

UNIT INFORMATION

LCT SERIES
25 & 30 ton

100142

Service Literature

LCT302 - 360 With R-454B

The LCT302H / 360H (25 and 30 ton) units are configured to order units (CTO) with a wide selection of factory-installed options. Optional electric heat is factory-or field-installed in LCT units. Electric heat operates in single or multiple stages depending on the kW input size. 30kW through 120kW heat sections are available..

Units may contain a supply air blower equipped with a variable frequency drive A96 (VFD) which varies supply air CFM.

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

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

! WARNING

If this appliance is conditioning a space with an area smaller than TA min or stored in a space with an area smaller than A min as defined by this instruction, then that space must be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (e.g. an operating electric heater or similar hot surface). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest system.

! WARNING

Auxiliary devices which may be potential ignition sources shall not be installed in the duct work. Examples of potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching components.



False ceilings or drop ceiling may be used as a return air plenum only if the unit being installed has a Refrigerant Detection System installed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out with work in confined spaces being avoided.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

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WARNING

To prevent serious injury or death:

- 1- Lock-out/tag-out before performing maintenance.
- 2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.
- 3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

WARNING

Only Manufacturer approved auxiliary devices are permitted to be installed in this unit.

CAUTION

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants.

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.

WARNING

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

CAUTION

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

IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

WARNING

- This appliance must be installed in accordance with local and national wiring regulations.
- If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

OPTIONS / ACCESSORIES

Item Description		Order Number	Size	
			302	360
COOLING SYSTEM				
Condensate Drain Trap	PVC	22H54	X	X
	Copper	76W27	X	X
Drain Pan Overflow Switch		21Z07	OX	OX
Stainless Steel Condensate Drain Pan		83W42	OX	OX
GAS HEAT				
Combustion Air Intake Extensions (Order 2 Kits)		89L97	X	X
Gas Heat Input	Standard - 260 kBtuh input	Factory	O	O
	Medium - 360 kBtuh input	Factory	O	O
	High - 480 kBtuh input	Factory	O	O
LPG/Propane Conversion Kits (Order 2 Kits)	Standard Heat	14N28	X	X
	Medium Heat	14N29	X	X
	High Heat	14N30	X	X
Stainless Steel Heat Exchanger		Factory	O	O
Vertical Vent Extension		42W16	X	X
BLOWER - SUPPLY AIR				
Blower Type	MSAV® Multi-Stage Air Volume	Factory	O	O
	VAV Variable Air Volume	Factory	O	O
Motors	Belt Drive (standard efficiency) - 5 HP	Factory	O	O
	Belt Drive (standard efficiency) - 7.5 HP	Factory	O	O
	Belt Drive (standard efficiency) - 10 HP	Factory	O	O
	Supply VFD Blower Bypass	Factory	O	O
Drive Kits See Blower Data Tables for usage and selection	Kit #1 740-895 rpm	Factory	O	O
	Kit #2 870-1045 rpm	Factory	O	O
	Kit #3 715-880 rpm	Factory	O	O
	Kit #4 770-965 rpm	Factory	O	O
	Kit #5 660-810 rpm	Factory	O	O
	Kit #6 770-965 rpm	Factory	O	O
	Kit #7 570-720 rpm	Factory	O	O
	Kit #8 480-630 rpm	Factory	O	O
	Kit #9 410-535 rpm	Factory	O	O
CABINET				
Combination Coil/Hail Guards		13T16	OX	OX
Corrosion Protection		Factory	O	O
Horizontal Return Air Panel Kit		38K48	X	X

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

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

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item Description	Order Number	Size		
		302	360	
INDOOR AIR QUALITY				
Air Filters				
Healthy Climate® High Efficiency Air Filters 20 x 20 x 2 - order 12 per unit	MERV 8	54W21	OX	OX
	MERV 13	52W39	OX	OX
	MERV 16	21U40	X	X
Replaceable Media Filter with Metal Mesh Frame (includes Non-Pleated Filter Media) 20 x 20 x 2- order 12 per unit		44N60	X	X
Indoor Air Quality (CO2) Sensors				
Sensor - Wall-mount, off-white plastic cover with LCD display		77N39	X	X
Sensor - Wall-mount, off-white plastic cover, no display		23V86	X	X
Sensor - Black plastic case, LCD display, rated for plenum mounting		87N52	X	X
Sensor - Black plastic case, no display, rated for plenum mounting		23V87	X	X
CO2 Sensor Duct Mounting Kit - for downflow applications		23Y47	X	X
Aspiration Box - for duct mounting non-plenum rated CO2 sensors (77N39)		90N43	X	X
Needlepoint Bipolar Ionization (NPBI)				
Needlepoint Bipolar Ionization (NPBI) Kit		TBD	X	X
UVC Germicidal Light Kit				
1 Healthy Climate® UVC Light Kit (110/230v-1ph)		TBD	X	X
Step-Down Transformers	460V primary, 230V secondary	10H20	X	X
	575V primary, 230V secondary	10H21	X	X
ELECTRICAL				
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O
	460V - 3 phase	Factory	O	O
	575V - 3 phase	Factory	O	O
HACR Circuit Breakers		Factory	O	O
2 Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)			O	O
3 Disconnect Switch	80 amp	54W85	OX	OX
	150 amp	54W86	OX	OX
	250 amp	54W87	OX	OX
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	74M70	OX	OX
	4, 5 15 amp factory-wired and powered (208/230V, 460V)	Factory	O	O
	6 20 amp non-powered, field-wired (208/230V, 460V, 575V)	67E01	X	X
	6 20 amp non-powered, field-wired (575V)	Factory	O	O
Weatherproof Cover for GFI		10C89	X	X
Phase/Voltage Detection		Factory	O	O
ELECTRIC HEAT				
30 kW	208/230V-3ph	30U68	OX	OX
	460V-3ph	30U69	OX	OX
	575V-3ph	30U70	OX	OX
45 kW	208/230V-3ph	30U74	OX	OX
	460V-3ph	30U75	OX	OX
	575V-3ph	30U76	OX	OX
60 kW	208/230V-3ph	30U80	OX	OX
	460V-3ph	30U81	OX	OX
	575V-3ph	30U82	OX	OX
90 kW	208/230V-3ph	30U83	OX	OX
	460V-3ph	30U84	OX	OX
	575V-3ph	30U85	OX	OX

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).

¹SCCR option is not available if the MOCP of the configured unit is greater than 200A.

²Disconnect Switch is furnished and factory installed with SCCR option

⁴If a factory installed disconnect switch is ordered with a factory installed GFI, the default disconnect size is 150 amps.

⁵Unit powered GFI Service Outlets are not available with SCCR option.

Disconnect Switch or Circuit Breaker is required with unit powered GFI Service Outlets.

⁶Canada requires a minimum 20 amp circuit. Select 20 amp, non-powered, field wired GFI.

