 - *To increase belt tension -*

Turn belt tension adjusting screw to the left, or counterclockwise, to tighten the belt. This increases the distance between the blower motor and the blower housing.

3 - To loosen belt tension -

Turn the adjusting screw to the right, or clockwise to loosen belt tension. 3- Tighten four screws securing blower motor to sliding base once adjustments have been made.

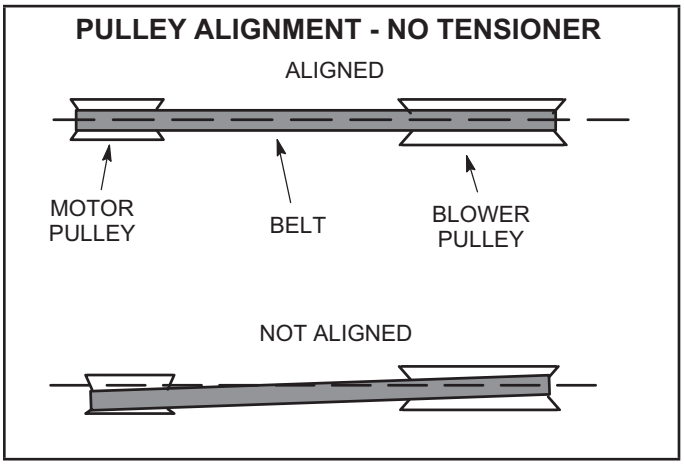


FIGURE 13

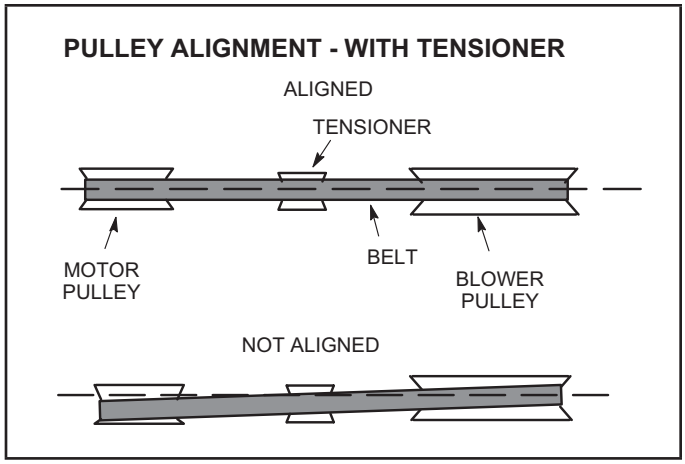


FIGURE 14

E-Check Belt Tension

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

1 - Measure span length X. See FIGURE 15.

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

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

3 - Measure belt deflection force. For a used belt, the deflection force should be 5 lbs. A new belt deflection force should be 7 lbs

A force below these values indicates and under tensioned belt. A force above these values indicates an over tensioned belt.

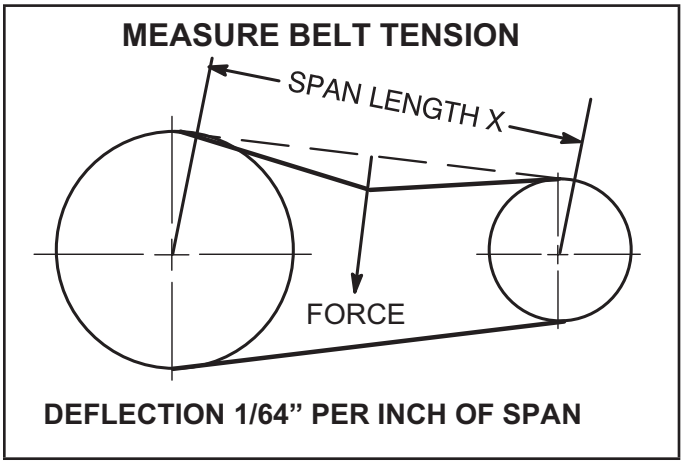


FIGURE 15

F-Field-Furnished Blower Drives

See BLOWER DATA tables for blower drives.

D-OPTIONAL ELECTRIC HEAT

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

EHA parts arrangement is shown in FIGURE 17 and FIGURE 18. All electric heat sections consist of electric heating elements exposed directly to the air stream. Two electric heat sections (first section and second section) are used in all 15kW through 90kW heaters. See FIGURE 16. Multiple-stage elements are sequenced on and off in response to thermostat demand.

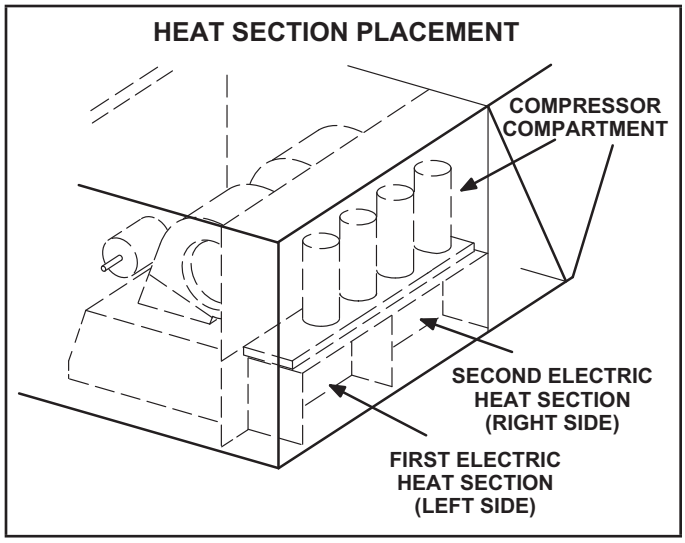


FIGURE 16

1-Main Control Box Components A55, K9

The main control box (FIGURE 3) houses the A55 Unit Controller and the K9 electric heat relay.

2-Contactors K15, K16, K17 and K18

Contactors K15, K16, K17 and K18 are all three-pole double-break contactors located on the electric heat vestibule. K15 and K16 are located on the first electric heat section, while K17 and K18 are located on the second electric heat section. However, in the 15 and 30kW heaters, the first section houses all contactors and fuses. All contactors are equipped with a 24VAC coil. The coils in the K15, K16, K17 and K18 contactors are energized by the main panel A55. Contactors K15 and K17 energize the first stage heating elements, while K16 and K18 energize the second stage heating elements.

3-High Temperature Limits S15 and S107 (Primary)

S15 and S107 are SPST N.C. auto-reset thermostats located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the first electric heat section, while S107 is the high temperature limit for the second electric heat section. Both thermostats are identical and are wired to the A55 Unit Controller. When either S15 or S107 opens, indicating a problem in the system, contactor K15 is de-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. The thermostats used on EHA360-45-1 Y/G/J are factory set to open at 200F $\pm$ 5F on a temperature rise and automatically reset at 160F $\pm$ 6F on a temperature fall. All other electric heat section thermostats are factory set to open at 170F $\pm$ 5F on a temperature rise and automatically reset at 130F $\pm$ 6F on a temperature fall. The thermostats are not adjustable.

4-Terminal Strip TB3

Electric heat line voltage connections are made to terminal strip TB3 (or a fuse block on some models) located in the upper left corner of the electric heat vestibule.

5-Heating Elements HE1 through HE14

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. Three elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a “Delta” arrangement. Elements in 460 and 575V units are connected in “Wye” arrangement.

Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses.

6-Fuse F3

Fuse F3 are housed in a fuse block which holds three fuses. Each F3 fuse is connected in series with each leg of electric heat. FIGURE 17, FIGURE 18 and TABLE 5 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1 through F3 - 8

