LCH092 through 152U

The LCH092H, 094U, 102H, 120H, 122U, 150S and 152Uunits are configure to order units (CTO) with a wide selection of factory installed options.

Cooling capacities range from 7.5 to 12.5 tons (38.1 to 70.3 kW). All units are equipped with two compressors.

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

Ultra-high efficiency units are available with an optional direct drive blower or belt drive blower equipped with a supply air inverter. Standard and high efficiency units are available with a belt drive blower equipped with an optional supply air inverter. The blower will operate at lower speeds when demand is low and increase to higher speeds when demand is high.

Standard and high efficiency units come standard with a lightweight, all-aluminum condenser coil; optional, fin/tube condenser coils are available. Ultra-high efficiency units come standard with a tube/fin condenser coil.

Ultra high efficiency units come standard with two single-speed compressors plumbed in tandem to form a single refrigerant circuit.

All LCH units are designed to accept any of several different energy management thermostat control systems with minimum field wiring. Factory or field provided control options connect to the unit with jack plugs. When "plugged in" the controls become an integral part of the unit wiring.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

⚠WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property va, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier

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⚠CAUTION

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

⚠WARNING

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.

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC - C1TRAP20AD2	76W26	OX	OX	OX	OX
	Copper - C1TRAP10AD2	76W27	OX	OX	OX	OX
Conventional Fin/Tube Condenser Coil (replaces Environ Coil System)		Factory	O	O	O	
Corrosion Protection		Factory	O	O	O	O
Drain Pan Overflow Switch	E1SNSR71AD1	68W88	OX	OX	OX	OX
Refrigerant Type		R-410A	O	O	O	O
Service Valves (not for Environ™ Coil System or Humiditrol® equipped units)		Factory	O	O	O	O
BLOWER - SUPPLY AIR						
Blower Option	CAV (Constant Air Volume)	Factory	O	O	O	O
	MSAV (Multi-Stage Air Volume) supply air blower option (With VFD Bypass Control)	Factory	O	O	O	O
	MSAV (Multi-Stage Air Volume) supply air blower option (Without VFD Bypass Control)	Factory	O	O	O	O
Motors - Constant Air Volume (CAV)	Belt Drive (standard efficiency) - 2 hp	Factory	O	O	O	O
	Belt Drive (standard or high efficiency) - 3 hp	Factory	O	O	O	O
	Belt Drive (standard efficiency) - 5 hp	Factory	O	O	O	O
Motors - MSAV® Multi-Stage Air Volume supply air	Belt Drive (standard efficiency) - 2 hp	Factory	O	O	O	O
	Belt Drive (standard efficiency) - 3 hp	Factory	O	O	O	O
	Belt Drive (standard efficiency) - 5 hp	Factory	O	O	O	O
Drive Kits See Blower Data Tables for selection	Kit #1 590-890 rpm	Factory	O	O	O	O
	Kit #2 800-1105 rpm	Factory	O	O	O	O
	Kit #3 795-1195 rpm	Factory	O	O	O	O
	Kit #4 730-970 rpm	Factory	O	O	O	O
	Kit #5 940-1200 rpm	Factory	O	O	O	O
	Kit #6 1015-1300 rpm	Factory	O	O	O	O
	Kit #7 730-970 rpm	Factory	O	O	O	O
	Kit #8 940-1200 rpm	Factory	O	O	O	O
	Kit #9 1015-1300 rpm	Factory	O	O	O	O
	Kit #10 900-1135 rpm	Factory	O	O	O	O
	Kit #11 1040-1315 rpm	Factory	O	O	O	O
	Kit #12 1125-1425 rpm	Factory	O	O	O	O
	Blower Belt Auto-Tensioner	Factory	O	O	O	O
CABINET						
Combination Coil/ Hail Guards	Furnished Environ™ Coil System - C1GARD52B-1	13T05	X	X	X	
	Optional Conventional Fin/Tube Condenser Coil - E1GARD51B-1	13T04	X	X	X	
	Furnished Conventional Fin/Tube Condenser Coil System - C1GARD52B-1	13T05				X
Horizontal Discharge Kit	K1HECK00B-1	51W25	X	X	X	X
Return Air Adaptor Plate (for LC/LG/LH and TC/TG/TH unit replacement)	C1CONV10B-1	54W96	OX	OX	OX	OX

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description		Model Number	Catalog Number	Unit Model No 092	102	120	150
CONTROLS							
Blower Proving Switch		C1SNSR35FF1	53W65	OX	OX	OX	OX
Commercial Controls	Prodigy® Control System - BACnet® Module - C0CTRL60AE1L		**59W51**	OX	OX	OX	OX
	Prodigy® Control System - LonTalk® Module - C0CTRL65FF1		54W27	OX	OX	OX	OX
	Novar® ETM-2051 - E0CTRL30B1		64W73	OX	OX	OX	OX
	Novar® LSE		Factory	O	O	O	O
	L Connection® Building Automation System		- - -	X	X	X	X
Dirty Filter Switch		E1SNSR55B-1	53W67	OX	OX	OX	OX
General Purpose Control Kit		E1GPBK30C1	13J78	X	X	X	X
Fresh Air Tempering		C1SNSR75AD1	58W63	OX	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		C1SNSR44B-2	11K76	OX	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		C1SNSR43B-2	11K80	OX	OX	OX	OX
INDOOR AIR QUALITY							
Air Filters							
Healthy Climate® High Efficiency Air Filters	MERV 8 - C1FLTR15B-1		50W61	OX	OX	OX	OX
20 x 25 x 2 in. (Order 4 per unit)	MERV 13 - C1FLTR40B-1		52W41	OX	OX	OX	OX
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		C1FLTR30B-1-	Y3063	X	X	X	X
Indoor Air Quality (CO_2) Sensors							
Sensor - Wall-mount, off-white plastic cover with LCD display		C0SNSR50AE1L	77N39	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		C0SNSR52AE1L	87N53	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		C0SNSR51AE1L	87N52	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		C0MISC19AE1	87N54	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		C0MISC19AE1-	85L43	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)		C0MISC16AE1-	90N43	X	X	X	X
UVC Germicidal Lamps							
[1] Healthy Climate® UVC Light Kit (208/230v-1ph)		C1UVCL10B-1	54W62	OX	OX	OX	OX
HUMIDITROL® CONDENSER REHEAT OPTION							
Humiditrol Dehumidification Option			Factory	O	O	O	O
Humidity Sensor Kit, Remote mounted (required)		C0SNSR31AE-1	17M50	X	X	X	X
ELECTRICAL							
Voltage 60 hz		208/230V - 3 phase	Factory	O	O	O	O
		460V - 3 phase	Factory	O	O	O	O
		575V - 3 phase	Factory	O	O	O	O
HACR Circuit Breakers			Factory	O	O	O	O
Disconnect Switch - See Electrical/Electric Heat tables for selection	80 amp - C1DISC080B-1		54W56	OX	OX	OX	OX
	150 amp - C1DISC150B-1		54W57	OX	OX	OX	OX
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	LTAGFIK10/15	74M70	OX	OX	OX	OX
	20 amp non-powered, field-wired (575V only)	C1GFCI20FF1	67E01	OX	OX	OX	OX
Weatherproof Cover for GFI		C1GFCI99FF1	10C89	X	X	X	X
Phase/Voltage Detection (Optional for CAV options only, furnished with MSAV® option)			Factory	O	O	O	O

[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)

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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 092	102	120	150
ELECTRIC HEAT						
7.5 kW	208/230V-3ph - C1EH0075B-1Y	56W38	OX	OX		
	460V-3ph - C1EH0075B-1G	56W39	OX	OX		
	575V-3ph - C1EH0075B-1J	56W40	OX	OX		
15 kW	208/230V-3ph - C1EH0015B-1Y	56W41	OX	OX	OX	OX
	460V-3ph - C1EH0150B-1G	56W42	OX	OX	OX	OX
	575V-3ph - C1EH0150B-1J	56W43	OX	OX	OX	OX
22.5 kW	208/230V-3ph - C1EH0225B-1Y	56W44	OX	OX	OX	OX
	460V-3ph - C1EH0225B-1G	56W45	OX	OX	OX	OX
	575V-3ph - C1EH0225B-1J	56W46	OX	OX	OX	OX
30 kW	208/230V-3ph - C1EH0300B-1Y	56W47	OX	OX	OX	OX
	460V-3ph - C1EH0300B-1G	56W48	OX	OX	OX	OX
	575V-3ph - C1EH0300B-1J	56W49	OX	OX	OX	OX
45 kW	208/230V-3ph - C1EH0450B-1Y	56W50	OX	OX	OX	OX
	460V-3ph - C1EH0450B-1G	56W51	OX	OX	OX	OX
	575V-3ph - C1EH0450B-1J	56W52	OX	OX	OX	OX
60 kW	208/230V-3ph - C1EH0600B-1Y	55W02			OX	OX
	460V-3ph - C1EH0600B-1G	55W03			OX	OX
	575V-3ph - C1EH0600B-1J	55W04			OX	OX
[1] SCR (Silicon Controlled Rectifier) Electric Heat Control		Factory	O	O	O	O
Thermostat (required)		45N59	X	X	X	X
Duct Sensor (required)		45N60	X	X	X	X
ECONOMIZER						
Standard Economizer (Not for Title 24)						
Standard Economizer Downflow or Horizontal - Includes Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood Order Horizontal Barometric Relief Dampers separately	E1ECON15B-2	13U46	OX	OX	OX	OX
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer Downflow or Horizontal - Includes Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood Order Horizontal Barometric Relief Dampers separately	E1ECON17B-1	10U59	OX	OX	OX	OX
Horizontal Barometric Relief Dampers						
Horizontal Low Profile Barometric Relief Dampers (Exhaust hood furnished)	LAGEDH03/15	53K04	X	X	X	X
Economizer Controls						
Differential Enthalpy (Not for Title 24)	Order 2 - C1SNSR64FF1	53W64	OX	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O	O
Single Enthalpy (Not for Title 24)	C1SNSR64FF1	53W64	OX	OX	OX	OX
Building Pressure Control	E1GPBK20C1	13J77	X	X	X	X
Outdoor Air CFM Control	E1GPBK10C1	13J76	X	X	X	X
Global Control	Sensor Field Provided	Factory	O	O	O	O
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized	C1DAMP20B-1	14G28	OX	OX	OX	OX
Manual	C1DAMP10B-2	14G29	OX	OX	OX	OX
POWER EXHAUST						
Standard Static	208/230V-3ph - K1PWRE10B-1Y	53W44	OX	OX	OX	OX
	460V-3ph - K1PWRE10B-1G	53W45	OX	OX	OX	OX
	575V-3ph - K1PWRE10B-1J	53W46	OX	OX	OX	OX

[1] NOTE - The SCR option is not available with 45 kW and 60 kW electric heat (208/230V) models.

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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 092	102	120	150
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height	C1CURB70B-1	11F54	X	X	X	X
14 in. height	C1CURB71B-1	11F55	X	X	X	X
18 in. height	C1CURB72B-1	11F56	X	X	X	X
24 in. height	C1CURB73B-1	11F57	X	X	X	X
Adjustable Pitch Curb						
14 in. height	C1CURB55B-1	54W50	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	13K61	X			
	RTD11-135S	13K62		X	X	
	RTD11-185S	13K63				X
Flush - Order one	FD11-95S	13K56	X			
	FD11-135S	13K57		X	X	
	FD11-185S	13K58				X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	12X65	X			
	C1DIFF31B-1	12X66		X	X	
	C1DIFF32B-1	12X67				X
Sunsource® Commercial Energy System						
Solar Module CE Kit	One 285W Solar Module (silver frame), One PanelClaw Polar Bear III Mounting System and One Enphase M250 Microinverter	10U67	X	X	X	X
Solar Power Entry with Disconnect		Factory	O	O	O	O
Enphase Envoy Communications Gateway (with Wireless Capability)		**13L89**	X	X	X	X
Line Communication Filter (external)	C1C400D11A	10F93	X	X	X	X
Transformer (6 kW)	E1TRFM15AD3Y (208Y to 208 VAC Delta)	11H71	X	X	X	X
	E1TRFM15AD2Y (230 VAC Delta)	11H28	X	X	X	X
	E1TRFM15AD3G (460 VAC Delta or Wye)	11H29	X	X	X	X

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

SPECIFICATIONS

General Data	Nominal Tonnage		7.5 Ton	7.5 Ton	8.5 Ton	8.5 Ton
	Model Number		LCH092H4B	LCH092H4M	LCH102H4B	LCH102H4M
	Efficiency Type		High	High	High	High
	Blower Type		Constant Air Volume CAV	MSAV® (Multi-Stage Air Volume)	Constant Air Volume CAV	MSAV® (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity - Btuh		93,000	93,000	103,800	103,800
	[1] Net Cooling Capacity - Btuh		90,000	90,000	100,000	100,000
	AHRI Rated Air Flow - cfm		3000	2800	3400	3400
	Total Unit Power - kW		7.5	7.5	8.1	8.1
	[1] EER (Btuh/Watt)		12.7	12.7	12.4	12.4
	[2] IEER (Btuh/Watt)		13.0	14.0	12.9	14.0
	Refrigerant Type		R-410A	R-410A	R-410A	R-410A
Refrigerant Charge	Environ™ Coil System	Circuit 1	6 lbs. 13 oz.	6 lbs. 13 oz.	6 lbs. 8 oz.	6 lbs. 8 oz.
		Circuit 2	7 lbs. 2 oz.	7 lbs. 2 oz.	6 lbs. 15 oz.	6 lbs. 15 oz.
	Environ™ Coil System with Humiditrol®	Circuit 1	6 lbs. 13 oz.	6 lbs. 13 oz.	6 lbs. 8 oz.	6 lbs. 8 oz.
		Circuit 2	7 lbs. 2 oz.	7 lbs. 2 oz.	6 lbs. 15 oz.	6 lbs. 15 oz.
	Conventional Fin/Tube Coil Option	Circuit 1	12 lbs. 14 oz.	12 lbs. 14 oz.	13 lbs. 8 oz.	13 lbs. 8 oz.
		Circuit 2	11 lbs. 3 oz.	11 lbs. 3 oz.	12 lbs. 7 oz.	12 lbs. 7 oz.
	Conventional Fin/Tube With Humiditrol®	Circuit 1	16 lbs. 6 oz.	16 lbs. 6 oz.	17 lbs. 0 oz.	17 lbs. 0 oz.
		Circuit 2	11 lbs. 3 oz.	11 lbs. 3 oz.	12 lbs. 7 oz.	12 lbs. 7 oz.
Electric Heat Available			7.5, 15, 22.5, 30 & 45 kW			
Compressor Type (number)			Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils Environ (Fin/Tube)	Net face area (total) - sq. ft.		28.0 (29.33)	28.0 (29.33)	28.0 (29.33)	28.0 (29.33)
	Number of rows		1 (3)	1 (3)	1 (3)	1 (3)
	Fins per inch		20 (20)	20 (20)	20 (20)	20 (20)
Outdoor Coil Fans	Motor - (No.) hp		(2) 1/3	(2) 1/3	(2) 1/3	(2) 1/3
	Motor rpm		1075	1075	1075	1075
	Total Motor watts		800	800	800	800
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3	3
	Total Air volume - cfm		8800	8800	8800	8800
Indoor Coil	Net face area (total) - sq. ft.		12.78	12.78	12.78	12.78
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		4	4	4	4
	Fins per inch		14	14	14	14
	Drain connection - Number and size		(1) 1 in. NPT coupling			
	Expansion device type		Balance port TXV, removable head			
3 Indoor Blower and Drive Selection	Nominal motor output		2 hp, 3 hp, 5 hp			
	Maximum usable motor output (US Only)		2.3 hp, 3.45 hp, 5.75 hp			
	Motor - Drive kit number		2 hp Kit 1 590-890 rpm (std. and high efficiency) Kit 2 800-1105 rpm (std. and high efficiency) Kit 3 795-1195 rpm (std. and high efficiency) 3 hp Kit 4 730-970 rpm (std. efficiency) Kit 5 940-1200 rpm (std. efficiency) Kit 6 1015-1300 rpm (std. efficiency) Kit 7 730-970 rpm (high efficiency) Kit 8 940-1200 rpm (high efficiency) Kit 9 1015-1300 rpm (high efficiency) 5 hp Kit 10 900-1135 rpm (std. efficiency) Kit 11 1040-1315 rpm (std. efficiency) Kit 12 1125-1425 rpm (std. efficiency)			
	Blower wheel nominal diameter x width - in.		(1) 15 X 15	(1) 15 X 15	(1) 15 X 15	(1) 15 X 15
Filters	Type of filter		Disposable			
	Number and size - in.		(4) 20 x 25 x 2			
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase			

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

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

[2] Integrated Energy Efficiency Ratio certified and tested according to AHRI Standard 340/360.

[3] 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 – Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 1.0.

SPECIFICATIONS

General Data	Nominal Tonnage		10 Ton	10 Ton	12.5 Ton	12.5 Ton
	Model Number		LCH120H4B	LCH120H4M	LCH150H4B	LCH150H4M
	Efficiency Type		High	High	High	High
	Blower Type		Constant Air Volume CAV	MSAV® (Multi-Stage Air Volume)	Constant Air Volume CAV	MSAV® (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity - Btuh		122,000	122,000	148,000	148,000
	[1] Net Cooling Capacity - Btuh		118,000	118,000	142,000	142,000
	AHRI Rated Air Flow - cfm		3600	3300	3950	3950
	Total Unit Power - kW		9.9	9.8	12.9	12.9
	[1] EER (Btuh/Watt)		12.2	12.2	11.0	11.0
	[2] IEER (Btuh/Watt)		13.2	14.0	12.4	13.5
	Refrigerant Type		R-410A	R-410A	R-410A	R-410A
Refrigerant Charge	Environ™ Coil System	Circuit 1	7 lbs. 4 oz.	7 lbs. 4 oz.	- - -	- - -
		Circuit 2	7 lbs. 8 oz.	7 lbs. 8 oz.	- - -	- - -
	Environ™ Coil System with Humiditrol®	Circuit 1	7 lbs. 4 oz.	7 lbs. 4 oz.	- - -	- - -
		Circuit 2	7 lbs. 8 oz.	7 lbs. 8 oz.	- - -	- - -
	Conventional Fin/Tube Coil Option	Circuit 1	14 lbs. 8 oz.	14 lbs. 8 oz.	12 lbs. 3 oz.	12 lbs. 3 oz.
		Circuit 2	13 lbs. 8 oz.	13 lbs. 8 oz.	11 lbs. 15 oz.	11 lbs. 15 oz.
	Conventional Fin/Tube With Humiditrol®	Circuit 1	18 lbs. 0 oz.	18 lbs. 0 oz.	12 lbs. 9 oz.	12 lbs. 9 oz.
		Circuit 2	13 lbs. 8 oz.	13 lbs. 8 oz.	12 lbs. 3 oz.	12 lbs. 3 oz.
Electric Heat Available			15, 22.5, 30, 45 & 60 kW			
Compressor Type (number)			Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils Environ (Fin/Tube)	Net face area (total) - sq. ft.		28.0 (29.33)	28.0 (29.33)	- - - (25.9)	- - - (25.9)
	Number of rows		1 (3)	1 (3)	3	3
	Fins per inch		20 (20)	20 (20)	20	20
Outdoor Coil Fans	Motor - (No.) hp		(2) 1/3	(2) 1/3	(2) 1/2	(2) 1/2
	Motor rpm		1075	1075	1075/600	1075/600
	Total Motor watts		800	800	1050	1050
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3	3
	Total Air volume - cfm		8800	8800	9700	9700
Indoor Coil	Net face area (total) - sq. ft.		13.54	13.54	13.54	13.54
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		4	4	4	4
	Fins per inch		14	14	14	14
	Drain connection - Number and size		(1) 1 in. NPT coupling			
	Expansion device type		Balance port TXV, removable head		[4] Refrigerant Metering Orifice (RFC)	
[3] Indoor Blower and Drive Selection	Nominal motor output		2 hp, 3 hp, 5 hp			
	Maximum usable motor output (US Only)		2.3 hp, 3.45 hp, 5.75 hp			
	Motor - Drive kit number		2 hp **Kit 1** 590-890 rpm (std. and high efficiency) **Kit 2** 800-1105 rpm (std. and high efficiency) **Kit 3** 795-1195 rpm (std. and high efficiency) 3 hp **Kit 4** 730-970 rpm (std. efficiency) **Kit 5** 940-1200 rpm (std. efficiency) **Kit 6** 1015-1300 rpm (std. efficiency) **Kit 7** 730-970 rpm (high efficiency) **Kit 8** 940-1200 rpm (high efficiency) **Kit 9** 1015-1300 rpm (high efficiency) 5 hp **Kit 10** 900-1135 rpm (std. efficiency) **Kit 11** 1040-1315 rpm (std. efficiency) **Kit 12** 1125-1425 rpm (std. efficiency)			
	Blower wheel nominal diameter x width - in.		(1) 15 X 15	(1) 15 X 15	(1) 15 X 15	(1) 15 X 15
Filters	Type of filter		Disposable			
	Number and size - in.		(4) 20 x 25 x 2			
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase			

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

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

[2] Integrated Energy Efficiency Ratio certified and tested according to AHRI Standard 340/360.

[3] 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.

[4] 150 models ordered with the Humiditrol® Dehumidification option are equipped with factory installed expansion valves.

NOTE – Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 1.0.

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 094	122	152
COOLING SYSTEM					
Condensate Drain Trap	PVC - C1TRAP20AD2	76W26	OX	OX	OX
	Copper - C1TRAP10AD2	76W27	OX	OX	OX
Corrosion Protection		Factory	O	O	O
Drain Pan Overflow Switch	E1SNSR71AD1	68W88	OX	OX	OX
Refrigerant Type		R-410A	O	O	O
BLOWER - SUPPLY AIR					
Blower	DirectPlus™ (Direct Drive) MSAV (Multi-Stage Air Volume) supply air blower	Factory	O	O	O
	Belt Drive MSAV (Multi-Stage Air Volume) supply air blower (With VFD Bypass Control)	Factory	O	O	O
	Belt Drive MSAV (Multi-Stage Air Volume) supply air blower (Without VFD Bypass Control)	Factory	O	O	O
Motors - MSAV® Multi-Stage Air Volume supply air	DirectPlus™ (direct drive) ECM 3.75 hp	Factory	O	O	O
	Belt Drive (standard efficiency) - 2 hp	Factory	O	O	O
	Belt Drive (standard efficiency) - 3 hp	Factory	O	O	O
	Belt Drive (standard efficiency) - 5 hp	Factory	O	O	O
Drive Kits See Blower Data Tables for selection	Kit #1 590-890 rpm	Factory	O	O	O
	Kit #2 800-1105 rpm	Factory	O	O	O
	Kit #3 795-1195 rpm	Factory	O	O	O
	Kit #4 730-970 rpm	Factory	O	O	O
	Kit #5 940-1200 rpm	Factory	O	O	O
	Kit #6 1015-1300 rpm	Factory	O	O	O
	Kit #7 730-970 rpm	Factory	O	O	O
	Kit #8 940-1200 rpm	Factory	O	O	O
	Kit #9 1015-1300 rpm	Factory	O	O	O
	Kit #10 900-1135 rpm	Factory	O	O	O
	Kit #11 1040-1315 rpm	Factory	O	O	O
	Kit #12 1125-1425 rpm	Factory	O	O	O
	Blower Belt Auto-Tensioner	Factory	O	O	O
CABINET					
Combination Coil/Hail Guards	E1GARD51BP1	13T06	X	X	X
Horizontal Discharge Kit	K1HECK00B-1	51W25	X	X	X
Return Air Adaptor Plate (for LC/LG and TC/TG/TH unit replacement)	C1CONV10B-1	54W96	OX	OX	OX

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 094	122	152
CONTROLS					
Blower Proving Switch	C1SNSR35FF1	53W65	OX	OX	OX
Commercial Controls — L Connection® Building Automation System		Factory	X	X	X
Prodigy® Control System - BACnet® Module - C0CTRL60AE1L		**59W51**	OX	OX	OX
Prodigy® Control System - LonTalk® Module - C0CTRL65FF1		54W27	OX	OX	OX
Novar® ETM-2051 - E0CTRL30B1		64W73	OX	OX	OX
Novar® LSM		Factory	O	O	O
Dirty Filter Switch	E1SNSR55B-1	53W67	OX	OX	OX
Fresh Air Tempering	C1SNSR75AD1	58W63	OX	OX	OX
General Purpose Control Kit	E1GPBK30C1	13J78	X	X	X
Smoke Detector - Supply or Return (Power board and one sensor)	C1SNSR44B-2	11K76	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)	C1SNSR43B-2	11K80	OX	OX	OX
INDOOR AIR QUALITY					
Air Filters					
Healthy Climate® High Efficiency Air Filters 20 x 25 x 2 (Order 4 per unit) — MERV 8	C1FLTR15B-1	50W61	OX	OX	OX
MERV 13	C1FLTR40B-1	52W41	OX	OX	OX
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	C1FLTR30B-1-	Y3063	X	X	X
Indoor Air Quality (CO_2) Sensors					
Sensor - Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	77N39	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	87N53	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	87N52	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	87N54	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications	C0MISC19AE1-	85L43	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)	C0MISC16AE1-	90N43	X	X	X
UVC Germicidal Lamps					
[1] Healthy Climate® UVC Light Kit (208/230v-1ph)	C1UVCL10B-1	54W62	OX	OX	OX
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
HACR Circuit Breakers		Factory	O	O	O
Disconnect Switch - See Electrical/Electric Heat tables for selection — 80 amp	C1DISC080B-1	54W56	OX	OX	OX
150 amp	C1DISC150B-1	54W57	OX	OX	OX
GFI Service Outlets — 15 amp non-powered, field-wired (208/230V, 460V only)	LTAGFIK10/15	74M70	OX	OX	OX
20 amp non-powered, field-wired (575V only)	C1GFCI20FF1	67E01	OX	OX	OX
Weatherproof Cover for GFI	C1GFCI99FF1	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)

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 094	122	152
ELECTRIC HEAT - DIRECT DRIVE UNITS					
7.5 kW	208/230V-3ph - E1EH0075BP1Y	10U96	OX		
	460V-3ph - E1EH0075BP1G	10U97	OX		
	575V-3ph - E1EH0075BP1J	11J19	OX		
15 kW	208/230V-3ph - E1EH0150BP1Y	10U99	OX	OX	OX
	460V-3ph - E1EH0150BP1G	10X01	OX	OX	OX
	575V-3ph - E1EH0150BP1J	10X02	OX	OX	OX
22.5 kW	208/230V-3ph - E1EH0225BP1Y	10X03	OX	OX	OX
	460V-3ph - E1EH0225BP1G	10X04	OX	OX	OX
	575V-3ph - E1EH0225BP1J	10X05	OX	OX	OX
30 kW	208/230V-3ph - E1EH0300BP1Y	10X06	OX	OX	OX
	460V-3ph - E1EH0300BP1G	10X07	OX	OX	OX
	575V-3ph - E1EH0300BP1J	10X08	OX	OX	OX
45 kW	208/230V-3ph - E1EH0450BP1Y	10X09	OX	OX	OX
	460V-3ph - E1EH0450BP1G	10X11	OX	OX	OX
	575V-3ph - E1EH0450BP1J	10X12	OX	OX	OX
60 kW	208/230V-3ph - E1EH0600BP1Y	10X13		OX	OX
	460V-3ph - E1EH0600BP1G	10X14		OX	OX
	575V-3ph - E1EH0600BP1J	10X15		OX	OX
ELECTRIC HEAT - BELT DRIVE UNITS					
7.5 kW	208/230V-3ph - C1EH0075B-1Y	56W38	OX		
	460V-3ph - C1EH0075B-1G	56W39	OX		
	575V-3ph - C1EH0075B-1J	56W40	OX		
15 kW	208/230V-3ph - C1EH0015B-1Y	56W41	OX	OX	OX
	460V-3ph - C1EH0150B-1G	56W42	OX	OX	OX
	575V-3ph - C1EH0150B-1J	56W43	OX	OX	OX
22.5 kW	208/230V-3ph - C1EH0225B-1Y	56W44	OX	OX	OX
	460V-3ph - C1EH0225B-1G	56W45	OX	OX	OX
	575V-3ph - C1EH0225B-1J	56W46	OX	OX	OX
30 kW	208/230V-3ph - C1EH0300B-1Y	56W47	OX	OX	OX
	460V-3ph - C1EH0300B-1G	56W48	OX	OX	OX
	575V-3ph - C1EH0300B-1J	56W49	OX	OX	OX
45 kW	208/230V-3ph - C1EH0450B-1Y	56W50	OX	OX	OX
	460V-3ph - C1EH0450B-1G	56W51	OX	OX	OX
	575V-3ph - C1EH0450B-1J	56W52	OX	OX	OX
60 kW	208/230V-3ph - C1EH0600B-1Y	55W02		OX	OX
	460V-3ph - C1EH0600B-1G	55W03		OX	OX
	575V-3ph - C1EH0600B-1J	55W04		OX	OX
SCR (Silicon Controlled Rectifier) Electric Heat Control NOTE - The SCR option is not available with 45 kW and 60 kW electric heat (208/230V) models.		Factory	O	O	O
Thermostat (required)		45N59	X	X	X
Duct Sensor (required)		45N60	X	X	X

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 094	122	152
ECONOMIZER					
Standard Economizer (Not for Title 24)					
Standard Economizer Downflow or Horizontal - Includes Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood Order Horizontal Barometric Relief Dampers separately	E1ECON15B-1	55W05	OX	OX	OX
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)					
High Performance Economizer Downflow or Horizontal - Includes Outdoor Air Hood and Downflow Barometric Relief Dampers with Exhaust Hood Order Horizontal Barometric Relief Dampers separately	E1ECON17B-1	10U59	OX	OX	OX
Economizer Controls					
Differential Enthalpy (Not for Title 24)	Order 2 - C1SNSR64FF1	53W64	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O
Single Enthalpy (Not for Title 24)	C1SNSR64FF1	53W64	OX	OX	OX
Global Control	Sensor Field Provided	Factory	O	O	O
Building Pressure Control	E1GPBK20C1	13J77	X	X	X
Outdoor Air CFM Control	E1GPBK10C1	13J76	X	X	X
Horizontal Barometric Relief Dampers					
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood	LAGEDH03/15	53K04	X	X	X
OUTDOOR AIR					
Outdoor Air Dampers					
Motorized Dampers (Hood furnished)	C1DAMP20B-1	14G28	OX	OX	OX
Manual Dampers (Hood furnished)	C1DAMP10B-2	14G29	OX	OX	OX
POWER EXHAUST					
Standard Static	208/230V-3ph - K1PWRE10B-1Y	53W44	OX	OX	OX
	460V-3ph - K1PWRE10B-1G	53W45	OX	OX	OX
	575V-3ph - K1PWRE10B-1J	53W46	OX	OX	OX

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	Unit Model No 094	122	152
ROOF CURBS					
Hybrid Roof Curbs, Downflow					
8 in. height	C1CURB70B-1	11F54	X	X	X
14 in. height	C1CURB71B-1	11F55	X	X	X
18 in. height	C1CURB72B-1	11F56	X	X	X
24 in. height	C1CURB73B-1	11F57	X	X	X
Adjustable Pitch Curb					
14 in. height	C1CURB55B-1	54W50	X	X	X
CEILING DIFFUSERS					
Step-Down - Order one	RTD11-95S	13K61	X		
	RTD11-135S	13K62		X	
	RTD11-185S	13K63			X
Flush - Order one	FD11-95S	13K56	X		
	FD11-135S	13K57		X	
	FD11-185S	13K58			X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	12X65	X		
	C1DIFF31B-1	12X66		X	
	C1DIFF32B-1	12X67			X
Sunsource® Commercial Energy System					
Solar Module CE Kit	One 285W Solar Module (silver frame), One PanelClaw Polar Bear III Mounting System and One Enphase M250 Microinverter	10U67	X	X	X
Solar Power Entry with Disconnect		Factory	O	O	O
Enphase Envoy Communications Gateway (with Wireless Capability)		**13L89**	X	X	X
Line Communication Filter (external)	C1C400D11A	10F93	X	X	X
Transformer (6 kW)	E1TRFM15AD3Y (208Y to 208 VAC Delta)	11H71	X	X	X
	E1TRFM15AD2Y (230 VAC Delta)	11H28	X	X	X
	E1TRFM15AD3G (460 VAC Delta or Wye)	11H29	X	X	X

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
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SPECIFICATIONS - DIRECTPLUS™ (DIRECT DRIVE) MODELS

General Data	Nominal Tonnage	7.5 Ton	10 Ton	12.5 Ton
	Model Number	LCH094U4E	LCH122U4E	LCH152U4E
	Efficiency Type	Ultra	Ultra	Ultra
	Blower Type	MSAV (Multi-Stage Air Volume) DirectPlus™ (Direct Drive)	MSAV (Multi-Stage Air Volume) DirectPlus™ (Direct Drive)	MSAV (Multi-Stage Air Volume) DirectPlus™ (Direct Drive)
Cooling Performance	Gross Cooling Capacity - Btuh	93,700	119,000	141,900
	[1] Net Cooling Capacity - Btuh	92,000	116,000	138,000
	AHRI Rated Air Flow - cfm	2800	3600	4000
	Total Unit Power - kW	6.6	8.8	11.2
	[1] EER (Btuh/Watt)	13.9	13.1	12.3
	[2] IEER (Btuh/Watt)	21.5	20.0	18.9
	Refrigerant Type	R-410A	R-410A	R-410A
Refrigerant Charge	Circuit 1	29 lbs. 0 oz.	29 lbs. 0 oz.	29 lbs. 0 oz.
Electric Heat Available		7.5, 15, 22.5, 30, 45 kW	15, 22.5, 30, 45, 60 kW	
Compressor Type (number)		Tandem Scroll (2)	Tandem Scroll (2)	Tandem Scroll (2)
Outdoor Coils	Net face area (total) - sq. ft.	40.8	40.8	40.8
	Number of rows	2	2	2
	Fins per inch	20	20	20
Outdoor Coil Fans	Motor - (No.) hp	(3) 1/3 ECM	(3) 1/3 ECM	(3) 1/3 ECM
	Motor rpm	520 - 900	640 - 900	640 - 900
	Total Motor watts	160 - 650	280 - 650	280 - 650
	Diameter - (No.) in.	(3) 24	(3) 24	(3) 24
	Number of blades	3	3	3
	Total Air volume - cfm	5160 - 10,250	7100 - 10,250	7100 - 10,250
Indoor Coil	Net face area (total) - sq. ft.	13.54	13.54	13.54
	Tube diameter - in.	3/8	3/8	3/8
	Number of rows	4	4	4
	Fins per inch	14	14	14
	Drain connection - Number and size	(1) 1 in. NPT coupling		
	Expansion device type	Dual-Flow Thermal Expansion Valve System Dual with Flow Control Balance port, removable head		
Indoor Blower	Nominal motor output	3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)
	Blower wheel nominal diameter x width - in.	(1) 22 x 9	(1) 22 x 9	(1) 22 x 9
Filters	Type of filter	Disposable		
	Number and size - in.	(4) 20 x 25 x 2		
Electrical characteristics		208/230V or 460V - 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; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[2] Integrated Energy Efficiency Ratio certified and tested according to AHRI Standard 340/360.