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

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

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OPTIONS / ACCESSORIES

Item Description	Order Number	Size	
		302	360
7 HUMIDITROL® CONDENSER REHEAT OPTION			
Humiditrol® Dehumidification Option	Factory	O	O
ECONOMIZER			
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)			
High Performance Economizer Downflow or Horizontal Applications - Includes Outdoor Air Hood, order Downflow or Horizontal Barometric Relief Dampers separately.	18X87	OX	OX
Economizer Controls			
Differential Enthalpy (Not for Title 24)	Order 2 21Z09	OX	OX
Sensible Control	Sensor is Furnished Factory	O	O
Single Enthalpy (Not for Title 24)	21Z09	OX	OX
Global	Sensor Field Provided Factory	O	O
Building Pressure Control	13J77	X	X
Differential Sensible	Sensor is Furnished Factory	O	O
Outdoor Air CFM Control	13J76	X	X
Barometric Relief Dampers With Exhaust Hood			
Downflow Barometric Relief Dampers	76W17	OX	OX
Horizontal Barometric Relief Dampers	33K78	OX	OX
OUTDOOR AIR			
Outdoor Air Dampers With Outdoor Air Hood			
Motorized	18X89	OX	OX
Manual	18X88	X	X
POWER EXHAUST			
Standard Static, SCCR Rated	208/230V 74W21	OX	OX
	460V 74W22	OX	OX
	575V 74W23	OX	OX
High Static with VFD 2 HP (731 - 932 rpm)	208/230V 83M89	X	X
	460V 83M90	X	X
	575V 83M91	X	X
Power Exhaust Control			
Pressure Transducer Control	13J77	X	X

Available for 302H and 360H models only with MSAV® Multi-Stage Air Volume option.

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

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OPTIONS / ACCESSORIES

Item Description	Order Number	Size		
		302	360	
ROOF CURBS				
Hybrid Roof Curbs, Downflow				
14 in. height	11F62	X	X	
18 in. height	11F63	X	X	
24 in. height	11F64	X	X	
Standard Roof Curbs, Horizontal - Requires Horizontal Return Air Panel Kit				
30 in. height - slab applications	11T90	X	X	
41 in. height - rooftop applications	11T97	X	X	
Horizontal Return Air Panel Kit				
Required for Horizontal Applications with Roof Curb	38K48	X	X	
Insulation Kit For Standard Horizontal Curbs				
For 30 in. Curb	73K33	X	X	
For 41 in. Curb	73K35	X	X	
CEILING DIFFUSERS				
Step-Down - Order one	LARTD30/36S	45K74	X	X
Flush - Order one	LAFD30/36S	45K75	X	X
Transitions (Supply and Return) - Order one	LASRT30/36	33K80	X	X

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

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

O = Configure To Order (Factory Installed)

X = Field Installed

SPECIFICATIONS				25 TON		
Model			LCT302H5V		LCT302H5M	
Nominal Tonnage			25 Ton		25 Ton	
Efficiency Type			High		High	
Blower Type			VAV Variable Air Volume		MSAV® Multi-Stage Air Volume	
Cooling Performance	Gross Cooling Capacity - Btuh		309,000		309,000	
	¹ Net Cooling Capacity (Btuh)		300,000		300,000	
	¹ AHRI Rated Air Flow (cfm)		8200		8200	
	Total Unit Power - kW		26.2		26.2	
	¹ IEER (Btuh/Watt)		14.3		15.8	
	¹ EER (Btuh/Watt)		11.4		11.4	
Sound Rating Number			dBA		95	
Refrigerant Charge			Refrigerant Type		R-454B	
	Without Reheat	Circuit 1	6 lbs. 12 oz.		6 lbs. 12 oz.	
		Circuit 2	6 lbs. 8 oz.		6 lbs. 8 oz.	
		Circuit 3	6 lbs. 11 oz.		6 lbs. 11 oz.	
		Circuit 4	6 lbs. 13 oz.		6 lbs. 13 oz.	
	With Reheat	Circuit 1	- - -		6 lbs. 12 oz.	
		Circuit 2	- - -		6 lbs. 8 oz.	
		Circuit 3	- - -		6 lbs. 11 oz.	
		Circuit 4	- - -		6 lbs. 13 oz.	
Electric Heat Available			See page 18			
Compressor Type (number)			Scroll (4)		Scroll (4)	
Outdoor Coils	Net face area - ft. ² (total)		68.3		68.3	
	Number of rows		1		1	
	Fins - in.		23		23	
Outdoor Coil Fans	Motor HP (number and type)		1/3 (6 PSC)		1/3 (6 PSC)	
	Rpm		1075		1075	
	Watts (total)		2500		2500	
	Diameter (Number) - in.		(6) 24		(6) 24	
	Blades		3		3	
	Total Air volume - cfm		21,500		21,500	
Indoor Coils	Net face area - ft. ² (total)		31.40		31.40	
	Tube diameter - in.		3/8		3/8	
	Rows		4		4	
	Fins - in.		14		14	
	Condensate drain size (NPT) - in.		(1) 1 in.		(1) 1 in.	
Expansion device type			Balanced Port Thermostatic Expansion Valve,removable power head			
³ Indoor Blower and Kit Selection	Nominal motor HP		5, 7.5, 10			
	Maximum usable motor output (US Only)		5.75, 8.63, 11.5			
	Motor - Drive kit number		5 HP Kit 5 660-810 rpm Kit 6 770-965 rpm Kit 7 570-720 rpm Kit 8 480-630 rpm Kit 9 410-535 rpm			
			7.5 HP Kit 3 715-880 rpm Kit 4 770-965 rpm			
			10 HP Kit 1 740-895 rpm Kit 2 870-1045 rpm			
	Wheel (Number) diameter x width - in.		(2) 18 x 15			
	Filters		Type of filter Fiberglass, disposable			
			Number and size - in. (12) 20 x 20 x 2			
	Line voltage data (Volts-Phase-Hz)			208/230-3-60, 460-3-60, 575-3-60		

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

¹ Tested at conditions included in with AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

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.