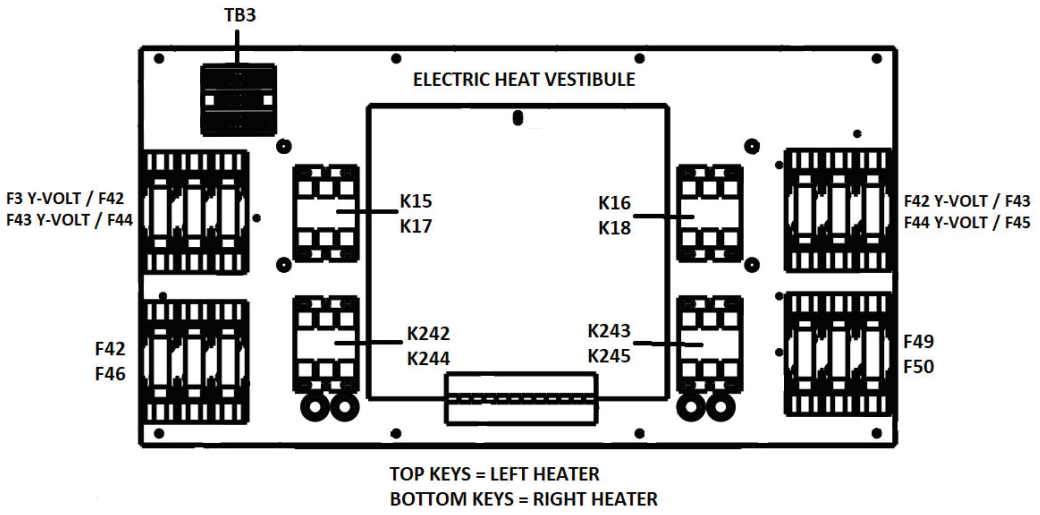


FIGURE 17

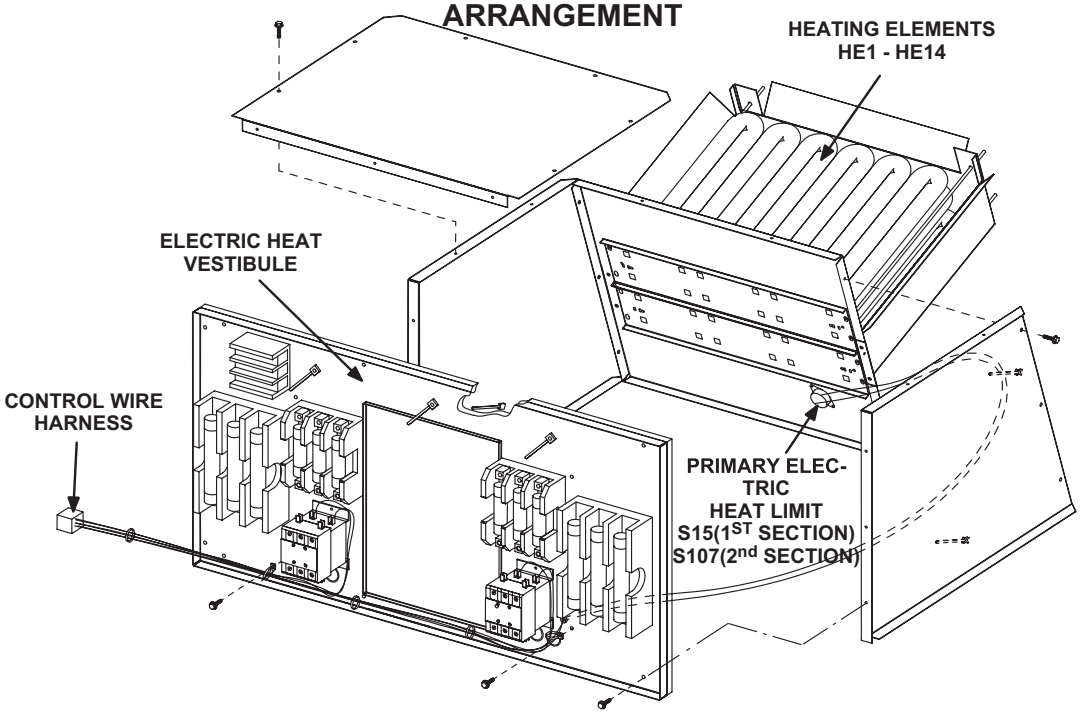


FIGURE 18

TABLE 5

ELECTRIC HEAT SECTION FUSE RATING									
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**							
		F3 - 1	**F3 - 2**	**F3 - 3**	**F3 - 4**	**F3 - 5**	**F3 - 6**	**F3 - 7**	**F3 - 8**
(1) EHA240-7.5 & (1) EHA240S-7.5 (15 kW Total)	208/230V	50 Amp 250V	-----	-----	-----	-----	-----	-----	-----
	460V	25 Amp 600V	-----	-----	-----	-----	-----	-----	-----
	575V	20 Amp 600V	-----	-----	-----	-----	-----	-----	-----
(1) EHA360-15 & (1) EHA360S-15 (30 kW Total) or (1) EHA156-15 & (1) EHA156S-15	208/230V	60 Amp 250V	60 Amp 250V	-----	-----	-----	-----	-----	-----
	460V	50 Amp 600V	-----	-----	-----	-----	-----	-----	-----
	575V	40 Amp 600V	-----	-----	-----	-----	-----	-----	-----
(2) EHA360-22.5 (45 kW Total) or (2) EHA156-22.5	208/230V	50 Amp 250V	-----	-----	25 Amp 250V	50 Amp 250V	-----	-----	25 Amp 250V
	460V	25 Amp 600V	-----	-----	15 Amp 600V	25 Amp 600V	-----	-----	15 Amp 600V
	575V	20 Amp 600V	-----	-----	10 Amp 600V	20 Amp 600V	-----	-----	10 Amp 600V
(2) EHA150-30 (60 kW Total) or (2) EHA156-30	208/230V	50 Amp 250V	-----	-----	50 Amp 250V	50 Amp 250V	-----	-----	50 Amp 250V
	460V	25 Amp 600V	-----	-----	25 Amp 600V	25 Amp 600V	-----	-----	25 Amp 600V
	575V	20 Amp 600V	-----	-----	20 Amp 600V	20 Amp 600V	-----	-----	20 Amp 600V
(2) EHA360-45 (90 kW Total)	208/230V	50 Amp 250V	-----	60 Amp 250V	60 Amp 250V	50 Amp 250V	-----	60 Amp 250V	60 Amp 250V
	460V	25 Amp 600V	-----	-----	50 Amp 600V	25 Amp 600V	-----	-----	50 Amp 600V
	575V	20 Amp 600V	-----	-----	40 Amp 600V	20 Amp 600V	-----	-----	40 Amp 600V

II-PLACEMENT AND INSTALLATION

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

III-CHARGING

A-Refrigerant Charge and Check - Fin/Tube Coil-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 60F, In temperatures below 60F, the charge* ***must*** *be weighed into the system.*

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

IMPORTANT - Charge unit in normal cooling mode.

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>TEST>COOL>COOL 3

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

3 - Apply the outdoor temperature to TABLE 6, TABLE 7 and TABLE 8 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 approach method along with the normal operating pressures to confirm readings.

TABLE 6

156 Compressor 1 Frequency 56Hz - 581167-01

Outdoor Coil Entering Air Temp°F	Circuit 1		Circuit 2	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65	218	110	232	118
75	262	129	279	138
85	305	146	319	144
95	350	149	365	148
105	400	152	416	150
110	454	155	471	153

TABLE 7

180 Compressor 1 Frequency 56Hz - 581168-01

Outdoor Coil Entering Air Temp°F	**Circuit 1**		**Circuit 2**	
	Dis. +10 psig	**Suc. +5 psig**	**Dis. +10 psig**	**Suc. +5 psig**
65	243	133	248	132
75	280	137	286	135
85	321	141	328	138
95	366	144	374	140
105	415	146	424	143
110	469	149	477	146

TABLE 8

240 Compressor 1 Frequency 68Hz - 581169-01

Outdoor Coil Entering Air Temp°F	**Circuit 1**		**Circuit 2**	
	Dis. +10 psig	**Suc. +5 psig**	**Dis. +10 psig**	**Suc. +5 psig**
65	260	135	264	135
75	297	136	304	136
85	338	138	346	138
95	384	140	394	140
105	434	142	443	142
110	485	144	494	144

B-Charge Verification - Approach Method - AHRI

Testing (Fin/Tube Coil)

1 - 1- Using the same thermometer, compare liquid temperature to outdoor ambient temperature.

Approach Temperature = Liquid temperature (at outdoor coil outlet) minus ambient temperature.

2 - Approach temperature should match values in TABLE 9. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.

3 - The approach method is not valid for grossly over or undercharged systems. Use TABLE 6, TABLE 7 and TABLE 8 as a guide for typical operating pressures.

TABLE 9

APPROACH TEMPERATURES - FIN/TUBE COIL

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
156	5°F ± 1 (2.8°C ±0.5)	4.0°F ± 1 (2.2°C ±0.5)
180	2°F ± 1 (1.1°C ±0.5)	5.0°F ± 1 (2.8°C +0.5)
240	6°F ± 1 (3.3°C +0.5)	6°F ± 1 (3.3°C ±0.5)

IV- START-UP OPERATION

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

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.*

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

2 - First-stage thermostat demand will energize indoor blower in Low Cooling CFM. Second-stage thermostat demand will energize indoor blower in High Cooling CFM. Both demands energize compressor 1. The remaining compressors will be energized as needed to meet cooling demand.

3 - 156, 180 and 240 units contain two refrigerant circuits or systems.

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

5 - Refer to the Refrigerant Check and Charge section to check refrigerant charge.

C-Heating Startup

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

2 - A first-stage heating demand (W1) will energize compressor heat pump heating, the outdoor fans, and the blower..

3 - A second-stage heating demand (W2) will energize the electrical heaters if available.

V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

LHT units are factory charged and require no further adjustment; however, charge should be checked periodically using the liquid temperature plots in section IIICHARGING.

VI-MAINTENANCE

⚠ WARNING

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

A-Filters

LHT units use six 24 X 24 X 2” fiberglass 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.

B-Lubrication

All motors and blower wheels used in LHT units are lubricated; 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 detergent or commercial coil cleaner and inspect monthly during the cooling season. Check connecting lines and coil for evidence of oil and refrigerant leaks.

F-Electrical

1 - Check all wiring for loose connections.

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

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

Fan Motor Rating Plate ____ Actual _____

Indoor Blower Motor Rating Plate____ Actual____

VII-ACCESSORIES

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

A-Roof Curbs

When installing the LHT units on a combustible surface for downflow discharge applications, the hybrid C1CURB70C-1 8-in height, C1CURB71C-1 14-in height, C1CURB72C-01 18-in height and C1CURB73C-1 24-in roof mounting frame is used. The assembled hybrid mounting frame is shown in FIGURE 19. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 20. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

For horizontal discharge applications, use the standard C1URB14C-1 26-in or C1CURB16C-1 37-in height roof mounting frame. This frame converts unit from down-flow to horizontal air flow. The 37 inch horizontal frame meets National Roofing Code requirements. The roof mounting frames are recommended in all other applications but not required. If the LHT units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

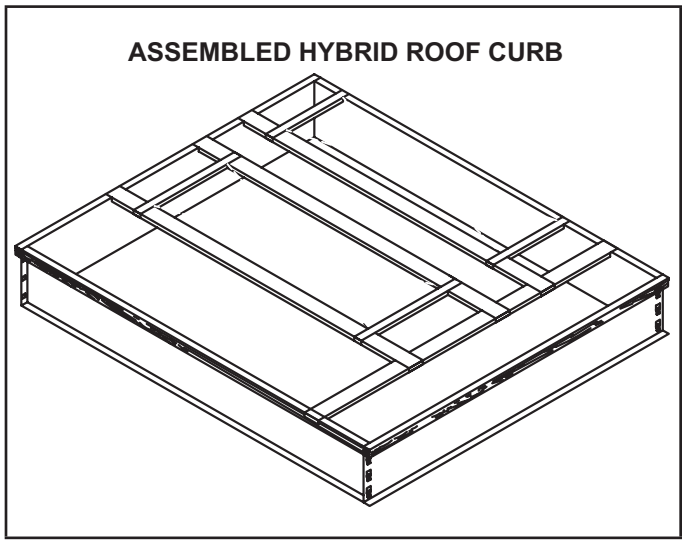


FIGURE 19

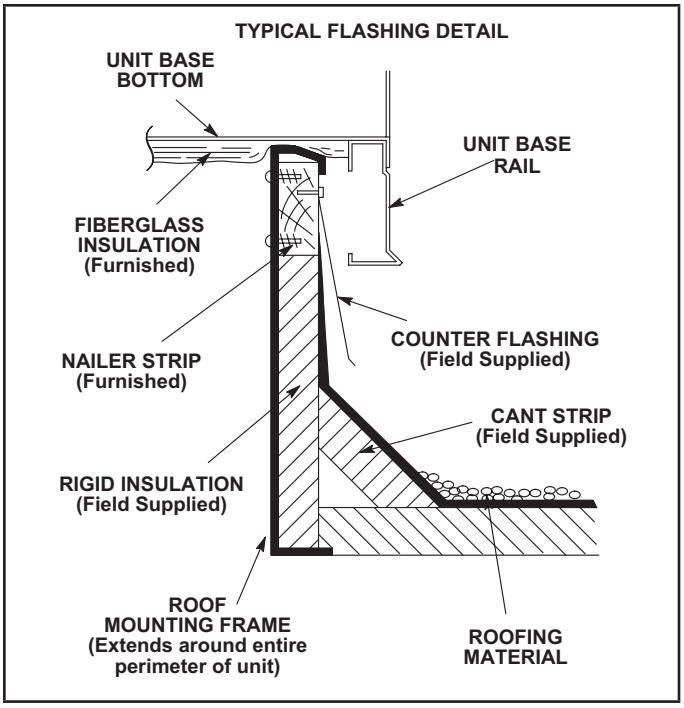


FIGURE 20

B-Transitions

Optional supply/return transitions C1DIFF33C-1 and C1DIFF34C-1 are available for use with LHT series units utilizing optional C1CURB roof curbs. Transition must be installed in the roof curb before mounting the unit to the frame. Refer to the manufacturer’s instructions included with the transition for detailed installation procedures.

C-C1DAMP10 & E1DAMP20 Outdoor Air Dampers

C1DAMP10C and E1DAMP20C (FIGURE 21) consist of a set of dampers which may be manually or motor operated to allow up to 25 percent outside air into the system at all times. Either air damper can be installed in LHT 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. Filter Handicoater is R.P. Products coating no. 418 and is available as Part No. P-8-5069.