SPECIFICATIONS - BELT DRIVE MODELS

General Data	Nominal Tonnage	7.5 Ton	10 Ton	12.5 Ton
	Model Number	LCH094U4M	LCH122U4M	LCH152U4M
	Efficiency Type	Ultra	Ultra	Ultra
	Blower Type	MSAV (Multi-Stage Air Volume) Belt Drive	MSAV (Multi-Stage Air Volume) Belt Drive	MSAV (Multi-Stage Air Volume) Belt Drive
Cooling Performance	Gross Cooling Capacity - Btuh	93,700	119,000	141,900
	[1] Net Cooling Capacity - Btuh	92,000	116,000	136,000
	AHRI Rated Air Flow - cfm	2800	3600	4000
	Total Unit Power - kW	6.9	8.8	11.3
	[1] EER (Btuh/Watt)	13.4	12.6	12.0
	[2] IEER (Btuh/Watt)	20.7	19.2	18.1
	Refrigerant Type	R-410A	R-410A	R-410A
Refrigerant Charge	Circuit 1	29 lbs. 0 oz.	29 lbs. 0 oz.	29 lbs. 0 oz.
Electric Heat Available		7.5, 15, 22.5, 30, 45 kW	15, 22.5, 30, 45, 60 kW	
Compressor Type (number)		Tandem Scroll (2)	Tandem Scroll (2)	Tandem Scroll (2)
Outdoor Coils	Net face area (total) - sq. ft.	40.8	40.8	40.8
	Number of rows	2	2	2
	Fins per inch	20	20	20
Outdoor Coil Fans	Motor - (No.) hp	(3) 1/3 ECM	(3) 1/3 ECM	(3) 1/3 ECM
	Motor rpm	520 - 900	640 - 900	640 - 900
	Total Motor watts	160 - 650	280 - 650	280 - 650
	Diameter - (No.) in.	(3) 24	(3) 24	(3) 24
	Number of blades	3	3	3
	Total Air volume - cfm	5160 - 10,250	7100 - 10,250	7100 - 10,250
Indoor Coil	Net face area (total) - sq. ft.	13.54	13.54	13.54
	Tube diameter - in.	3/8	3/8	3/8
	Number of rows	4	4	4
	Fins per inch	14	14	14
	Drain connection - Number and size	(1) 1 in. NPT coupling		
	Expansion device type	Dual-Flow Thermal Expansion Valve System Dual with Flow Control Balance port, removable head		
[3] Indoor Blower and Drive Selection	Nominal motor output	2 hp, 3 hp, 5 hp		
	Motor - Drive kit number	2 hp **Kit 1** 590-890 rpm (std. and high efficiency) **Kit 2** 800-1105 rpm (std. and high efficiency) **Kit 3** 795-1195 rpm (std. and high efficiency) 3 hp **Kit 4** 730-970 rpm (std. efficiency) **Kit 5** 940-1200 rpm (std. efficiency) **Kit 6** 1015-1300 rpm (std. efficiency) **Kit 7** 730-970 rpm (high efficiency) **Kit 8** 940-1200 rpm (high efficiency) **Kit 9** 1015-1300 rpm (high efficiency) 5 hp **Kit 10** 900-1135 rpm (std. efficiency) **Kit 11** 1040-1315 rpm (std. efficiency) **Kit 12** 1125-1425 rpm (std. efficiency)		
	Blower wheel nominal diameter x width - in.	(1) 15 X 15	(1) 15 X 15	(1) 15 X 15
Filters	Type of filter	Disposable		
	Number and size - in.	(4) 20 x 25 x 2		
Electrical characteristics		208/230V, 460V or 575V - 60 hertz - 3 phase		

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

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

[2] Integrated Energy Efficiency Ratio certified and tested according to AHRI Standard 340/360.

[3] 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.

BLOWER DATA - DIRECTPLUS™ (DIRECT DRIVE) - ALL ULTRA MODELS

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

FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.
2 − Any factory installed options air resistance (heat section, economizer, etc.)
3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)
See page 18 for wet coil and option/accessory air resistance data.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)

094 Models - 7.5 kW - 1750 cfm
All Models - 15 kW, 22.5 kW, 30 kW, 45 kW - 2750 cfm
122 and 152 Models - 60 kW - 3500 cfm

Total Air Volume cfm	Total Static Pressure - in. w.g.													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	711	188	771	279	836	366	905	453	975	544	1044	640	1109	737
2000	752	242	812	332	876	420	944	510	1011	606	1075	709	1138	812
2250	799	300	860	389	923	479	988	575	1052	678	1113	787	1171	896
2500	853	362	914	453	976	548	1038	650	1097	761	1154	877	1209	990
2750	914	434	974	529	1033	629	1091	739	1146	858	1199	979	1250	1098
3000	980	513	1037	614	1092	720	1146	837	1198	961	1247	1088	1295	1215
3250	1048	598	1101	705	1153	819	1203	941	1251	1071	1298	1206	1343	1343
3500	1116	693	1166	809	1214	931	1261	1060	1307	1198	1351	1341	1395	1489
3750	1185	806	1232	931	1277	1063	1322	1201	1365	1348	1407	1499	1448	1657
4000	1254	937	1299	1072	1341	1214	1383	1363	1424	1518	1464	1679	1503	1844
4250	1324	1089	1366	1234	1406	1386	1445	1545	1484	1708	1522	1876	1559	2046
4500	1395	1262	1433	1417	1471	1579	1508	1745	1544	1913	1581	2084	1616	2256
4750	1465	1455	1501	1619	1536	1787	1571	1957	1606	2128	1641	2299	1675	2470
5000	1534	1666	1568	1834	1602	2004	1635	2174	1668	2345	1701	2514	1735	2682
5250	1603	1887	1635	2055	1667	2224	1699	2392	1731	2559	1763	2724	- - -	- - -
5500	1671	2110	1702	2275	1733	2441	1764	2605	- - -	- - -	- - -	- - -	- - -	- - -
5750	1738	2325	1768	2488	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

Total Air Volume cfm	Total Static Pressure - in. w.g.											
	1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	1172	833	1231	932	1287	1039	1340	1156	1391	1283	1442	1426
2000	1197	913	1253	1019	1306	1135	1357	1261	1407	1398	1457	1547
2250	1227	1003	1280	1117	1330	1242	1379	1378	1428	1525	1477	1680
2500	1261	1103	1311	1226	1360	1361	1407	1507	1454	1663	1501	1826
2750	1299	1219	1347	1350	1394	1494	1440	1649	1485	1813	1530	1982
3000	1342	1346	1388	1487	1432	1640	1476	1803	1520	1973	1563	2146
3250	1388	1485	1432	1638	1475	1800	1517	1969	1558	2143	1600	2319
3500	1437	1643	1479	1805	1519	1975	1560	2148	1600	2325	1640	2502
3750	1489	1821	1528	1990	1567	2164	1605	2340	1645	2517	1685	2693
4000	1541	2014	1579	2187	1616	2364	1654	2540	1693	2715	1732	2887
4250	1596	2218	1632	2393	1668	2569	1705	2742	1743	2913	- - -	- - -
4500	1652	2429	1687	2603	1722	2775	1759	2944	- - -	- - -	- - -	- - -
4750	1709	2641	1743	2811	1778	2979	- - -	- - -	- - -	- - -	- - -	- - -
5000	1768	2850	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5250	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5500	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5750	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA - BELT DRIVE - 7.5 TON (092 / 094 / 102)

BELT DRIVE BLOWER − BASE UNIT

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

FOR ALL UNITS ADD:
1 − Wet indoor coil air resistance of selected unit.
2 − Any factory installed options air resistance (heat section, economizer, etc.)
3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)
Then determine from blower table blower motor output required.
See page 18 for blower motors and drives.
See page 18 for wet coil and option/accessory air resistance data.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)

7.5 kW, 15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6	
	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
1750	481	0.21	549	0.4	618	0.57	688	0.7	758	0.82	824	0.93	885	1.08	941	1.23	991	1.39	1038	1.54	1082	1.68	1124	1.82	1166	1.95
2000	493	0.29	561	0.47	629	0.64	700	0.77	768	0.9	832	1.02	892	1.17	946	1.33	995	1.49	1041	1.66	1085	1.81	1126	1.97	1167	2.12
2250	507	0.37	574	0.56	643	0.72	712	0.86	779	0.99	842	1.13	900	1.28	953	1.44	1001	1.61	1045	1.78	1088	1.95	1128	2.12	1168	2.3
2500	521	0.46	588	0.64	657	0.81	727	0.95	792	1.09	853	1.24	909	1.4	960	1.57	1007	1.74	1050	1.93	1091	2.11	1130	2.29	1170	2.48
2750	537	0.56	604	0.74	674	0.91	743	1.06	806	1.21	865	1.36	920	1.53	969	1.71	1014	1.89	1055	2.08	1095	2.27	1133	2.47	1172	2.66
3000	554	0.67	622	0.86	692	1.02	760	1.18	822	1.34	878	1.5	931	1.68	979	1.86	1021	2.06	1061	2.26	1099	2.46	1136	2.65	1174	2.85
3250	572	0.78	641	0.98	712	1.15	778	1.32	838	1.49	892	1.66	943	1.84	989	2.03	1030	2.24	1068	2.45	1105	2.65	1141	2.85	1178	3.06
3500	592	0.9	663	1.12	733	1.3	798	1.47	855	1.65	907	1.83	956	2.02	1000	2.22	1039	2.44	1076	2.65	1111	2.86	1146	3.07	1183	3.27
3750	614	1.04	687	1.28	756	1.47	818	1.65	872	1.83	923	2.02	970	2.22	1011	2.43	1049	2.65	1084	2.87	1118	3.09	1152	3.29	1189	3.51
4000	639	1.22	713	1.48	780	1.66	838	1.83	890	2.02	939	2.22	984	2.44	1023	2.66	1059	2.89	1093	3.11	1126	3.33	1160	3.54	1197	3.77
4250	667	1.43	741	1.69	805	1.86	859	2.02	909	2.22	956	2.45	998	2.68	1036	2.92	1070	3.15	1103	3.37	1135	3.59	1169	3.81	1207	4.05

BLOWER DATA - BELT DRIVE - 10 AND 12.5 TON (120 / 122 / 150 / 152)

BELT DRIVE BLOWER − BASE UNIT

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

FOR ALL UNITS ADD:
1 − Wet indoor coil air resistance of selected unit.
2 − Any factory installed options air resistance (heat section, economizer, etc.)
3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)
Then determine from blower table blower motor output required.
See page 18 for blower motors and drives.
See page 18 for wet coil and option/accessory air resistance data.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)

15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

60 kW - 4000 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																							
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6	
	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
2000	497	0.25	558	0.44	624	0.6	694	0.74	764	0.85	830	0.99	889	1.16	943	1.34	994	1.52	1045	1.71	1096	1.89	1146	2.08	1197	2.27
2250	511	0.34	573	0.52	638	0.68	708	0.82	776	0.94	839	1.09	896	1.26	948	1.45	998	1.64	1048	1.83	1098	2.01	1149	2.2	1200	2.4
2500	527	0.44	589	0.62	654	0.78	723	0.91	789	1.05	850	1.21	904	1.39	955	1.58	1003	1.77	1052	1.96	1101	2.14	1152	2.33	1203	2.53
2750	545	0.55	606	0.72	672	0.88	740	1.03	804	1.17	861	1.34	914	1.53	962	1.72	1010	1.92	1057	2.10	1105	2.29	1154	2.47	1206	2.68
3000	564	0.66	626	0.84	692	1.01	759	1.16	819	1.32	874	1.49	924	1.68	971	1.88	1017	2.08	1063	2.26	1110	2.44	1158	2.63	1208	2.83
3250	585	0.79	648	0.98	714	1.14	778	1.31	836	1.48	887	1.66	935	1.86	981	2.06	1026	2.26	1071	2.45	1117	2.63	1163	2.80	1213	3.00
3500	607	0.93	672	1.13	737	1.31	798	1.48	852	1.66	901	1.85	948	2.05	993	2.26	1037	2.46	1081	2.65	1125	2.83	1171	3.01	1221	3.21
3750	632	1.10	698	1.31	762	1.50	819	1.67	869	1.86	915	2.05	961	2.25	1005	2.47	1049	2.68	1092	2.88	1136	3.05	1181	3.24	1231	3.45
4000	660	1.30	726	1.52	787	1.70	838	1.87	885	2.06	930	2.26	974	2.48	1018	2.71	1062	2.93	1105	3.12	1149	3.30	1194	3.49	1245	3.72
4250	691	1.53	755	1.75	810	1.91	857	2.07	901	2.27	945	2.50	990	2.74	1034	2.98	1077	3.20	1120	3.39	1163	3.58	1210	3.79	1262	4.03
4500	724	1.78	783	1.98	831	2.12	874	2.28	917	2.50	962	2.75	1006	3.02	1051	3.27	1094	3.49	1137	3.70	1181	3.89	1228	4.11	1281	4.38
4750	757	2.05	809	2.20	851	2.33	891	2.51	935	2.76	980	3.05	1025	3.33	1070	3.59	1113	3.82	1156	4.03	1201	4.24	1249	4.47	1303	4.75
5000	787	2.31	831	2.43	870	2.57	910	2.78	954	3.06	1000	3.38	1046	3.68	1091	3.95	1135	4.19	1178	4.40	1224	4.62	1272	4.86	1325	5.13
5250	814	2.55	852	2.66	889	2.83	930	3.09	975	3.41	1023	3.76	1070	4.08	1115	4.35	1159	4.59	1203	4.81	1248	5.03	1297	5.27	1350	5.53
5500	835	2.78	871	2.91	909	3.13	952	3.44	999	3.81	1049	4.18	1096	4.51	1142	4.79	1186	5.03	1229	5.24	1275	5.46	1324	5.69	- - -	- - -
5750	854	3.01	890	3.19	930	3.48	977	3.86	1027	4.27	1078	4.66	1126	4.99	1171	5.26	1214	5.49	1258	5.70	- - -	- - -	- - -	- - -	- - -	- - -
6000	871	3.26	910	3.53	955	3.90	1006	4.34	1060	4.80	1111	5.19	1158	5.51	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
6250	890	3.57	934	3.94	985	4.41	1041	4.91	1096	5.38	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA ALL MODELS

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Motor Efficiency	Nominal hp	Drive Kit Number	RPM Range
Standard & High	2	1	590 - 890
Standard & High	2	2	800 - 1105
Standard & High	2	3	795 - 1195
Standard	3	4	730 - 970
Standard	3	5	940 - 1200
Standard	3	6	1015 - 1300
High	3	7	730 - 970
High	3	8	940 - 1200
High	3	9	1015 - 1300
Standard	5	10	900 - 1135
Standard	5	11	1040 - 1315
Standard	5	12	1125 - 1425

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. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

POWER EXHAUST FAN PERFORMANCE

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

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

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Filters		Return Air Adaptor Plate
	094	122, 152			MERV 8	MERV 13	
1750	0.04	0.04	0.03	0.05	0.01	0.03	0.00
2000	0.05	0.05	0.03	0.06	0.01	0.03	0.00
2250	0.06	0.06	0.04	0.08	0.01	0.04	0.00
2500	0.07	0.07	0.04	0.11	0.01	0.05	0.00
2750	0.08	0.08	0.05	0.12	0.02	0.05	0.00
3000	0.10	0.09	0.06	0.13	0.02	0.06	0.02
3250	0.11	0.10	0.06	0.15	0.02	0.06	0.02
3500	0.12	0.11	0.09	0.15	0.03	0.07	0.04
3750	0.14	0.13	0.09	0.15	0.03	0.08	0.07
4000	0.15	0.14	0.09	0.19	0.04	0.08	0.09
4250	0.17	0.15	0.13	0.19	0.04	0.09	0.11
4500	0.19	0.17	0.14	0.22	0.04	0.09	0.12
4750	0.20	0.18	0.17	0.25	0.05	0.10	0.16
5000	0.22	0.20	0.20	0.29	0.06	0.10	0.18
5250	0.24	0.22	0.22	0.32	0.06	0.11	0.19
5500	0.25	0.23	0.25	0.34	0.07	0.12	0.22
5750	0.27	0.25	0.31	0.45	0.07	0.12	0.25
6000	0.29	0.27	0.33	0.52	0.08	0.13	0.27

BLOWER DATA ALL MODELS

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

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

CEILING DIFFUSER AIR THROW DATA

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

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

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

7.5 TON HIGH EFFICIENCY (R-410A) — LCH092H4

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph					
Compressor 1	Rated Load Amps	11.6			5.5			4.7					
	Locked Rotor Amps	86			37			34					
Compressor 2	Rated Load Amps	11.6			5.5			4.7					
	Locked Rotor Amps	86			37			34					
Outdoor Fan Motors (2)	Full Load Amps (total)	2.4 (4.8)			1.3 (2.6)			1 (2)					
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1					
Service Outlet 115V GFI (amps)		15			15			20					
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5			
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1			
[2] Maximum Overcurrent Protection	Unit Only	45	50	60	20	25	30	20	20	25			
	With (1) 0.33 HP Power Exhaust	50	50	60	25	25	30	20	20	25			
[3] Minimum Circuit Ampacity	Unit Only	39	42	49	19	20	24	16	17	20			
	With (1) 0.33 HP Power Exhaust	41	44	52	20	22	25	17	18	21			

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	45	45	50	50	60	60	20	25	30	20	20	25
		15 kW	[4]50	60	60	60	[4]60	70	30	30	35	25	25	30
		22.5 kW	[4]70	80	[4]80	90	[4]80	90	40	40	45	35	35	35
		30 kW	[4]90	100	[4]100	110	[4]100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4]150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	39	39	42	42	49	49	19	20	24	16	17	20
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	60	60	[4]60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4]80	90	[4]80	90	[4]90	100	40	45	45	35	35	40
		30 kW	[4]100	110	[4]100	110	[4]110	125	60	60	60	45	45	45
		45 kW	150	150	[4]150	175	[4]150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	41	41	44	44	52	52	20	22	25	17	18	21
		15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

8.5 TON HIGH EFFICIENCY (R-410A) — LCH102H4

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	11			5.5			4.7		
	Locked Rotor Amps	86			37			34		
Compressor 2	Rated Load Amps	11			5.5			4.7		
	Locked Rotor Amps	86			37			34		
Outdoor Fan Motors (2)	Full Load Amps (total)	2.4 (4.8)			1.3 (2.6)			1 (2)		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection	Unit Only	45	50	60	20	25	30	20	20	25
	With (1) 0.33 HP Power Exhaust	50	50	60	25	25	30	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	38	41	48	19	20	24	16	17	20
	With (1) 0.33 HP Power Exhaust	40	43	51	20	22	25	17	18	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	45	45	50	50	60	60	20	25	30	20	20	25
		15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	38	38	41	41	48	48	19	20	24	16	17	20
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	25	25	30	20	20	25
		15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	45
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	40	40	43	43	51	51	20	22	25	17	18	21
		15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

10 TON HIGH EFFICIENCY (R-410A) — LCH120H4

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Outdoor Fan Motors (2)	Full Load Amps (total)	2.4 (4.8)			1.3 (2.6)			1 (2)		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection	Unit Only	50	50	60	30	30	35	20	20	25
	With (1) 0.33 HP Power Exhaust	50	60	70	30	30	35	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	43	46	53	24	26	29	16	18	20
	With (1) 0.33 HP Power Exhaust	46	49	56	26	27	30	17	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	45
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

Disconnect	15 kW	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56
	22.5 kW	54W56	54W56	54W56	54W56	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56
	30 kW	54W57	54W57	54W57	54W57	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56
	45 kW	54W57	54W57	54W57	54W57	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56
	60 kW	[5] N/A	[5] N/A	[5] N/A	[5] N/A	[5] N/A	[5] N/A	54W56	54W56	[5] N/A	54W56	54W56	54W56

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

[5] Disconnect must be field furnished.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

12.5 TON HIGH EFFICIENCY (R-410A) — LCH150H4

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Compressor 2	Rated Load Amps	22.4			10.6			7.7		
	Locked Rotor Amps	149			75			54		
Outdoor Fan Motors (2)	Full Load Amps	3.2			1.7			1.5		
	(total)	(6.4)			(3.4)			(3)		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection	Unit Only	80	80	90	35	35	40	25	30	30
	With (1) 0.33 HP Power Exhaust	80	80	90	35	40	40	30	30	30
[3] Minimum Circuit Ampacity	Unit Only	62	65	71	28	30	33	22	23	25
	With (1) 0.33 HP Power Exhaust	64	67	73	30	31	34	23	24	26

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	70	70	80	80	80	80	30	30	35	25	25	30
		22.5 kW	[4]70	80	[4]80	90	[4]80	90	40	40	45	35	35	35
		30 kW	[4]90	100	[4]100	110	[4]100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4]150	175	80	80	80	60	60	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	58	58	61	61	67	67	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	70	70	80	80	80	80	30	35	35	25	25	30
		22.5 kW	[4]80	90	[4]80	90	[4]90	100	40	45	45	35	35	40
		30 kW	[4]100	110	[4]100	110	[4]110	125	60	60	60	45	45	45
		45 kW	150	150	[4]150	175	[4]150	175	80	80	80	60	70	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	60	60	64	64	70	70	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

Disconnect	15 kW	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56	54W56
	22.5 kW	54W56	54W56	54W56	54W56	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56	54W56
	30 kW	54W57	54W57	54W57	54W57	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56	54W56
	45 kW	54W57	54W57	54W57	54W57	54W57	54W57	54W56	54W56	54W56	54W56	54W56	54W56	54W56
	60 kW	[5] N/A	[5] N/A	[5] N/A	[5] N/A	[5] N/A	[5] N/A	54W56	54W56	54W57	54W56	54W56	54W56	54W56

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

[5] Disconnect must be field furnished.

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

DIRECTPLUS™ (DIRECT DRIVE) — LCH094U4E

[1] Voltage - 60hz			208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps		13.1	6.1	4.4
	Locked Rotor Amps		83.1	41	33
Compressor 2	Rated Load Amps		13.1	6.1	4.4
	Locked Rotor Amps		83.1	41	33
Outdoor Fan Motors (3)	Full Load Amps (total)		2.8 (8.4)	1.4 (4.2)	1.1 (3.3)
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	1.3	1
Service Outlet 115V GFI (amps)			15	15	20
Indoor Blower Motor	Horsepower		3.75	3.75	3.75
	Full Load Amps		8.8	4.3	3.4
[2] Maximum Overcurrent Protection	Unit Only		50	25	20
	With (1) 0.33 HP Power Exhaust		60	25	20
[3] Minimum Circuit Ampacity	Unit Only		47	23	17
	With (1) 0.33 HP Power Exhaust		50	24	18

ELECTRIC HEAT DATA						
Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	25	20
		15 kW	60	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	47	47	23	17
		15 kW	51	57	28	23
		22.5 kW	70	79	40	32
		30 kW	90	102	51	41
		45 kW	129	147	74	59
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	60	60	25	20
		15 kW	60	60	30	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	50	50	24	18
		15 kW	54	60	30	24
		22.5 kW	73	82	41	33
		30 kW	93	105	53	42
		45 kW	132	150	75	60

ELECTRICAL ACCESSORIES					
Disconnect	7.5 kW	54W56	54W56	54W56	54W56
	15 kW	54W56	54W56	54W56	54W56
	22.5 kW	54W56	54W56	54W56	54W56
	30 kW	54W57	54W57	54W56	54W56
	45 kW	54W57	54W57	54W56	54W56

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

DIRECTPLUS™ (DIRECT DRIVE) — LCH122U4E

[1] Voltage - 60hz			208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps		16	7.8	5.7
	Locked Rotor Amps		110	52	38.9
Compressor 2	Rated Load Amps		16	7.8	5.7
	Locked Rotor Amps		110	52	38.9
Outdoor Fan Motors (3)	Full Load Amps (total)		2.8 (8.4)	1.4 (4.2)	1.1 (3.3)
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	1.3	1
Service Outlet 115V GFI (amps)			15	15	20
Indoor Blower Motor	Horsepower		3.75	3.75	3.75
	Full Load Amps		8.8	4.3	3.4
[2] Maximum Overcurrent Protection	Unit Only		60	30	25
	With (1) 0.33 HP Power Exhaust		70	35	25
[3] Minimum Circuit Ampacity	Unit Only		54	27	20
	With (1) 0.33 HP Power Exhaust		56	28	21

ELECTRIC HEAT DATA						
Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	60	60	30	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	54	57	28	23
		22.5 kW	70	79	40	32
		30 kW	90	102	51	41
		45 kW	129	147	74	59
		60 kW	137	156	78	62
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	70	70	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	56	60	30	24
		22.5 kW	73	82	41	33
		30 kW	93	105	53	42
		45 kW	132	150	75	60
		60 kW	140	159	80	64

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

DIRECTPLUS™ (DIRECT DRIVE) — LCH152U4E

[1] Voltage - 60hz			208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps		19.6	8.2	6.6
	Locked Rotor Amps		136	66.1	55.3
Compressor 2	Rated Load Amps		19.6	8.2	6.6
	Locked Rotor Amps		136	66.1	55.3
Outdoor Fan Motors (3)	Full Load Amps (total)		2.8 (8.4)	1.4 (4.2)	1.1 (3.3)
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	1.3	1
Service Outlet 115V GFI (amps)			15	15	20
Indoor Blower Motor	Horsepower		3.75	3.75	3.75
	Full Load Amps		8.8	4.3	3.4
[2] Maximum Overcurrent Protection	Unit Only		80	35	25
	With (1) 0.33 HP Power Exhaust		80	35	25
[3] Minimum Circuit Ampacity	Unit Only		62	27	22
	With (1) 0.33 HP Power Exhaust		64	29	23

ELECTRIC HEAT DATA						
Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	80	80	35	25
		22.5 kW	80	80	40	35
		30 kW	[4] 90	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	62	62	28	23
		22.5 kW	70	79	40	32
		30 kW	90	102	51	41
		45 kW	129	147	74	59
		60 kW	137	156	78	62
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	80	80	35	25
		22.5 kW	[4] 80	90	45	35
		30 kW	[4] 100	110	60	45
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	64	64	30	24
		22.5 kW	73	82	41	33
		30 kW	93	105	53	42
		45 kW	132	150	75	60
		60 kW	140	159	80	64

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

BELT DRIVE — LCH094U4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph					
Compressor 1	Rated Load Amps	13.1			6.1			4.4					
	Locked Rotor Amps	83.1			41			33					
Compressor 2	Rated Load Amps	13.1			6.1			4.4					
	Locked Rotor Amps	83.1			41			33					
Outdoor Fan Motors (3)	Full Load Amps (total)	2.8 (8.4)			1.4 (4.2)			1.1 (3.3)					
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1					
Service Outlet 115V GFI (amps)		15			15			20					
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5			
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1			
[2] Maximum Overcurrent Protection	Unit Only	50	60	70	25	25	30	20	20	25			
	With (1) 0.33 HP Power Exhaust	60	60	70	25	30	30	20	20	25			
[3] Minimum Circuit Ampacity	Unit Only	46	49	56	22	23	26	16	18	20			
	With (1) 0.33 HP Power Exhaust	48	51	58	23	25	28	17	19	21			

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	60	60	70	70	25	25	30	20	20	25
		15 kW	[4]50	60	60	60	70	70	30	30	35	25	25	30
		22.5 kW	[4]70	80	[4]80	90	[4]80	90	40	40	45	35	35	35
		30 kW	[4]90	100	[4]100	110	[4]100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4]150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	46	46	49	49	56	56	22	23	26	16	18	20
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	60	60	60	60	70	70	25	30	30	20	20	25
		15 kW	60	60	[4]60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4]80	90	[4]80	90	[4]90	100	40	45	45	35	35	40
		30 kW	[4]100	110	[4]100	110	[4]110	125	60	60	60	45	45	45
		45 kW	150	150	[4]150	175	[4]150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	7.5 kW	48	48	51	51	58	58	23	25	28	17	19	21
		15 kW	52	58	56	62	63	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

BELT DRIVE — LCH122U4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph					
Compressor 1	Rated Load Amps	16.5			7.2			5.5					
	Locked Rotor Amps	110			52			38.9					
Compressor 2	Rated Load Amps	16			7.8			5.7					
	Locked Rotor Amps	110			52			38.9					
Outdoor Fan Motors (3)	Full Load Amps	2.8			1.4			1.1					
	(total)	(8.4)			(4.2)			(3.3)					
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1					
Service Outlet 115V GFI (amps)		15			15			20					
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5			
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1			
[2] Maximum Overcurrent Protection	Unit Only	60	70	70	30	30	35	20	25	25			
	With (1) 0.33 HP Power Exhaust	70	70	80	30	35	35	25	25	25			
[3] Minimum Circuit Ampacity	Unit Only	53	56	62	25	26	29	19	20	23			
	With (1) 0.33 HP Power Exhaust	55	59	65	26	28	31	20	21	24			

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	60	60	70	70	70	70	30	30	35	25	25	30
		22.5 kW	[4]70	80	[4]80	90	[4]80	90	40	40	45	35	35	35
		30 kW	[4]90	100	[4]100	110	[4]100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4]150	175	80	80	80	60	60	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	53	55	56	59	62	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	70	70	70	70	80	80	30	35	35	25	25	30
		22.5 kW	[4]80	90	[4]80	90	[4]90	100	40	45	45	35	35	40
		30 kW	[4]100	110	[4]100	110	[4]110	125	60	60	60	45	45	45
		45 kW	150	150	[4]150	175	[4]150	175	80	80	80	60	70	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	55	58	59	62	65	69	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

[5] Disconnect must be field furnished.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

BELT DRIVE — LCH152U4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Compressor 2	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Outdoor Fan Motors (3)	Full Load Amps (total)	2.8 (8.4)			1.4 (4.2)			1.1 (3.3)		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection	Unit Only	70	80	80	30	35	35	25	25	30
	With (1) 0.33 HP Power Exhaust	80	80	90	35	35	35	25	25	30
[3] Minimum Circuit Ampacity	Unit Only	60	64	70	27	28	31	21	23	25
	With (1) 0.33 HP Power Exhaust	63	66	72	28	29	32	22	24	26

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	70	70	80	80	80	80	30	35	35	25	25	30
		22.5 kW	[4]70	80	[4]80	90	[4]80	90	40	40	45	35	35	35
		30 kW	[4]90	100	[4]100	110	[4]100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4]150	175	80	80	80	60	60	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	60	60	64	64	70	70	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	80	80	80	80	90	90	35	35	35	25	25	30
		22.5 kW	[4]80	90	[4]80	90	[4]90	100	40	45	45	35	35	40
		30 kW	[4]100	110	[4]100	110	[4]110	125	60	60	60	45	45	45
		45 kW	150	150	[4]150	175	[4]150	175	80	80	80	60	70	70
		60 kW	[4]150	175	[4]150	175	[4]150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	15 kW	63	63	66	66	72	72	29	31	34	23	25	27
		22.5 kW	72	81	75	84	83	92	40	42	45	32	34	36
		30 kW	91	103	95	107	103	115	51	53	57	41	43	45
		45 kW	130	148	134	152	142	160	74	76	79	59	61	64
		60 kW	138	157	142	161	149	169	79	80	84	63	64	67

ELECTRICAL ACCESSORIES

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

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

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

[2] HACR type breaker or fuse.