SPECIFICATIONS			30 TON	
Model		LCT360H5V	LCT360H5M	
Nominal Tonnage		30 Ton	30 Ton	
Efficiency Type		High	High	
Blower Type		VAV Variable Air Volume	MSAV® Multi-Stage Air Volume	
Cooling Performance	Gross Cooling Capacity - Btuh	360,000	360,000	
	¹ Net Cooling Capacity (Btuh)	350,000	350,000	
	¹ AHRI Rated Air Flow (cfm)	8750	8750	
	Total Unit Power - kW	32.5	32.5	
	¹ IEER (Btuh/Watt)	13.5	14.2	
	¹ EER (Btuh/Watt)	10.8	10.8	
Sound Rating Number		dBA	95	
Refrigerant Charge		Refrigerant Type	R-454B	
Without Reheat Option	Circuit 1	6 lbs. 6 oz.	6 lbs. 6 oz.	
		6 lbs. 13 oz.	6 lbs. 13 oz.	
		6 lbs. 10 oz.	6 lbs. 10 oz.	
		6 lbs. 6 oz.	6 lbs. 6 oz.	
	Circuit 2	---	7 lbs. 12 oz.	
		---	7 lbs. 8 oz.	
		---	6 lbs. 14 oz.	
		---	6 lbs. 12 oz.	
Electric Heat Available		See page 18		
Compressor Type (number)		Scroll (4)	Scroll (4)	
Outdoor Coils	Net face area - ft. ² (total)	68.3	68.3	
	Number of rows	1	1	
	Fins - in.	23	23	
Outdoor Coil Fans	Motor HP (number and type)	1/3 (6 PSC)	1/3 (6 PSC)	
	Rpm	1075	1075	
	Watts (total)	2500	2500	
	Diameter (Number) - in.	(6) 24	(6) 24	
	Blades	3	3	
	Total Air volume - cfm	21,500	21,500	
	Net face area - ft. ² (total)	31.40	31.40	
Indoor Coils	Tube diameter - in.	3/8	3/8	
	Rows	4	4	
	Fins - in.	14	14	
	Condensate drain size (NPT) - in.	(1) 1 in.	(1) 1 in.	
	Expansion device type	Balanced Port Thermostatic Expansion Valve,removable power head		
³ Indoor Blower and Kit Selection	Nominal motor HP	5, 7.5, 10		
	Maximum usable motor output (US Only)	5.75, 8.63, 11.5		
	Motor - Drive kit number	5 HP Kit 5 660-810 rpm Kit 6 770-965 rpm Kit 7 570-720 rpm Kit 8 480-630 rpm Kit 9 410-535 rpm		
		7.5 HP Kit 3 715-880 rpm Kit 4 770-965 rpm		
		10 HP Kit 1 740-895 rpm Kit 2 870-1045 rpm		
		Wheel (Number) diameter x width - in.		(2) 18 x 15
		Filters	Type of filter	Fiberglass, disposable
		Number and size - in.	(12) 20 x 20 x 2	
	Line voltage data (Volts-Phase-Hz)		208/230-3-60, 460-3-60, 575-3-60	

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

¹ Tested at conditions included in with AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

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

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

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

Then determine from blower table blower motor output and drive required.

See page 10 for wet coil and option/accessory air resistance data.

See page 10 for factory installed drive kit specifications.

Air Volume cfm	TOTAL STATIC PRESSURE - In. w.g.																	
	0.20		0.40		0.60		0.80		1.00		1.20		1.40		1.60		1.80	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4000	372	0.26	433	0.65	497	0.99	565	1.27	630	1.54	687	1.79	738	2.04	784	2.30	824	2.56
4500	382	0.41	441	0.79	506	1.12	574	1.41	638	1.69	694	1.95	744	2.22	790	2.50	831	2.77
5000	392	0.56	451	0.93	516	1.25	584	1.55	646	1.85	702	2.12	751	2.41	796	2.70	837	3.00
5500	402	0.73	462	1.08	527	1.40	594	1.72	655	2.02	710	2.31	758	2.61	802	2.92	843	3.24
6000	414	0.89	473	1.24	539	1.56	605	1.90	665	2.21	718	2.51	766	2.83	809	3.16	850	3.51
6500	426	1.07	486	1.41	551	1.74	616	2.10	675	2.42	727	2.73	774	3.07	817	3.43	857	3.80
7000	439	1.26	499	1.60	565	1.93	628	2.31	685	2.64	737	2.97	782	3.34	825	3.72	864	4.11
7500	453	1.46	513	1.79	579	2.14	641	2.55	696	2.88	747	3.24	792	3.63	833	4.04	872	4.45
8000	467	1.66	528	2.00	593	2.38	653	2.81	708	3.15	757	3.53	801	3.95	843	4.39	881	4.82
8500	483	1.88	544	2.22	608	2.65	667	3.10	720	3.44	768	3.85	812	4.30	852	4.78	890	5.22
9000	499	2.11	561	2.47	624	2.95	681	3.41	733	3.76	780	4.20	823	4.69	862	5.19	900	5.65
9500	516	2.36	578	2.75	640	3.26	696	3.73	746	4.10	792	4.58	834	5.11	873	5.64	910	6.12
10,000	534	2.64	596	3.06	657	3.60	711	4.07	760	4.48	805	5.00	845	5.57	884	6.12	921	6.61
10,500	553	2.93	615	3.39	674	3.95	727	4.44	775	4.90	817	5.46	857	6.06	895	6.62	932	7.12
11,000	572	3.24	634	3.74	692	4.31	744	4.83	789	5.35	830	5.95	869	6.58	907	7.16	943	7.65
11,500	592	3.58	653	4.12	711	4.70	760	5.27	803	5.85	843	6.49	881	7.13	918	7.71	954	8.21
12,000	613	3.95	674	4.53	729	5.14	776	5.75	818	6.39	857	7.06	894	7.71	930	8.30	965	8.80
12,500	635	4.37	695	4.98	748	5.62	792	6.29	832	6.98	870	7.67	906	8.33	941	8.91	976	9.42
13,000	657	4.83	715	5.50	766	6.18	808	6.89	847	7.61	883	8.32	918	8.98	953	9.56	988	10.06
13,500	680	5.35	736	6.06	784	6.78	824	7.53	861	8.29	896	9.00	930	9.66	965	10.24	---	---
14,000	704	5.92	757	6.67	801	7.44	839	8.23	875	9.00	909	9.72	943	10.38	---	---	---	---
14,500	727	6.55	777	7.34	818	8.16	854	8.97	889	9.75	922	10.48	---	---	---	---	---	---
15,000	750	7.23	797	8.07	834	8.92	868	9.75	902	10.54	---	---	---	---	---	---	---	---

BLOWER DATA

DRIVE KIT SPECIFICATIONS

Motor Efficiency	Nominal HP	Maximum HP	Drive Kit Number	RPM Range
Standard	5	5.75	5	660 - 810
Standard	5	5.75	6	770 - 965
Standard	5	5.75	7	570 - 720
Standard	5	5.75	8	480 - 630
Standard	5	5.75	9	410 - 535
Standard	7.5	8.63	3	715 - 880
Standard	7.5	8.63	4	770 - 965
Standard	10	11.50	1	740 - 895
Standard	10	11.50	2	870 - 1045

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

For VFD applications, nominal motor output is also maximum usable motor output.