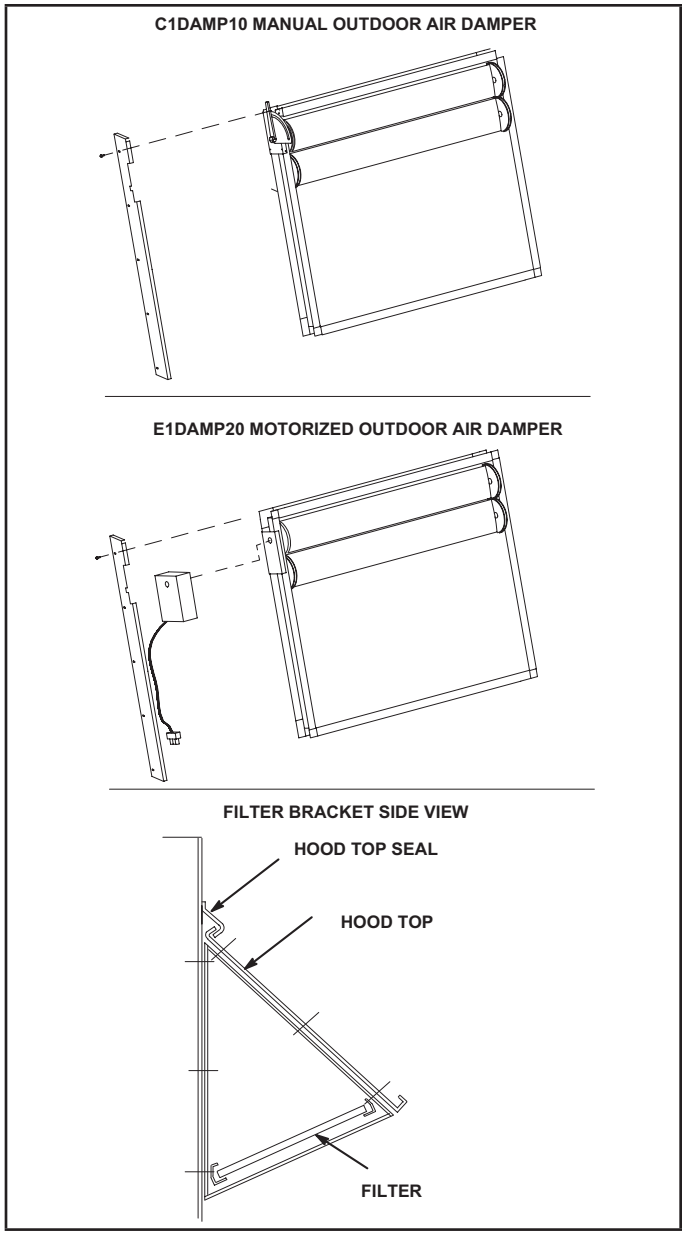


FIGURE 21

D-Supply and Return Diffusers

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

E-E1ECON15C-2 Standard and E1ECON17C-1 High Performance Economizer (Field or Factory Installed)

The optional economizer can be used with downflow and horizontal air discharge applications. The economizer uses outdoor air for free cooling when temperature and/or humidity is suitable. An economizer hood is furnished with the economizer.

NOTE - *Gravity exhaust dampers are required with power exhaust.*

The economizer is controlled by the A55 Unit Controller. The economizer will operate in one of four modes. Each mode requires a different A55 Unit Controller DIP switch setting. Each mode also requires different sensors. The following is a brief description. See economizer installation instruction for more detail.

1-"TMP" MODE (SENSIBLE TEMPERATURE)

In the "TMP" mode, the IMC uses input from the factory installed RT6 Supply Air Sensor, RT16 Return Air Sensor and RT17 Outdoor Air Sensor to determine suitability of outside air and economizer damper operation. When outdoor sensible temperature is less than return air sensible temperature, outdoor air is used for cooling. This may be supplemented by mechanical cooling to meet comfort demands. This application does not require additional optional sensors.

2-"ODE" MODE (OUTDOOR ENTHALPY)

The "ODE" or outdoor enthalpy mode requires a field-provided and -installed Honeywell C7400 enthalpy sensor (16K96). The sensor monitors outdoor air temperature and humidity (enthalpy). When outdoor air enthalpy is below the enthalpy control setpoint, the economizer modulates to allow outdoor air for free cooling.

3-"DIF" MODE (DIFFERENTIAL ENTHALPY)

The "DIF" or differential enthalpy mode requires two field-provided and -installed Honeywell C7400 enthalpy sensors (16K97). One sensor is installed in the outside air opening and the other sensor is installed in the return air opening. When the outdoor air enthalpy is below the return air enthalpy, the economizer opens to bring in out door air for free cooling.

4-"GLO" MODE (GLOBAL)

Global Mode - The "GLO" or global mode is used with an energy management system which includes a global control feature. Global control is used when multiple units (in one location) respond to a single outdoor air sensor. Each energy management system uses a specific type of outdoor sensor which is installed and wired by the controls contractor.

Motorized Outdoor Air Damper - The "GLO" mode is also used when a motorized outdoor air damper is installed in the system.

NOTE - *All economizer modes of operation will modulate dampers to 55F supply air.*

F-Gravity Exhaust Dampers

C1DAMP50C dampers (FIGURE 22) are used in downflow and LAGEDH are used in horizontal air discharge applications. LAGEDH 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 LHT series units. An exhaust hood is furnished with the gravity exhaust damper.

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.

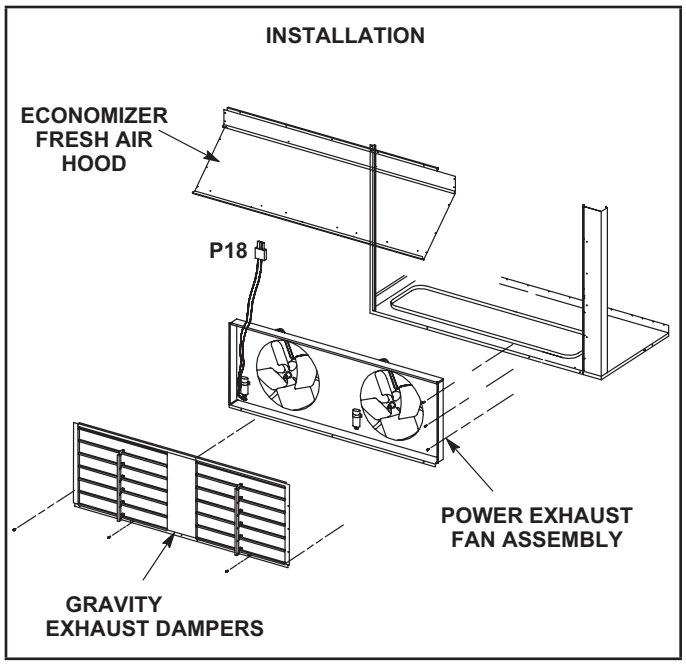


FIGURE 22

G-C1PWRE10 Power Exhaust Fans

C1PWRE10 power exhaust fans are used in downflow applications only. C1PWRE10 fans require optional downflow gravity exhaust dampers and E1ECON15 economizers. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. FIGURE 22 shows the location of the power exhaust fans. See installation instructions for more detail.

H-Control Systems

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

I-Smoke Detectors A171, A172, A173

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

J-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at .15” W.C. The switch is mounted on the middle left corner of the blower support panel. Wiring for the blower proving switch is shown on the temperature control section (C) wiring diagram in back of this manual.

K-Dirty Filter Switch S27

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

L-Indoor Air Quality (CO2) Sensor A63

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

M-Optional UVC Lights

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

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

Germicidal lamps are NOT intended to be used for removal of active mold growth. Existing mold growth must be appropriately removed PRIOR to installation of the germicidal lamp.

Refer closely to UVC light installation instruction warnings when servicing units.

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-Indoor Air Quality Sensor

If a sensor fails, use the following procedures to physically remove the failed sensor from the unit. All units will have two IAQ sensors installed, one in the return air and the second one in the supply side. See FIGURE 23. The sensors are secured to the tray by two screws. The power cable assembly will need to be detached from the connector located on the bottom of the sensor as well.

Removing the Sensor

1 - Go to Menu > Network Integrations > Wireless Sensor Network Setup > Wireless Sensor Network.

2 - From the Network Nodes list, select the IAQ sensor that is being replaced.

3 - On the Sensor Information Screen, select the Remove Sensor option at the bottom of the screen.

4 - Type in the sensor name that is to be removed and select Proceed.

Replacing the Sensor

1 - Open the CORE Service App and navigate to Menu > (Setup) Network Integration > Wireless Sensor Network Setup > Wireless Sensor Network.

2 - Click Add node on the Network Nodes screen. This triggers the CORE Service App to scan for both the WIAQ Return Sensor and WIAQ Discharge Sensor.

3 - Follow the prompts on the screen to finish the adding process.

4 - Verify that the CORE Service App displays the “Node Provisioned” on the Provision Sensor Network.

5 - Verify if CORE Service app is showing PM2.5 counts for both return and supply mounted sensors and TVOC counts from return mounted sensor.

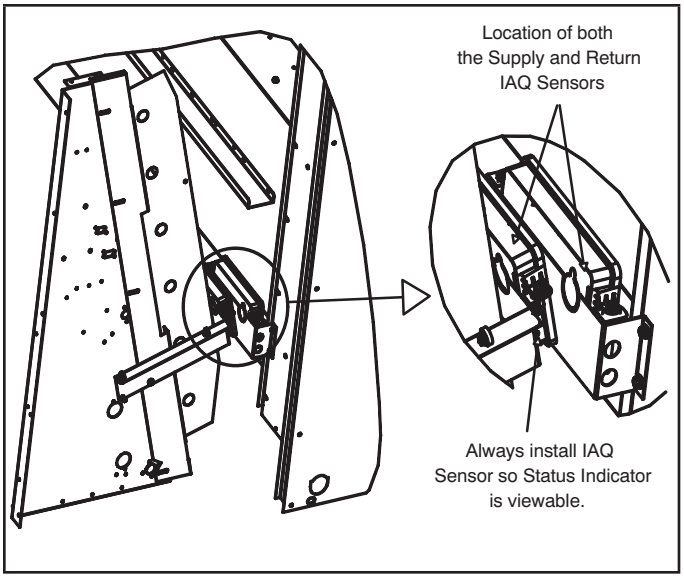


FIGURE 23

P-Bipolar Ionizer

The Needlepoint Bipolar Ionizer (NBPI) kit is specifically designed for LG/LC/LH/LD/KG/KC/KH 024-300 units. The ionizer is equipped with dry contacts which allow a Building Automation System (BAS) to interface and indicate ionizer functionality.

Note - *The BAS will be able to monitor units equipped with M4 Unit Controllers only. Units with an M3 Unit Controller or no controller need to be connected to a separate monitoring system.*

The Ionizers are also equipped with a green LED which indicates power is on. When the blower is in operation, power is delivered to the Ionizers and ions are generated. See TABLE 10 for unit application.

TABLE 10

LHT Unit	Part No.	
156	21U37	622688-03
240	21U38	622688-04
300	21U39	622688-05

VIII--Multi-Staged Blower

A-Design Specifications

Use the TABLE 11 to fill in test and balance values when setting up the unit. If only high and low cooling design specifications are provided, set the medium cooling CFM at the high or low cooling design spec or any CFM between.

B-Set Maximum CFM

Use attached table to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See Determining Unit CFM in the Blower Operation and Adjustment section.

C-Set Blower Speeds

1 - Use the following mobile service app menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in TABLE 11 or TABLE 12. Refer to the Unit Controller manual provided with unit.