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

[4] Factory installed circuit breaker not available.

[5] Disconnect must be field furnished.

ELECTRIC HEAT CAPACITIES

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

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

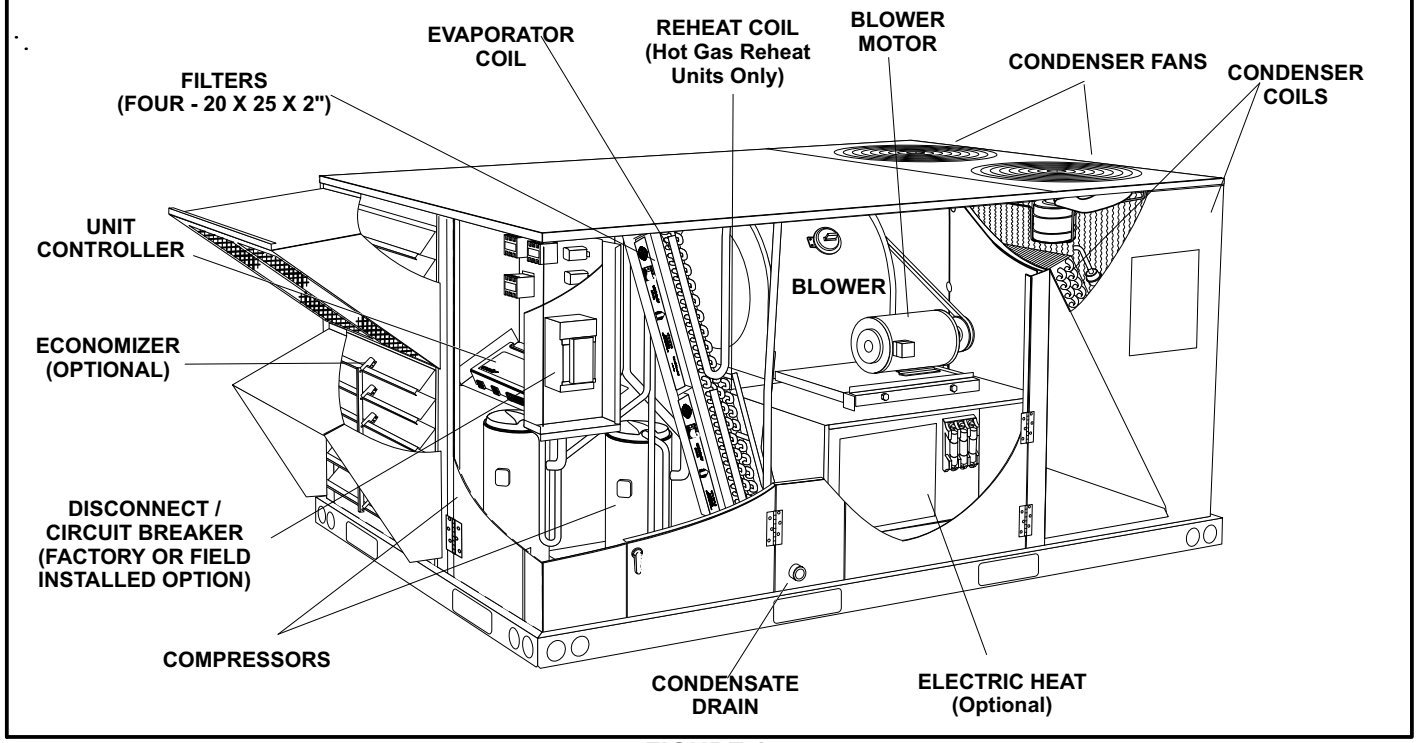


FIGURE 1

PARTS ARRANGEMENT 094U, 122U, 152U

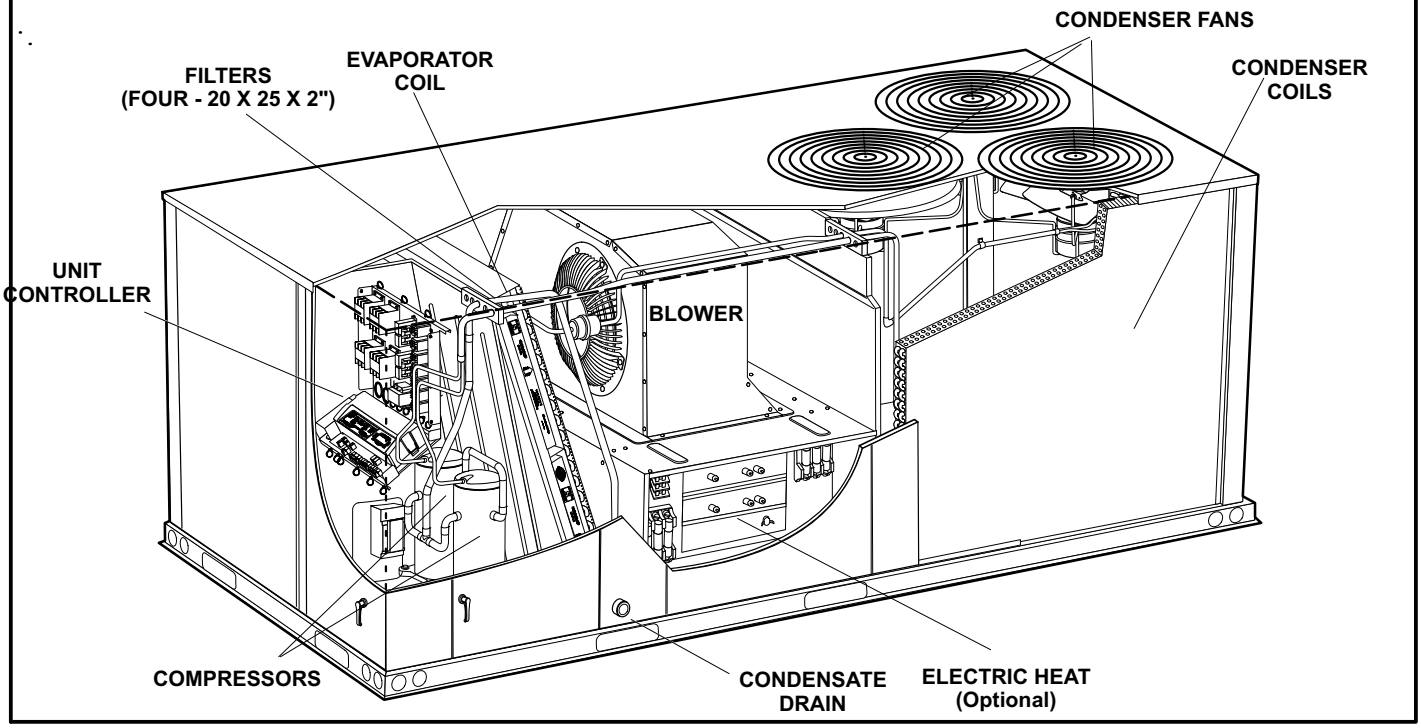


FIGURE 2

CONTROL BOX PARTS ARRANGEMENT - Standard & High Efficiency Units

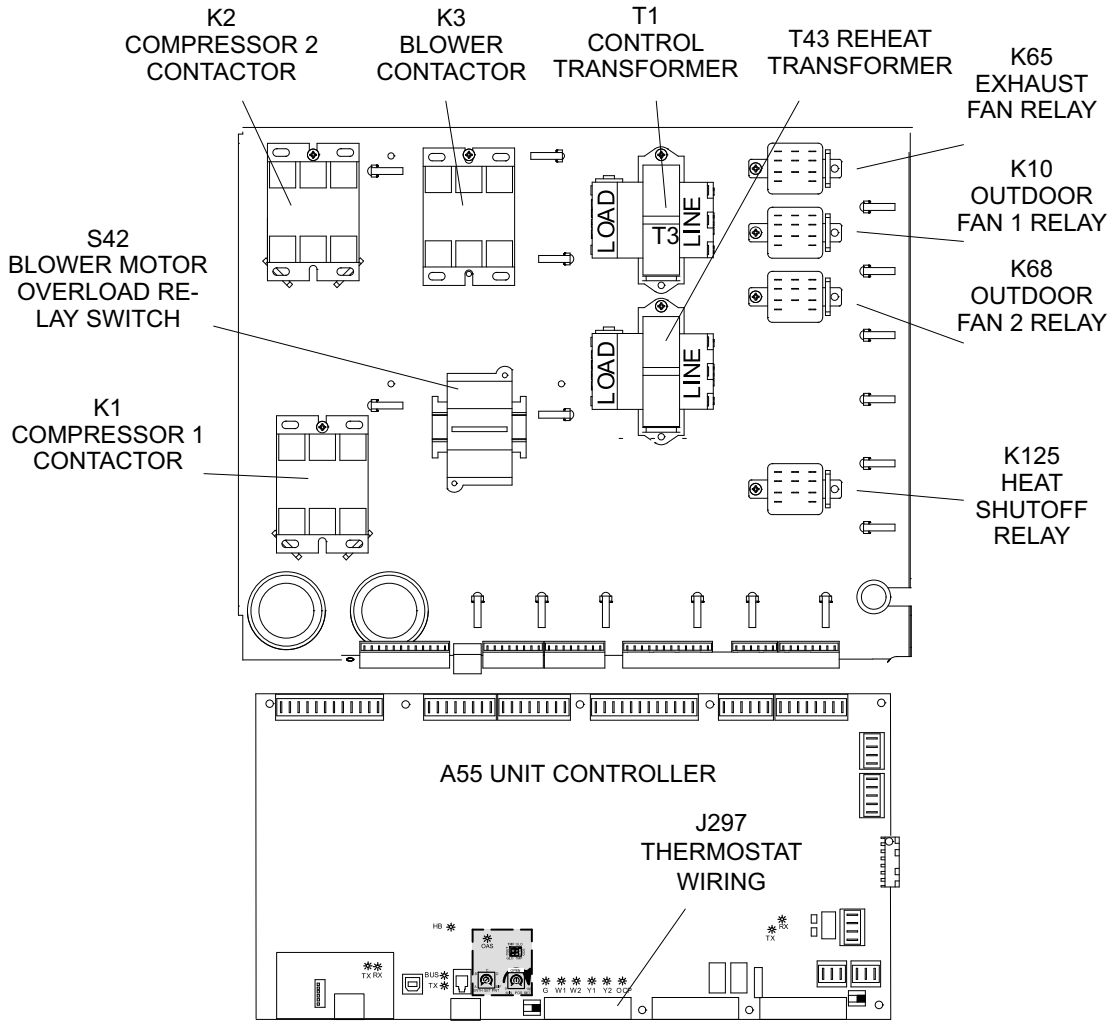


FIGURE 3

CONTROL BOX PARTS ARRANGEMENT - Ultra High Efficiency Units

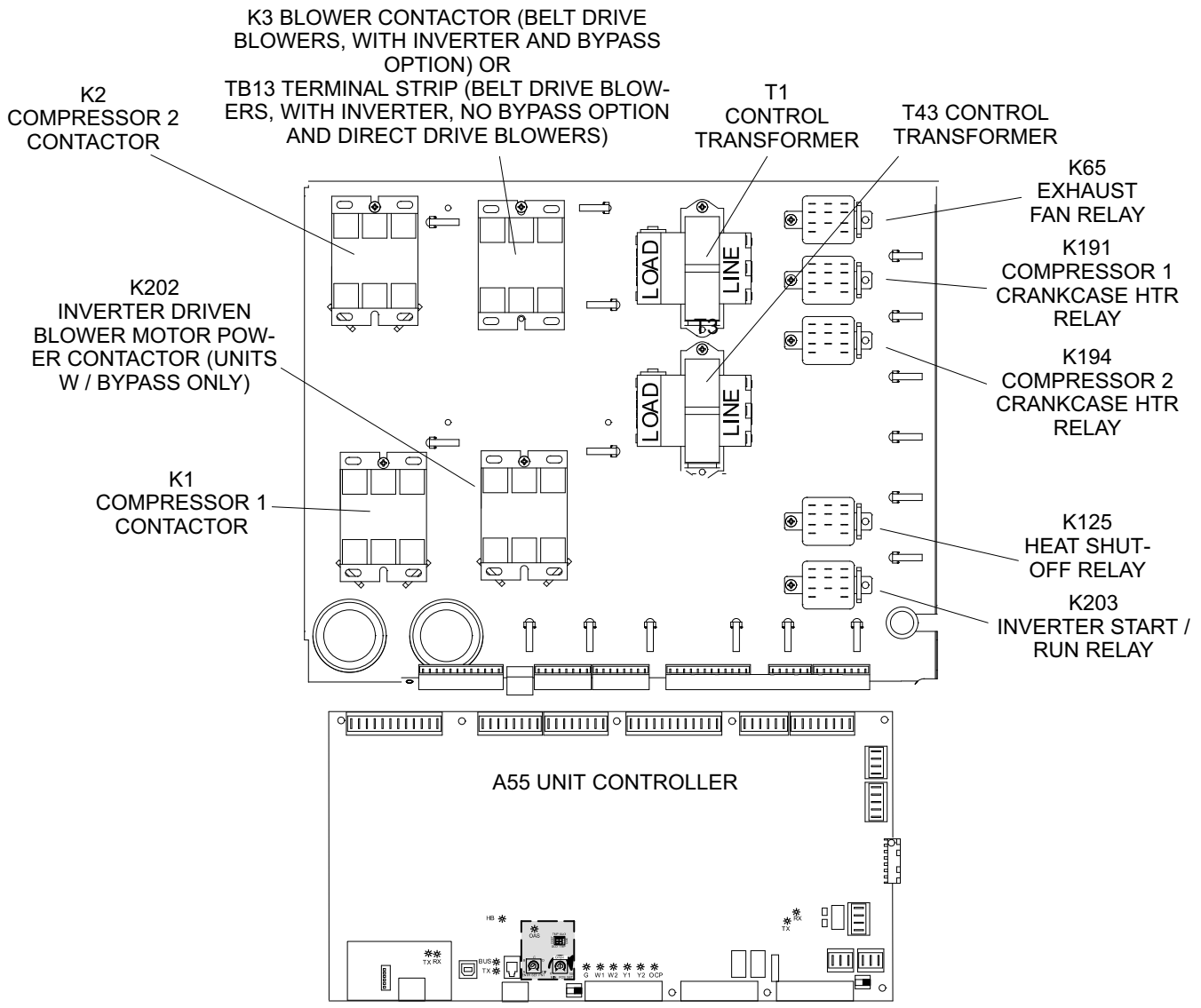


FIGURE 4

I-UNIT COMPONENTS

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

A-Control Box Components

⚠ CAUTION

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

LCH standard and high efficiency units control box components are shown in figure 3. Ultra units control box components are shown in figure 4. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48 (Optional)

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

2-Control Transformer T1

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use primary voltage taps as shown in figure 5, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

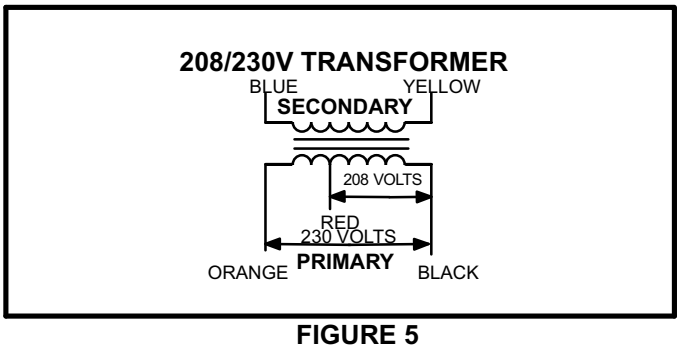


FIGURE 5

3-Outdoor Fan Capacitors C1, C2 (non-Ultra units)

Fan capacitors C1 and C2 370V / 10 MFD capacitors are used to assist in the start up of condenser fans B4 and B5.

4-Compressor Contactor K1, K2

All compressor contactors are three-pole, double-break contactors with 24VAC coils. In all LCH units, K1 and K2 (both energized by A55) energize compressors B1 and B2. On CE M-volt units, contactor is CE approved by manufacturer (Siemens). See figure 6.

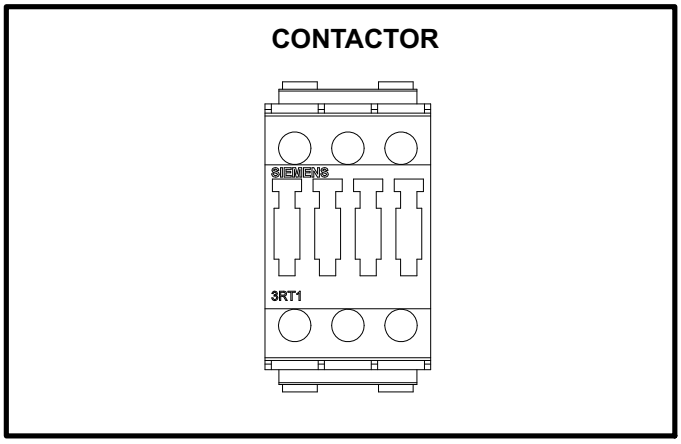


FIGURE 6

5-Blower Contactor K3

K3 is used in units with a constant blower speed or a staged blower which is not equipped with a bypass option. K3 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 A55 Unit Controller. On M-volt CE units, the contactor is CE approved by manufacturer (Siemens). See figure 6.

6-Outdoor Fan Relay K10, K68 (non-Ultra units)

Outdoor fan relays K10 and K68 are DPDT relays with a 24VAC coil. In all LCH units K10 and K68 energize condenser fans B4 and B5.

7-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a N.O. DPDT relay with a 24VAC coil. K65 is used in all LCH units equipped with the optional power exhaust dampers. K65 is energized by the economizer control panel (A56), after the economizer dampers reach 50% open (adjustable in ECTO). When K65 closes, the exhaust fans B10 and B11 are energized.

8-Unit Controller A55

The Unit Controller provides all unit control functions, unit status information, unit diagnostics, programmable parameters and USB verification and profile sharing. Use the Unit Controller keypad and display to navigate through menus. Software is also available to access the Unit Controller. Refer to the Unit Controller guide provided with the unit. Thermostat wires are connected to J297 on the Unit Controller.

9-Compressor Overload Relays S176, S177 (M-volt CE units)

Relays are wired in series with the appropriate compressor contactor and monitor the current flow to the compressor motor. When the relay senses an overload condition, N.C. contacts open to de-energize the compressor. Relays are manufactured by Siemens; see figure 7.

10-Variable Frequency Drive A96 (optional)

Units may be 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 as shown in Belt Drive Supply Air Inverter section. The VFD is located below the Unit Controller.

11-VFD Power To Motor Contactor K202 (optional)

Contactor is used in VFD units equipped with a VFD bypass option. The three-pole 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 VFD 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-VFD Controller (GP board) A133 (VFD units)

M2 and earlier versions of Unit Controller only. The GP board A133 controls and monitors the status of the VFD A96. The board sends the signal to start the VFD forward rotation and also sends a 0-10VDC signal to the VFD to control the speed of the blower rotation. A133 also reports VFD malfunctions to the A55.

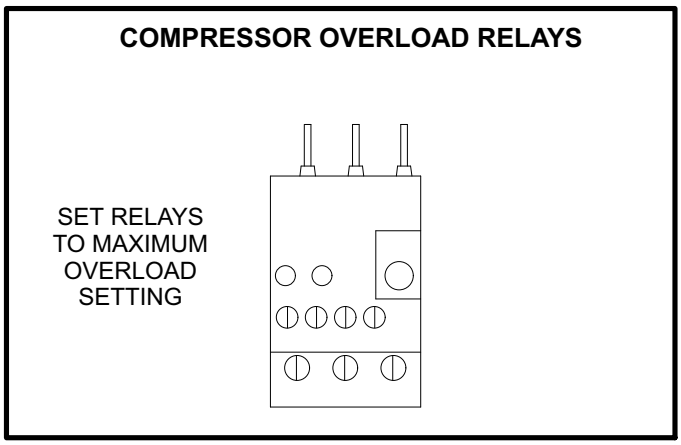


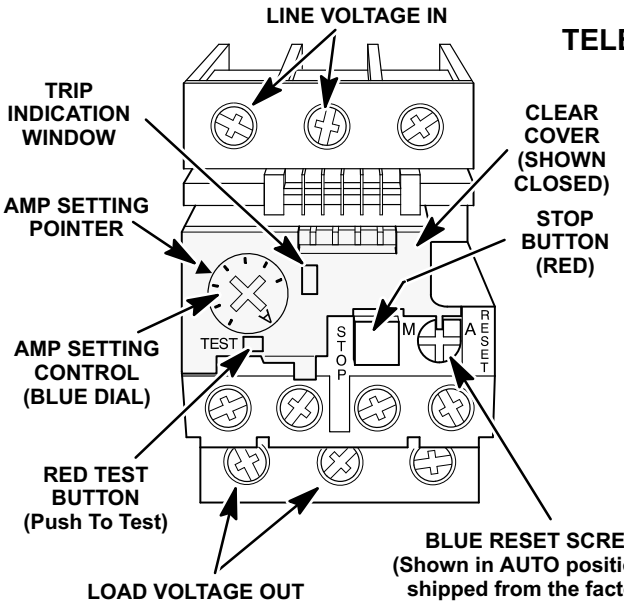
FIGURE 7

14-Blower Motor Overload Relay S42

Two hp high efficiency blower motors and M-volt unit blower motors are equipped with an overload relay. High efficiency blower motors and M-volt unit blower motors manufactured before Dec. 19, 2010, are equipped with the relay.

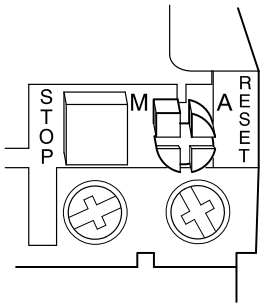
The relay (S42) is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts open to de-energize the blower. Units will be equipped with a relay manufactured by Telemecanique figure 8 or Siemens figure 9.

TELEMECANIQUE OVERLOAD RELAY



DETAIL SHOWING RESET BUTTON ADJUSTED TO MANUAL POSITION

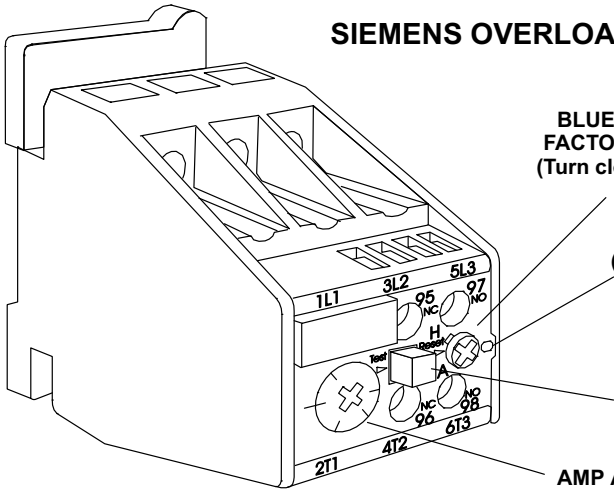
Lift clear cover and turn adjustment screw counterclockwise. Reset screw will pop out when pointer is in M (manual position). Close cover to lock reset screw into position.



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 8

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 9

PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL
Standard Efficiency / Fin Tube Coil

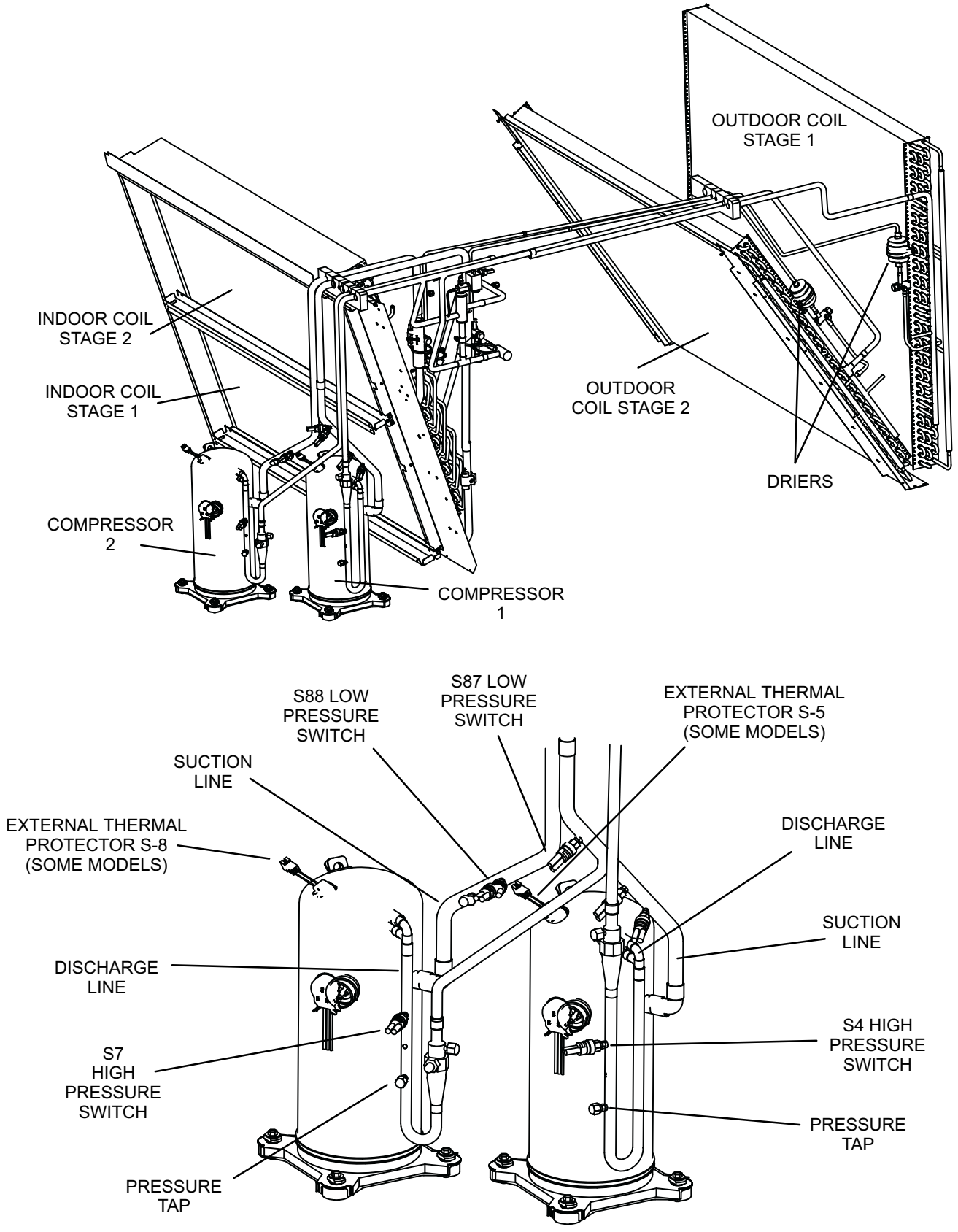
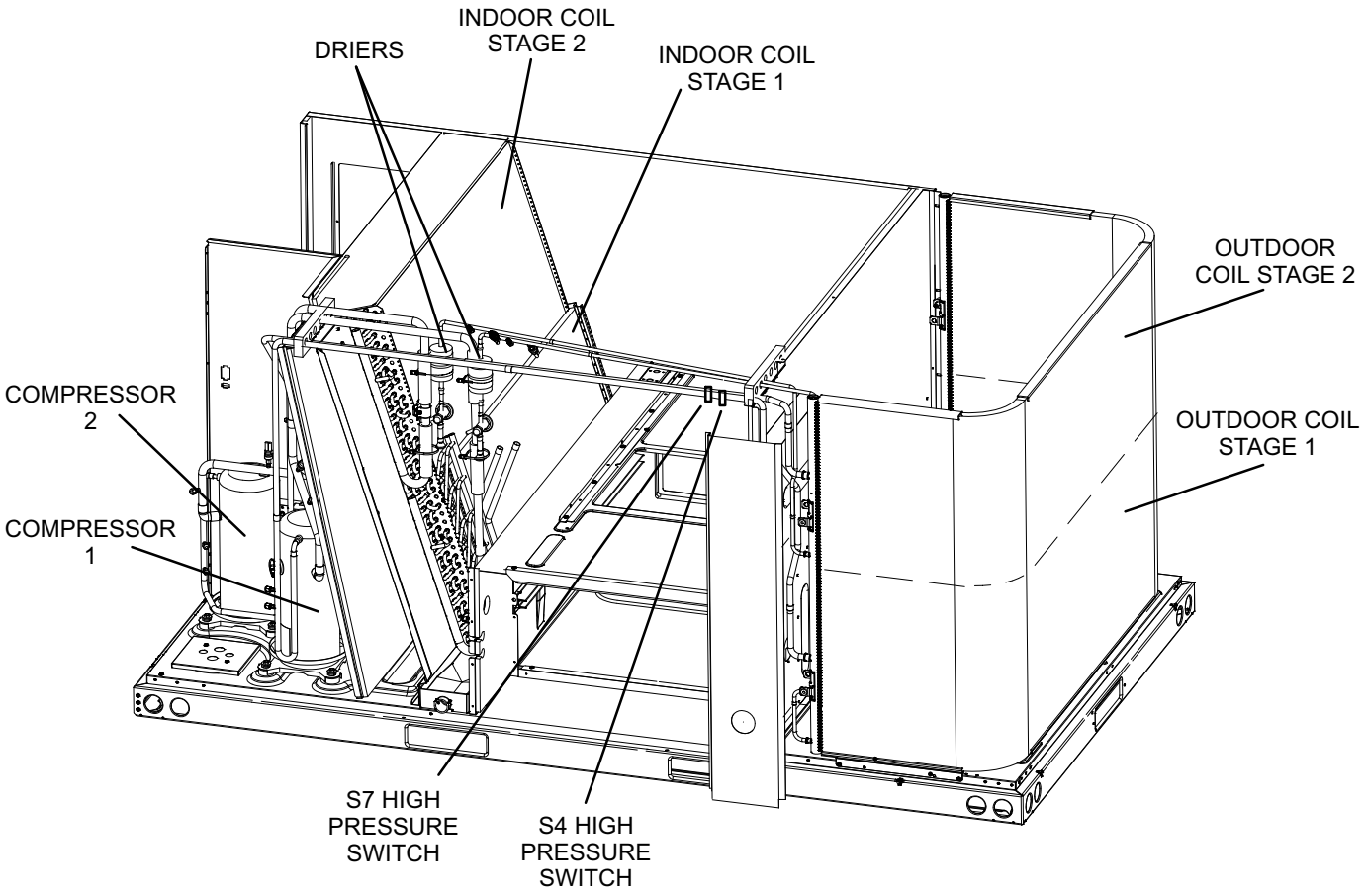