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE

Air Volume cfm	Wet Indoor Coil	Reheat Coil	Gas Heat Exchanger			Economizer	Filters			Horizontal Roof Curb
			Standard Heat	Medium Heat	High Heat		MERV 8	MERV 13	MERV 16	
	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.	in. w.g.
4000	0.04	0.04	0.08	0.08	0.11	0.00	0.00	0.00	0.06	0.04
4500	0.04	0.04	0.09	0.10	0.13	0.00	0.00	0.00	0.07	0.05
5000	0.05	0.04	0.10	0.12	0.15	0.00	0.00	0.00	0.08	0.06
5500	0.06	0.06	0.11	0.14	0.17	0.01	0.00	0.01	0.09	0.07
6000	0.07	0.06	0.12	0.16	0.19	0.01	0.00	0.02	0.10	0.08
6500	0.08	0.08	0.13	0.18	0.21	0.01	0.01	0.02	0.11	0.09
7000	0.09	0.08	0.14	0.20	0.24	0.02	0.01	0.03	0.12	0.10
7500	0.10	0.10	0.15	0.21	0.25	0.02	0.01	0.04	0.13	0.11
8000	0.11	0.10	0.17	0.24	0.28	0.02	0.01	0.04	0.14	0.13
8500	0.12	0.10	0.20	0.27	0.31	0.03	0.01	0.04	0.15	0.15
9000	0.13	0.12	0.22	0.29	0.34	0.04	0.01	0.04	0.16	0.17
9500	0.14	0.14	0.24	0.32	0.38	0.04	0.02	0.06	0.17	0.19
10,000	0.15	0.16	0.27	0.36	0.42	0.05	0.02	0.06	0.18	0.21
10,500	0.16	0.17	0.30	0.40	0.46	0.06	0.02	0.06	0.19	0.24
11,000	0.18	0.18	0.33	0.43	0.50	0.07	0.02	0.07	0.20	0.27
11,500	0.19	0.19	0.37	0.48	0.55	0.08	0.02	0.08	0.22	0.30
12,000	0.20	0.20	0.40	0.52	0.60	0.10	0.02	0.08	0.23	0.33
12,500	0.21	0.22	0.44	0.57	0.65	0.11	0.03	0.10	0.24	0.37
13,000	0.23	0.23	0.48	0.61	0.70	0.13	0.03	0.10	0.25	0.40
13,500	0.24	0.25	0.53	0.67	0.76	0.14	0.03	0.11	0.26	0.44
14,000	0.26	0.26	0.57	0.72	0.82	0.16	0.03	0.12	0.27	0.49
14,500	0.27	0.27	0.62	0.78	0.89	0.18	0.04	0.13	0.28	0.53
15,000	0.29	0.29	0.68	0.84	0.95	0.21	0.04	0.13	0.29	0.58

BLOWER DATA

POWER EXHAUST PERFORMANCE - STANDARD STATIC

Return Duct Negative Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0.00	12,800
0.05	12,200
0.10	11,500
0.15	10,800
0.20	9900
0.25	9000
0.30	7900
0.35	6750
0.40	5450
0.45	4150
0.50	2900

POWER EXHAUST - HIGH STATIC

Air Volume cfm	Return Duct Negative Static Pressure - In. w.g.																					
	0		0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8500	487	0.43	501	0.44	521	0.46	548	0.49	584	0.53	625	0.58	667	0.64	708	0.70	746	0.75	783	0.81	818	0.87
9000	515	0.51	528	0.52	547	0.54	570	0.57	601	0.61	638	0.66	678	0.71	717	0.77	755	0.83	791	0.90	826	0.96
9500	544	0.60	556	0.61	573	0.63	594	0.66	620	0.69	652	0.74	689	0.80	727	0.86	765	0.93	800	0.99	834	1.05
10,000	572	0.70	584	0.71	599	0.73	618	0.76	641	0.79	669	0.83	702	0.89	738	0.95	774	1.02	810	1.09	843	1.15
10,500	601	0.81	612	0.82	626	0.84	643	0.87	663	0.90	688	0.94	718	0.99	750	1.05	785	1.12	819	1.19	853	1.27
11,000	629	0.93	640	0.95	653	0.97	668	0.99	687	1.02	709	1.06	735	1.11	764	1.16	796	1.23	830	1.31	862	1.38
11,500	658	1.06	668	1.08	680	1.10	694	1.12	711	1.15	731	1.19	754	1.24	780	1.29	810	1.36	841	1.43	872	1.50
12,000	686	1.21	696	1.22	707	1.24	721	1.27	736	1.30	754	1.34	774	1.38	798	1.43	825	1.49	853	1.56	883	1.64

BLOWER DATA

CEILING DIFFUSER AIR RESISTANCE - in. w.g.

Air Volume cfm	Step-Down Diffuser			Flush Diffuser
	LARTD30/36S			LAFD30/36S
	2 Ends Open	1 Side/2 Ends Open	All Ends & Sides Open	
7500	0.37	0.31	0.25	0.29
8000	0.42	0.36	0.29	0.34
8500	0.48	0.41	0.34	0.39
9000	0.55	0.47	0.39	0.44
9500	0.62	0.53	0.45	0.51
10,000	0.70	0.60	0.51	0.57
10,500	0.78	0.68	0.58	0.65
11,000	0.87	0.76	0.65	0.72
11,500	0.97	0.85	0.73	0.81
12,000	1.08	0.94	0.82	0.9
12,500	1.19	1.04	0.91	0.99
13,000	1.30	1.15	1.00	1.10
13,500	1.43	1.26	1.10	1.20
14,000	1.56	1.38	1.20	1.31
14,500	1.69	1.50	1.31	1.43
15,000	1.84	1.63	1.43	1.56

CEILING DIFFUSER AIR THROW DATA - ft.

Air Volume cfm	¹ Effective Throw Range - ft.	
	Step-Down	Flush
9000	40 - 47	29 - 35
9500	43 - 50	33 - 41
10,000	46 - 54	37 - 46
10,500	50 - 58	42 - 51
11,000	53 - 61	46 - 56
11,500	55 - 64	50 - 61
12,000	58 - 67	54 - 66
12,500	61 - 71	58 - 71
13,000	64 - 74	62 - 75
13,500	67 - 77	66 - 79

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

MINIMUM R454B SPACE AND CFM REQUIREMENTS

Minimum Airflow		
Unit	Q_{min} (CFM)	Q_{min} (m ³ /h)
LCT/LGT302	178	303
LCT/LGT360	169	286

¹ **NOTE** - The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).

Minimum Room Area of Conditioned Space		
Unit	TA _{min} (ft ²)	TA _{min} (m ²)
LCT/LGT302	99	9.19
LCT/LGT360	94	8.68

² **NOTE** - The minimum room area of conditioned space is the smallest area the unit can service.

Refrigerant Charge R-454B		
Unit	M _o (lbs)	M _o (kg)
LGT/LCT302 Stage 1	6.75	3.06
LGT/LCT302 Stage 2	6.50	2.95
LGT/LCT302 Stage 3	6.69	3.03
LGT/LCT302 Stage 4	6.81	3.09
LGT/LCT360 Stage 1	6.38	2.89
LGT/LCT360 Stage 2	6.81	3.09
LGT/LCT360 Stage 3	6.63	3.01
LGT/LCT360 Stage 4	6.38	2.89

Altitude Adjustment Factor									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

³ **NOTE** - Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an LCT/LGT302 at 1000 ft. above sea level, multiply 178 by 1.05 to get 186.9 CFM as the new Q_{min} .