RTU MENU > RTU OPTIONS > BLOWER > SPEED

2 - Enter the following design specifications as shown in TABLE 11.

Blower /

Heat CFM

Cooling High CFM

Cooling Low CFM

Vent CFM

3 - Adjust the blower RPM to deliver the target CFM based on the measured static pressure using the blower table.

4 - Measure the static pressure again and apply the static pressure and RPM to the blower tables to determine adjusted CFM.

5 - Repeat adjustments until design CFM is reached.

D-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 damper to "Min OCP Blwr High" when blower CFM is at or ABOVE the "midpoint"

CFM.

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

The Unit Controller will calculate the "midpoint" CFM.

*Available blower speeds vary by unit and thermostat stages.

Set Minimum Position 1

Use the following mobile service app menu to set "Min OCP Blwr High" for the blower CFM above the "midpoint" CFM. When navigating into this menu, the Unit Controller will run damper calibration and allow damper position adjustment.

RTU MENU > SETTINGS > RTU OPTIONS > DAMPER

Tap "Next" to skip tabs and complete damper position calibration until "Damper Calibration Blower Speed High" tab appears.

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 following mobile service app 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 run damper calibration and allow damper position adjustment.

RTU MENU > SETTINGS > RTU OPTIONS > DAMPER

Tap "Next" to skip tabs and complete damper position calibration until "Damper Calibration Blower Speed High" tab appears.

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.*

E-Inverter Bypass Option

The supply air inverter is factory-set to by-pass the inverter manually. To by-pass the inverter and operate the blower in the constant air volume mode, use the following Unit Controller menu and set to "engaged":

SETTINGS > RTU OPTIONS > BLOWER > VFD BYPASS

To configure the unit to by-pass the inverter automatically, use the following Unit Controller menu.

SETUP > INSTALL

Press SAVE until the menu reads:

CONFIGURATION ID 1

Change the 6th character position to "A" for automatic by-pass option.

Press SAVE

Caution - *Units not equipped with an inverter will have the 6th character set to "N", indicating the inverter is not by-passed. The blower motor could be damaged and/or result in product or property damage if the setting is changed to automatic or manual.*

F-Unit Operation

Use the mobile app to check unit mechanical operation. See the Service - Test section of the Unit Controller manual.

G-Manual Supply Air VFD Bypass

IMPORTANT - *All dampers must be open to prevent damage to duct work and dampers.*

Note - *This section does not apply to units equipped with optional automatic VFD bypass. That option will automatically change from multi-stage air volume to constant air volume operation in the event of VFD failure.*

Manually change blower operation to constant air volume as follows:

1 - Disconnect all power to unit and WAIT AT LEAST 10 MINUTES before opening the VFD cover.

⚠ WARNING

ELECTRICAL SHOCK HAZARD.

STOP! Before you continue, make sure that power to the VFD has been off for at least 10 minutes. The capacitor in the VFD holds high voltage power for up to 10 minutes after power has been disconnected.

2 - Locate P246 and P247 connectors near the VFD. See FIGURE 24.

3 - Disconnect P246 from P246 (power in to VFD) and P247 from P247 (power out to blower). See FIGURE 25.

4 - Connect P246 to P247. See FIGURE 26.

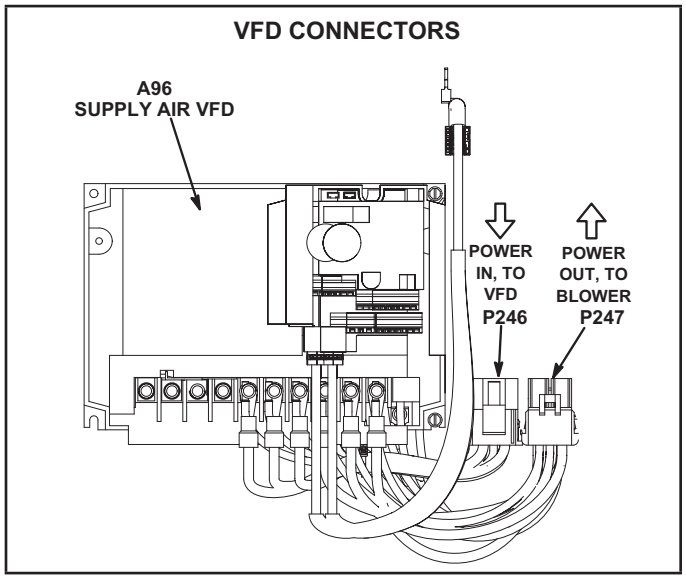


FIGURE 24

5 - Restore power to unit. Blower will operate in constant air volume (CAV) mode.

Note - *The indoor blower motor will start as soon as the main unit power is restored. In manual bypass, the blower will run regardless of thermostat signals until main unit power is turned off. Manual bypass is meant for emergency operation only and not long-term usage.*

6 - Check the indoor blower motor nameplate for full load amperage (FLA) value. Measure the amp readings from the indoor blower motor operating in bypass mode. If measured amps are higher than nameplate FLA value, decrease the CFM by opening (turning counterclockwise) the motor pulley. See FIGURE 12. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 4.

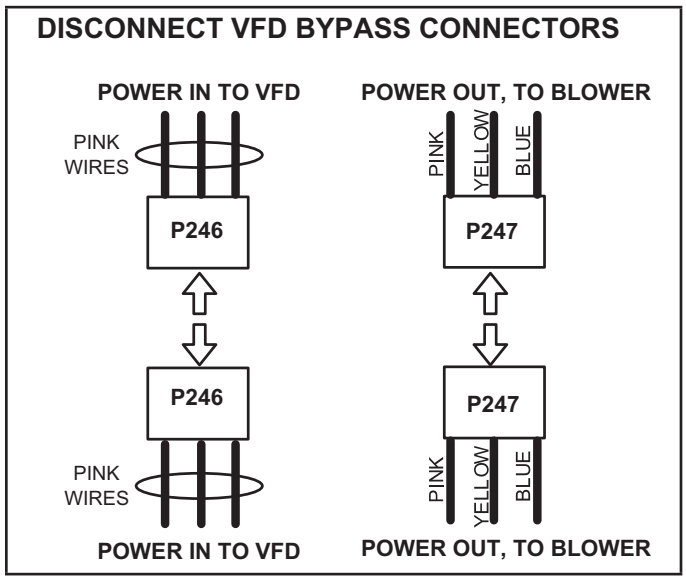


FIGURE 25

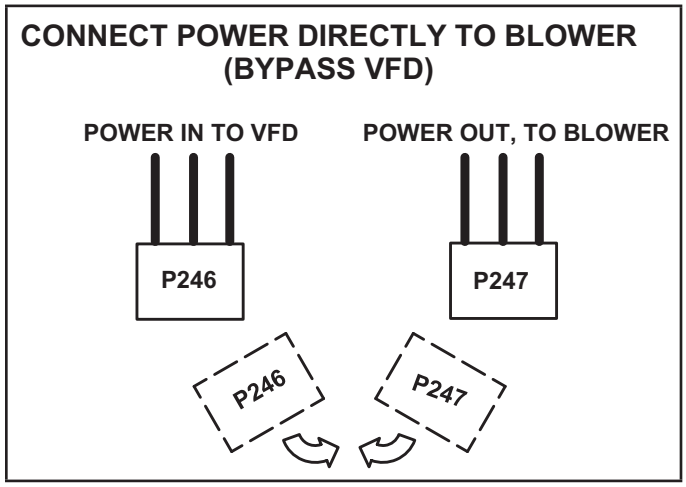


FIGURE 26

TABLE 11

HEATING, VENTILATION & SMOKE MINIMUM AND MAXIMUM CFM

Unit			Heating CFM			Vent CFM			Smoke CFM		
Model	Speed	Heat Code	Default	Min	Max	Default	Min	Max	Default	Min	Max
LDT156H	Low	L	6000	2725	6250	5200	1950	62500	5200	1950	6250
	Std	S		4325							
	Med	M		4500							
LHT156H	HP W/O EH	N		3900							
	15, 30, 45, 60, 90 KW	E, J, K, L,		6000							
LDT180H	Low	L	6000	2725	7200	6000	2250	7200	6000	2250	7200
	Std	S		4325							
	Med	M		4500							
	High	H		5125							
LHT180H	HP W/O EH	N		4500							
	15, 30, 45, 60, 90 KW	E, J, K, L, P		6000							
LDT240H	Low, Std, Med	L, S, M	8000	4500	9600	8000	3000	9600	8000	3000	9600
	High	H		5125							
LHT240H	HP W/O EH	N		6000							
	15, 30, 45, 60, 90 KW	E, J, K, L, P		6000							

*Use highest value between Heating and Cooling High CFM Max.
*Use highest value between Heating and Cooling High CFM Max.

TABLE 12

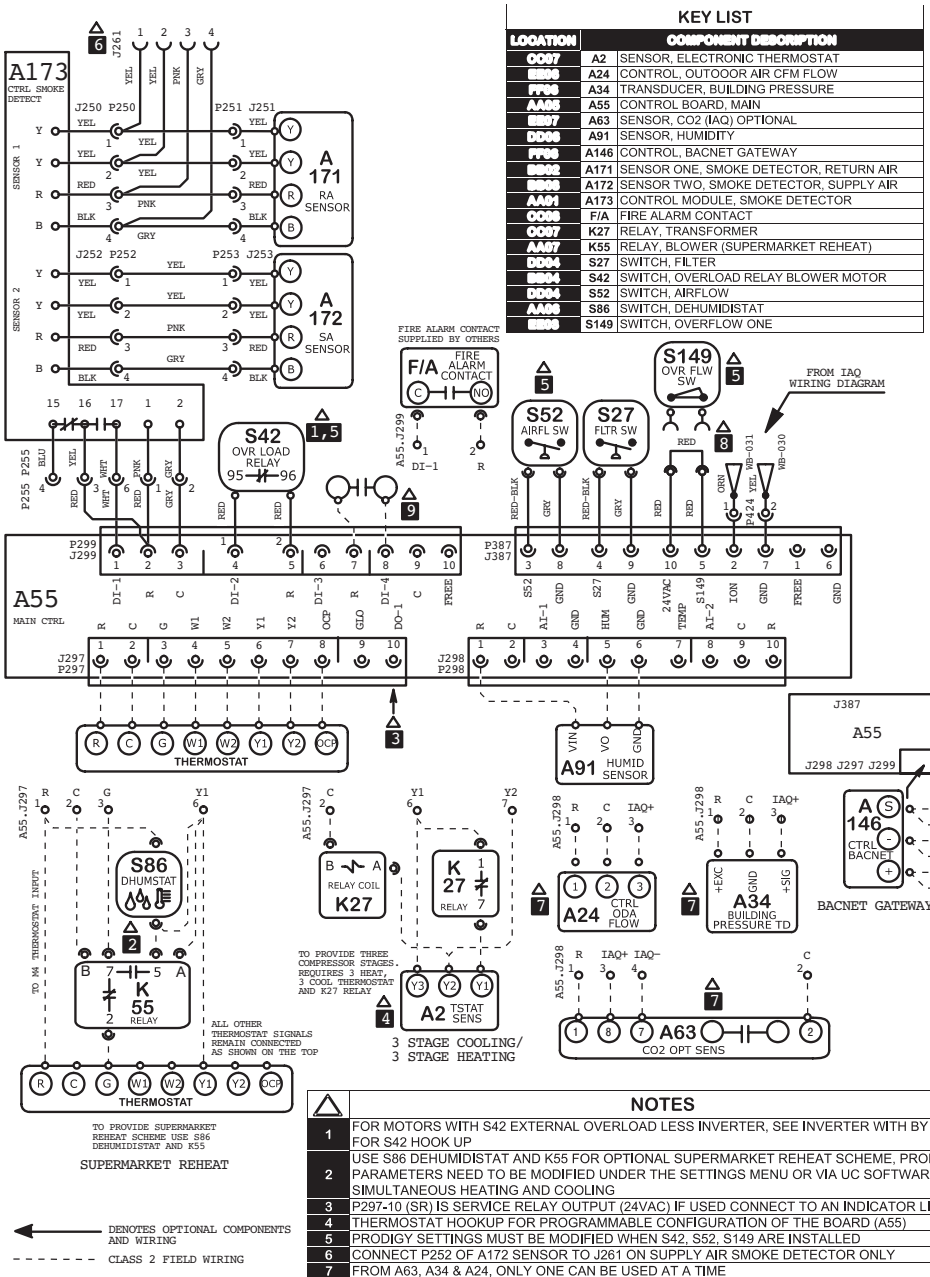
COOLING MINIMUM AND MAXIMUM CFM

LHT Unit	Cooling Low CFM			Cooling High CFM		
	De-fault	Min	Max	De-fault	Min	Max
156H	3380	1500	6250	4675	4000	6250
180H	3900	2000	7200	5400	5000	7200
240H	5200	3000	9600	7200	6250	9600