FIGURE 10

PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL
High Efficiency All-Aluminum Outdoor Coil



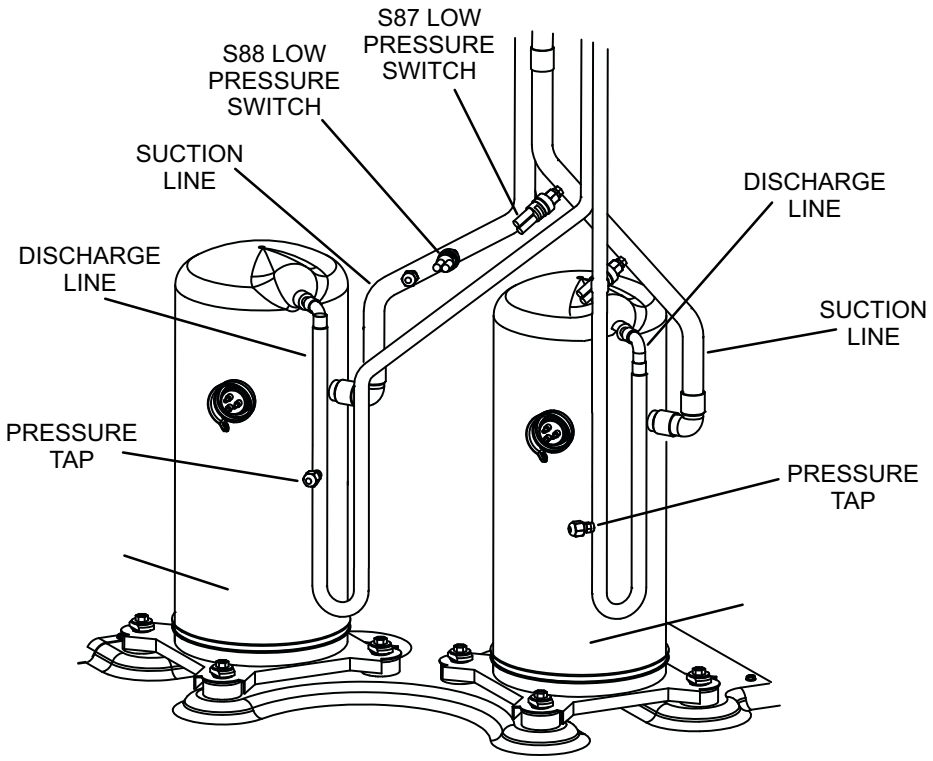


FIGURE 11

PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL
Ultra High Efficiency Units With Fin/Tube Coil

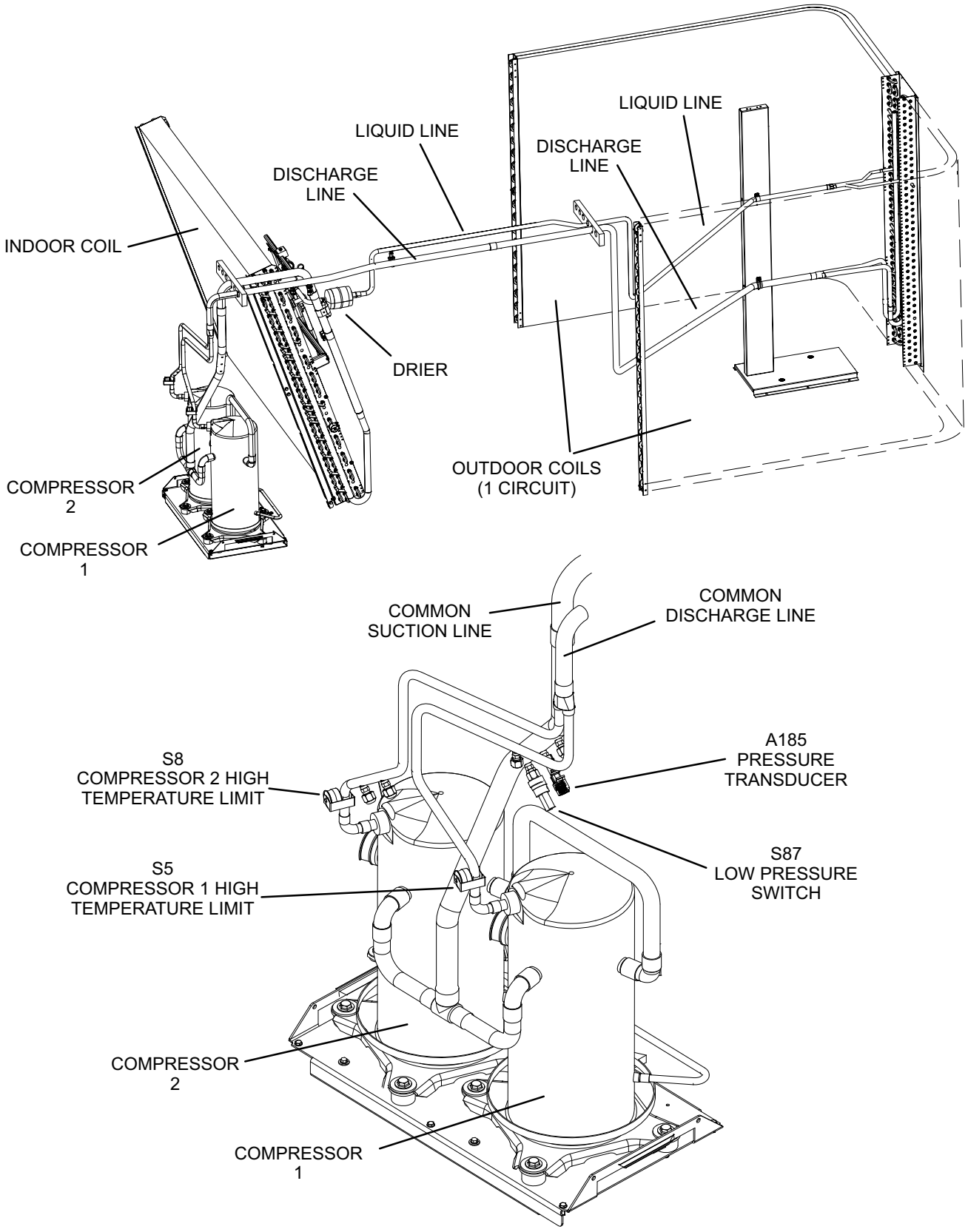


FIGURE 12

B-Cooling Components

Standard and high efficiency units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figure 10 or 11. Ultra high efficiency units use a common cooling circuit consisting of two compressors in parallel, two condenser coils in parallel, and one evaporator coil. See figure 12. On standard and high efficiency units, two draw-through type condenser fans are used. On ultra high efficiency units, three draw-through type condenser fans are used. Standard and high efficiency units are equipped with belt-drive blowers which draw air across the evaporator during unit operation. Ultra high efficiency units are equipped with either a belt-drive blower or a drive drive blower which draws air across the evaporator during unit operation.

On standard and high efficiency units, the evaporators are slab type and are stacked. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Ultra high efficiency units are equipped with a single slab style evaporator. The evaporator uses two thermostatic expansions valves. Evaporators are equipped with enhanced fins and rifled tubing.

In all units, each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by low ambient switches and freezestats. Ultra high efficiency units are also equipped with a suction line pressure transducer and compressor sump thermistors (temperature sensors) for added compressor reliability.

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

1-Compressors B1, B2

Standard and high efficiency units are equipped with two scroll compressors and two independent cooling circuits. Ultra efficiency units are equipped with two scroll compressors and one common cooling circuit. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

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

⚠ IMPORTANT

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

2-Thermal Protectors

Some compressors have S-5 and S-8 thermal protectors located on top of the compressor. The protectors open at 248 ± 9°F and close at 169 ± 18°F.

3-Crankcase Heaters HR1, HR2

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

4-High Pressure Switches S4, S7

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

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

All-Aluminum Coil Units -

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

Fin/Tube Coil Units -

On standard and high efficiency units, when discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 20 psig (3275 ± 138 kPa) the pressure switch will close.

On ultra high efficiency units, BOTH compressors are de-energized or energized at the pressures listed in the previous paragraph.

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

5-Low Ambient Switches S11, S84

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows mechanical cooling operation at low outdoor temperatures. On standard and high efficiency units, the switches are located in each liquid line prior to the indoor coil section. On ultra high efficiency units, S11 (only) is located on the common liquid line prior to the indoor coil section.

On standard and high efficiency units, S11 and S84 are wired to the A55 Unit Controller which cycles outdoor fans via K10 (outdoor fan 1) and K68 (outdoor fan 2). On ultra high efficiency units, S11 is wired to the A55 Unit Controller which cycles outdoor fan 1 (outdoor fans 2 and 3 are de-energized during low ambient operation).

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fan is energized. When discharge pressure in one refrigerant circuit drops to 240 ± 10 psig (1655 ± 69 kPa), the switch opens and the condenser fan in that refrigerant circuit is de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

6-Low Pressure Switches S87, S88

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line.

On standard and high efficiency units, S87 (compressor one) and S88 (compressor two) are wired to A55 Unit Controller. On ultra high efficiency units, S87 (only) is located on the common suction line and is wired to A55 Unit Controller.

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

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

7-Service Valve (optional)

LCH units may be equipped with service valves located in the discharge and liquid lines. The service valves are manually operated valves used for service operation.

8-Filter Drier

LCH 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.

9-Freezestats S49 and S50

Standard and high efficiency units are equipped with a low temperature switch (freezestat) located on the return bend of each evaporator coil. S49 (first circuit) and S50 (second circuit) are located on the corresponding evaporator coils. Ultra high efficiency units are equipped with S49 only which is located on the return bend of the common evaporator coil.

Each freezestat is wired to the A55 Unit Controller. Each freezestat is a SPST N.C. auto-reset switch which opens at 29°F $\pm$ 3°F (-1.7°C $\pm$ 1.7°C) on a temperature drop and closes at 58°F $\pm$ 4°F (14.4°C $\pm$ 2.2°C) on a temperature rise. To prevent coil icing, freezestats open during compressor operation to temporarily disable the respective compressor until the coil warms sufficiently to melt any accumulated frost.

If the freezestats are tripping frequently due to coil icing, check the unit charge, airflow and filters before allowing unit back in operation. Make sure to eliminate conditions which might promote evaporator ice buildup.

10-Condenser Fans B4, B5

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

Ultra High Efficiency Units Only

Ultra high efficiency units are equipped with electronically commutated condenser fan motors (ECM). The ECM motors are wired directly to 230VAC power but do not operate until a pulse width modulated (PWM) control signal is sent from the A55 Unit Controller. The PWM signal determines the condenser fan speed. All three fans will operate in low speed with a Y1 demand; all three fans will operate in high speed with a Y2 demand.

Both low and high voltage plugs are located at the top of the blower compartment in the indoor section of the unit. Condenser fan motors B4, B5 and B21 high voltage plugs are J86, J87 and J88 respectively. Low voltage plugs are J336, J337 and J338 respectively. Refer to wiring markings to identify plugs. Use figure 13 to identify fan motors.

If an ECM fan is not operating:

1 Check to make sure high voltage is present before checking low voltage.

2 Read the voltage at the appropriate high voltage fan motor plug (J86, J87, or J88) using the VAC meter setting.

3 If high voltage is present, check the low voltage plug (J336, J337, or J338) for a signal from the Unit Controller. Use either the duty cycle (%) or a VDC meter setting.

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

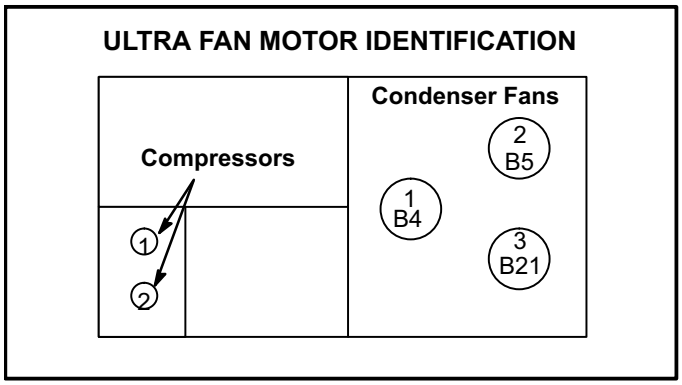


FIGURE 13

11-Temperature Sensors RT37 and RT38

Ultra high efficiency units are equipped with a temperature sensor (thermistor) located on the back of each compressor underneath the crankcase heater. The A55 Unit Controller uses input from RT37 (compressor 1), RT38 (compressor 2) and A185 pressure transducer to calculate sump superheat for each compressor. The Unit Controller uses this information to optimize system reliability.

Verify the sensor value using the menu path:

MAIN MENU > DATA > IN/OUTPUTS > SENSORS > LOCAL

Sensors should read within +/- 5 degrees of actual compressor sump temperature. Make sure the sensor is making sufficient contact with the compressor shell.

12-Pressure Transducer A185

Ultra high efficiency units are equipped with a pressure transducer located on the common suction line. The Unit Controller uses the input from the transducer, RT37 and RT38 to calculate sump superheat for each compressor. The Unit Controller uses this information to optimize system reliability.

Verify the sensor value using the menu path:

MAIN MENU > DATA > IN/OUTPUTS > SENSORS > LOCAL

A185 should read within +/- 10 psi of actual suction pressure.

C-Blower Compartment

STANDARD BLOWER ASSEMBLY

TO INCREASE BELT TENSION

1- Loosen four bolts securing motor mounting base to frame.

2- Turn adjusting bolt to the right, or clockwise, to move the motor away from the blower housing.

IMPORTANT - Gap between end of frame and motor mounting base should be equal at both ends, i.e. parallel along gap.

3- Tighten four bolts securing motor mounting base to frame.

4- Relieve tension on two adjusting bolts.

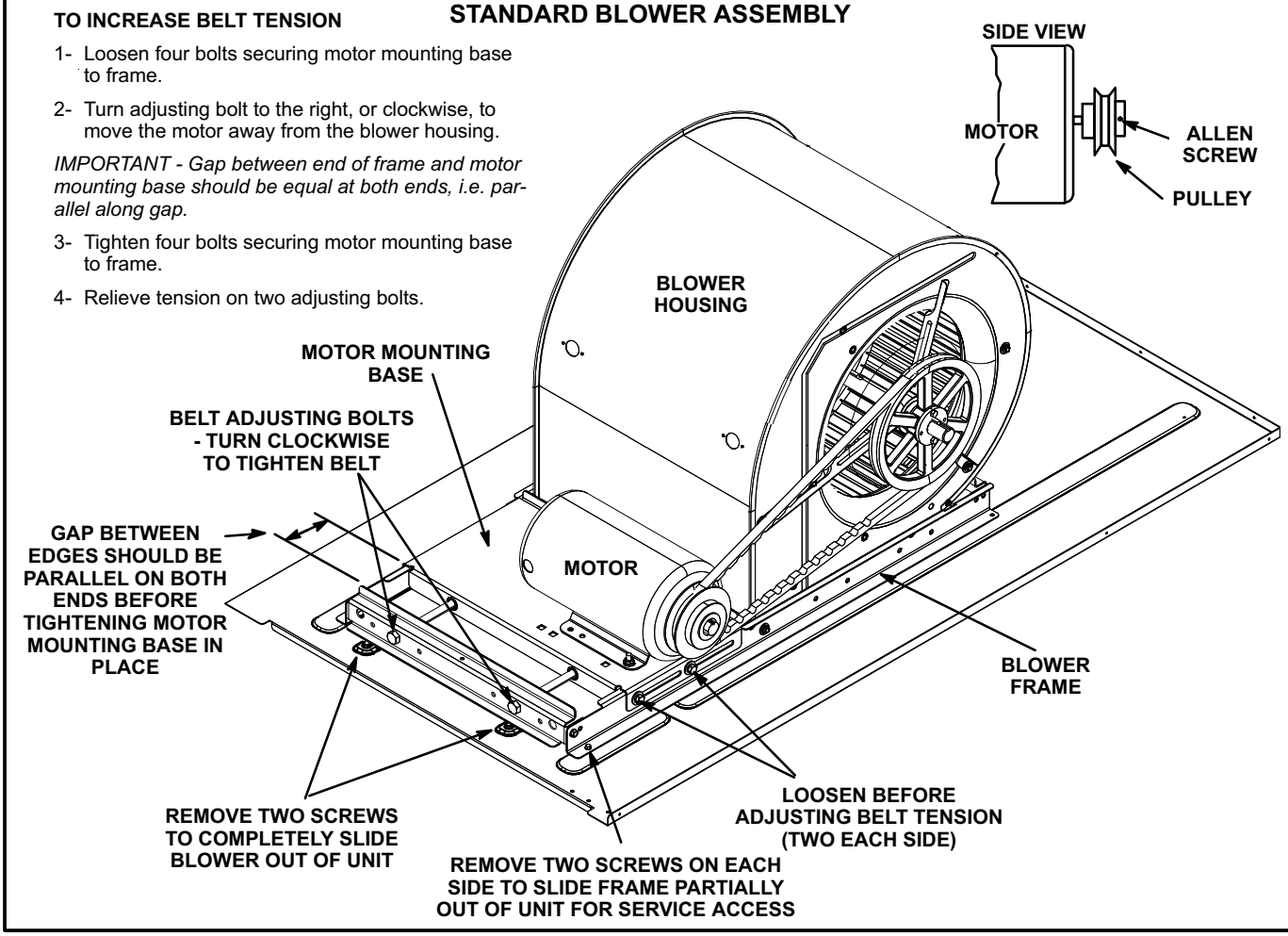


FIGURE 14

TENSIONER BLOWER ASSEMBLY (VIEW SHOWN WITHOUT BELT)

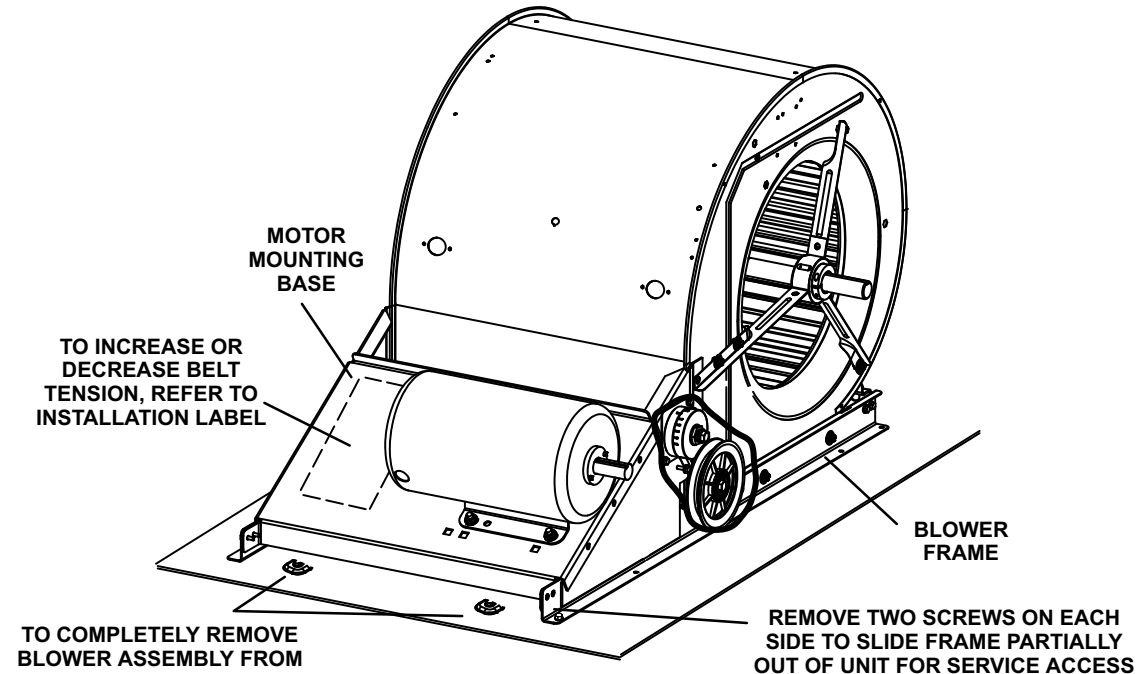


FIGURE 15

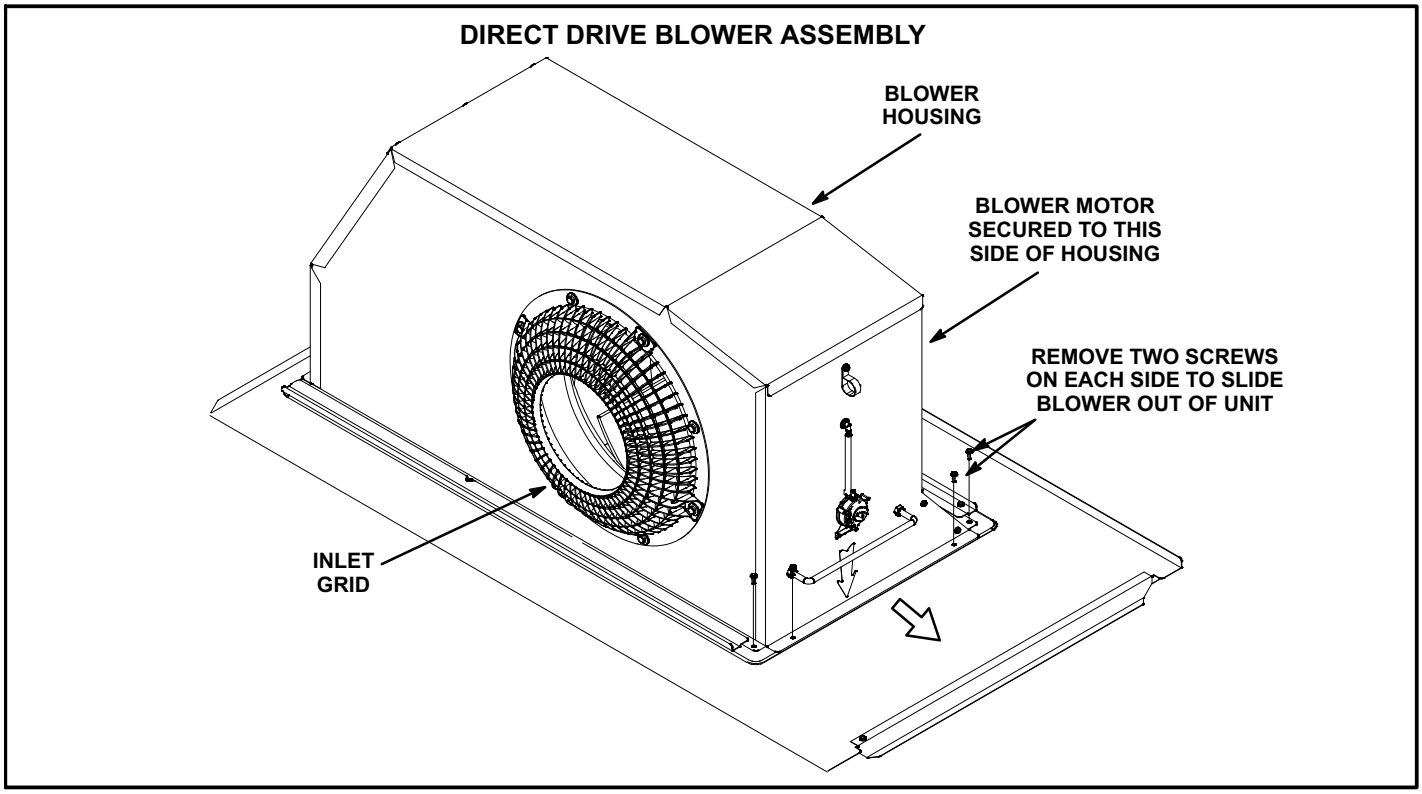


FIGURE 16

The blower compartment is located between the evaporator coil and the condenser coil section. The blower assembly is secured to a sliding frame which allows the blower motor assembly to be pulled out of the unit. See figure 14. 15, or 16.

Belt Drive Blowers

1 Loosen the reusable wire tie which secures the blower wiring to the blower motor mounting plate.

2 Remove and retain screws on either side of sliding frame. Pull frame toward outside of unit.

3 Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower motor base using the wire tie.

4 Replace retained screws on either side of the sliding frame.

Direct Drive Blowers

1 Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing.

2 Remove and retain screws in front and on either side of blower housing. Pull frame toward outside of unit.

3 Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower housing using the wire tie.

4 Replace retained screws in front and on either side of the blower housing.

1-Blower Wheels

Belt drive blowers are equipped with one 15 in. x 15 in. (381 mm x 381 mm) blower wheel. Ultra high efficiency units may be equipped with an optional direct drive blower assembly with a backward inclined blower wheel.

2-Indoor Blower Motor B3

Belt driven blowers use three-phase single-speed blower motors. CFM adjustments are made by adjusting the motor pulley (sheave). Ultra high efficiency units may be equipped with an optional direct drive blower assembly with a three-phase, variable speed, direct drive blower motor.

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

OPERATION / ADJUSTMENT

VFD / Direct Drive Units - The blower rotation will always be correct on VFD units. Checking blower rotation is not a valid method of determining voltage phasing for incoming power. To check for proper voltage phasing, measure compressor suction and discharge pressures. Make sure suction pressure decreases and discharge pressure increases on start-up.

VFD / Direct Drive Units and Units Equipped With Optional Factory-Installed Voltage or Phase Detection - The Unit Controller checks the incoming power during start-up (A55 P299-1 and P269-2). If the voltage, phase, or frequency is incorrect, the Unit Controller will display an

alarm and the unit will not start. If line voltage is corrected, the Unit Controller will energize the unit after five (default) minutes. While line voltage is continually checked by the Unit Controller, the voltage phasing is not. If one or more phases is interrupted, power to one or more transformers is interrupted and the unit is shut down by either the Unit Controller or the corresponding transformer.

Note - Optional phase/voltage detection is set at the factory and is enabled by the Unit Controller internal logic. If an after market device is installed, refer to the device manufacturer's literature.

On units equipped with Unit Controller firmware version 7.06 and earlier:

Voltage, phase and frequency are checked on start-up

Blower Operation

NOTE-The following is a generalized procedure and does not apply to all thermostat control systems.

1 Blower operation is dependent on the thermostat control system option that has been installed in the units. Refer to operation sequence of the control system installed for detailed descriptions of blower operation.

2 Generally, blower operation is set at the thermostat fan switch. With the fan switch in "ON" position and the **OCP** input is **"ON"**, the blower operates continuously. With the fan switch in "AUTO" position, the blower cycles with demand.

3 In most cases, the blower and entire unit will be off when the system switch is in the "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 VFD motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the VFD blower is rotating incorrectly.

Determining Unit Air Volume

IMPORTANT - VFD 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 Supply Air Inverter Start-Up section to set blower CFM for all modes once the motor pulley is set.

IMPORTANT - Direct drive variable blower unit CFM is determined by the Unit Controller. Refer to the Direct Drive Variable Speed Start-Up section.

1 The following measurements must be made with a dry indoor coil. Run blower 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 17.

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

3 Refer to blower tables in BLOWER DATA (table of contents) in the front of this manual. Use static pressure and RPM readings to determine unit air volume. Apply accessory air resistance tables when installing units with any of the optional accessories listed.

4 *Standard Blowers -*
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 14. Do not exceed minimum and maximum number of pulley turns as shown in table 1.

Tensioner Blowers -
Refer to label on motor base. See figure 15.

TABLE 1
MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Minimum Turns Open	Maximum Turns Open
A Section	0	5
B Section	1*	6

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

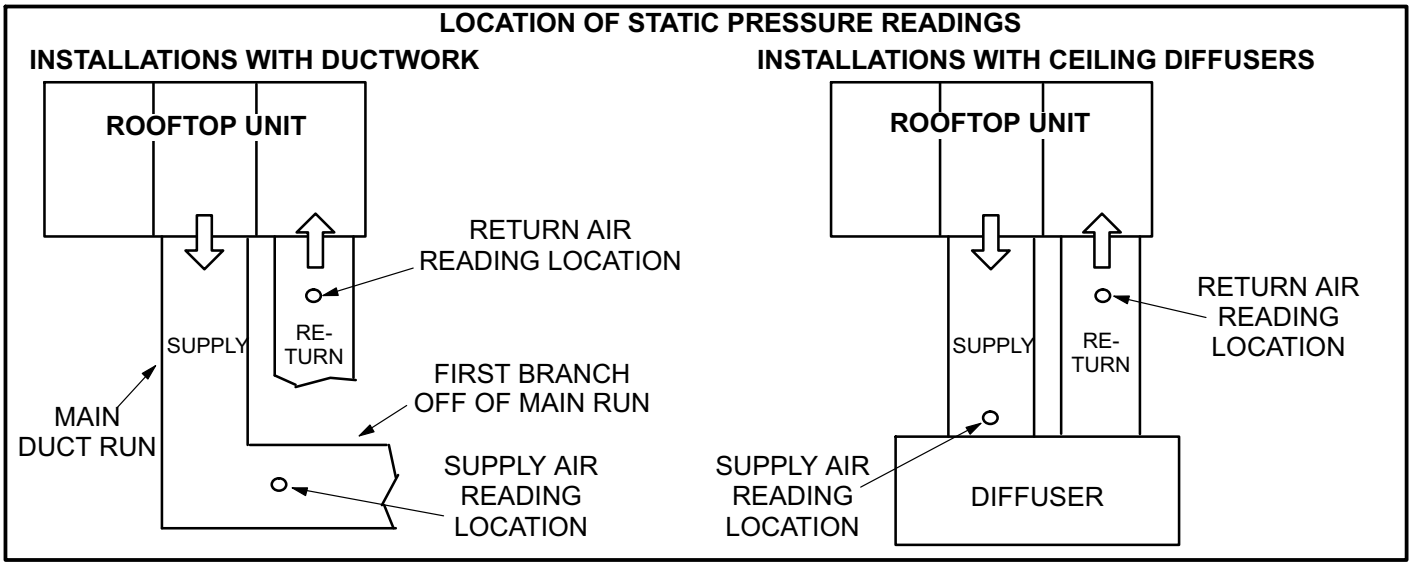


FIGURE 17

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 in the pulley grooves. Make sure blower and motor pulleys are aligned as shown in figure 18.

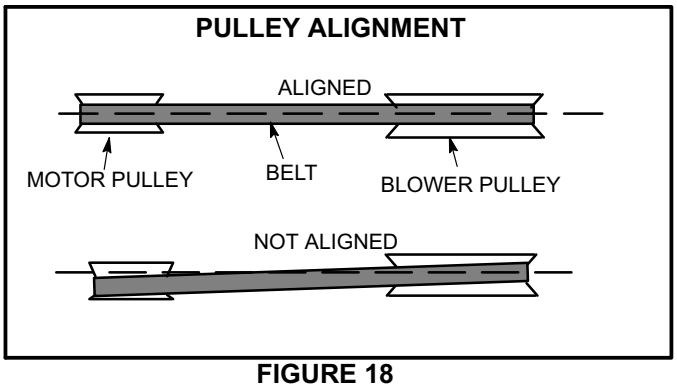


FIGURE 18

1 Loosen four bolts securing motor base to mounting frame. See figure 14 or 15.

2 *To increase belt tension -*
Turn both adjusting bolts to the right, or clockwise, to move the motor outward and tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -
Turn the adjusting bolt to the left, or counterclockwise to loosen belt tension.

IMPORTANT - Align edges of blower motor base and mounting frame base parallel before tightening four bolts on the side of base. Motor shaft and blower shaft must be parallel.

3 Tighten bolts on side of base.

Check Belt Tension

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

1 Measure span length X. See figure 19.

2 Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length.

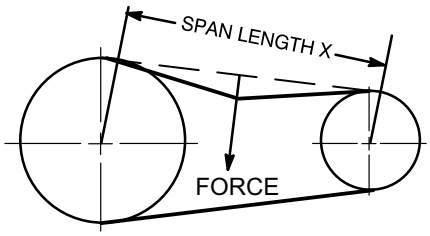
Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3 Measure belt deflection force. For a new 2 and 3hp belt, the deflection force should be 5.0-7.0 lbs. (35-48kPa). For a new 5hp belt, the deflection force should be 7-10lbs. (48-69kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

MEASURE BELT TENSION



DEFLECTION 1/64" PER INCH OF SPAN OR 1.5mm PER 100mm OF SPAN

FIGURE 19

F-Field-Furnished Blower Drives

For field-furnished blower drives, use the the blower tables in the BLOWER TABLES section of this manual to determine BHP, RPM and drive kit required. Reference table 2 for drive component manufacturer's numbers.