ELECTRICAL DATA	25 TON
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Model		LCT302H5M, LCT302H5V								
¹ Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	22.4			9.1			7.2		
	Locked Rotor Amps	166.2			74.6			54		
Compressor 2	Rated Load Amps	22.4			9.1			7.2		
	Locked Rotor Amps	166.2			74.6			54		
Compressor 3	Rated Load Amps	22.4			9.1			7.2		
	Locked Rotor Amps	166.2			74.6			54		
Compressor 4	Rated Load Amps	22.4			9.1			7.2		
	Locked Rotor Amps	166.2			74.6			54		
Outdoor Fan Motors (6)	Full Load Amps (6 Non-ECM)	2.4			1.3			1		
	Total	14.4			7.8			6		
Standard Power Exhaust (3) 0.33 HP	Full Load Amps	2.4			1.3			1		
	Total	7.2			3.9			3		
High Static Power Exhaust (3) 2 HP	Full Load Amps	7.5			3.4			2.7		
	Total	22.5			10.2			8.1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	HP	5	7.5	10	5	7.5	10	5	7.5	10
	Full Load Amps	16.7	24.2	30.8	7.6	11	14	6.1	9	11
² Maximum Overcurrent Protection (MOCP)	Unit Only	150	150	150	60	60	70	45	50	50
	With (3) 0.33 HP Standard Power Exhaust	150	150	175	60	70	70	50	50	60
	With High Static Power Exhaust (3) 2 HP	150	175	175	70	70	80	60	60	60
³ Minimum Circuit Ampacity (MCA)	Unit Only	127	135	143	55	58	62	43	47	49
	With (3) 0.33 HP Standard Power Exhaust	134	142	150	58	62	66	46	50	52
	With High Static Power Exhaust (3) 2 HP	149	157	165	65	69	72	51	55	57

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

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

HACR type breaker or fuse.

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

ELECTRIC HEAT DATA

25 TON

Model			LCT302H5M, LCT302H5V											
¹ Voltage - 60Hz			208/230V - 3 Ph						460V - 3 Ph			575V - 3 Ph		
Indoor Blower Motor - HP			5		7.5		10		5	7.5	10	5	7.5	10
Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	30 kW	150	150	150	150	150	150	60	60	70	45	50	50
		45 kW	⁴ 150	175	⁴ 150	175	175	175	80	90	90	70	70	70
		60 kW	⁴ 150	175	175	175	⁴ 175	200	90	90	90	70	70	80
		90 kW	⁴ 225	250	⁴ 225	250	⁴ 250	⁴ 300	125	125	150	100	100	110
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	30 kW	127	127	135	135	143	143	55	59	63	44	48	50
		45 kW	139	157	148	166	156	174	78	82	86	62	66	68
		60 kW	146	166	156	175	164	183	82	86	90	66	69	72
		90 kW	209	238	218	247	227	256	118	123	126	95	98	101
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and Standard Power Exhaust (3) 0.33 HP	30 kW	150	150	150	150	175	175	60	70	70	50	60	60
		45 kW	⁴ 150	175	175	175	⁴ 175	200	90	90	100	70	70	80
		60 kW	175	175	⁴ 175	200	⁴ 175	200	90	100	100	70	80	80
		90 kW	⁴ 225	250	⁴ 250	⁴ 300	⁴ 250	⁴ 300	125	150	150	100	110	110
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and Standard Power Exhaust (3) 0.33 HP	30 kW	134	134	142	142	150	150	60	64	68	48	52	54
		45 kW	148	166	157	175	165	183	83	87	91	66	70	72
		60 kW	155	175	165	184	173	192	87	91	95	70	73	76
		90 kW	218	247	227	256	236	265	123	127	131	98	102	105
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and High Static Power Exhaust (3) 2 HP	30 kW	150	150	175	175	175	175	70	80	80	60	60	60
		45 kW	⁴ 175	200	200	200	⁴ 200	225	90	100	100	80	80	80
		60 kW	⁴ 175	200	⁴ 200	225	⁴ 200	225	100	100	110	80	80	90
		90 kW	⁴ 250	⁴ 300	⁴ 250	⁴ 300	300	⁴ 300	150	150	150	110	110	125
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and High Static Power Exhaust (3) 2 HP	30 kW	149	149	157	157	165	165	68	72	76	54	58	60
		45 kW	167	185	176	194	184	202	90	95	98	72	76	79
		60 kW	175	194	184	203	192	211	95	99	103	76	80	82
		90 kW	237	266	247	275	255	284	131	135	139	105	108	111

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

HACR type breaker or fuse.

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

Factory installed circuit breaker not available.

ELECTRICAL DATA

30 TON

Model		LCT360H5M, LCT360H5V								
¹ Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	30.9			12.8			10.1		
	Locked Rotor Amps	178.5			103			78		
Compressor 2	Rated Load Amps	30.9			12.8			10.1		
	Locked Rotor Amps	178.5			103			78		
Compressor 3	Rated Load Amps	30.9			12.8			10.1		
	Locked Rotor Amps	178.5			103			78		
Compressor 4	Rated Load Amps	30.9			12.8			10.1		
	Locked Rotor Amps	178.5			103			78		
Outdoor Fan Motors (6)	Full Load Amps (6 Non-ECM)	2.4			1.3			1		
	Total	14.4			7.8			6		
Standard Power Exhaust (3) 0.33 HP	Full Load Amps	2.4			1.3			1		
	Total	7.2			3.9			3		
High Static Power Exhaust (3) 2 HP	Full Load Amps	7.5			3.4			2.7		
	Total	22.5			10.2			8.1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	HP	5	7.5	10	5	7.5	10	5	7.5	10
	Full Load Amps	16.7	24.2	30.8	7.6	11	14	6.1	9	11
² Maximum Overcurrent Protection (MOCP)	Unit Only	175	200	200	80	80	90	60	60	70
	With (3) 0.33 HP Standard Power Exhaust	200	200	200	80	80	90	60	70	70
	With High Static Power Exhaust (3) 2 HP	200	200	225	90	90	100	70	70	70
³ Minimum Circuit Ampacity (MCA)	Unit Only	163	170	177	70	74	77	56	58	61
	With (3) 0.33 HP Standard Power Exhaust	170	178	184	74	78	81	59	61	64
	With High Static Power Exhaust (3) 2 HP	185	193	200	80	84	87	64	67	69

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

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

HACR type breaker or fuse.

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

ELECTRIC HEAT DATA

30 TON

Model			LCT360H5M, LCT360H5V											
¹ Voltage - 60Hz			208/230V - 3 Ph						460V - 3 Ph			575V - 3 Ph		
Indoor Blower Motor - HP			5		7.5		10		5	7.5	10	5	7.5	10
Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	30 kW	175	175	200	200	200	200	80	80	90	60	60	70
		45 kW	175	175	200	200	200	200	80	90	90	70	70	70
		60 kW	175	175	200	200	200	200	90	90	90	70	70	80
		90 kW	⁴ 225	250	⁴ 225	250	⁴ 250	⁴ 300	125	125	150	100	100	110
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	30 kW	163	163	170	170	177	177	70	74	77	56	58	61
		45 kW	163	163	170	170	177	177	78	82	86	62	66	68
		60 kW	163	166	170	175	177	183	82	86	90	66	69	72
		90 kW	209	238	218	247	227	256	118	123	126	95	98	101
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and Standard Power Exhaust (3) 0.33 HP	30 kW	200	200	200	200	200	200	80	80	90	60	70	70
		45 kW	200	200	200	200	200	200	90	90	100	70	70	80
		60 kW	200	200	200	200	200	200	90	100	100	70	80	80
		90 kW	⁴ 225	250	⁴ 250	⁴ 300	⁴ 250	⁴ 300	125	150	150	100	110	110
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and Standard Power Exhaust (3) 0.33 HP	30 kW	170	170	178	178	184	184	74	78	81	59	61	64
		45 kW	170	170	178	178	184	184	83	87	91	66	70	72
		60 kW	170	175	178	184	184	192	87	91	95	70	73	76
		90 kW	218	247	227	256	236	265	123	127	131	98	102	105
² Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and High Static Power Exhaust (3) 2 HP	30 kW	200	200	200	200	225	225	90	90	100	70	70	70
		45 kW	200	200	200	200	225	225	90	100	100	80	80	80
		60 kW	200	200	⁴ 200	225	225	225	100	100	110	80	80	90
		90 kW	⁴ 250	⁴ 300	⁴ 250	⁴ 300	300	⁴ 300	150	150	150	110	110	125
³ Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and High Static Power Exhaust (3) 2 HP	30 kW	185	185	193	193	200	200	80	84	87	64	67	69
		45 kW	185	185	193	194	200	202	90	95	98	72	76	79
		60 kW	185	194	193	203	200	211	95	99	103	76	80	82
		90 kW	237	266	247	275	255	284	131	135	139	105	108	111

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

HACR type breaker or fuse.