*Use Cooling High CFM Max

IX-Wiring Diagrams and Sequence of Operation

THERMOSTAT



KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
[illegible]	A2	SENSOR, ELECTRONIC THERMOSTAT
[illegible]	A24	CONTROL, OUTOOOR AIR CFM FLOW
[illegible]	A34	TRANSDUCER, BUILDING PRESSURE
[illegible]	A55	CONTROL BOARD, MAIN
[illegible]	A63	SENSOR, CO2 (IAQ) OPTIONAL
[illegible]	A91	SENSOR, HUMIDITY
[illegible]	A146	CONTROL, BACNET GATEWAY
[illegible]	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
[illegible]	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
[illegible]	A173	CONTROL MODULE, SMOKE DETECTOR
[illegible]	F/A	FIRE ALARM CONTACT
[illegible]	K27	RELAY, TRANSFORMER
[illegible]	K55	RELAY, BLOWER (SUPERMARKET REHEAT)
[illegible]	S27	SWITCH, FILTER
[illegible]	S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
[illegible]	S52	SWITCH, AIRFLOW
[illegible]	S86	SWITCH, DEHUMIDISTAT
[illegible]	S149	SWITCH, OVERFLOW ONE

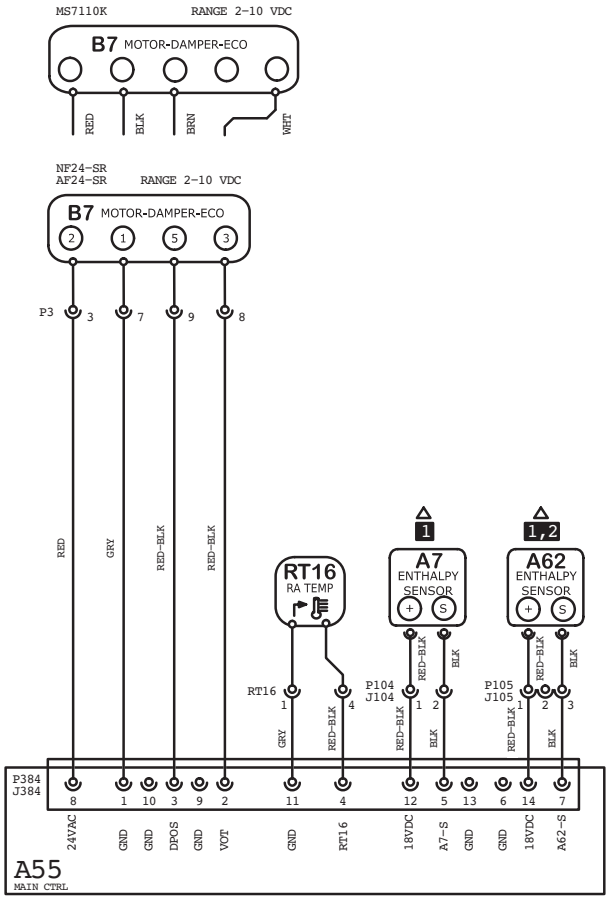
NOTES	
1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10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

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

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

WIRING DIAGRAM FLOW

Economizer



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

KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
C006	A7	SENSOR, SOLID STATE ENTHALPY
AA06	A55	CONTROL BOARD, MAIN
D003	A62	SENSOR, ENTHALPY INDOOR
BB02	B7	MOTOR, DAMPER ECONOMIZER
C005	RT16	SENSOR, RETURN AIR TEMP

Model: LC, LG, LH, LD Series RTU Economizer & Motorized OAD

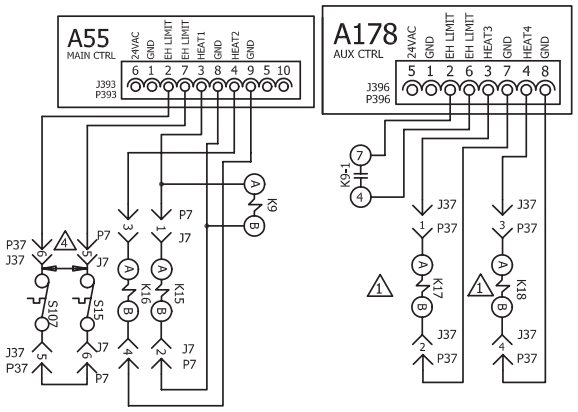
HTG SEC A | CLG SEC B | CLG SEC B3 | ACCS SEC C | ACCS SEC D

WIRING DIAGRAM FLOW

Voltage: All Voltages

Supersedes: N/A Form No: 538072-01 Rev: 1

EHA-15/90 G Voltage



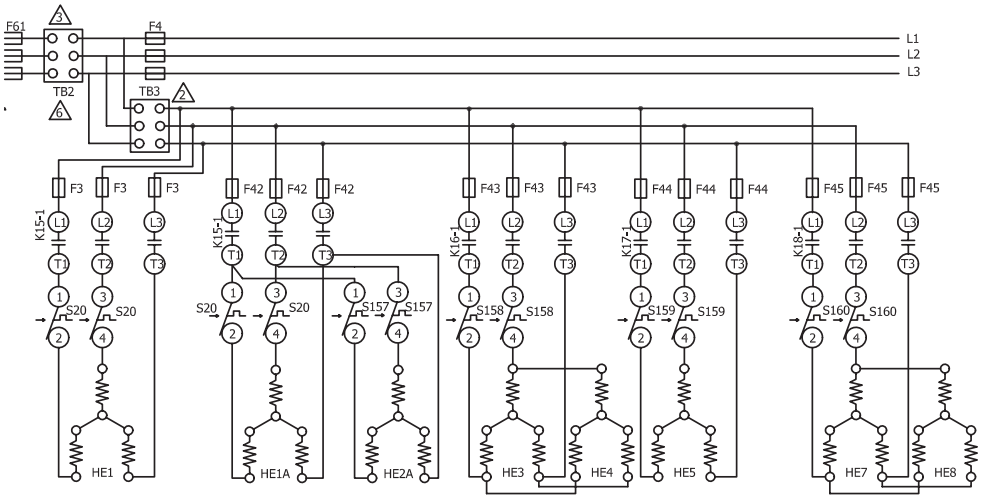
KEY	DESCRIPTION
A55	CONTROL, BOARD LENNOX
A178	BOARD,COMPRESSORS 3 & 4
F3	FUSE, ELECTRIC HEAT
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 1 A, 2A
F43	FUSE, ELECTRIC HEAT 3, 4
F44	FUSE, ELECTRIC HEAT 5, 6
F45	FUSE, ELECTRIC HEAT 7, 8
HE1	ELEMENT, ELECTRIC HEAT 1
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE7	ELEMENT, ELECTRIC HEAT 7
HE8	ELEMENT, ELECTRIC HEAT 8
K9,-1	RELAY, HEAT
K15,-1	CONTACTOR, ELECTRIC HEAT 1,2
K16,-1	CONTACTOR, ELECTRIC HEAT 1A,2A
K17,-1	CONTACTOR, ELECTRIC HEAT 3,4
K18,-1	CONTACTOR, ELECTRIC HEAT 5,6

S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1,2
S107	SWITCH, PRIMARY ELECTRIC HEAT
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1A
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2A
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3,4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 5,6
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT

J/P	DESCRIPTION
7	ELECTRIC HEAT CONTROL
37	ELECTRIC HEAT CONTROL

DESIGNATION	VOLTAGE
G	460/60/3

1. NOT USED ON 15 AND 30KW UNITS
2. TB3 IS USED IN SOME UNITS
3. TB2, S48 OR CB10 MAY BE USED
4. REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
5. F61 USED ON UNITS WITH SCCR OPTION
6. TB2 IS USED IN SOME SCCR OPTION UNITS ONLY



KW	HE1	HE1A	HE2A	HE3	HE4	HE5	HE7	HE8
15		7.5	7.5					
30		15	15					
45	15			7.5		15	7.5	
60	15			15		15	15	
90	15			15	15	15	15	15

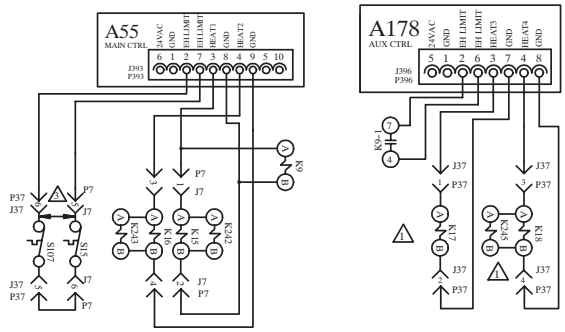
DENOTES OPTIONAL COMPONENTS

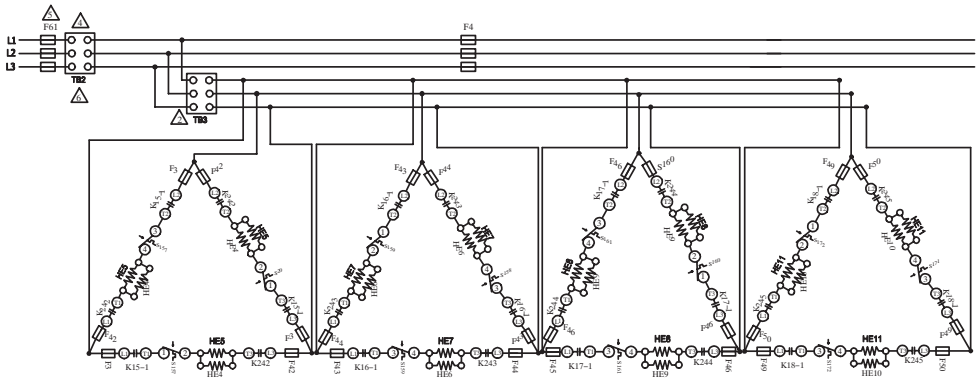
2020/10	WIRING DIAGRAM 538126-01	10/20
HEATING ELECTRIC HEAT E1EH,EHA-15,30,45,60,90 - G		
SECTION A		REV.0
Supersedes	New Form No. 538126-01	