TABLE 2
MANUFACTURER'S NUMBERS

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

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

D-Electric Heat Components

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

Electric heat is shown in figure 20. All electric heat sections consist of electric heating elements exposed directly to the air stream.

1-Heating Elements HE1, HE2

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

2-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil and are energized by the A55 Unit Controller. Contactors energize the first and only stage of heating elements. On M-volt units, contactors are CE approved by manufacturer (Siemens). See figure 6.

3-Primary Limit Switch S15

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

4-High Temperature Thermostat S19

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

5-High Temperature Limits S20, S158

Limits are SPST N.C. manual-reset thermostats. Like the primary temperature limit, S20 is wired in series with the first-stage contactor coil (K15). When S20 opens, heating elements (HE1, HE2) are de-energized. S158 is wired in series with the second-stage contactor coil (K16). When S158 opens, heating elements (HE1, HE2) are de-energized. When the contactors are de-energized, first-stage and all subsequent stages of heat are de-energized. The thermostat is factory-set to open at 220°F ± 6°F (104°C ± 3.3°C) on a temperature rise and can be manually reset when temperature falls below 160°F (71.0°C).

6-Terminal Strip TB2

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

7-Terminal Strip TB3

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

8-Fuse F3 and F42

Fuses are housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. Figure 20 and table 3 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F42 - 1, 2.

9-Unit Fuse Block F4

Three line voltage fuses provide short circuit and ground fault protection to all cooling components in units equipped with electric heat. The fuses are rated in accordance with the amperage of the cooling components. On M-volt CE units, fuses are equipped with fuse covers..

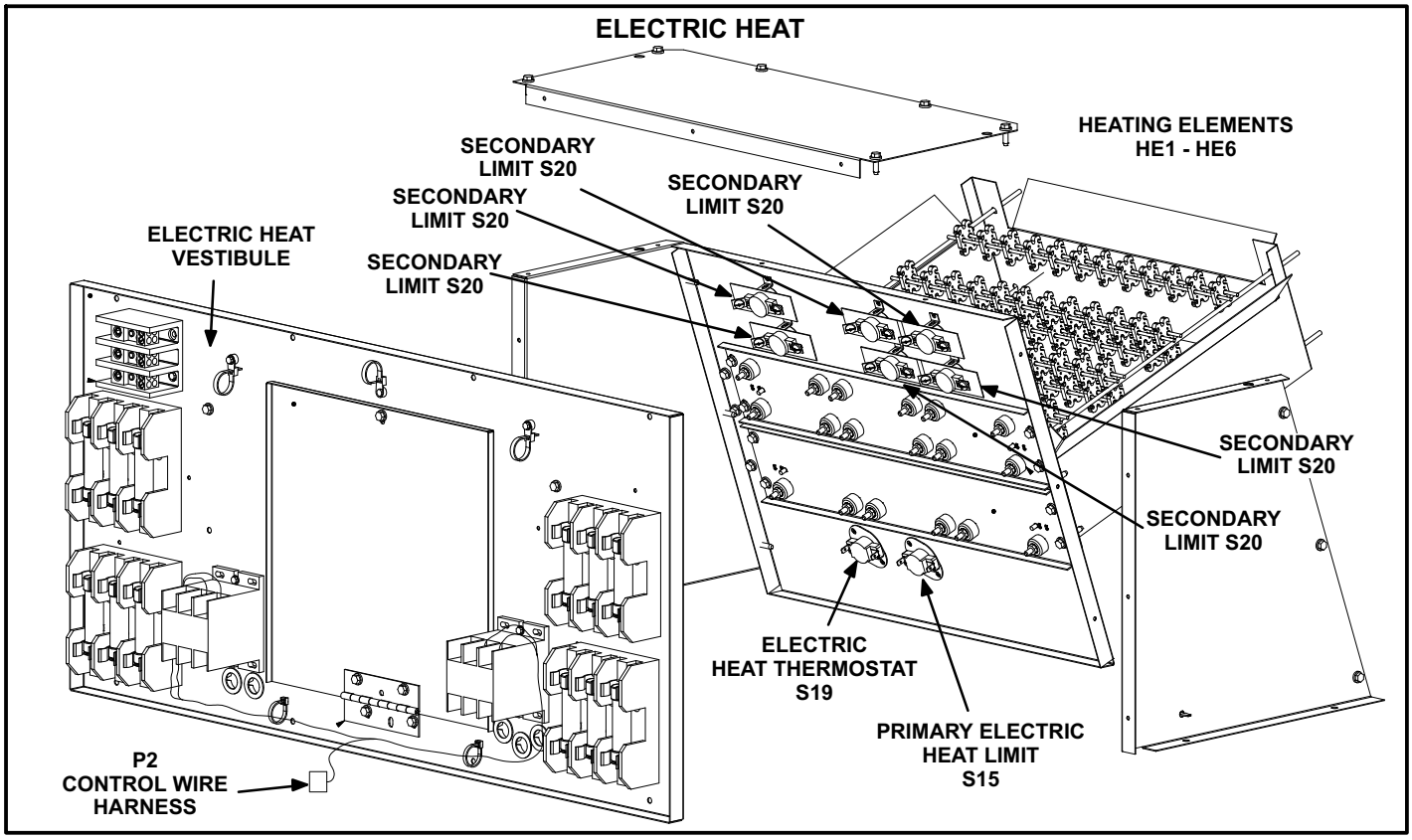


FIGURE 20

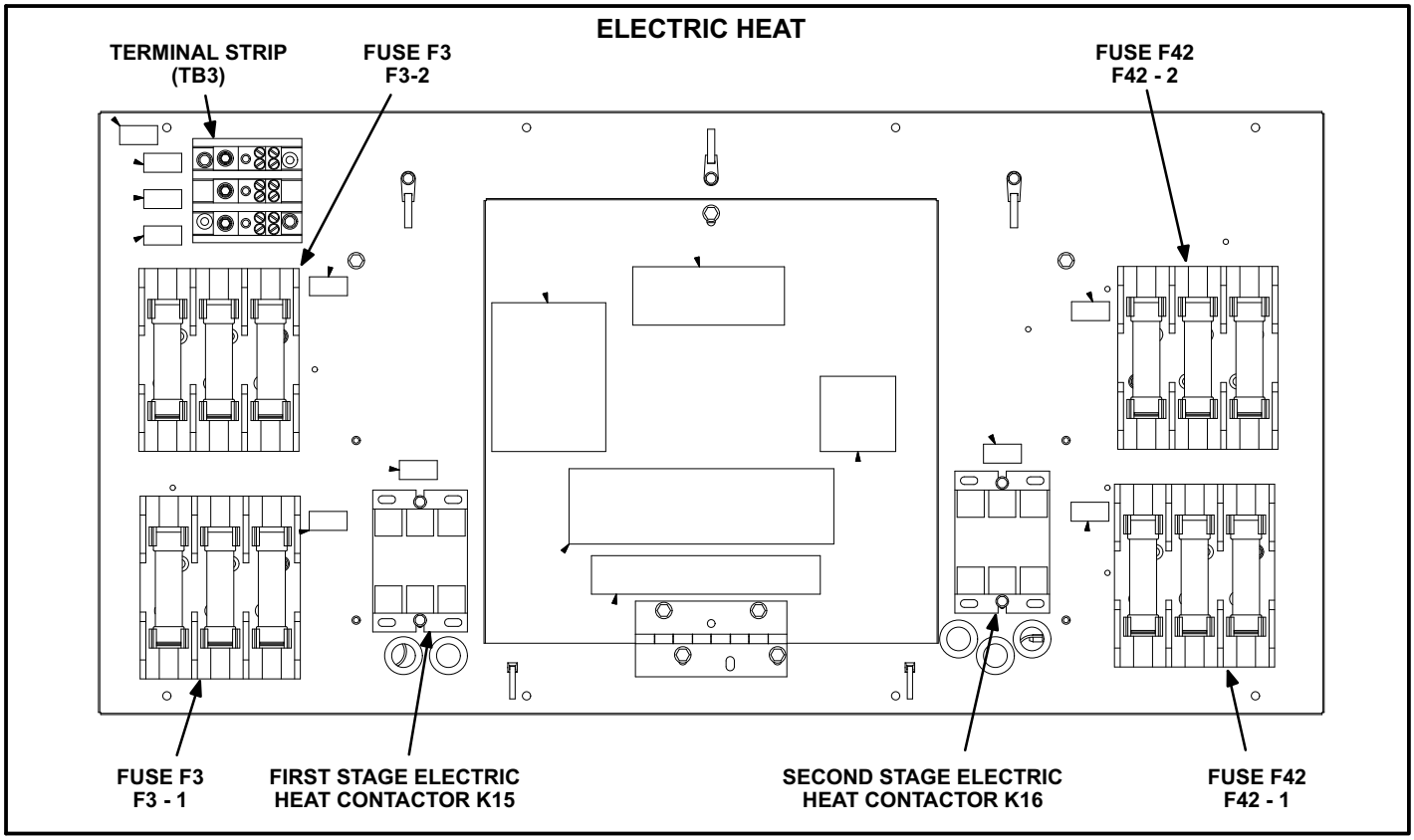


FIGURE 21

TABLE 3

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

II-PLACEMENT AND INSTALLATION

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

III-CHARGING

⚠ WARNING

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

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

⚠ IMPORTANT

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

A-Refrigerant Charge and Check - All-Aluminum Coil 092H, 102H, 120H, 150S Units

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, *reclaim the charge, evacuate the system,* and *add required nameplate charge.*

*NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge **must** be weighed into the system.*

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

IMPORTANT - Charge unit in standard cooling mode.

1 Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with econo-

mizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.

2 Check each system separately with all stages operating. Compare the normal operating pressures (see tables 4 - 7) to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

Note - Pressures are listed for sea level applications.

4 Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

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

6 Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 Example LCH092 Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 96°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 4

LCH092H All-Aluminum Coil Normal Operating Pressures - TXV

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	110	235	113	273	116	316	117	363	120	423	123	478
	120	235	122	275	124	319	124	367	129	419	131	480
	140	241	141	278	142	321	145	370	148	420	150	479
	158	248	162	285	166	328	168	374	170	427	173	481
Circuit 2	111	233	114	270	117	310	116	362	119	417	122	481
	120	236	122	272	124	314	126	359	128	415	130	482
	140	239	142	275	143	317	147	359	148	412	151	472
	158	247	163	282	167	323	169	368	171	417	173	473

TABLE 5

LCH102H All-Aluminum Coil Normal Operating Pressures - TXV												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	106	232	113	274	116	321	119	366	119	416	124	475
	120	239	124	276	124	321	127	367	128	421	134	477
	139	246	144	285	144	326	148	372	149	425	153	482
	158	259	161	293	167	336	168	378	171	435	175	488
Circuit	110	233	113	273	114	317	118	364	118	420	123	493
	119	236	122	274	123	317	125	363	128	420	131	488
	139	241	143	280	143	319	146	368	147	417	150	483
	158	254	161	287	167	328	168	370	171	426	174	480

TABLE 6

LCH120H All-Aluminum Coil Normal Operating Pressures - TXV												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	113	251	113	290	112	331	116	383	117	439	120	520
	120	254	123	293	124	338	126	388	127	441	129	510
	139	264	142	303	144	345	147	393	146	445	148	510
	155	278	160	314	164	357	167	403	169	456	173	512
Circuit 2	110	251	111	287	111	329	114	388	117	454	120	538
	119	249	120	291	122	336	124	389	126	447	128	520
	139	259	142	297	143	337	145	390	144	444	149	514
	155	274	160	307	164	349	166	393	169	448	170	510

TABLE 7

LCH150S All-Aluminum Coil Normal Operating Pressures - TXV												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	111	259	113	301	115	345	114	396	117	456	120	526
	121	264	122	303	124	351	125	398	128	455	130	524
	140	274	142	313	145	357	146	405	148	460	151	525
	159	285	163	327	165	369	166	413	171	471	174	532
Circuit 2	111	253	113	290	115	334	114	381	117	440	120	523
	122	255	122	294	124	336	125	385	127	440	130	520
	140	263	142	302	144	345	145	391	147	445	150	510
	159	274	163	314	165	355	165	397	170	455	172	513

B-Refrigerant Charge and Check - Fin/Tube Coil - TXV LCH092H, 102H, 120H, 150S

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, *reclaim the charge, evacuate the system,* and *add required nameplate charge.*

*NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C) , the charge **must** be weighed into the system.*

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

IMPORTANT - Charge unit in standard cooling mode.

1 Attach gauge manifolds and operate unit in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.

2 Check each system separately with all stages operating.

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

4 Apply the outdoor temperature to tables 8 through 15 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.

5 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.**

6 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.

7 Use the following approach method along with the normal operating pressures to confirm readings.

TABLE 8
LCH092H Fin/Tube Coil - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	240	142	257	141
75° F	277	143	292	142
85° F	317	145	333	145
95° F	362	148	378	147
105° F	410	151	422	149
115° F	460	154	472	152

TABLE 9
LCH092H Fin/Tube Coil Hot Gas Reheat - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	247	140	257	141
75° F	284	142	294	144
85° F	324	144	334	147
95° F	367	145	375	149
105° F	417	147	423	152
115° F	468	150	469	154

TABLE 10
LCH102H Fin/Tube Coil - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	245	142	262	142
75° F	281	144	298	144
85° F	322	146	341	146
95° F	367	149	384	148
105° F	415	152	430	150
115° F	465	154	475	153

TABLE 11
LCH102H Fin/Tube Coil Hot Gas Reheat - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	250	140	262	141
75° F	289	143	301	144
85° F	328	145	339	147
95° F	374	147	382	150
105° F	425	149	429	153
115° F	478	151	473	155

TABLE 12
LCH120H Fin/Tube Coil - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	259	137	283	139
75° F	297	140	321	142
85° F	338	143	360	144
95° F	382	146	406	146
105° F	431	149	453	148
115° F	486	151	505	151

TABLE 13
LCH120H Fin/Tube Coil Hot Gas Reheat - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	266	134	281	139
75° F	303	137	310	141
85° F	344	140	358	143
95° F	391	143	403	145
105° F	443	146	450	146
115° F	499	149	497	148

TABLE 14
LCH150S Fin/Tube Coil - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65° F	275	140	298	139
75° F	312	142	335	141
85° F	354	143	374	142
95° F	398	146	419	146
105° F	449	149	465	148
115° F	500	151	514	150

TABLE 15
LCH150S Fin/Tube Coil Hot Gas Reheat - TXV

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65° F	280	136	296	136
75° F	319	141	335	141
85° F	360	142	376	143
95° F	407	144	420	144
105° F	455	147	466	147
115° F	510	150	518	150

Charge Verification - Approach Method - AHRI Testing (Fin/Tube Coil Continued)

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

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

2 Approach temperature should match values in table 16. 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 tables 8 through 15 as a guide for typical operating pressures.

TABLE 16
APPROACH TEMPERATURE - FIN/TUBE COIL - TXV

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
092	6°F ± 1 (3.3°C ± 0.5)	7°F ± 1 (3.9°C ± 0.5)
102	6°F ± 1 (3.3°C ± 0.5)	9°F ± 1 (5.0°C ± 0.5)
120 & 150	6°F ± 1 (3.3°C ± 0.5)	10°F±1 (5.6°C ± 0.5)
092, 120 & 150 Hot Gas Reheat	6°F ± 1 (3.3°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)
102 Hot Gas Reheat	6°F ± 1 (3.3°C ± 0.5)	9°F ± 1 (5.0°C ± 0.5)

F-Refrigerant Charge and Check - Fin/Tube Coil & RFC

LCH150S

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, *reclaim the charge, evacuate the system,* and *add required nameplate charge.*

NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge ***must*** *be weighed into the system.*

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

IMPORTANT - Charge unit in standard cooling mode.

1 Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.

2 Check each system separately with all stages operating. Compare the normal operating pressures (see table 17) to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

Note - Pressures are listed for sea level applications.

4 Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

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

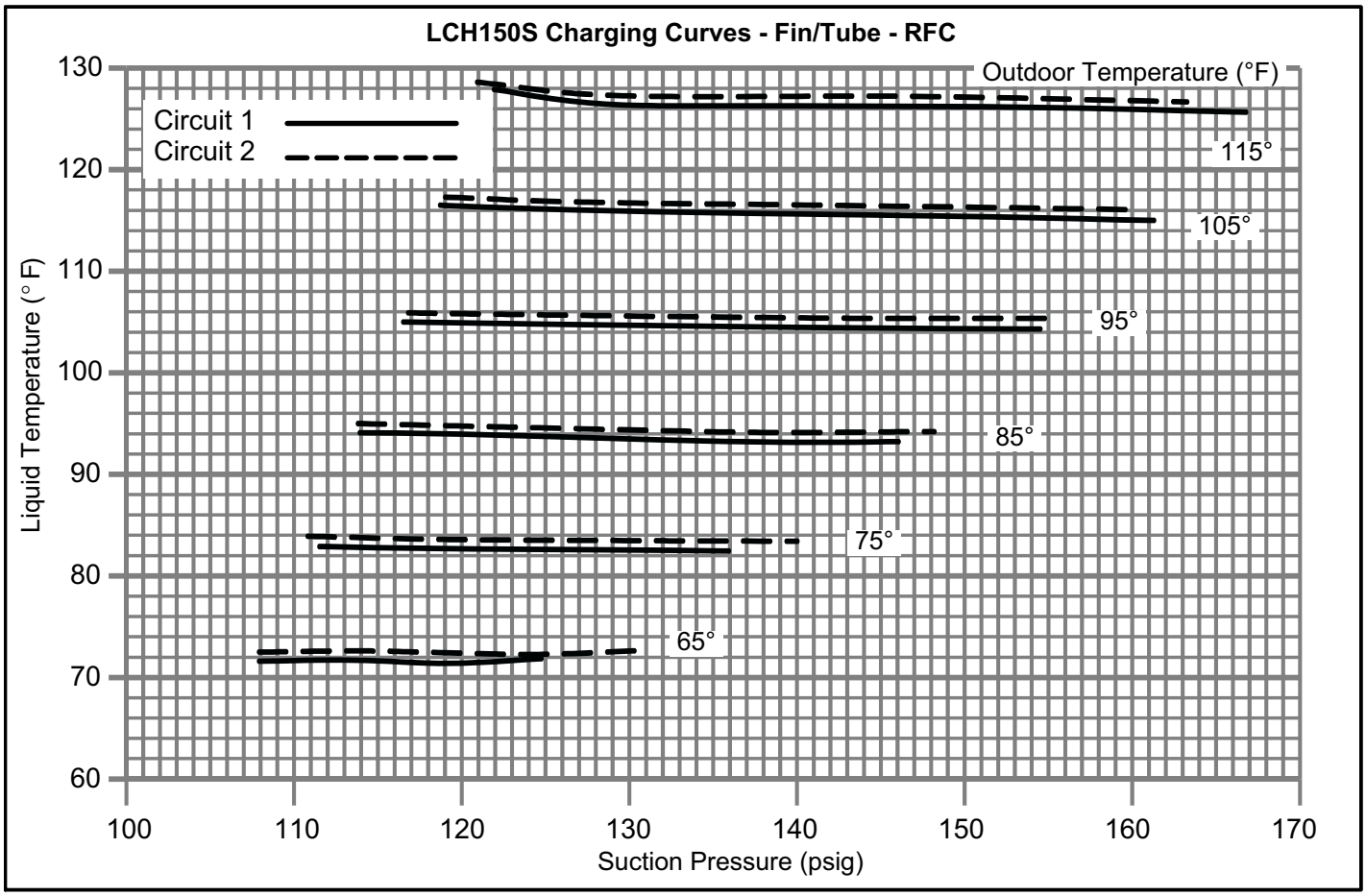
6 Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 Example LCH150 Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 96°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 17

LCH150S Normal Operating Pressures - Fin/Tube - RFC												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	108	253	112	295	114	338	117	384	119	438	122	501
	114	255	119	296	122	342	125	390	127	444	129	501
	119	257	129	303	136	348	141	403	145	460	149	522
	125	264	136	308	146	358	155	413	161	470	167	530
Circuit 2	108	273	111	314	114	356	117	400	119	451	121	508
	115	277	119	318	122	362	125	409	128	460	129	512
	124	284	131	327	137	372	141	422	145	474	147	532
	131	289	140	334	148	382	155	434	160	486	163	541

LCH150S Charging Curves - Fin/Tube - RFC



G-Refrigerant Charge and Check - Fin/Tube Coil & TXV

LCH094U, 122U, 152U

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. This unit is equipped with solenoid valves which do not allow refrigerant flow between the high side and the low side when the unit is de-energized. When reclaiming/ evacuating the system, make sure refrigerant/vacuum is pulled from both the suction and discharge lines. When adding nameplate charge, add 1/3 to the suction line and 2/3 to the discharge line.*

NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C) , the charge ***must*** *be weighed into the system.*

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

IMPORTANT - Charge unit in standard cooling mode.

1 Attach gauge manifolds and operate unit in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.

2 Make sure both compressors are operating.

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

4 Apply the outdoor temperature to tables 18 through 20 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.

5 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.**

6 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.

7 Use the following approach method along with the normal operating pressures to confirm readings.

TABLE 18
LCH094U

Outdoor Coil Entering Air Temp	Discharge ±10 psig	Suction ±5 psig
65° F	238	136
75° F	273	141
85° F	313	143
95° F	361	146
105° F	396	149
115° F	448	152

TABLE 19
LCH122U

Outdoor Coil Entering Air Temp	Discharge ±10 psig	Suction ±5 psig
65° F	250	134
75° F	288	138
85° F	331	141
95° F	378	143
105° F	412	144
115° F	463	147

TABLE 20
LCH152U

Outdoor Coil Entering Air Temp	Discharge ±10 psig	Suction ±5 psig
65° F	266	129
75° F	305	132
85° F	346	134
95° F	391	138
105° F	443	141
115° F	498	143

Charge Verification - Approach Method - AHRI Testing (Fin/Tube Coil Continued)

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

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

2 Approach temperature should match values in table 21. 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 tables18 through20 as a guide for typical operating pressures.

TABLE 21
APPROACH TEMPERATURE - 094, 122, 152

Unit	Liquid Temp. Minus Ambient Temp.
	Full Load (Both Compressors)
094	5°F ± 1 (2.8°C ± 0.5)
122, 152	4°F ± 1 (2.2°C ± 0.5)

IV-STARTUP - OPERATION

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

A-Preliminary and Seasonal Checks

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

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

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

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

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

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

B-Cooling Startup See figures 22, 23 or 24 for circuits

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.

LCH092H, 102H, 120H and 150S (Figure 22 or 23)

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

2 First-stage thermostat demand will energize compressor 1 and condenser fans 1 and 2. Second-stage thermostat demand will energize compressor 2.

3 Units contain two refrigerant circuits or stages.

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

LCH094U, 122U and 152U (Figure 24)

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

2 First-stage thermostat demand will energize compressor 1 and condenser fans 1, 2 and 3 on low speed..

Second-stage thermostat demand will energize compressor 2 and condenser fans 1, 2 and 3 on high speed.

3 Units contain one common (tandem) refrigerant circuit.

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

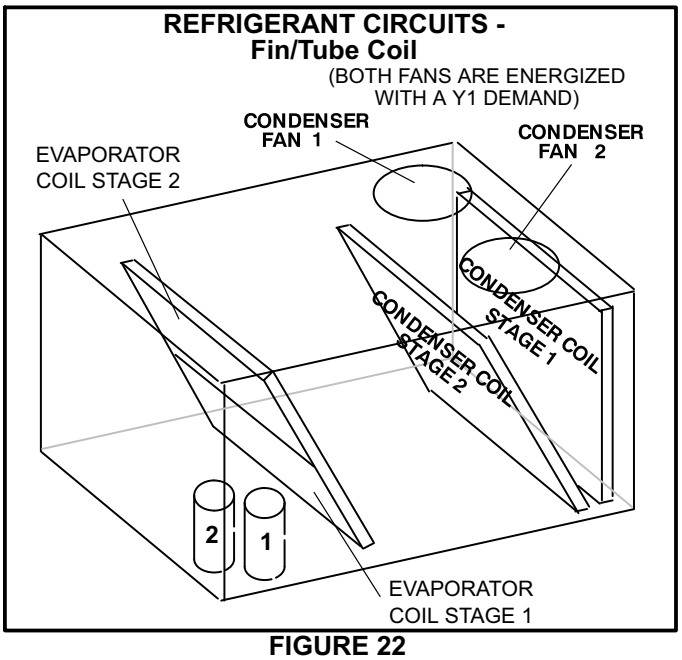


FIGURE 22

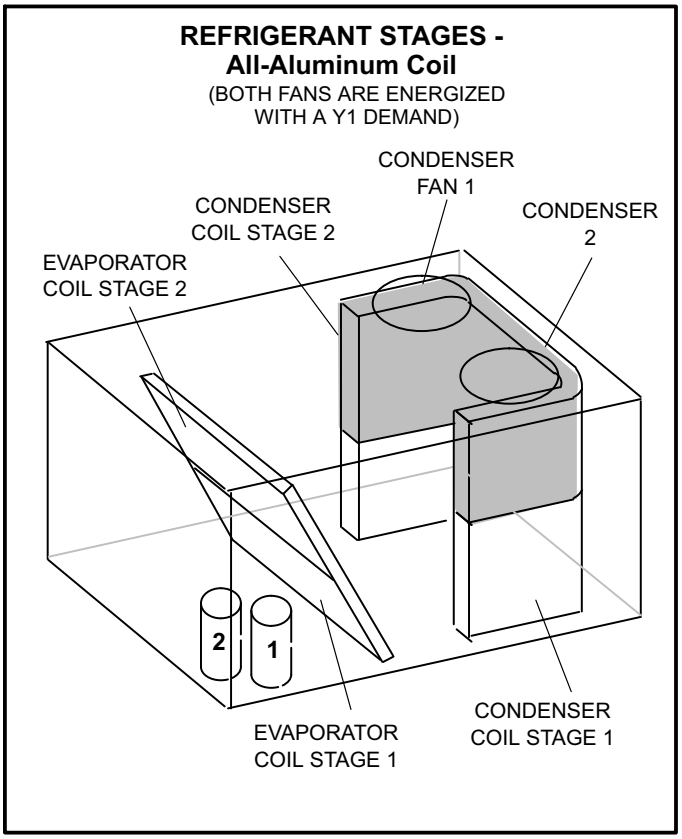


FIGURE 23

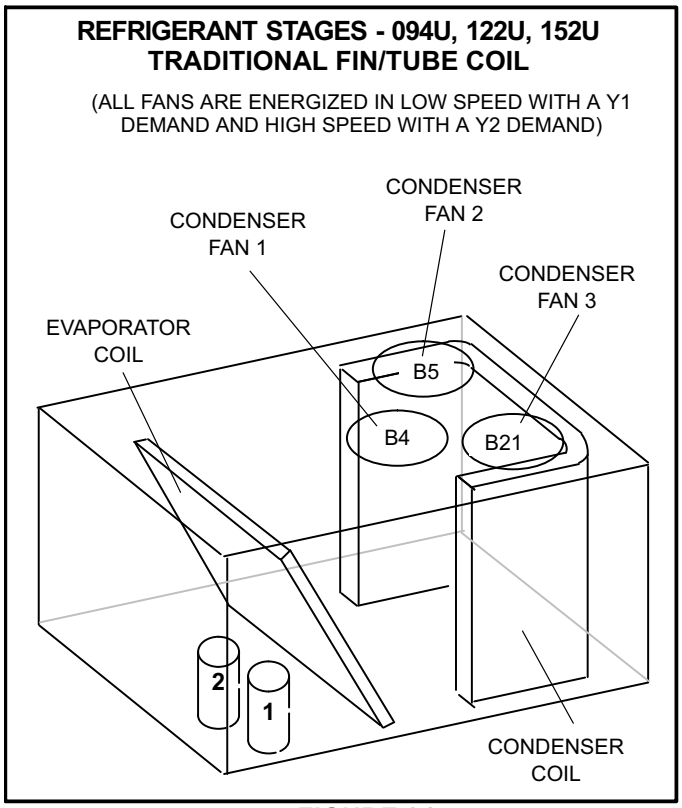


FIGURE 24

V- SYSTEMS SERVICE CHECKS

A-Electrical

1 Check all wiring for loose connections.

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

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

VI-ACCESSORIES

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

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LCH units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled C1CURB mounting frame is shown in figure 25. 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 26. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

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

C-C1DAMP Outdoor Air Dampers (all units)

C1DAMP consists of a set of dampers which may be manually C1DAMP10B-2 or motor C1DAMP20B-1 operated to allow up to 25 percent outside air into the system at all times (see figure 27 or 28). Either air damper can be installed in LCH units. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild detergent. It should be sprayed with Filter Handicoater when dry prior to reinstallation. Filter Handicoater is R.P. Products coating no. 418 and is available as Part No. P-8-5069.