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

Factory installed circuit breaker not available.

ELECTRIC HEAT CAPACITIES

Volts Input	30 kW			45 kW			60 kW			90 kW		
	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages	kW Input	Btuh Output	Stages
208	22.5	76,800	1	33.8	115,300	2	45.0	153,600	2	67.6	230,700	2
220	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
230	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
240	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
440	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
460	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
480	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
550	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
575	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
600	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2

PARTS ARRANGEMENT

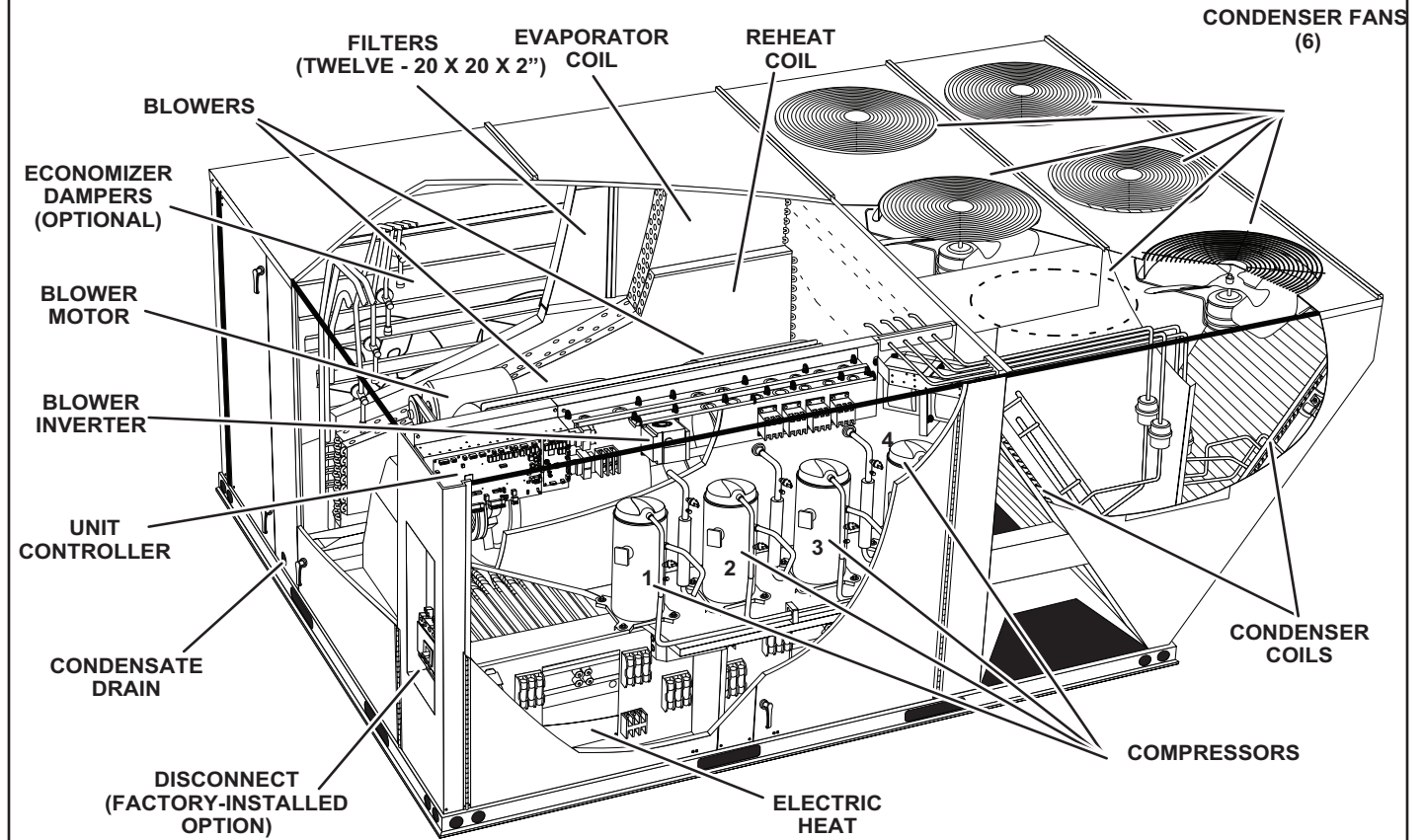


FIGURE 1

The diagram illustrates the LGT Field Installed Control Panel, showing the internal components and their connections. The panel is divided into two main sections: the top section for the LGT ONLY and the bottom section for the LGT FIELD INSTALLED. The components are labeled with letters and numbers, and their functions are listed in the accompanying tables.

Labels and Components:

- A55:** Control, M4
- A178:** Control, C4
- T1:** Control Inverter, Blower
- T18:** Control Inverter, Blower
- TB13:** Control, Smoke Detector
- A96:** Control Inverter, Blower
- K202:** Contact, Inverter
- K203:** Relay, Inverter Control
- F10:** Fuse, Component
- S42:** Overload Protector, Blower Motor
- K1:** Contact, Compressor 1
- K2:** Contact, Compressor 2
- K146:** Contact, Compressor 2
- K65:** Relay, Exhaust Fan
- C20:** Capacitor, Outdoor Fan 5
- C19:** Capacitor, Outdoor Fan 4
- K152:** Relay, Outdoor Fan 5
- K10:** Relay, Outdoor Fan 1
- C1:** Capacitor, Outdoor Fan 1
- C2:** Capacitor, Outdoor Fan 2
- C18:** Capacitor, Outdoor Fan 3
- C21:** Capacitor, Outdoor Fan 6
- K153:** Relay, Outdoor Fan 6
- K149:** Relay, Outdoor Fan 3
- K68:** Relay, Outdoor Fan 2
- K231:** Relay, Exhaust Fan 2
- F6:** Fuse, Exhaust Fan
- TB25:** Control, Burner 1
- T13:** Control, Burner 2
- T49:** Control, Burner 2
- A3:** Control, Burner 1
- A12:** Control, Burner 2
- K262:** Relay, Electric Heat
- K9:** Relay, Electric Heat