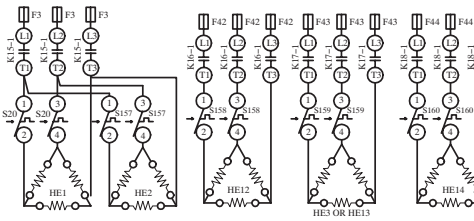
EHA15/90 Y Voltage

J/P	JACK/PLUG
7	ELECTRIC HEAT CONTROL
37	ELECTRIC HEAT CONTROL

KEY	DESCRIPTION
A55	CONTROL, BOARD LENNOX
A178	BOARD, COMP 3 & 4, C3 2nd STAGE HEAT
F3	FUSE, ELECTRIC HEAT
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 1 A, 2A
F43	FUSE, ELECTRIC HEAT 3
F44	FUSE, ELECTRIC HEAT 4
F45	FUSE, ELECTRIC HEAT 5
F46	FUSE, ELECTRIC HEAT 6
F49	FUSE, ELECTRIC HEAT 7
F50	FUSE, ELECTRIC HEAT 8
F61	FUSE, UNIT – SCCR
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
HE7	ELEMENT, ELECTRIC HEAT 7
HE8	ELEMENT, ELECTRIC HEAT 8
HE9	ELEMENT, ELECTRIC HEAT 9
HE10	ELEMENT, ELECTRIC HEAT 10
HE11	ELEMENT, ELECTRIC HEAT 11
HE12	ELEMENT, ELECTRIC HEAT 12
HE13	ELEMENT, ELECTRIC HEAT 13
HE14	ELEMENT, ELECTRIC HEAT 14
K9,–1	RELAY, HEAT
K15,–1	CONTACTOR, ELECTRIC HEAT 1,2
K16,–1	CONTACTOR, ELECTRIC HEAT 1A,2A
K17,–1	CONTACTOR, ELECTRIC HEAT 3,4
K18,–1	CONTACTOR, ELECTRIC HEAT 5,6
K242	CONTACTOR, ELECTRIC HEAT 1
K243	CONTACTOR, ELECTRIC HEAT 2
K244	CONTACTOR, ELECTRIC HEAT 3
K245	CONTACTOR, ELECTRIC HEAT 4
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1,2
S107	SWITCH, PRIMARY ELECTRIC HEAT
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 5
S161	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 6
S171	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 7
S172	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 8
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT







DESIGNATION	VOLTAGE
Y	208–230/60/3

C UNITS 156 TO 300

1. NOT USED ON 15 AND 30KW UNITS
2. TB3 IS USED IN SOME UNITS
3. REMOVE PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
4. TB2, CB10 OR S48 MAY BE USED ON NON SCCR UNITS
5. F61 USED ON SCCR OPTION UNITS ONLY
6. TB2 IS USED IN SOME SCCR OPTION UNITS ONLY

DENOTES OPTIONAL COMPONENTS

KW	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14
15	7.5	7.5												
30				15	15									
45	15											7.5	15	7.5
60	15											15	15	15
90	15		15			15	15			15	15			

2020/10

WIRING DIAGRAM 10/20

538127-01

HEATING

ELECTRIC HEAT
E1EH, EHA - 15, 30, 45, 60, 90, - Y

SECTION A REV 0

Supersedes | New Form No. 538127-01

SEQUENCE OF OPERATION

HEAT PUMP

1 - A55 Unit Controller receives W1 heating demand

2 - A55 energizes outdoor fans B4, B5 & B21 through K10 & K68 respectively.

3 - After A55 proves N.C. lower pressure switch S87 and N.C. high pressure switch S4, contactor K1 is energized.

4 - N.O. K1 closes energizing compressor B1, and N.C. K1-52 opens de-energizing HR1.

5 - A55 energizes outdoor fans B22, B23 & B24 through K149 & K150 respectively.

6 - After A55 proves N.C. lower pressure switch S88 and N.C. high pressure switch S7, contactor K2 is energized.

7 - N.O. K2 closes energizing compressor B2, and N.C. K2-52 opens de-energizing HR2.

EHA-15, 30, 45, 60, 90 - Y & G

NOTE:*Two electric heat sections are used in all 15kW through 90kW heaters. The heat sections are labeled first electric heat section (left side) and second electric heat section (right side). See figure 16.*

NOTE: *In the case of EHA 15 and 30kW, the second heat section (right side) is a slave (only has electric heat elements and a limit). Line voltage is supplied to elements in both heat section one (left side) and two (right side) by the contactors in heat section one (left side).*

HEATING ELEMENTS:

1 - Terminal strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 through HE14. Each heating element is protected by fuse F3.

FIRST STAGE HEAT:

2 - Heating demand initiates at W1 in thermostat.

3 - 24VAC is routed to the main control module A55. After A55 proves N.C. primary limits S15 (heat section one, left side), S107 (heat section two, right side), the electric heat contactor K15 and heat relay K9 are energized.

4 - N.O. contact K15-1 closes allowing the first bank of elements in heat section one (left side) to be energized.

5 - At the same time, N.O. contacts K9-1 close. A N.O. contact in A55 closes, energizing electric heat relay K17.

6 - N.O. contacts K17-1 close allowing the first set of elements in heat section two (right side) to be energized.

SECOND STAGE HEAT:

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

8 - 24VAC is routed through the main control module A55, which in turn energizes the electric heat contactor K16.

9 - N.O. contacts K16-1 close allowing the second set of elements in heat section one (left side) to be energized.

10 - Simultaneous with step eight, a N.O. contact in the A55 Unit controller closes, allowing 24VAC to energize electric heat contactor K18.

11 - N.O. contacts K18-1 close allowing the second set of elements in heat section two (right side) to be energized.

END OF SECOND STAGE HEAT:

12 - Heating demand is satisfied. Terminal W2 in the thermostat is de-energized.

13 - Electric heat contactors K16 and K18 are de-energized.

14 - The second set of electric heat elements in heat sections one (left side) and two (right side) are de-energized.

END OF FIRST STAGE HEAT:

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

16 - Electric heat contactors K15 and K17 are de-energized.

17 - The first set of electric heat elements in heat sections one (left side) and two (right side) are de-energized.

Sequence of Operation LHT156/180/240

1 - Line voltage from TB13 energizes transformer T1 and T18. Transformer T1 and T18 provides 24VACpower to the main controller A55. The transformers also provides 24VAC power to the unit cooling, heating and blower controls and thermostat.

ECONOMIZER OPERATION

2 - The A55 Unit Controller receives a demand and energizes exhaust fan relay K65 and K231 with 24VAC at 50% (travel) outside air damper open (adjustable).

3 - N.O. K65-1, K65-2, K231-01 and K231-02 close, energizing exhaust fan motors B10 and B11.

1ST STAGE COOLING

4 - First stage cooling demand energizes Y1 and G in the thermostat. G energizes blower, if blower is not already running.

5 - 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. low pressure switch S87 and high pressure switch S4, compressor contactor K1 and L34 are energized.

6 - A55 energizes outdoor fan B21 directly and fans B4 and B5 through K10.

7 - N.O. K1 closes energizing compressor B1, and N.C. K1-52 opens denergizing HR1.

2ND STAGE COOLING

8 - Second stage cooling demand energizes Y2.

9 - After A55 proves N.C. low pressure switch S88 and N.C. high pressure switch S7, contacotor K2 is energized.

10 - N.O. K2 closes energizing compressor B2 and K2-52 opens de-energizing crankcase heater HR2.

BLOWER OPERATION

With By Pass Installed - Active

1 - Main control A55 de-energizes relays K202 and K203

2 - K202 contacts open to interrupt power to B3 blower motor from A96 blower inverter.

3 - Main control A55 energizes relay K203-7.

4 - K203-1 N.C. contacts close allowing power to K3.

5 - K3 contacts close to allow power to B3 blower motor.

With By Pass Installed - Inactive

1 - Main control A55 energizes relays K202 and K203.

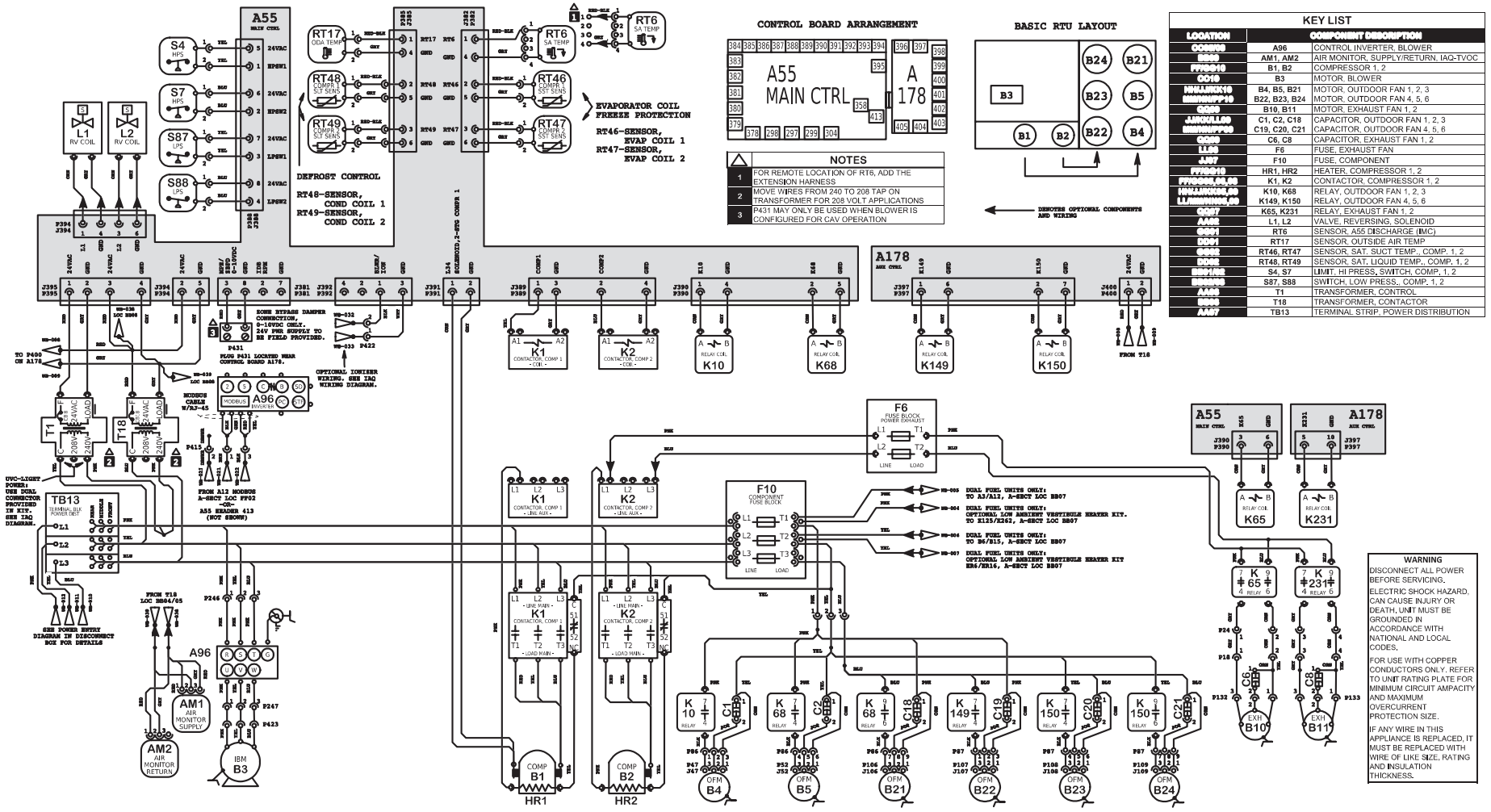
2 - K203-1 N.C. contacts open to de-energize K3 relay coil. K3 contacts open to interrupt power to B3 blower motor through K3 N.O. contacts.