D-Supply and Return Diffusers (all units)

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

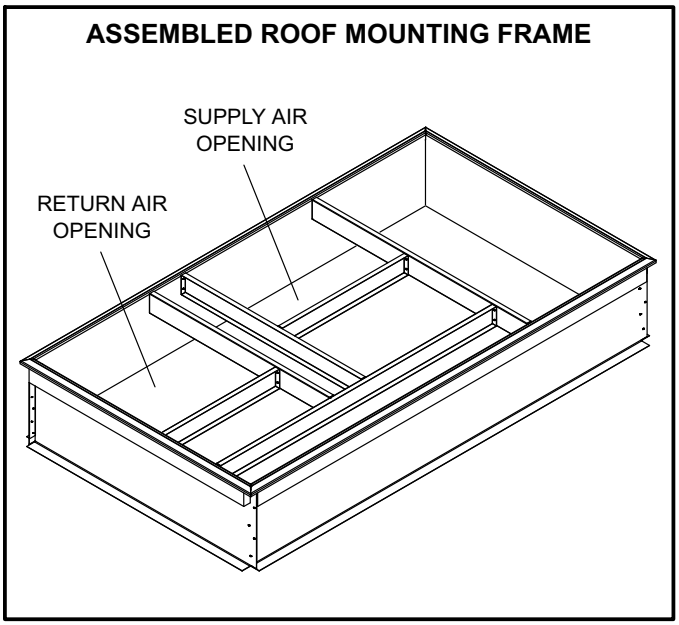


FIGURE 25

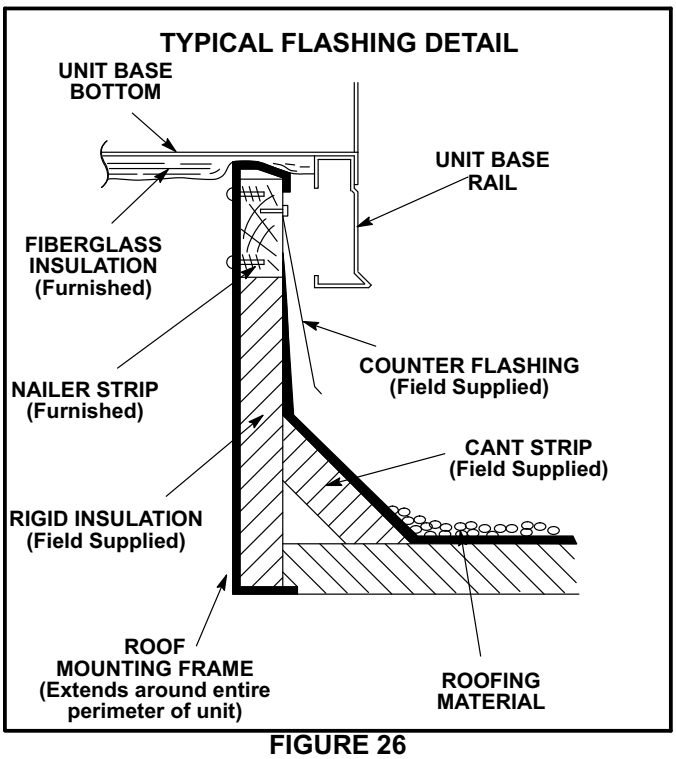


FIGURE 26

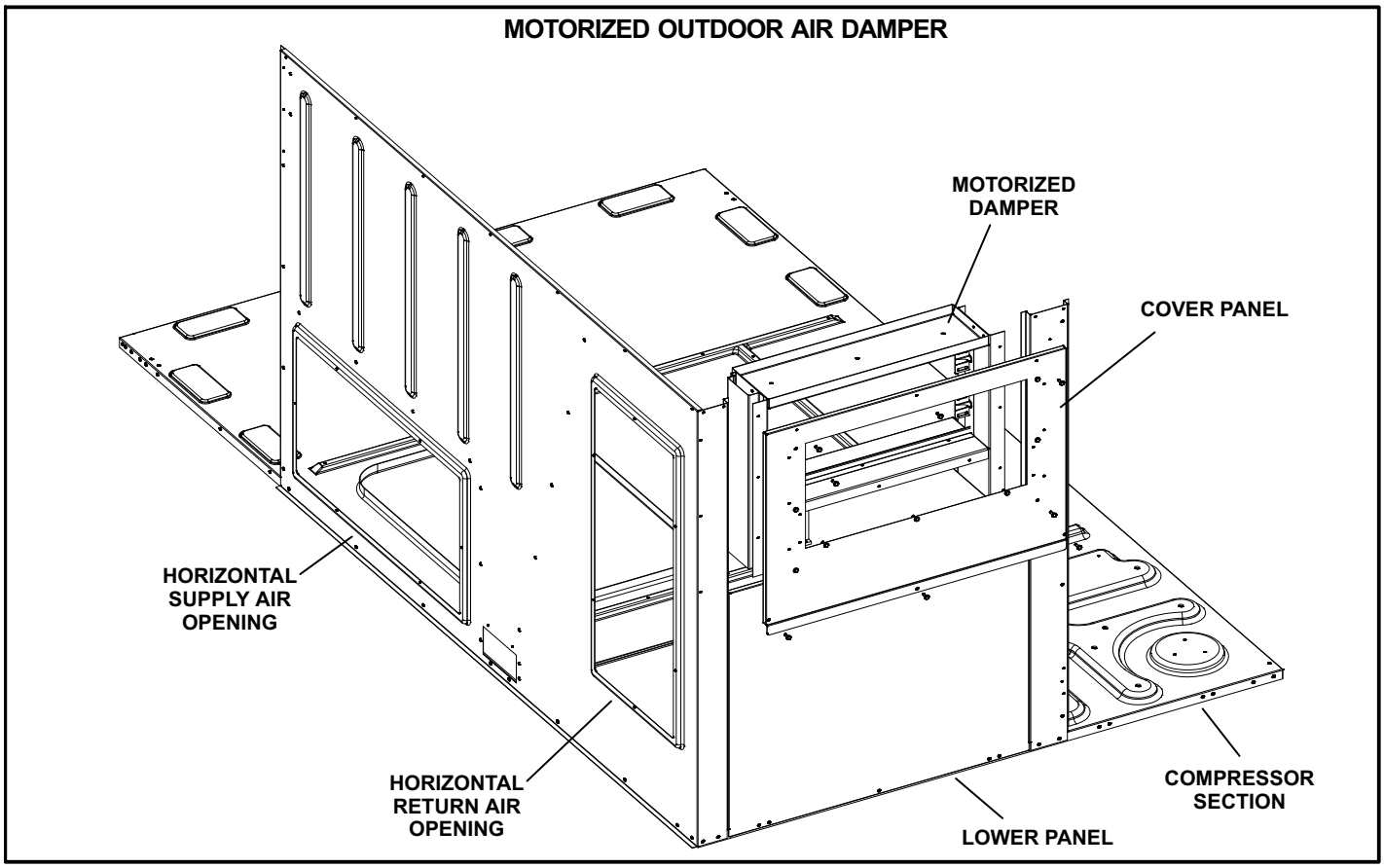


FIGURE 27

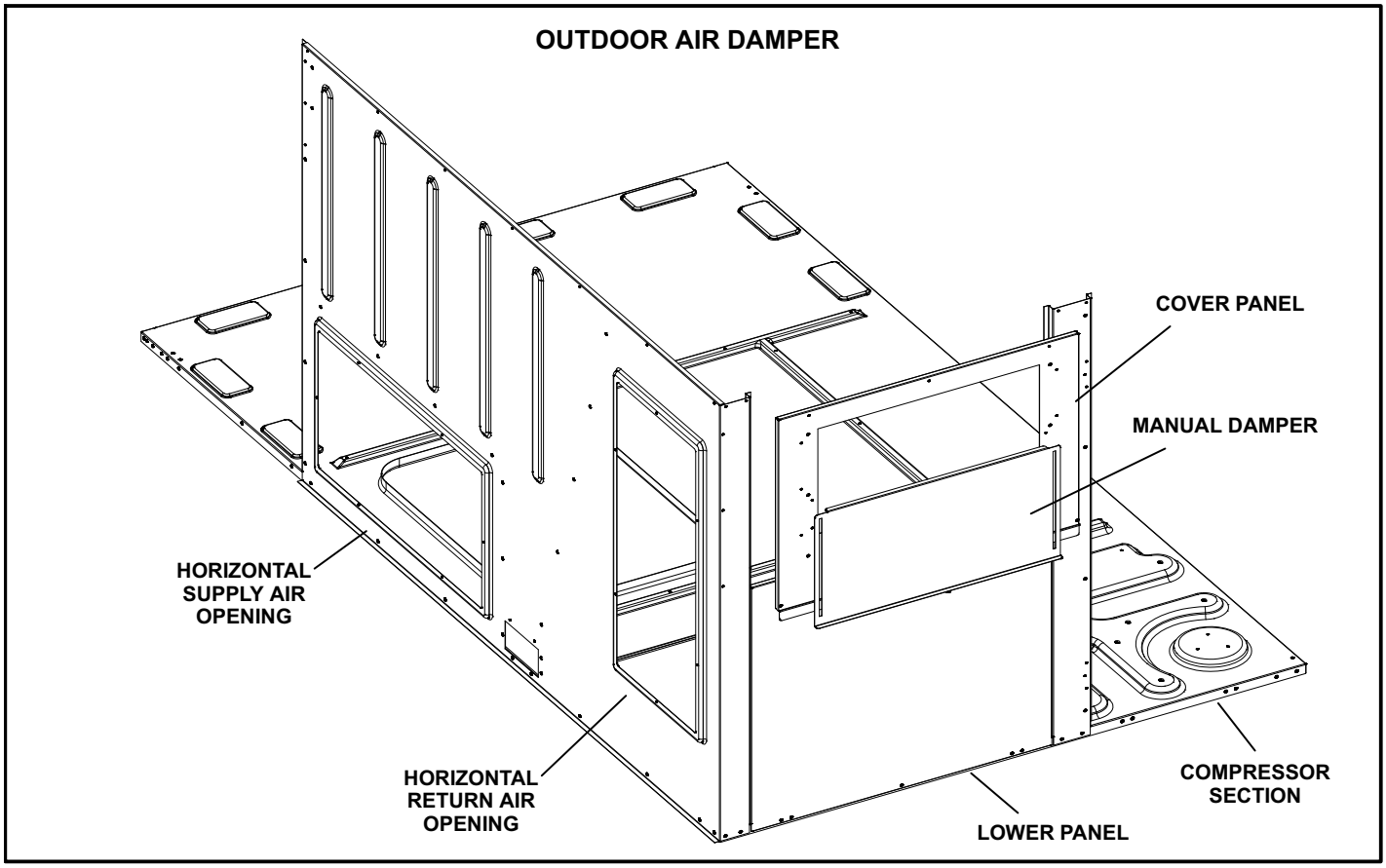


FIGURE 28

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

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

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See figure 29. The economizer uses outdoor air for free cooling when outdoor temperature and/or humidity is suitable. The economizer is controlled by the A55 Unit Controller.

Free Cooling Mode

The Unit Controller will allow free cooling in one of five modes. Each mode uses different combinations of sensors to determine outdoor air suitability. See table 22 for modes. See figure NO TAG for factory-installed sensors. Temperature offset is the default free cooling mode.

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

Unit Controller Settings

On early versions, switches are located on the Unit Controller to adjust settings. On newer versions, the display and keypad on the Unit Controller are used to navigate through menus to adjust settings. Some versions require a configuration ID be entered to enable the economizer. Refer to economizer installation instructions and Unit Controller installation and application manuals.

TABLE 22
ECONOMIZER MODES AND SETPOINT

Free Cooling Mode	Free Cooling Setpoint	Field-Provided Sensors	Dampers will modulate to 55°F (default, parameter 159) discharge air (RT6) when outdoor air is suitable:	Input Ranges
TEMP	OFFSET	None Needed	Outdoor air temperature (RT17) is less than return air temperature (RT16) by at least the OFFSET value (10°F default; parameter 161).	0-40°F
TEMP	OAT STPT	None Needed	Outdoor air temperature (RT17) is less than the OAT STPT value (75°F default; parameter 160).	41-75°F
Remote	Remote	Energy Management System**	Either of the TEMP modes can be used when a network OAS signal is provided by an energy management or building control system, via BACnet, LonTalk, or L Connection. The network can command OAS, NOT OAS, or AUTO. AUTO returns to local control of OAS, which is the selected TEMP mode.	NA
ENTH	DIFF OFFSET	(Two) C7400	Outdoor air enthalpy* (A7) is less than return air enthalpy (A62) by at least the OFFSET value (1mA = 2°F default; parameter 163).	0mA-4mA
ENTH	ODE STPT	C7400	Outdoor air enthalpy (A7) is less than free cooling setpoint (12mA = 75°F default, parameter 162).	12-19mA
GLOBAL	GLOBAL	24VAC Input Signal	Global input is energized by (P297-9). This setting is also used for outdoor air damper applications. Global input also brings on the blower. (This mode is NOT used when OAS signal is provided via network connection. GLO is only used when a 24VAC signal is used to energize the P297-9 GLO input.)	NA

*Enthalpy includes effects of both temperature and humidity.

**Energy management systems may require additional field-provided sensors; refer to manufacturer's instructions.

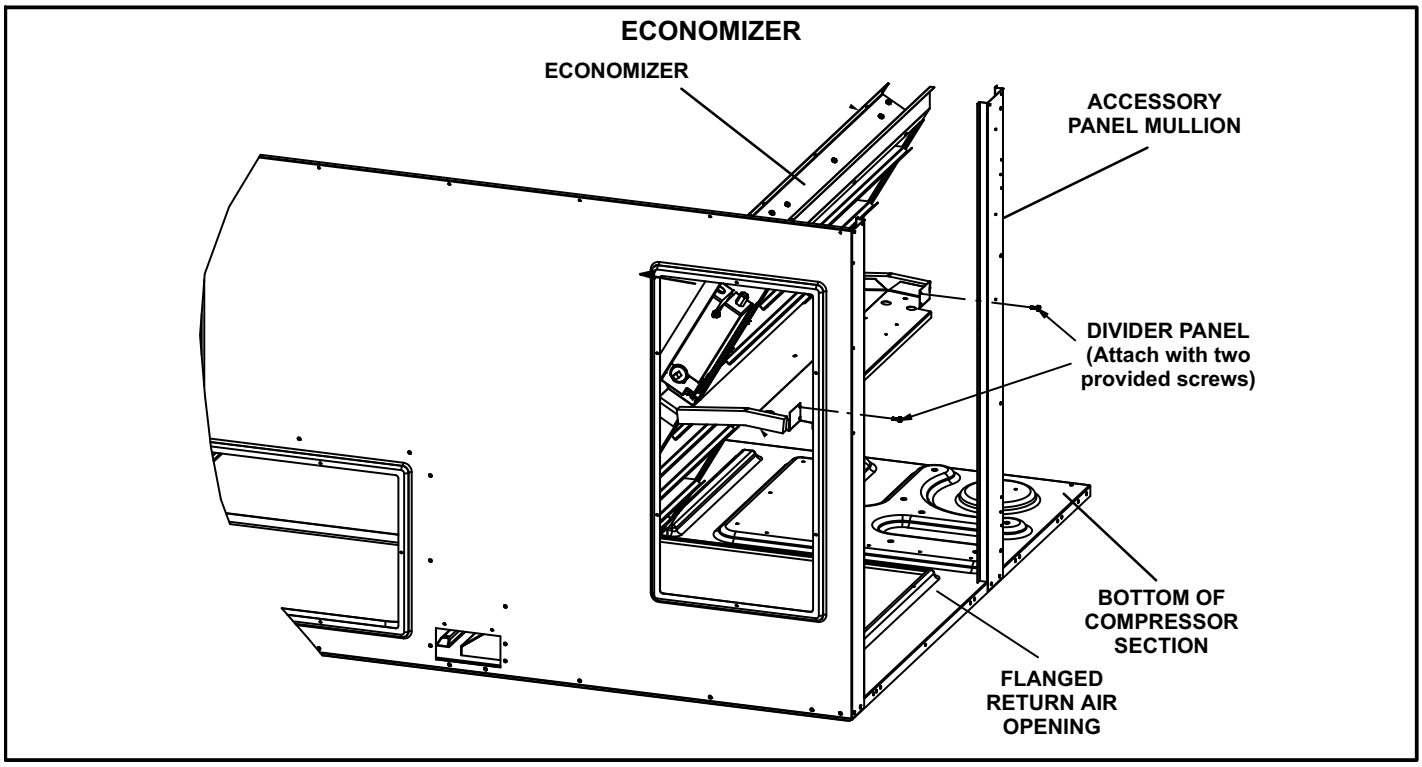


FIGURE 29

F-Gravity Exhaust Dampers

LAGEDH03/15 dampers (figure 30) are used in downflow and horizontal air discharge applications. Horizontal gravity exhaust dampers are installed in the return air plenum . The dampers must be used any time an economizer or power exhaust fans are applied to LCH units.

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

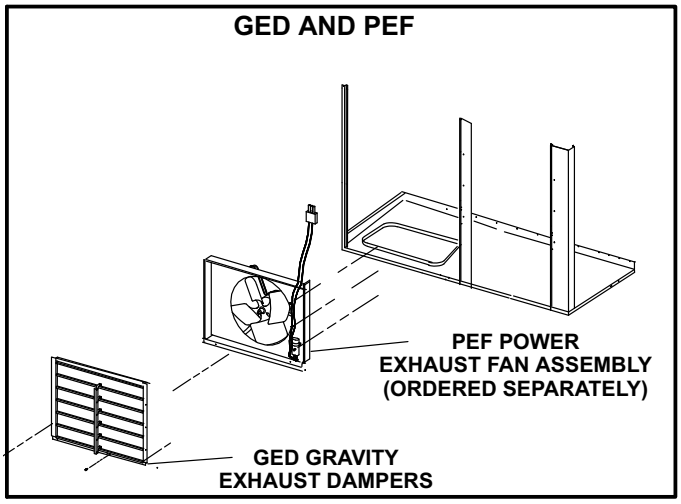


FIGURE 30

G-K1PWRE10B Power Exhaust Fans

Power exhaust fans are used in downflow applications only. Fan requires optional down flow gravity exhaust dampers and economizer. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. Figure 31 shows the location of the LAPEF. See installation instructions for more detail.

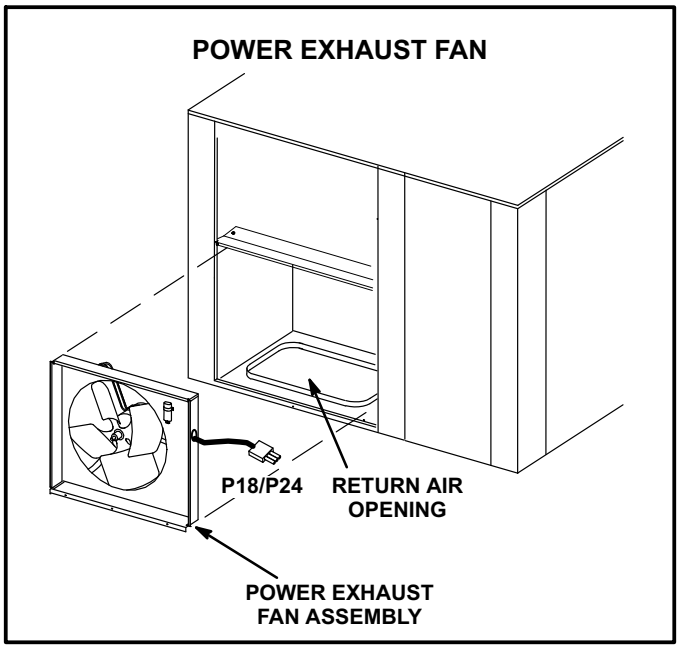


FIGURE 31

H-Control Systems

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

I-Smoke Detectors A17 and A64

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

J-Blower Proving Switch S52

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

K-Dirty Filter Switch S27

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

L-Indoor Air Quality (CO_2) Sensor A63

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

M-Drain Pan Overflow Switch S149 (optional)

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

N-Factory Installed-Hot Gas Reheat (option)

General

Hot Gas Reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See figure 32 for reheat refrigerant routing and figure 33 for standard cooling refrigerant routing.

L14 Reheat Coil Solenoid Valve

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

Reheat Setpoint

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

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

Check-Out

Test Hot Gas Reheat operation using the following procedure.

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

2 Make sure unit is in local thermostat mode.

3 Select Unit Controller *Service - Test.*

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

4 Deselect Unit Controller *Service - Test.*

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

Default Reheat Operation

TABLE 23
Reheat Operation - Two Cooling Stages - Default

T'stat and Humidity Demands	Operation
Reheat Only	Compressor 1 Reheat
Reheat & Y1	Compressor 1 Reheat & Compressor 2 Cooling*
Reheat & Y1 & Y2	Compressor 1 Cooling & Compressor 2 Cooling**

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

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

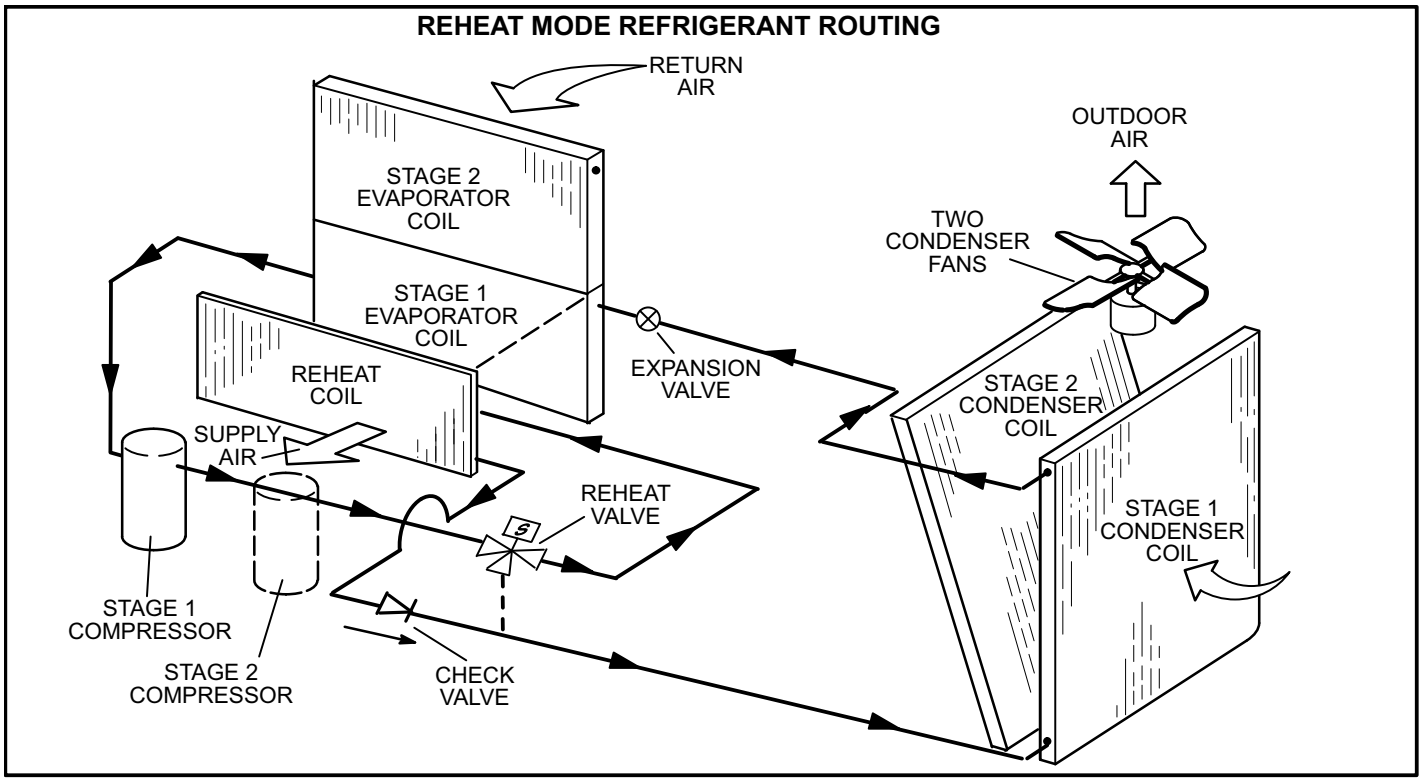


FIGURE 32

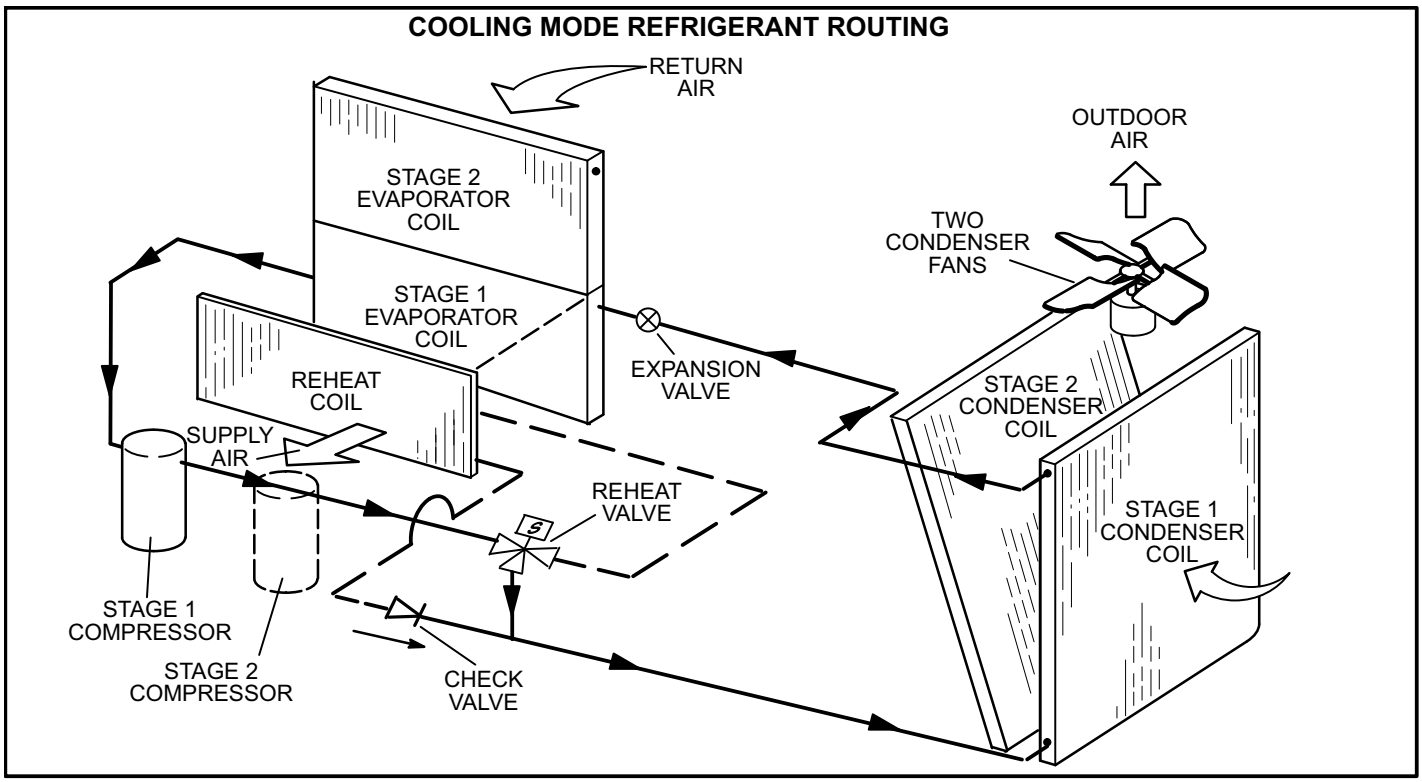


FIGURE 33

VII-Belt Drive Supply Air Inverter

The supply air inverter or variable frequency drive (VFD), is located in the compressor compartment. The VFD stages the amount of supply airflow according to the number of compressors operating.

The amount of airflow for each stage is set in the Unit Controller when the unit is initially commissioned. Each value is recorded on a label on the inside of the compressor access panel. Settings can also be read on the Unit Controller display. Use one of the following menus.

M2 Unit Controllers:

Data > Status > Blower

M3 Unit Controllers:

DATA > ADVANCED STATUS > BLOWER > BLOWER STATUS

Use figure 34 to determine whether the VFD should be providing a staged output to the blower motor.

⚠WARNING

ELECTRICAL SHOCK HAZARD.

Failure to follow instructions exactly could result in serious injury or death.

VFD HOLDS A POTENTIALLY LETHAL CHARGE UP TO 10 MINUTES AFTER POWER HAS BEEN DISCONNECTED. Do not open VFD cover until 10 minutes AFTER power source has been disconnected and power lamp has turned off.

Read manual provided by VFD manufacturer. Carefully review and follow all safety warnings in that manual also.

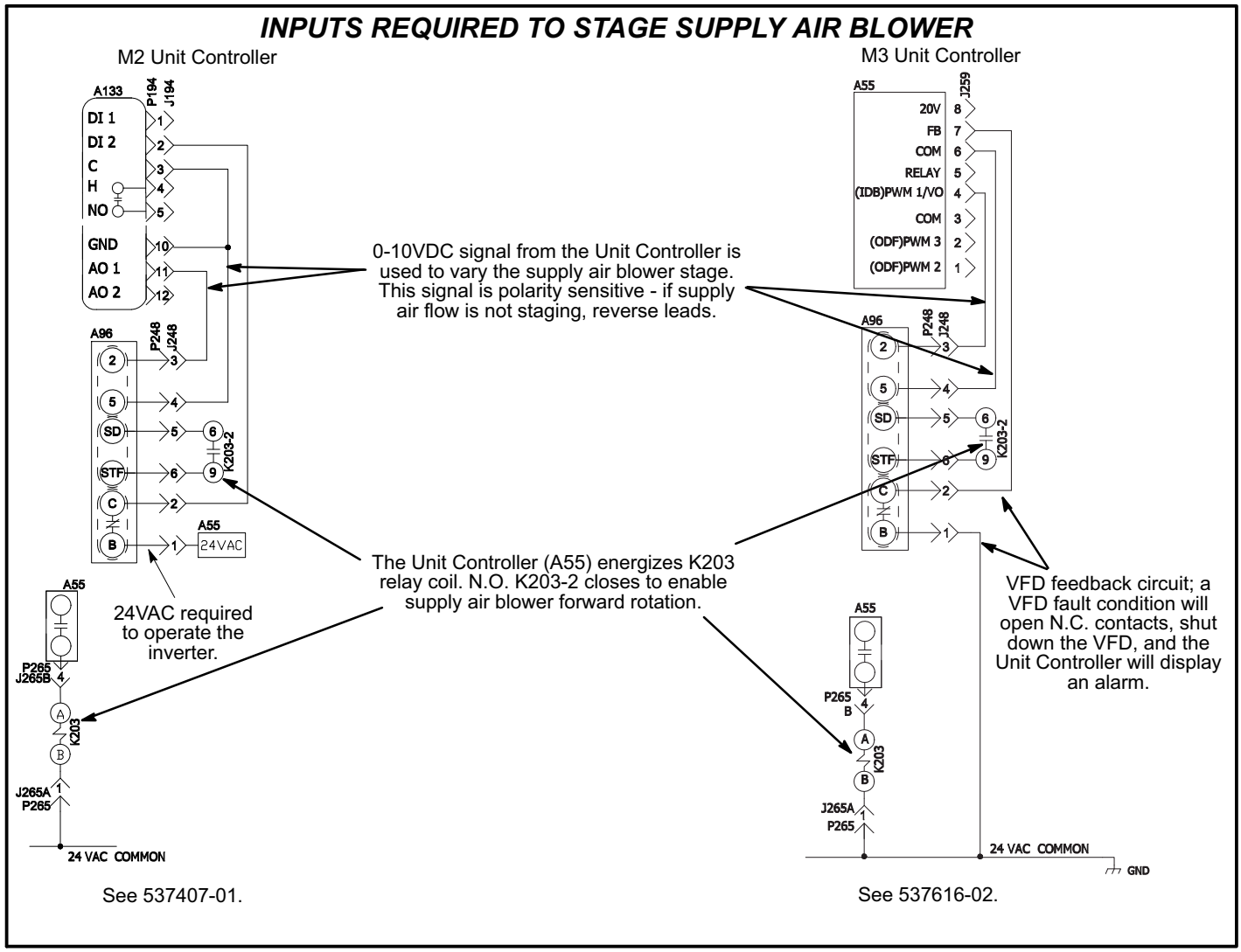


FIGURE 34

ADJUST CFM

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

A-Design Specifications

Use table 24 to fill in field-provided, design specified blower CFM.

B-Set Maximum CFM

Use table 24 to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See section 1-UNIT COMPONENTS; C-Blower Compartment; *Determining Unit CFM*.

TABLE 24
Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Low	
Ventilation	

C-Enter Design Specifications Into Controller

Use the following menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in table 25. Refer to the Unit Controller manual provided with unit.

M2 Unit Controller -

Settings > Control > Guided Setup > Advanced Guided Setup > Setup Equipment >Change MSAV™ *Settings?>Yes*

M3 Unit Controller -

SETUP > TEST & BALANCE > BLOWER >

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

The Unit Controller will calculate the "midpoint" CFM.

Set Minimum Position 1

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

M2 Unit Controller -

Settings > Control > MSAV > Damper > Low Speed

M3 Unit Controller -

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

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

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

Set Minimum Position 2

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

M2 Unit Controller -

Settings > Control > MSAV > Damper > High Speed

M3 Unit Controller -

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

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

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

E-VFD Bypass Option

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

M2 Unit Controller -

Settings > Control > MSAV > VFD Bypass >

M3 Unit Controller -

SETTINGS>RTU OPTIONS>BLOWER>VFD BYPASS

To configure the unit to by-pass the VFD automatically, use the following Unit Controller menu and set to "automatic":

M2 Unit Controller -

Settings > Install > New M2 > MSAV VFD Bypass >

M3 Unit Controller -

SETUP > INSTALL > PRESS SAVE UNTIL THE MENU READS CONFIGURATION ID 1 > CHANGE CHARACTER POSITION 6TH TO "A" FOR AUTOMATIC BYPASS OPTION AND SAVE

Caution - Units not equipped with a VFD will be set to Settings > Control > MSAV VFD Bypass > None. The blower motor could be damaged and/or result in product or property damage if the setting is changed to automatic or manual.

TABLE 25
MINIMUM AND MAXIMUM CFM
092H, 102H, 120H, 150S

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM
LGH092-150	Std. , Med.	2225
LGH092-150	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCH092-102	0	2800
LCH092-150	7.5, 15, 22.5, 30, 45	2800
LCH120-150	0, 60	4000
Cooling Minimum CFM - 220* CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	Low	1650
LGH/LCH102	Low	1870
LGH/LCH120	Low	2200
LGH/LCH150	Low	2750
Cooling Minimum CFM - 280* CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	High	2100
LGH/LCH102	High	2380
LGH/LCH120	High	2800
LGH/LCH150	High	3500
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGH/LCH092	NA	1125
LGH/LCH102	NA	1275
LGH/LCH120	NA	1500
LGH/LCH150	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	High	3600
LGH/LCH102	High	4080
LGH/LCH120	High	4800
LGH/LCH150	High	6000

**Refer to table 27 for ultra high efficiency unit minimum CFM / ton. Ultra high efficiency units are equipped with tandem compressors which allow lower minimum airflow.*

VIII-Direct Drive Supply Air Inverter

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

A-Set Blower Speed

1 Use table 26 to fill in field-provided, design specified blower CFM.

TABLE 26
Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Low	
Ventilation	

2 Use the following menu to enter the blower design specified CFM into the Unit Controller. ***Don't press "SAVE" until all CFM are entered.*** Make sure blower CFM is within limitations shown in table 27. Refer to the Unit Controller manual provided with unit.