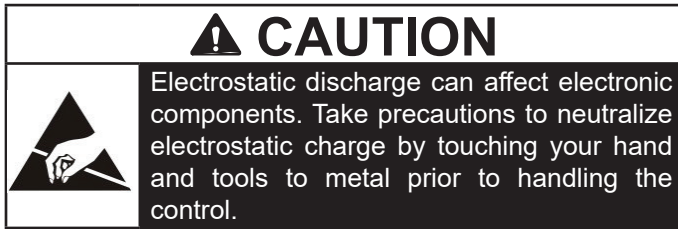
Legend:

Label	Function
A3	CONTROL, BURNER 1
A12	CONTROL, BURNER 2
A55	CONTROL, M4
A178	CONTROL, C4
A96	CONTROL INVERTER, BLOWER
A173	CONTROL, SMOKE DETECTOR
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C18	CAPACITOR, OUTDOOR FAN 3
C19	CAPACITOR, OUTDOOR FAN 4
C20	CAPACITOR, OUTDOOR FAN 5
C21	CAPACITOR, OUTDOOR FAN 6
F6	FUSE, EXHAUST FAN
F10	FUSE, COMPONENT
K1	CONTACTOR, COMPRESSOR 1
K2	CONTACTOR, COMPRESSOR 2
K231	RELAY, EXHAUST FAN 2
K65	RELAY, EXHAUST FAN
K10	RELAY, OUTDOOR FAN 1
K68	RELAY, OUTDOOR FAN 2
K149	RELAY, OUTDOOR FAN 3
K150	RELAY, OUTDOOR FAN 4
K252	RELAY, OUTDOOR FAN 5
K153	RELAY, OUTDOOR FAN 6
K125	RELAY, LOW TEMP VEST HEATER 1
K262	RELAY, LOW TEMP VEST HEATER 2
K202	CONTACTOR, INVERTER
K203	RELAY, INVERTER CONTROL
S42	OVERLOAD PROTECTOR, BLOWER MOTOR
T1	CONTROL INVERTER, BLOWER
T18	CONTROL INVERTER, BLOWER
TB13	CONTROL, SMOKE DETECTOR
TB25	CONTROL, BURNER 1
T13	CONTROL, BURNER 2
T49	CONTROL, BURNER 2

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I-UNIT COMPONENTS

ELECTROSTATIC DISCHARGE (ESD) Precautions and Procedures



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

A-Control Box Components

Control box components are shown in FIGURE 2. The control box is located in the upper left portion of the compressor compartment.

1-Disconnect Switch S48 (Optional all units)

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 or twist-style switches, which can be used by the service technician to disconnect power to the unit.

2-Transformer T1 (all units)

All units use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

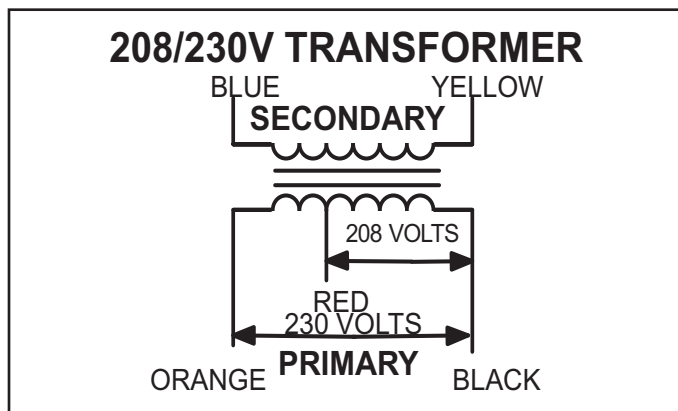


FIGURE 3

3-Transformer T18

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

4-C. A. B. Transformers T3 & T13 (575V)

All LCT 575 (J) voltage units use transformer T3 and T13. The auto voltage to 230VAC transformers are located in the control box. The transformers have an output rating of 0.75A. T3 transformer supplies 230VAC power to combustion air blower motor (B6) while T13 transformer supplies power to combustion air blower motor (B15) in all units. T3 and T13 also provide 230VAC to optional ultraviolet germicidal (UVC) lamps.

5-Terminal Block TB13

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

6-Terminal Block TB2

When unit is not equipped with an optional S48 disconnect switch, supply power is connected to TB2.

7-Outdoor Fan Motor Fuse Block & Fuses F10 and Power Exhaust Fan Motor Fuse Block and Fuses F6 (240 & 300 Y Volt Only)

Three line voltage fuses, F10, provide overcurrent protection to all condenser fans. Two line voltage fuses, F6, provide overcurrent protection to the two optional power exhaust fans. The fuses are rated at 30A in 208/230V units.

8-Fuses F4

Fuse F4 is used only with single point power supply. F4 provides overcurrent protection to the compressor and other cooling components.

Note - F4, S48 and TB2 are located inside a sheet metal enclosure in the unit front left corner mullion.

9-Outdoor Fan Capacitors C1, C2, C18, C19, C20, C21

Fan capacitors C1, C2, C18, C19, C20 and C21 are 370V / 10 MFD capacitors used to assist in the start up of condenser fans B4, B5, B21, B22, B23 and B24. respectively.

10-Compressor Contactors K1, K2, K14, K146

All compressor contactors are three pole double break contactors with a 24VAC coil. In all units, K1, K2, K14 and K146 energize compressors B1, B2, B13, and B20 respectively.

ELECTRIC HEAT CONTROL SECTION

(30 - 90 kW electric heat only)

11-Electric Heat Relay K9

All unit equipped with optional electric heat use an electric heat relay K9. K9 is a N.O. SPST pilot relay intended to electrically interlock operation of left and right side electric heat sections. K9 is energized by the A55 Unit Controller.

12-Blower Contactor K3

Blower contactor 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.

13-Outdoor Fan Relay K10, K68, K149, K150, K152, K153

Outdoor fan relays K10, K68, K149, K150, K152 and K153 used in all units, are DPDT relays with a 24VAC coil. In all units, K10 energizes fan 1 (B4), K68 energizes fan 2 (B5), K149 energizes fan 3 (B21), K150 energizes fan 4 (B22), K152 energizes fan 5 (B23) and K153 energizes fan 6 (B24).

14-Power Exhaust Relay K65 (PEF units)

Power exhaust relay K65 is a N.O. DPDT relay with a 24VAC coil. K65 is used in all units equipped with optional power exhaust fans. K65 is energized by the Unit Controller (A55).

15-Blower Motor Overload Relay S42

The blower motor overload relay is used in all units equipped with M-volt unit blower motors manufactured before Dec. 19, 2010 as well as units with standard efficiency motors of 10 HP. The relay (S42) is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts open to de-energize pin #4 in plug P299 of the A55 Unit Controller. A55 de-energizes all outputs. Units will be equipped with a relay manufactured by Telemecanique figure 4 or Siemens figure 5.

16-Ultraviolet Germicidal Lamp (UVC) and Transformer T49

UVC transformer T49 is used by units of all voltages except 208/230V. 575V LCT which are equipped with a UVC. The auto voltage to 230VAC transformer is installed in the control box. The transformer has an output rating of 0.75 amps. T49 transformer supplies 230VAC power to the UVC lamp.