3 - K202 contacts close to allow power to B3 blower motor from A96 blower inverter.

By-Pass Not Installed

1 - Control inverter A96 energizes B3.

LHT,LDT156/180/240 Y Voltage No By-Pass
538224-01



KEY LIST	
LOCATION	COMPONENT DESCRIPTION
CONTROL	A96 — CONTROL INVERTER, BLOWER
BLOWER	AM1, AM2 — AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
COMPRESSOR	B1, B2 — COMPRESSOR 1, 2
MOTOR, BLOWER	B3 — MOTOR, BLOWER
MOTOR, OUTDOOR FAN	B4, B5, B21 — MOTOR, OUTDOOR FAN 1, 2, 3
MOTOR, EXHAUST FAN	B22, B23, B24 — MOTOR, OUTDOOR FAN 4, 5, 6
CAPACITOR, BLOWER	B10, B11 — MOTOR, EXHAUST FAN 1, 2
CAPACITOR, OUTDOOR FAN	C1, C2, C18 — CAPACITOR, OUTDOOR FAN 1, 2, 3
CAPACITOR, OUTDOOR FAN	C19, C20, C21 — CAPACITOR, OUTDOOR FAN 4, 5, 6
CAPACITOR, EXHAUST FAN	C6, C8 — CAPACITOR, EXHAUST FAN 1, 2
FUSE, EXHAUST FAN	F6 — FUSE, EXHAUST FAN
FUSE, COMPONENT	F10 — FUSE, COMPONENT
HEATER, COMPRESSOR	HR1, HR2 — HEATER, COMPRESSOR 1, 2
CONTACTOR, COMPRESSOR	K1, K2 — CONTACTOR, COMPRESSOR 1, 2
RELAY, OUTDOOR FAN	K10, K68 — RELAY, OUTDOOR FAN 1, 2, 3
RELAY, OUTDOOR FAN	K149, K150 — RELAY, OUTDOOR FAN 4, 5, 6
RELAY, EXHAUST FAN	K65, K231 — RELAY, EXHAUST FAN 1, 2
VALVE, REVERSING	L1, L2 — VALVE, REVERSING, SOLENOID
SENSOR, A55 DISCHARGE (IMC)	RT6 — SENSOR, A55 DISCHARGE (IMC)
SENSOR, OUTSIDE AIR TEMP	RT17 — SENSOR, OUTSIDE AIR TEMP
SENSOR, SAT, SUCT TEMP., COMP.	RT46, RT47 — SENSOR, SAT, SUCT TEMP., COMP. 1, 2
SENSOR, SAT, LIQUID TEMP., COMP.	RT48, RT49 — SENSOR, SAT, LIQUID TEMP., COMP. 1, 2
SWITCH, LOW PRESS., COMP.	S4, S7 — LIMIT, HI PRESS. SWITCH, COMP., 1, 2
SWITCH, LOW PRESS., COMP.	S87, S88 — SWITCH, LOW PRESS., COMP. 1, 2
TRANSFORMER, CONTROL	T1 — TRANSFORMER, CONTROL
TRANSFORMER, CONTACTOR	T18 — TRANSFORMER, CONTACTOR
TERMINAL STRIP, POWER DISTRIBUTION	TB13 — TERMINAL STRIP, POWER DISTRIBUTION

WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

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

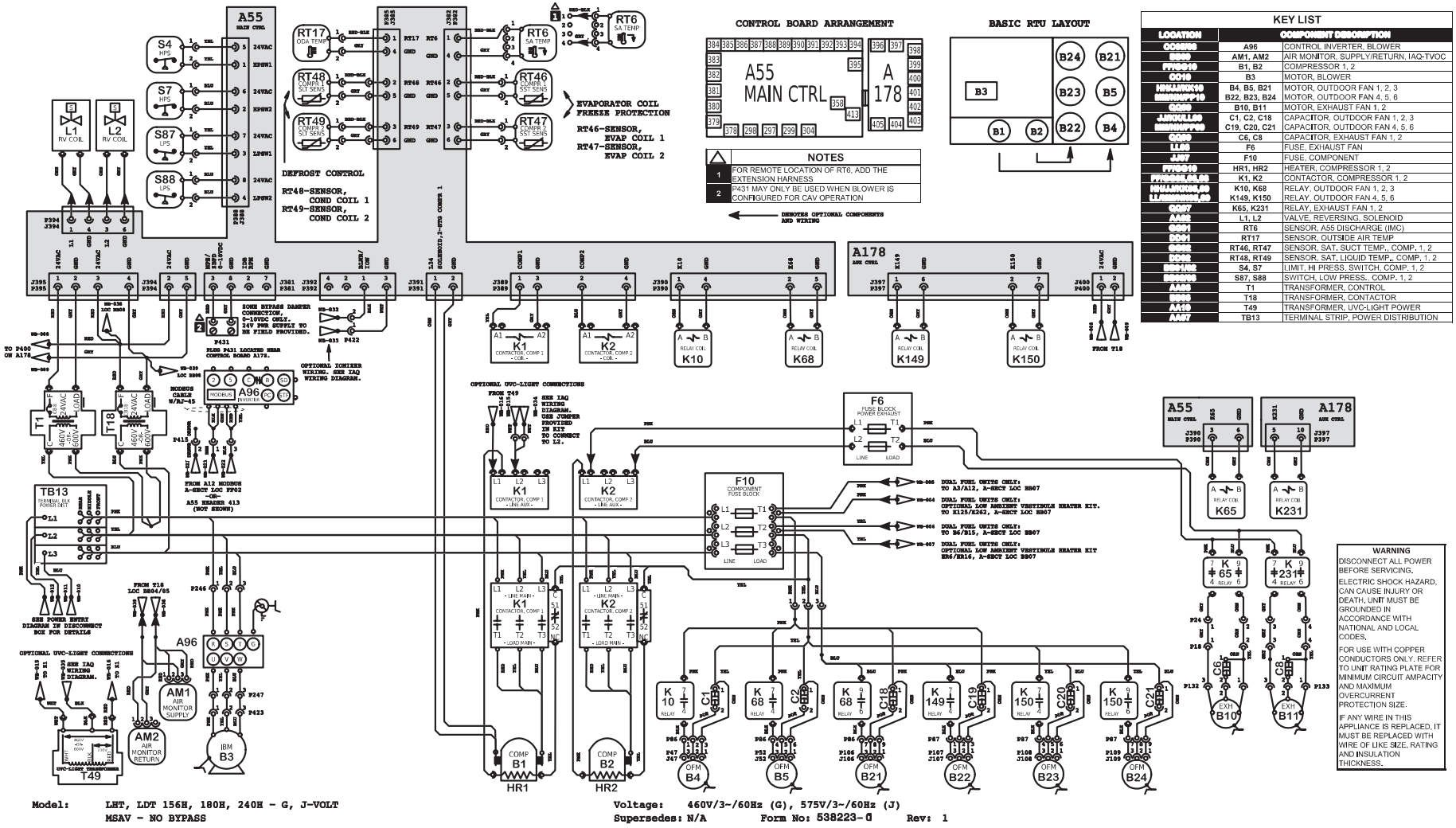
FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