SETUP > TEST & BALANCE > BLOWER

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

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

4 Measure the static pressure as shown in the *Blower Start-Up* section. Use the static pressure, target CFM and blower tables to determine the RPM needed. Values in the blower table reflect the static pressures taken in locations shown in figure 17.

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

6 Press SAVE followed by MAIN MENU.

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

B-Set Damper Minimum Position

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

The Unit Controller will calculate the “midpoint” CFM.

Set Minimum Position 1

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

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

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

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

Set Minimum Position 2

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

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

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

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

TABLE 27
MINIMUM AND MAXIMUM CFM
094U4E, 122U4E, 152U4E

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM*
LGH094-152	Std. , Med.	2225
LGH094-152	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCH094	7.5	1750
LCH094	0, 15, 22.5, 30, 45	2750
LCH122, 152	15, 22.5, 30, 45	2750
LCH122, 152	0, 60	3500
Cooling Low Minimum CFM - 160 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	Low	1200
LGH/LCH122	Low	1600
LGH/LCH152	Low	2000
Cooling High Minimum CFM - 220 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	1650
LGH/LCH122	High	2200
LGH/LCH152	High	2750
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGH/LCH094	NA	1125
LGH/LCH122	NA	1500
LGH/LCH152	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	3600
LGH/LCH122	High	4800
LGH/LCH152	High	6000

*Rounded to nearest 25 CFM.

IX-Staged Supply Air Operation

This is a summary of cooling operation for both belt and direct drive blowers.

Note - During a dehumidification demand the blower operates at the highest speed. Free cooling is locked-out during reheat operation. Refer to Hot Gas Reheat start-up and operation section for details.

A-Two-Stage Thermostat

1-Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate

Note - If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On (on ultra high efficiency units, one compressor will operate)
Blower Cooling Low
Dampers Minimum Position

Y2 Demand -

Compressor 1 and 2 On
Blower Cooling High
Dampers Minimum Position

B-Three-Stage Thermostat OR Zone Sensor

1-Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate

Y2 Demand -

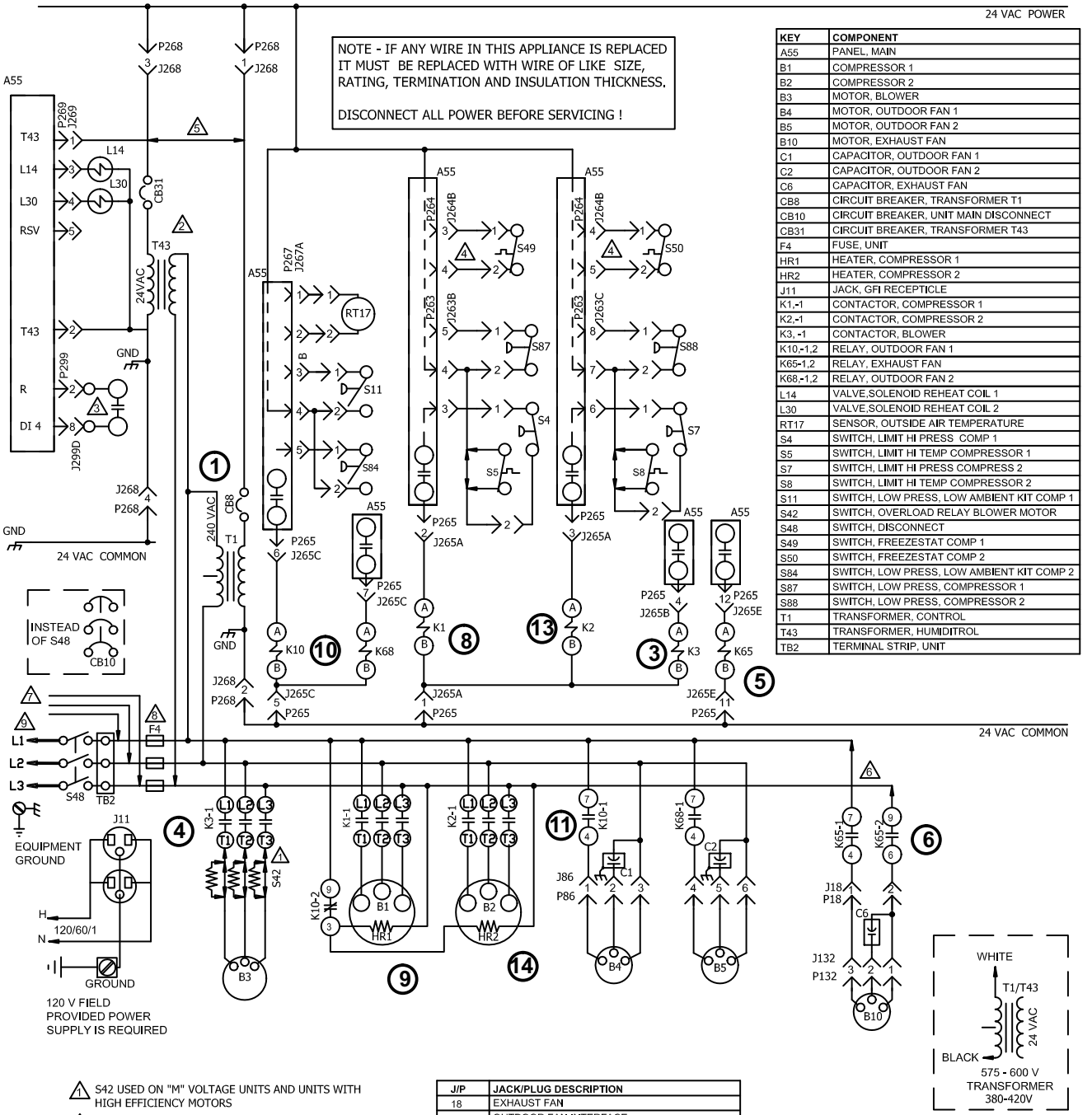
Compressors Off
Blower Cooling High
Dampers Modulate

Note - If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.

Y3 Demand -

Compressors 1 and 2 On
Blower Cooling High
Dampers Maximum Open

LCH092/150S & H - CONSTANT SUPPLY AIR, BELT DRIVE BLOWER



KEY	COMPONENT
A55	PANEL, MAIN
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT BREAKER, TRANSFORMER T1
CB10	CIRCUIT BREAKER, UNIT MAIN DISCONNECT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K68,-1,2	RELAY, OUTDOOR FAN 2
L14	VALVE,SOLENOID REHEAT COIL 1
L30	VALVE,SOLENOID REHEAT COIL 2
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
S88	SWITCH, LOW PRESS, COMPRESSOR 2
T1	TRANSFORMER, CONTROL
T43	TRANSFORMER, HUMIDITROL
TB2	TERMINAL STRIP, UNIT

1. S42 USED ON "M" VOLTAGE UNITS AND UNITS WITH HIGH EFFICIENCY MOTORS
2. ONLY IN UNITS WITH HUMIDITROL OR PHASE AND VOLTAGE DETECTION OPTION
3. EXTERNAL HUMIDITROL CONTACTS
4. S49 AND S50 ARE PART OF 5VDC CIRCUIT
5. J268-1,-3 AND J268-2,-4 ARE CONNECTED ON UNITS WITHOUT HUMIDITROL OR PHASE DETECTION OPTIONS
6. B10 IS NOT USED ON UNITS WITH ERV
7. USED ON UNITS WITH ERV SINGLE POINT POWER. SEE ERV DIAGRAM
8. USED ON LCH AND UNITS WITH ERV SINGLE POINT POWER ONLY
9. NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

J/P	JACK/PLUG DESCRIPTION
18	EXHAUST FAN
86	OUTDOOR FAN INTERFACE
132	EXHAUST FAN MOTOR
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANSFORMER T1 POWER
269	HUMIDITROL CONTROL
299	HUMIDITROL SAFETY INTERFACE

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

04/15	WIRING DIAGRAM 537625-01	04/15
COOLING		
LCH/LGH - 092H, 102H, 120H, 150S - G, J, M, Y		
SECTION B		REV. 1
Supersedes	New Form No. 537625-01	

LCH092/150S & H SEQUENCE OF OPERATION

Power:

1 Line voltage through the S48 unit disconnect, TB2 terminal block, or CB10 circuit breaker energizes the T1 transformer. T1 provides 24VAC power to A55 Unit Controller which provides 24VAC to the unit cooling, heating and blower controls.

2 Line voltage is also routed to compressor crankcase heaters, compressor contactors, the blower motor contactor, condenser fan relays and exhaust fan relays.

Blower Operation:

3 The A55 Unit Controller module receives a demand from thermostat terminal G. A55 energizes blower contactor K3 with 24VAC.

4 N.O. K3-1 closes, energizing blower B3.

Economizer Operation:

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

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

1st Stage Cooling (compressor B1)

7 A55 receives a Y1 thermostat demand.

8 After A55 proves N.C. low pressure switch S87, N.C. freezestat S49 and N.C. high pressure switch S4, compressor contactor K1 is energized.

9 N.O. contacts K1-1 close energizing compressor B1.

10 At the same time, A55 energizes condenser fan relays K10 (when N.O. low ambient switches S11 and S84 close) and K68.

11 N.O. contacts K10-1 close energizing condenser fan B4 and N.C. contacts K10-2 open, de-energizing compressor crankcase heaters HR1 and HR2. N.O. contacts K68-1 close energizing condenser fan B5.

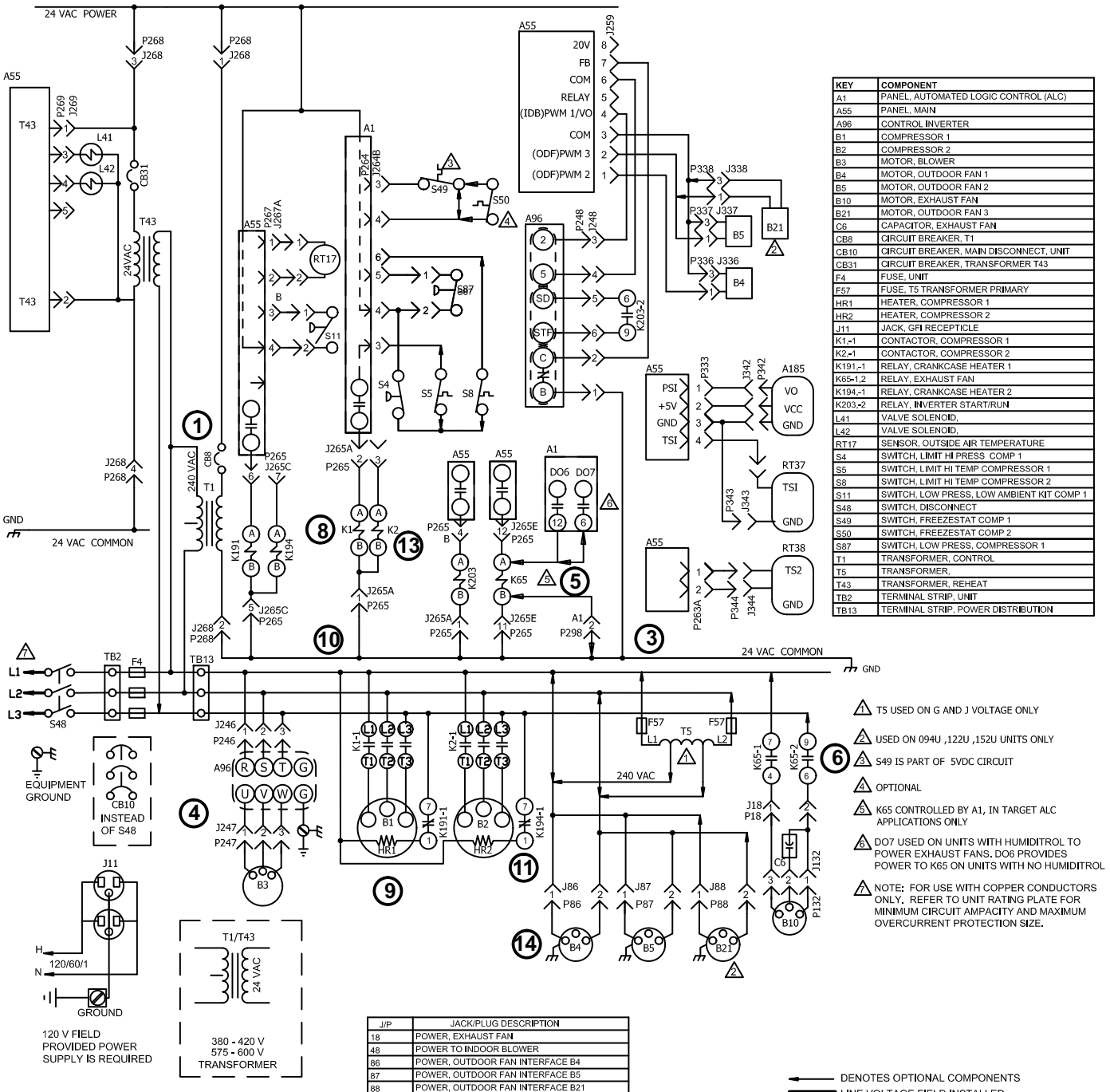
2nd Stage Cooling (compressor B2 is energized)

12 A55 receives a Y2 thermostat demand.

13 After A55 proves N.C. low pressure switch S88, N.C. freezestat S50 and N.C. high pressure switch S7, compressor contactor K2 is energized.

14 N.O. contacts K2-1 close energizing compressor B2.

LCH092/152U STAGED SUPPLY AIR, NO BYPASS, BELT DRIVE BLOWER



KEY	COMPONENT
A1	PANEL, AUTOMATED LOGIC CONTROL (ALC)
A55	PANEL, MAIN
A96	CONTROL INVERTER
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
B21	MOTOR, OUTDOOR FAN 3
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT BREAKER, T1
CB10	CIRCUIT BREAKER, MAIN DISCONNECT, UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
F57	FUSE, T5 TRANSFORMER PRIMARY
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K191,-1	RELAY, CRANKCASE HEATER 1
K65-1,2	RELAY, EXHAUST FAN
K194,-1	RELAY, CRANKCASE HEATER 2
K203,-2	RELAY, INVERTER START/RUN
L41	VALVE SOLENOID,
L42	VALVE SOLENOID,
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
T1	TRANSFORMER, CONTROL
T5	TRANSFORMER,
T43	TRANSFORMER, REHEAT
TB2	TERMINAL STRIP, UNIT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

1. T5 USED ON G AND J VOLTAGE ONLY
2. USED ON 094U ,122U ,152U UNITS ONLY
3. S49 IS PART OF 5VDC CIRCUIT
4. OPTIONAL
5. K65 CONTROLLED BY A1, IN TARGET ALC APPLICATIONS ONLY
6. DO7 USED ON UNITS WITH HUMIDITROL TO POWER EXHAUST FANS. DO6 PROVIDES POWER TO K65 ON UNITS WITH NO HUMIDITROL
7. NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

J/P	JACK/PLUG DESCRIPTION
18	POWER, EXHAUST FAN
48	POWER TO INDOOR BLOWER
86	POWER, OUTDOOR FAN INTERFACE B4
87	POWER, OUTDOOR FAN INTERFACE B5
88	POWER, OUTDOOR FAN INTERFACE B21
132	POWER, EXHAUST FAN MOTOR
246	POWER TO VFD
247	POWER, VFD TO MOTOR
248	VFD CONTROL
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANFORMER T1 POWER
269	TRANFORMER T43 POWER
298	IAQ INTERFACE

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

03/15	WIRING DIAGRAM 537616-02	03/15
COOLING -MSAV NO BYPASS		
(ULTRA) LCH/LGH - 092U, 094U, 120U, 122U, 152U - Y, G, J, M		
SECTION B		REV 0
Supersedes	New Form No. 537616-02	

LCH092/152U SEQUENCE OF OPERATION

Power:

1 Line voltage through the S48 unit disconnect, TB2 terminal block, or CB10 circuit breaker energizes the T1 transformer. T1 provides 24VAC power to A55 Unit Controller which provides 24VAC to the unit cooling, heating and blower controls.

2 Line voltage is also routed to compressor crankcase heaters, compressor contactors, supply air inverter control, condenser fan relays and exhaust fan relays.

Blower Operation:

Supply Air Inverter: Refer to Supply Air Inverter or Direct Drive blower diagram and sequence of operation.

Economizer Operation:

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

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

1st Stage Cooling (compressor B1 or B2)

5 A55 receives a Y1 thermostat demand.

6 After A55 proves N.C. low pressure switch S87, N.C. freezestat S49 and N.C. high pressure switch S4, compressor contactor K1 or K2 are energized. *Note - A55 logic (using input from RT37 and RT38 temperature sensors and A185 pressure transducer) determines which contactor is energized.*

7 N.O. contacts K1-1 or K2-1 close energizing compressor B1 or B2.

At the same time A55 energizes:

All three condenser fans, B4, B5 & B21, on **LOW** speed.

K191 compressor 1 crankcase heater relay when K1 is energized or K194 compressor 2 crankcase heater relay when K2 is energized (after A55 proves N.O. low ambient switch S11 is closed).

8 N.C. K191-1 compressor 1 crankcase heater contacts or N.C. K194-1 compressor 2 crankcase heater contacts open and de-energize compressor crankcase heater HR1 or HR2.

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

9 A55 receives a Y2 thermostat demand.

10 The K1 or K2 compressor contactor which was not energized will close.

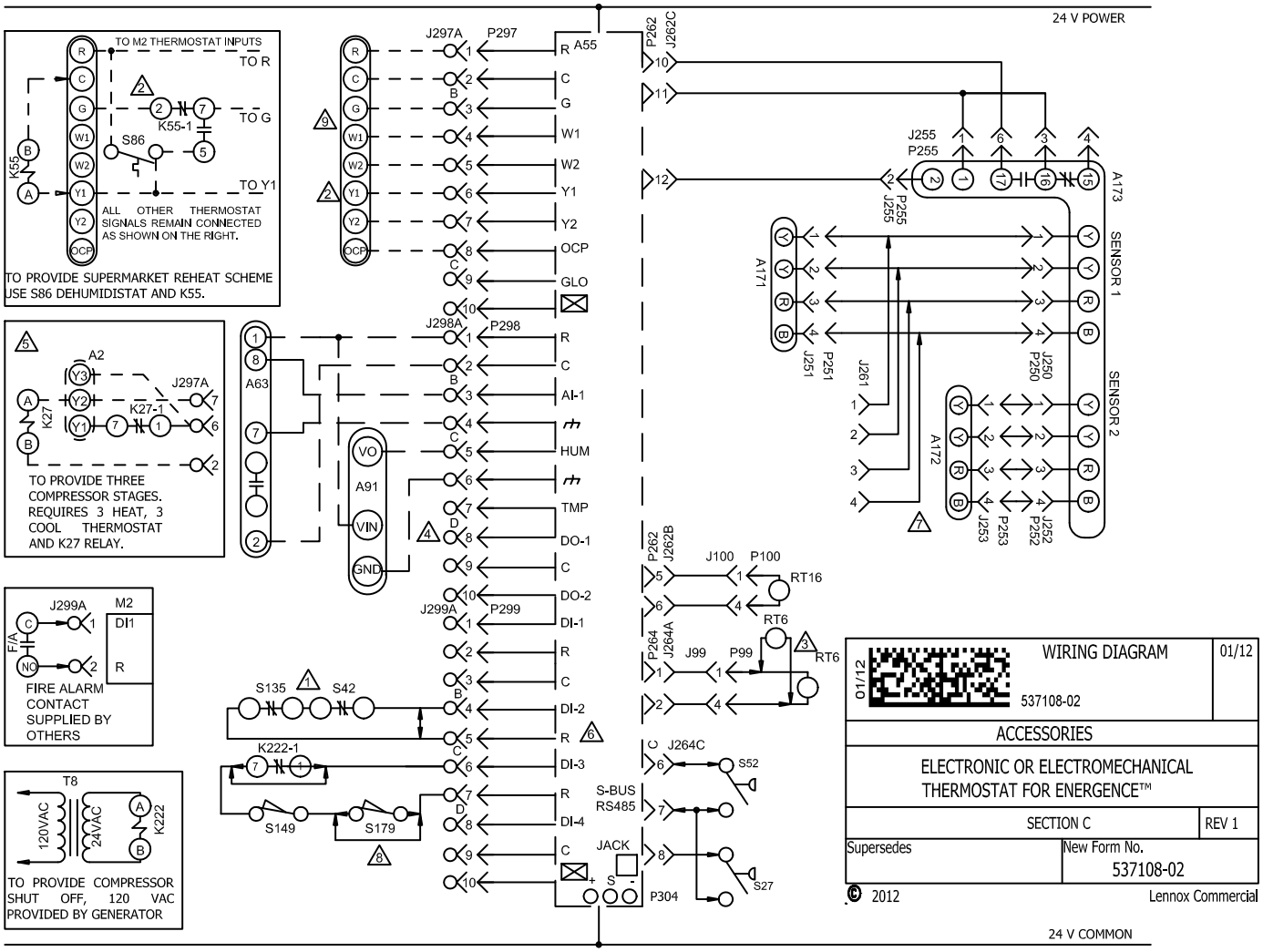
11 N.O. K1-1 or K2-1 relay contacts which were not energized will close. The corresponding B1 or B2 compressor will operate in tandem with the other compressor.

At the same time A55 energizes:

All three condenser fans, B4, B5 & B21, on **HIGH** speed.

The K191 or K194 crankcase heater relay which was not energized will close. N.C. K191-1 or K194-1 relay contacts open and de-energize the corresponding crankcase heater HR1 or HR2.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



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

1. FOR MOTORS WITH S42 AND S135 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2. USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, M2 PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING.
3. REMOTE LOCATION OF RT6
4. P298-8 (DO-1) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
5. THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE M2 BOARD (A55).
6. M2 SETTINGS MUST BE MODIFIED WHEN K222, S42, S52, S135, S149 OR S179 ARE INSTALLED
7. CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
8. S179, OVERFLOW SWITCH USED ON LGH/LCH 420-600 UNITS ONLY
9. SEE SCR DIAGRAM FOR W1 AND W2 WIRING

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

POWER:

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

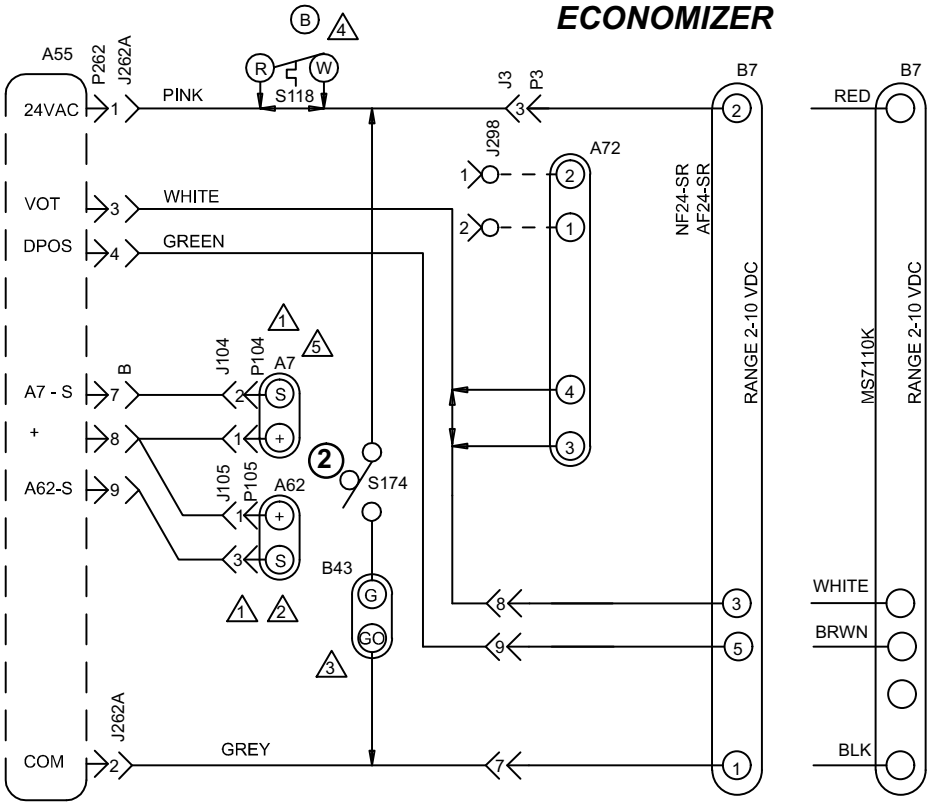
OPERATION:

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

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

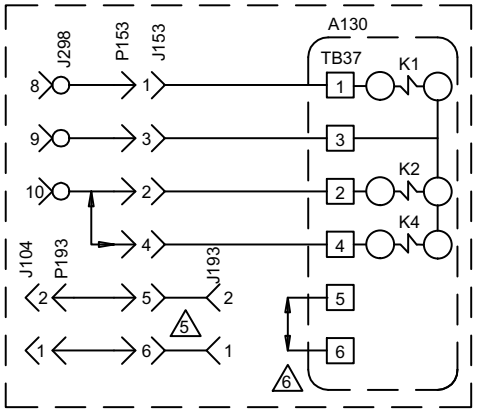
4 The A55 Unit Controller receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP) and the CO_2 sensor A63 (if economizer is used). A55 energizes the appropriate components.

ECONOMIZER



1. DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL
2. FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR
3. OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
4. S118 USED ON 35 TO 50 TON ENERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW)
5. REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF THE ERW ROOFTOP UNIT
6. REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH

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



ENERGY RECOVERY WHEEL HOOK UP

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

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

WIRING DIAGRAM	09/09
ACCESSORIES	
ENERGENCE™ SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERY SYSTEM OPTION	
SECTION D	
Supersedes	New Form No. 537189-01

SEQUENCE OF OPERATION
ECONOMIZER

POWER:

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

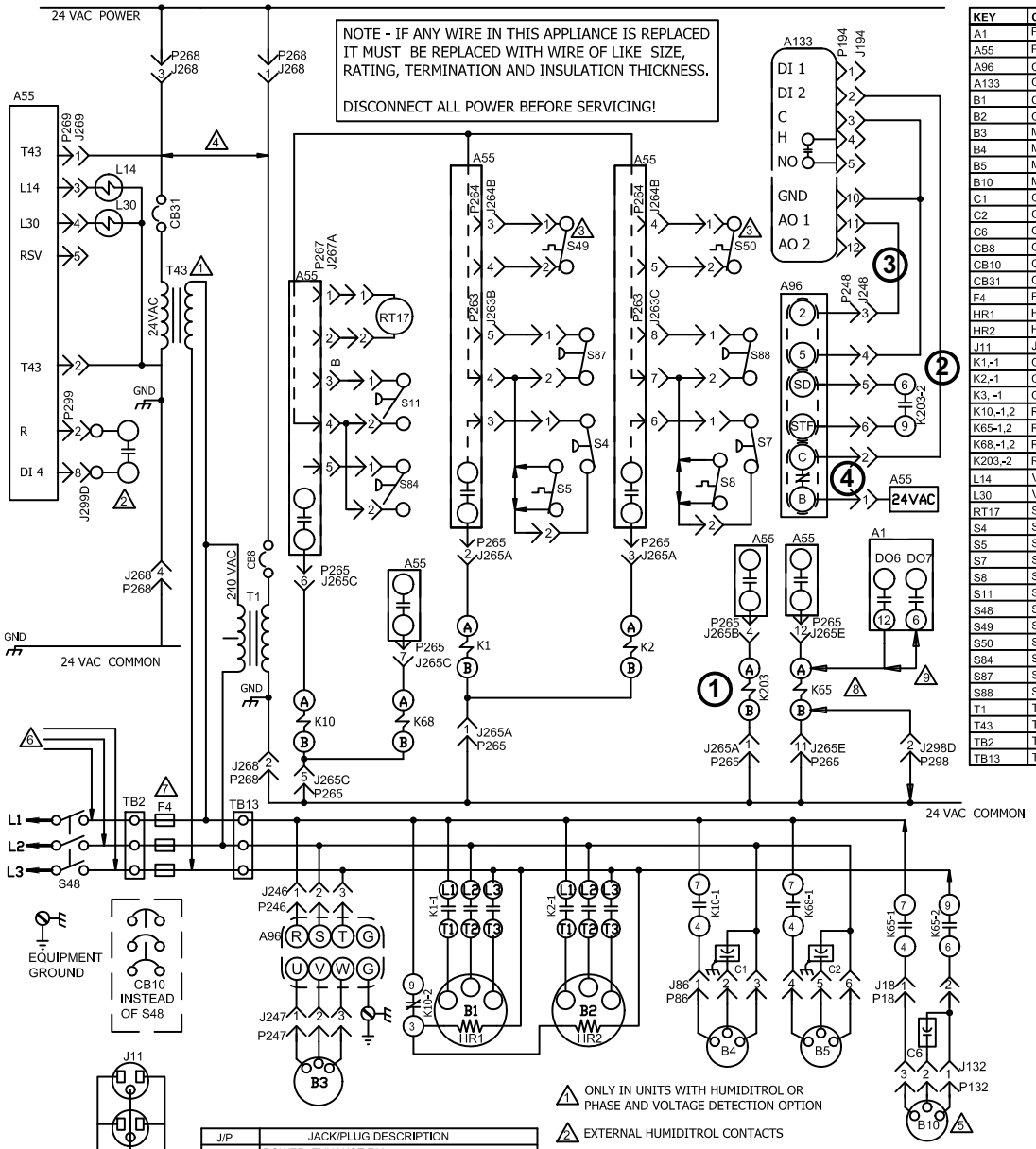
OPERATION:

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

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

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

LCH092-150S & H STAGED SUPPLY AIR, NO BYPASS, BELT DRIVE BLOWER



KEY	COMPONENT
A1	PANEL, AUTOMATED LOGIC CONTROL (ALC)
A55	PANEL, MAIN
A96	CONTROL INVERTER
A133	CONTROL, GENERAL PURPOSE
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT, BREAKER
CB10	CIRCUIT BREAKER, MAIN DISCONNECT, UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	REALY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K68,-1,2	RELAY, OUTDOOR FAN 2
K203,-2	RELAY, INVERTER START/RUN
L14	VALVE SOLENOID, REHEAT COIL 1
L30	VALVE SOLENOID, REHEAT COIL 2
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
S88	SWITCH, LOW PRESS, COMPRESSOR 2
T1	TRANSFORMER, CONTROL
T43	TRANSFORMER, REHEAT
TB2	TERMINAL STRIP, UNIT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