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

Model: LHT, LDT 156H, 180H, 240H - Y-VOLT
MSAV - NO BYPASS

Voltage: 208-240V/3-/60Hz (Y)
Supersedes: N/A **Form No:** 538224-0 **Rev:** 1

LHT, LDT156/180/240 G, J Voltage No By-Pass
538223-01

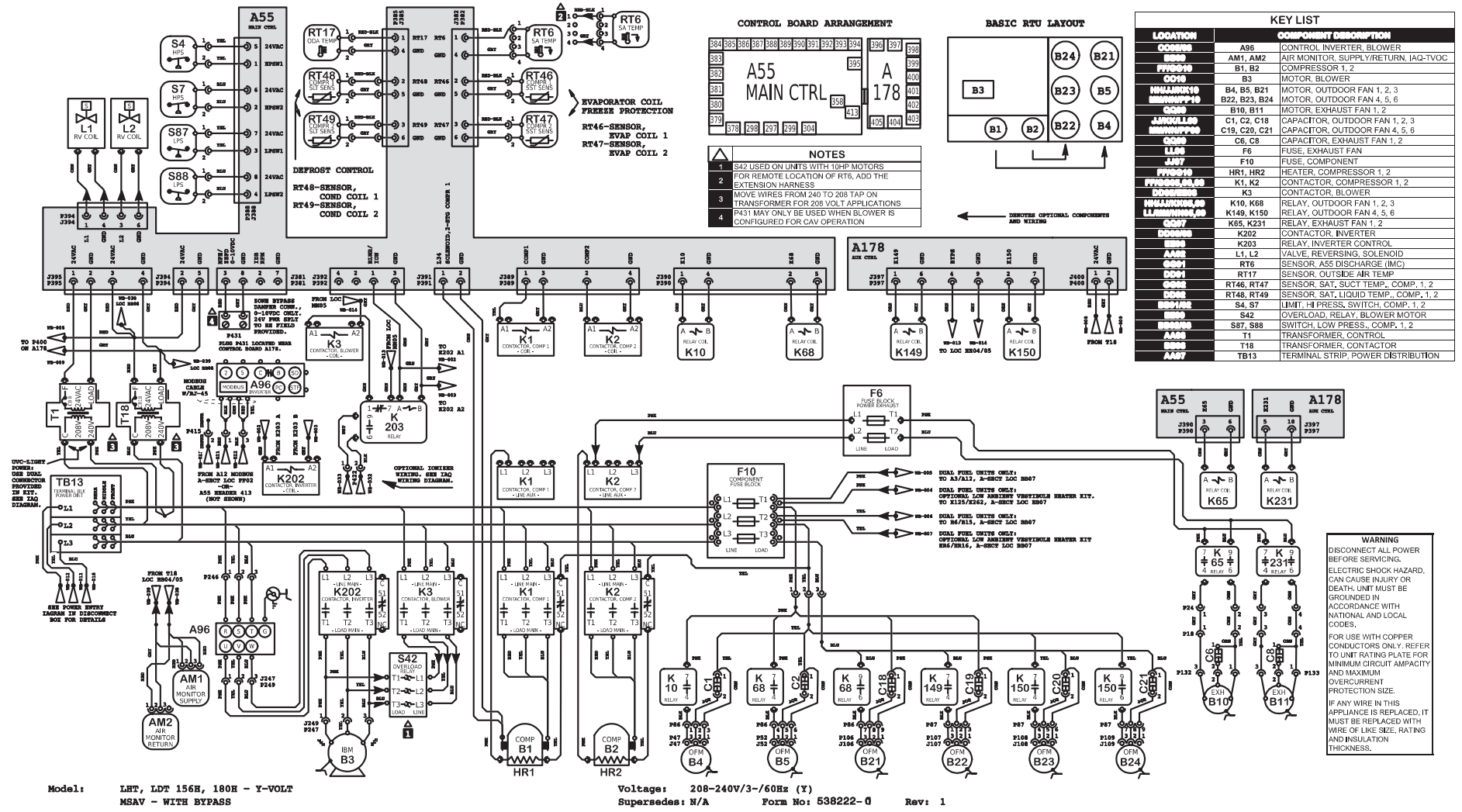


KEY LIST	
LOCATION	COMPONENT DESCRIPTION
A96	CONTROL INVERTER, BLOWER
AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
B1, B2	COMPRESSOR 1, 2
B3	MOTOR, BLOWER
B4, B5, B21 B22, B23, B24	MOTOR, OUTDOOR FAN 1, 2, 3 MOTOR, OUTDOOR FAN 4, 5, 6
B10, B11	MOTOR, EXHAUST FAN 1, 2
C1, C2, C18 C19, C20, C21	CAPACITOR, OUTDOOR FAN 1, 2, 3 CAPACITOR, OUTDOOR FAN 4, 5, 6
C6, C8	CAPACITOR, EXHAUST FAN 1, 2
F6	FUSE, EXHAUST FAN
F10	FUSE, COMPONENT
HR1, HR2	HEATER, COMPRESSOR 1, 2
K1, K2	CONTACTOR, COMPRESSOR 1, 2
K10, K68 K149, K150	RELAY, OUTDOOR FAN 1, 2, 3 RELAY, OUTDOOR FAN 4, 5, 6
K65, K231	RELAY, EXHAUST FAN 1, 2
L1, L2	VALVE, REVERSING, SOLENOID
RT6	SENSOR, A55 DISCHARGE (IMC)
RT17	SENSOR, OUTSIDE AIR TEMP
RT46, RT47	SENSOR, SAT, SUCT TEMP., COMP. 1, 2
RT48, RT49	SENSOR, SAT, LIQUID TEMP., COMP. 1, 2
S4, S7	LIMIT, HI PRESS. SWITCH, COMP. 1, 2
S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, CONTACTOR
T49	TRANSFORMER, UVC-LIGHT POWER
TB13	TERMINAL STRIP, POWER DISTRIBUTION

Model: LHT, LDT 156H, 180H, 240H – G, J-VOLT
MSAV – NO BYPASS

Voltage: 460V/3~/60Hz (G), 575V/3~/60Hz (J)
Supersedes: N/A **Form No:** 538223-0 **Rev:** 1

LHT, LDT156/180 Y Voltage With By-Pass
538222-01



NOTES	
1	S42 USED ON UNITS WITH 10HP MOTORS
2	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
3	MOVE WIRES FROM 240 TO 208 TAP ON TRANSFORMER FOR 208 VOLT APPLICATIONS
4	P431 MAY ONLY BE USED WHEN BLOWER IS CONFIGURED FOR CAV OPERATION

KEY LIST		
LOCATION	COMPONENT DESCRIPTION	
A96	A96	CONTROL INVERTER, BLOWER
AM1, AM2	AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
B1, B2	B1, B2	COMPRESSOR 1, 2
B3	B3	MOTOR, BLOWER
B4, B5, B21 B22, B23, B24	B4, B5, B21	MOTOR, OUTDOOR FAN 1, 2, 3
	B22, B23, B24	MOTOR, OUTDOOR FAN 4, 5, 6
B10, B11	B10, B11	MOTOR, EXHAUST FAN 1, 2
C1, C2, C18 C19, C20, C21	C1, C2, C18	CAPACITOR, OUTDOOR FAN 1, 2, 3
	C19, C20, C21	CAPACITOR, OUTDOOR FAN 4, 5, 6
C6, C8	C6, C8	CAPACITOR, EXHAUST FAN 1, 2
F6	F6	FUSE, EXHAUST FAN
F10	F10	FUSE, COMPONENT
HR1, HR2	HR1, HR2	HEATER, COMPRESSOR 1, 2
K1, K2	K1, K2	CONTACTOR, COMPRESSOR 1, 2
K3	K3	CONTACTOR, BLOWER
K10, K68 K149, K150	K10, K68	RELAY, OUTDOOR FAN 1, 2, 3
	K149, K150	RELAY, OUTDOOR FAN 4, 5, 6
K65, K231	K65, K231	RELAY, EXHAUST FAN 1, 2
K202	K202	CONTACTOR, INVERTER
K203	K203	RELAY, INVERTER CONTROL
L1, L2	L1, L2	VALVE, REVERSING, SOLENOID
RT6	RT6	SENSOR, A55 DISCHARGE (IMC)
RT17	RT17	SENSOR, OUTSIDE AIR TEMP
RT46, RT47	RT46, RT47	SENSOR, SAT, SUCT TEMP., COMP. 1, 2
RT48, RT49	RT48, RT49	SENSOR, SAT, LIQUID TEMP., COMP. 1, 2
S4, S7	S4, S7	LIMIT, HI PRESS. SWITCH, COMP. 1, 2
S42	S42	OVERLOAD, RELAY, BLOWER MOTOR
S87, S88	S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
T1	T1	TRANSFORMER, CONTROL
T18	T18	TRANSFORMER, CONTACTOR
TB13	TB13	TERMINAL STRIP, POWER DISTRIBUTION

WARNING

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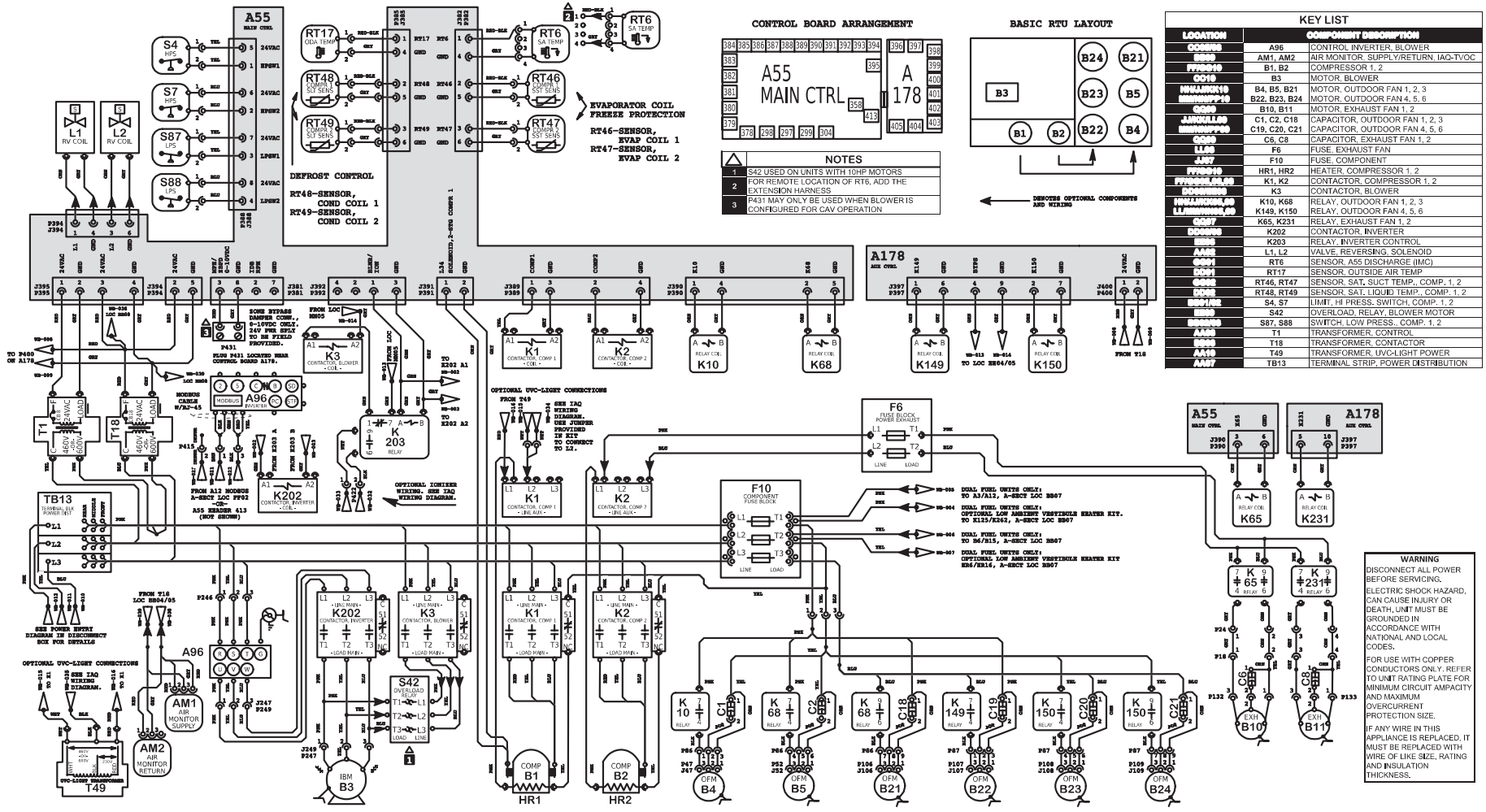
LHT, LDT156/180 G, J Voltage With By-Pass
538221-01



KEY LIST	
LOCATION	COMPONENT DESCRIPTION
A96	CONTROL INVERTER, BLOWER
AM1, AM2	AIR MONITOR, SUPPLY/RETURN, IAQ-TVOC
B1, B2	COMPRESSOR 1, 2
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B10, B11	MOTOR, EXHAUST FAN 1, 2
C1, C2, C18 C19, C20, C21	CAPACITOR, OUTDOOR FAN 1, 2, 3 CAPACITOR, OUTDOOR FAN 4, 5, 6
C6, C8	CAPACITOR, EXHAUST FAN 1, 2
F6	FUSE, EXHAUST FAN
F10	FUSE, COMPONENT
HR1, HR2	HEATER, COMPRESSOR 1, 2
K1, K2	CONTACTOR, COMPRESSOR 1, 2
K3	CONTACTOR, BLOWER
K10, K68 K149, K150	RELAY, OUTDOOR FAN 1, 2, 3 RELAY, OUTDOOR FAN 4, 5, 6
K65, K231	RELAY, EXHAUST FAN 1, 2
K202	CONTACTOR, INVERTER
K203	RELAY, INVERTER CONTROL
L1, L2	VALVE, REVERSING, SOLENOID
RT6	SENSOR, A55 DISCHARGE (IMC)
RT17	SENSOR, OUTSIDE AIR TEMP
RT46, RT47	SENSOR, SAT, SUCT TEMP., COMP. 1, 2
RT48, RT49	SENSOR, SAT, LIQUID TEMP., COMP. 1, 2
S4, S7	LIMIT, HI PRESS. SWITCH, COMP. 1, 2
S42	OVERLOAD, RELAY, BLOWER MOTOR
S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
T1	TRANSFORMER, CONTROL
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