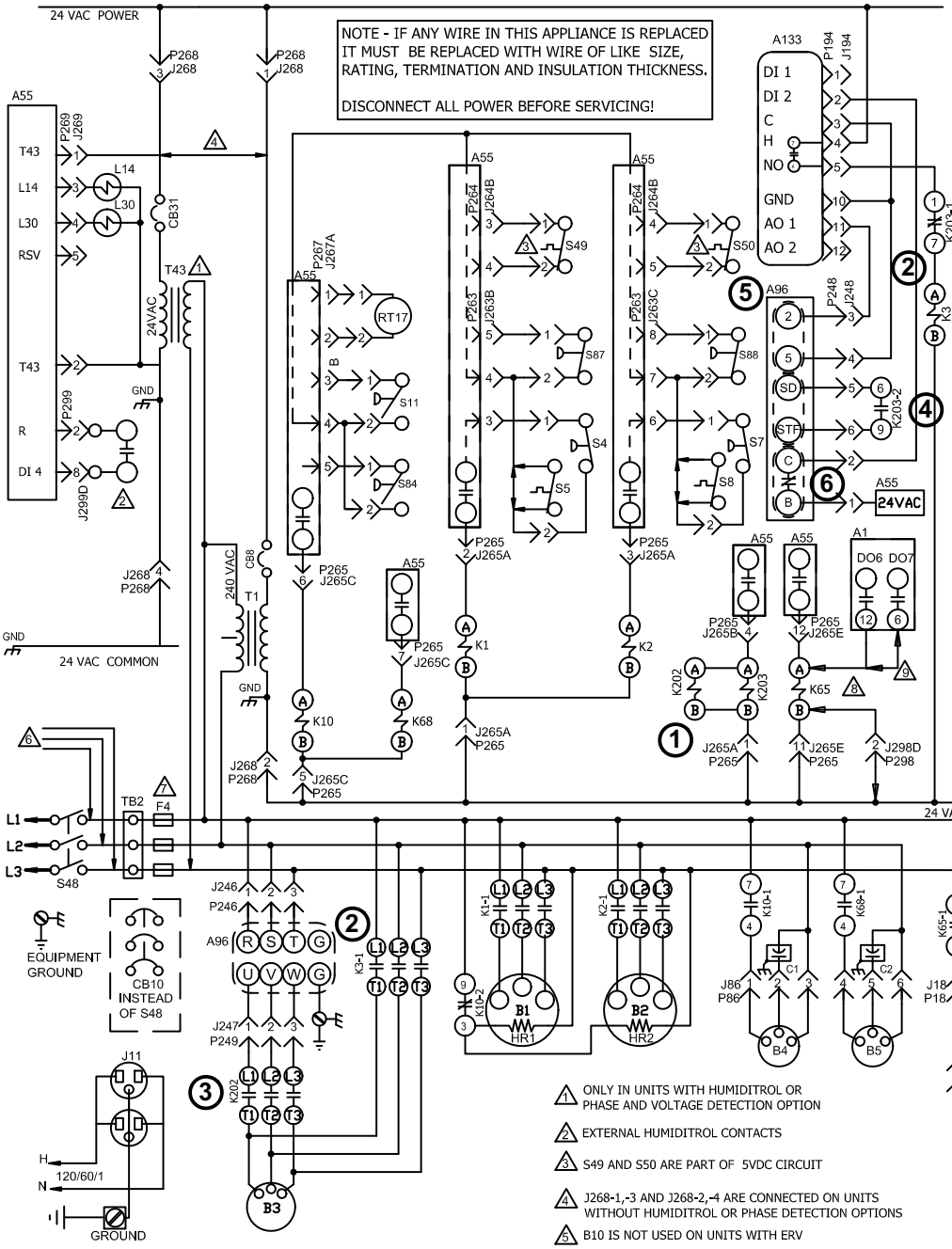
J/P	JACK/PLUG DESCRIPTION
18	POWER, EXHAUST FAN
86	POWER, OUTDOOR FAN INTERFACE
132	POWER, EXHAUST FAN MOTOR
194	GP CONTROL INPUT/OUTPUT
246	POWER TO VFD
247	POWER, VFD TO MOTOR
248	VFD CONTROL
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANFORMER T1 POWER
269	TRANFORMER T43 POWER
298	IAQ INTERFACE
299	HUMIDITROL, SAFETY

1. ONLY IN UNITS WITH HUMIDITROL OR PHASE AND VOLTAGE DETECTION OPTION
2. EXTERNAL HUMIDITROL CONTACTS
3. S49 AND S50 ARE PART OF 5VDC CIRCUIT
4. J268-1,-3 AND J268-2,-4 ARE CONNECTED ON UNITS WITHOUT HUMIDITROL OR PHASE DETECTION OPTIONS
5. B10 IS NOT USED ON UNITS WITH ERV
6. USED ON UNITS WITH ERV SINGLE POINT POWER. SEE ERV DIAGRAM
7. K65 IS CONTROLLED BY A1 ONLY IN TARGET ALC APPLICATIONS
8. USED ON LCH AND UNITS WITH ERV SINGLE POINT POWER ONLY
9. DO7 USED ON UNITS WITH HUMIDITROL TO POWER EXHAUST FANS. DO6 PROVIDES POWER TO K65 ON UNITS WITH NO HUMIDITROL

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

	B-BOX WIRING DIAGRAM	06/11
COOLING -MSAV NO BYPASS		
LCH/LGH - 092H,102H,120H, 150S - G , J, M, Y		
SECTION B		REV 0
Supersedes	New Form No. 537407-01	

LCH092-150S & H STAGED SUPPLY AIR, WITH BYPASS, BELT DRIVE BLOWER



KEY	COMPONENT
A1	PANEL, AUTOMATED LOGIC CONTROL (ALC)
A55	PANEL, MAIN
A96	CONTROL INVERTER
A133	CONTROL, GENERAL PURPOSE
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT, BREAKER
CB10	CIRCUIT BREAKER, MAIN DISCONNECT, UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	REALY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K68,-1,2	RELAY, OUTDOOR FAN 2
K202,-1	CONTACTOR, POWER TO MOTOR
K203,-2	RELAY, INVERTER START/RUN
L14	VALVE SOLENOID, REHEAT COIL 1
L30	VALVE SOLENOID, REHEAT COIL 2
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
S88	SWITCH, LOW PRESS, COMPRESSOR 2
T1	TRANSFORMER, CONTROL
T43	TRANSFORMER, REHEAT
TB2	TERMINAL STRIP, UNIT

J/P	JACK/PLUG DESCRIPTION
18	POWER, EXHAUST FAN
86	POWER, OUTDOOR FAN INTERFACE
132	POWER, EXHAUST FAN MOTOR
194	GP CONTROL INPUT/OUTPUT
246	POWER TO VFD
247	POWER, VFD TO MOTOR
248	VFD CONTROL
249	POWER, CONTACTOR BYPASS
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANFORMERS T1 POWER
269	TRANFORMER T43 POWER
298	IAQ INTERFACE
299	HUMIDITROL, SAFETY

120 V FIELD PROVIDED POWER SUPPLY IS REQUIRED

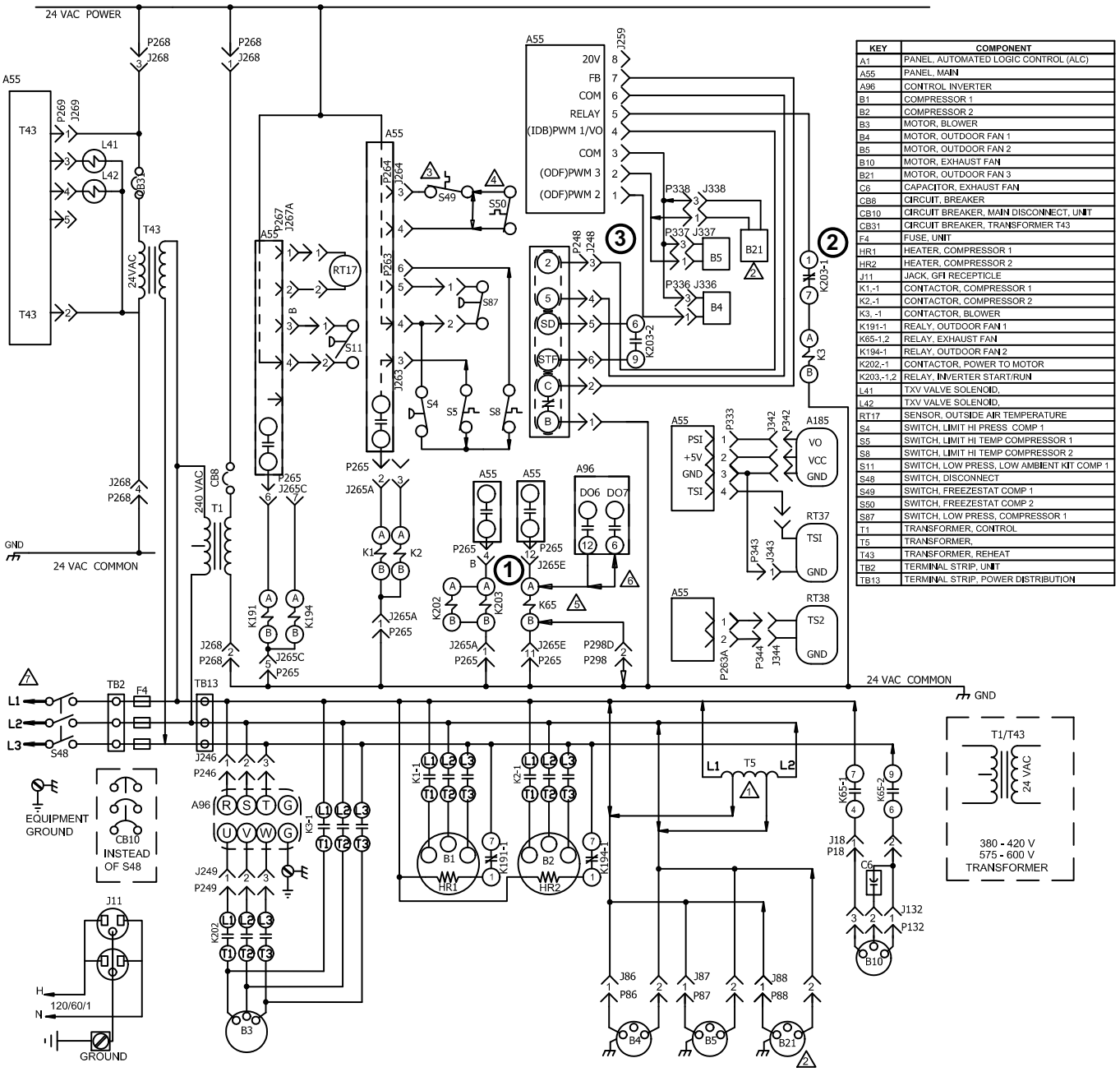
NOTE: USE COPPER CONDUCTORS ONLY

1. ONLY IN UNITS WITH HUMIDITROL OR PHASE AND VOLTAGE DETECTION OPTION
2. EXTERNAL HUMIDITROL CONTACTS
3. S49 AND S50 ARE PART OF 5VDC CIRCUIT
4. J268-1,-3 AND J268-2,-4 ARE CONNECTED ON UNITS WITHOUT HUMIDITROL OR PHASE DETECTION OPTIONS
5. B10 IS NOT USED ON UNITS WITH ERV
6. USED ON UNITS WITH ERV SINGLE POINT POWER. SEE ERV DIAGRAM
7. K65 IS CONTROLLED BY A1 ONLY IN TARGET ALC APPLICATIONS
8. USED ON LCH AND UNITS WITH ERV SINGLE POINT POWER ONLY
9. DO7 USED ON UNITS WITH HUMIDITROL TO POWER EXHAUST FANS. DO6 PROVIDES POWER TO K65 ON UNITS WITH NO HUMIDITROL

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

B-BOX WIRING DIAGRAM		08/11
COOLING -MSAV WITH BYPASS		
LCH/LGH - 092H,102H,120H, 150S - G , J, M, Y		
SECTION B		REV 0.1
Supersedes	New Form No. 537408-01	

LCH092-152U STAGED SUPPLY AIR, WITH BYPASS, BELT DRIVE BLOWER



KEY	COMPONENT
A1	PANEL, AUTOMATED LOGIC CONTROL (ALC)
A55	PANEL, MAIN
A96	CONTROL INVERTER
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
B21	MOTOR, OUTDOOR FAN 3
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT, BREAKER
CB10	CIRCUIT BREAKER, MAIN DISCONNECT, UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T43
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K191-1	REALY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K194-1	RELAY, OUTDOOR FAN 2
K202,-1	CONTACTOR, POWER TO MOTOR
K203,-1,2	RELAY, INVERTER START/RUN
L41	TXV VALVE SOLENOID,
L42	TXV VALVE SOLENOID,
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
T1	TRANSFORMER, CONTROL
T5	TRANSFORMER,
T43	TRANSFORMER, REHEAT
TB2	TERMINAL STRIP, UNIT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	JACK/PLUG DESCRIPTION
18	POWER, EXHAUST FAN
86	POWER, OUTDOOR FAN INTERFACE B4
87	POWER, OUTDOOR FAN INTERFACE B5
88	POWER, OUTDOOR FAN INTERFACE B21
132	POWER, EXHAUST FAN MOTOR
246	POWER TO VFD
247	POWER, VFD TO MOTOR
248	VFD CONTROL
249	POWER, CONTACTOR BYPASS
259	BLOWER CONTROL HARNESS
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANFORMERS T1 POWER
269	TRANFORMER T43 POWER
298	IAQ INTERFACE

1. T5 USED ON G & J VOLTAGE ONLY
2. USED ON 094U, 122U, 152U UNITS ONLY
3. S49 AND S50 ARE PART OF 5VDC CIRCUIT
4. OPTIONAL
5. K65 CONTROLLED BY A1, IN TARGET ALC APPLICATIONS ONLY
6. DO7 USED ON UNITS WITH HUMIDITROL TO POWER EXHAUST FANS. DO6 PROVIDES POWER TO K65 ON UNITS WITH NO HUMIDITROL
7. NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

04/15	WIRING DIAGRAM	04/15
	537617-01	
COOLING -MSAV WITH BYPASS		
(ULTRA) LCH/LGH - 092U, 094U, 120U, 122U, 152U - Y, G, J, M		
SECTION B		REV 1
Supersedes	New Form No. 537617-01	

SUPPLY AIR INVERTER - NO BYPASS SEQUENCE OF OPERATION

OPERATION:

1 A55 energizes the K203 relay coil.

2 K203-2 N.O. contacts close to start A96 forward rotation signal STF.

3 Blower B3 speed is controlled by a 0-10VDC signal from A133 AO1 to A96 terminal 2. VFD output voltage can be checked between A96 terminals 2 and 5.

A96 FAULT SEQUENCE:

A96 will interrupt the 0-10VDC signal at terminal 2 on an internal failure. A96 will retry three times before terminals B-C open. In addition, A55 and A133 will recognize A96 B-C contacts are open and A55 will de-energize the K203 coil.

Optional S52 Blower Proving Switch Installed -
Refer to Blower Fault Sequence below.

SUPPLY AIR INVERTER - WITH OPTIONAL FACTORY-INSTALLED BYPASS SEQUENCE OF OPERATION

OPERATION:

1 A55 energizes K202 and K203 relay coils.

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

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

4 K203-2 N.O. contacts close to start A96 forward rotation signal STF.

5 Blower B3 speed is controlled by a 0-10VDC signal from A133 AO1 (or A55 PWM1/VO) to A96 terminal 2. VFD output voltage can be checked between A96 terminals 2 and 5.

A96 FAULT SEQUENCE:

The same sequence as shown above. Note that the same alarms will be displayed whether there is an A96 internal fault, a blower component failure, or a control failure.

BLOWER FAULT SEQUENCE:

1 The control system initiates a blower demand.

2 After 16 seconds, if S52 remains open, A55 will shut the blower down for 5 minutes.

3 A55 will energize the blower.

4 After 16 seconds if S52 remains open, A55 will shut the blower down for another 5 minutes.

5 After the third try, A55 will shut the unit down.

Note - The unit will remain in lockout until the failed component is fixed or A55 selection conditions are changed to: M2-SETTINGS-CONTROL-MSAV-VFD BYPASS-ENGAGE M3-RTU OPTION-BLOWER-VFD BYPASS DISENGAGED - NO (configuration ID 1 set to A=automatic bypass).

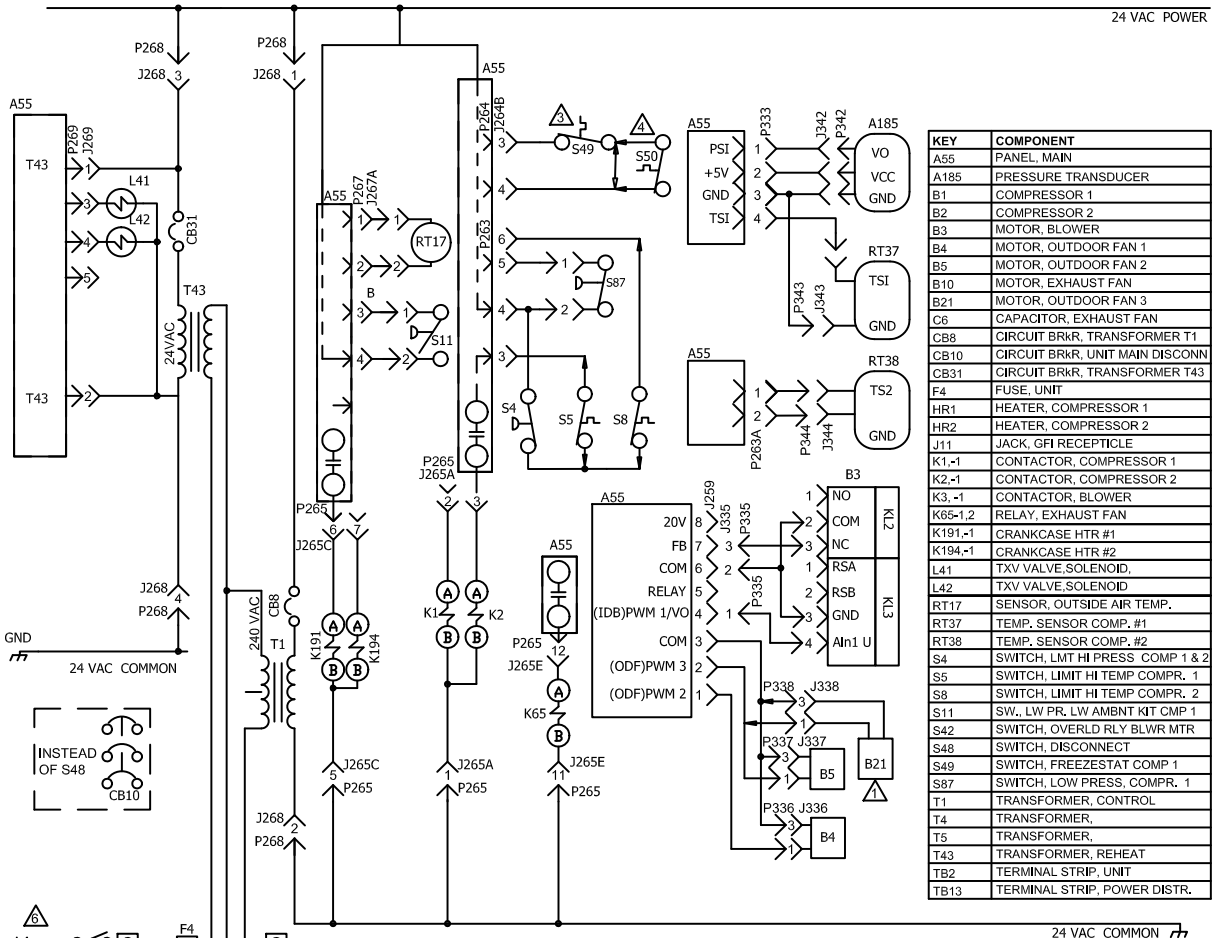
6 The VFD can be set to automatically bypass the VFD after the third start attempt. A55 selection condition must changed to:
M2-*SETTINGS-INSTALL-NEW M2-MSAV VFD BYPASS-AUTOMATIC*
M3-RTU OPTION-BLOWER-VFD BYPASS DISENGAGED - YES (configuration ID 1 set to M=manual bypass)

Note - Regardless of whether the blower is started in CAV mode using the "engage" selection or the "automatic" selection, S52 will still lock out the the blower after 16 seconds.

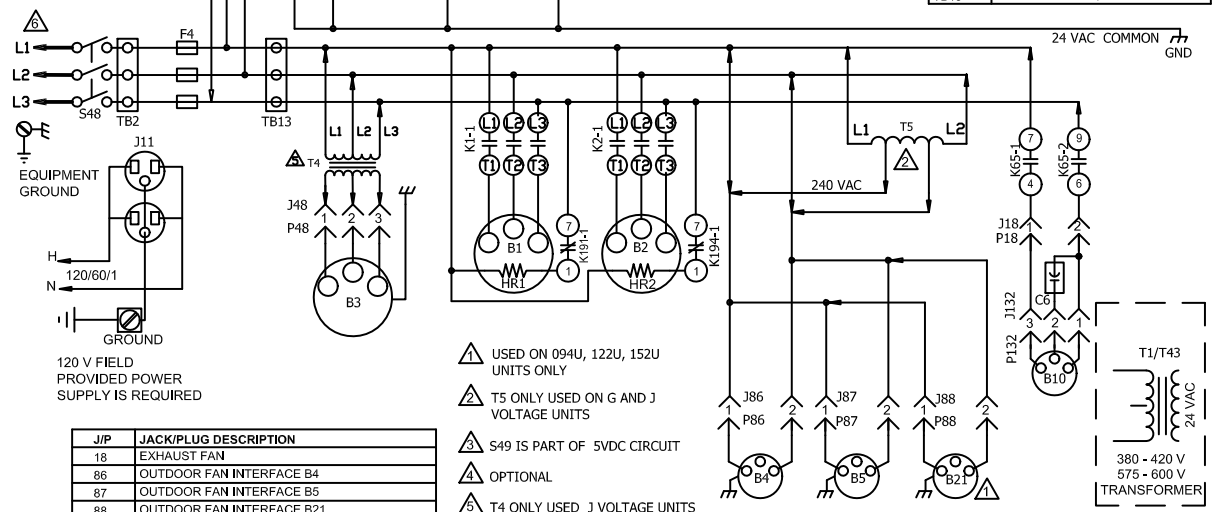
7 Do not immediately assume the inverter has failed. Troubleshoot the unit keeping the following in mind:

- Be sure to check multiple components and controls when troubleshooting. A blower component, inverter, or control failure will show the same alarms as an internal VFD fault condition (open A96 terminals B-C).
- If there are no thermostat wires connected to A55 terminal P297, check the control system to verify a blower demand.
- S52 is factory-installed in units equipped with the VFD bypass option. S52 is shown on the thermostat diagram.
- Make sure blower demand is continuous; if blower demand is interrupted A96 and A55 timers will reset.

LCH092-152U STAGED SUPPLY AIR, DIRECT DRIVE BLOWER



KEY	COMPONENT
A55	PANEL, MAIN
A185	PRESSURE TRANSDUCER
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
B21	MOTOR, OUTDOOR FAN 3
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT BRKR, TRANSFORMER T1
CB10	CIRCUIT BRKR, UNIT MAIN DISCONN
CB31	CIRCUIT BRKR, TRANSFORMER T43
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K65-1,2	RELAY, EXHAUST FAN
K191,-1	CRANKCASE HTR #1
K194,-1	CRANKCASE HTR #2
L41	TXV VALVE,SOLENOID,
L42	TXV VALVE,SOLENOID
RT17	SENSOR, OUTSIDE AIR TEMP.
RT37	TEMP. SENSOR COMP. #1
RT38	TEMP. SENSOR COMP. #2
S4	SWITCH, LMT HI PRESS COMP 1 & 2
S5	SWITCH, LIMIT HI TEMP COMPR. 1
S8	SWITCH, LIMIT HI TEMP COMPR. 2
S11	SW., LW PR. LW AMBNT KIT CMP 1
S42	SWITCH, OVERLD RLY BLWR MTR
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S87	SWITCH, LOW PRESS, COMPR. 1
T1	TRANSFORMER, CONTROL
T4	TRANSFORMER,
T5	TRANSFORMER,
T43	TRANSFORMER, REHEAT
TB2	TERMINAL STRIP, UNIT
TB13	TERMINAL STRIP, POWER DISTR.



J/P	JACK/PLUG DESCRIPTION
18	EXHAUST FAN
86	OUTDOOR FAN INTERFACE B4
87	OUTDOOR FAN INTERFACE B5
88	OUTDOOR FAN INTERFACE B21
132	EXHAUST FAN MOTOR
259	ECM BLOWER MOTOR CONTROL
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANSFORMER T1 POWER
269	HUMIDITROL CONTROL
333	0-5V TRANSDUCER INPUT

1. USED ON 094U, 122U, 152U UNITS ONLY
2. T5 ONLY USED ON G AND J VOLTAGE UNITS
3. S49 IS PART OF 5VDC CIRCUIT
4. OPTIONAL
5. T4 ONLY USED J VOLTAGE UNITS
6. NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

04/15	WIRING DIAGRAM 537618-01	04/15
	COOLING	
	Energence Ultra EBM LCH/LGH - 092U, 094U, 120U, 122U, 152U - Y, G, J, M	
	SECTION B	REV 1
Supersedes	New Form No. 537618-01	

Direct Drive EBM Blower Motor: The blower speed is determined by thermostat demand and settings programmed into the A55. When A55 receives a Y1 demand, a low speed voltage output from A55 terminal 4 will energize B3 in low speed. When A55 receives a Y2 demand, a high speed voltage output from A55 terminal 4 will energize B3 in high speed. A55 output voltage can be checked between A55 terminals 4 and 6.

DIRECT DRIVE BLOWER SEQUENCE OF OPERATION / TROUBLESHOOTING

Blower Operation:

1- Line voltage is routed to B3 blower motor through TB2 terminal strip, TB13 terminal strip, T4 transformer (575v units only), and J/P48 terminals 1, 2 and 3.

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

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

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

Blower Fault Sequence Direct Drive Motor - No S52:

1- Line voltage is provided to B3 blower motor.

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

3- Alarm 186 is set by the A55 Unit Controller, de-energizing unit. If one of the “Error” failures listed in table 28 occurs (“Warning” failures will not set Alarm 186), service is required. Refer to the Failure Handling/Troubleshooting section.

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

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

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

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

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

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

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

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

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

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

Failure Handling/Troubleshooting:

1- Follow table 28 to troubleshoot possible failures that would cause Alarm 186 to set.

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

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

4- Main Menu > Service > Test > Blower

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

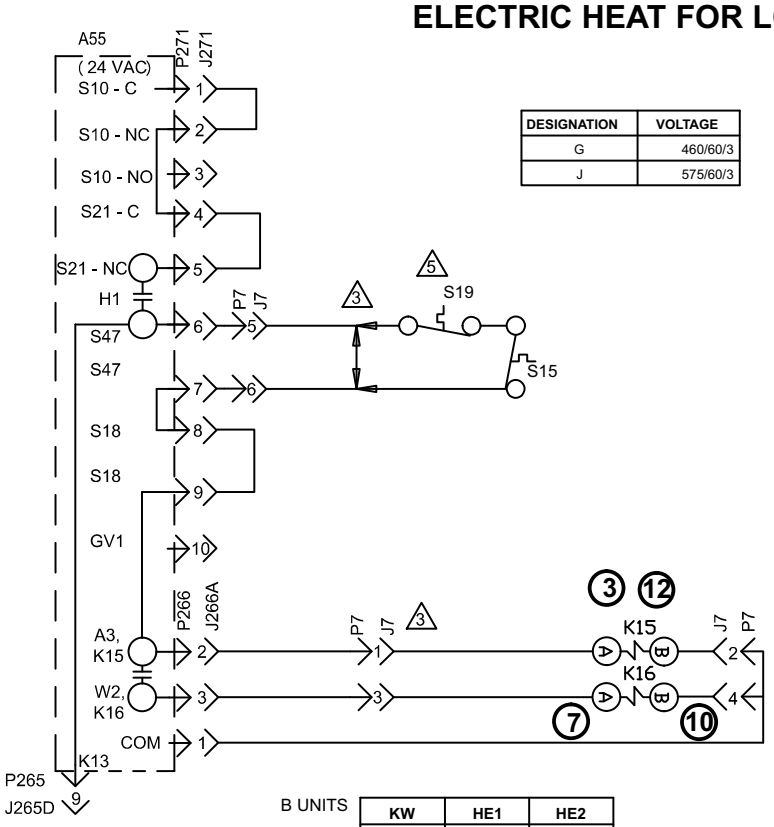
6- If blower does not operate and Alarm 186 is set again, blower assembly must be replaced.

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

TABLE 28
DIRECT DRIVE BLOWER MOTOR TROUBLESHOOTING

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

ELECTRIC HEAT FOR LCH092/150 UNITS

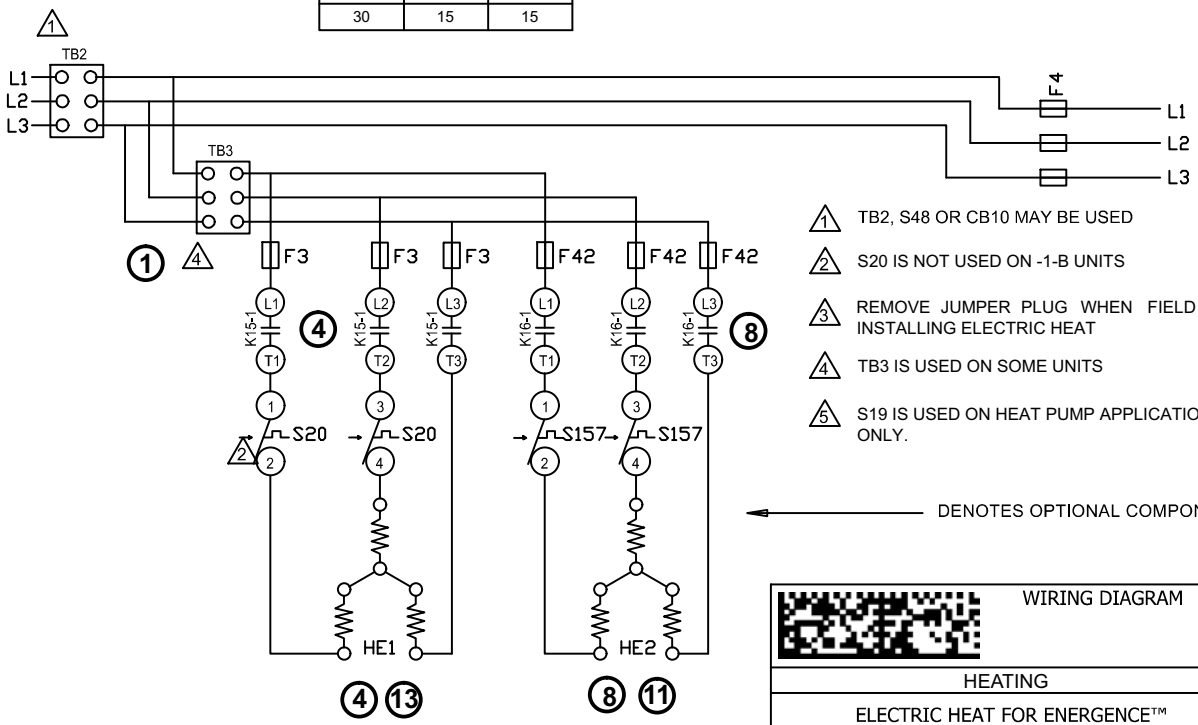


DESIGNATION	VOLTAGE
G	460/60/3
J	575/60/3

DESCRIPTION	
KEY	DESCRIPTION
A55	PANEL, MAIN
F3	FUSE, ELECTRIC HEAT
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 1 A, 2A
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
J2	JACK, ELECTRIC HEAT
J265C	JACK, CONTACTOR RELAY
J266A	JACK, HEATING CONTROL STG 1
J271A,B	JACK, HEATING SENSORS STG 1
K15,-1	CONTACTOR, ELECTRIC HEAT 1
K16,-1	CONTACTOR, ELECTRIC HEAT 2
P2	PLUG, ELECTRIC HEAT
P265	PLUG, CONTACTOR RELAY
P266	PLUG, HEATING CONTROL
P271	PLUG, HEATING SENSORS STG 1
S15	SWITCH LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH LIMIT SECONDARY ELECTRIC HEAT 1
S157	SWITCH LIMIT SECONDARY ELECTRIC HEAT 2
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

B UNITS

KW	HE1	HE2
7.5	7.5	
15	15	
22.5	15	7.5
30	15	15



1. TB2, S48 OR CB10 MAY BE USED
2. S20 IS NOT USED ON -1-B UNITS
3. REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
4. TB3 IS USED ON SOME UNITS
5. S19 IS USED ON HEAT PUMP APPLICATIONS ONLY.

DENOTES OPTIONAL COMPONENTS

WIRING DIAGRAM	04/10
HEATING	
ELECTRIC HEAT FOR ENERGENCE™ E1EH, EHA - 7.5,15,22.5, 30 - G,J	
SECTION A	
Supersedes	New Form No. 537183-02

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

NOTE - This sequence of operation is for Y through J voltage electric heat. Each step of operation is numbered and can be followed in sequence on the diagrams.

Heating Elements:

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

First Stage Heat:

2 Heating demand initiates at W1 in the thermostat.

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

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

Second Stage Heat:

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

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

7 A55 energizes contactor K16.

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

End of Second Stage Heat:

9 Heating demand is satisfied. Thermostat W1 terminal is de-energized.

10 K16 electric heat contactor is de-energized.

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

12 Electric heat contactor K15 is de-energized.

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