17-Unit Controller A55 (all units)

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

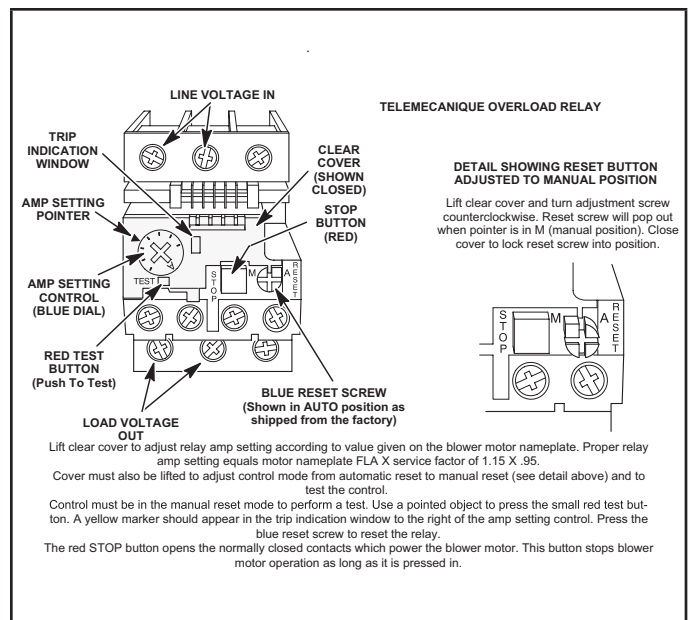


FIGURE 4

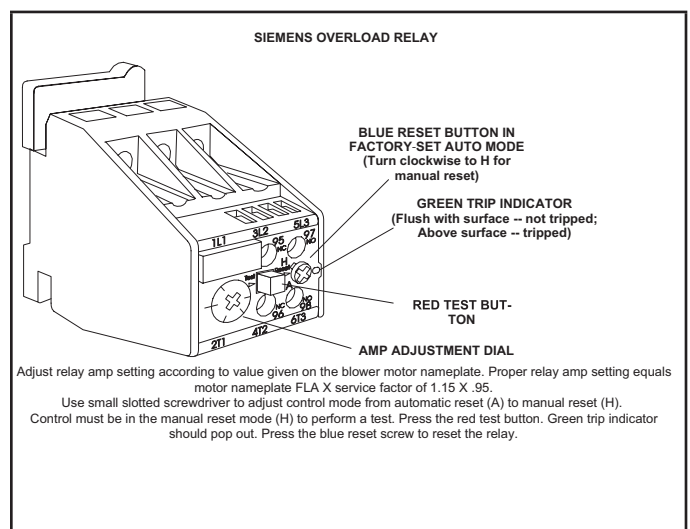


FIGURE 5

18-Compressor 3 & 4 Control Module A178 (all units)

The compressor 3 & 4 control module A178 controls two additional compressor stages. A178 includes all inputs and outputs required for compressor and fan control, compressor stage diagnostics, and low ambient control.

Relative Humidity Sensor - Optional

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

Enthalpy Sensor - Optional

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

Economizer Differential Pressure Sensor - Optional

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

Temperature Sensors

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

TABLE 1

Resistance vs. Temperature

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

Room Sensors

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

TABLE 2

Two-Wire Thermistor

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

Carbon Dioxide Sensor

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

TABLE 3

Carbon Dioxide Range

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

VAV Supply Static Sensor

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

TABLE 4

Carbon Dioxide Range

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

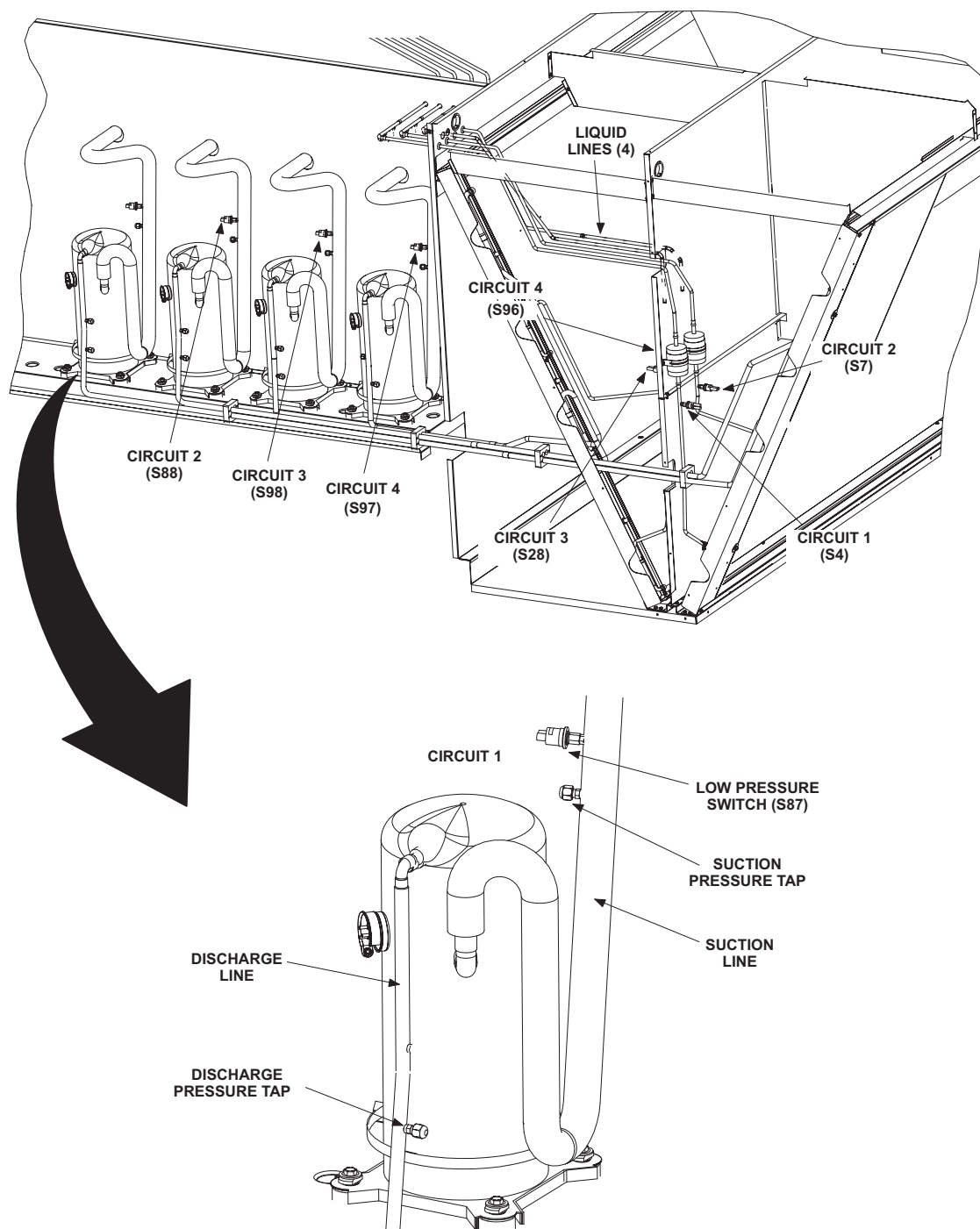


FIGURE 6

B-Cooling Components FIGURE 6

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. Six draw-through type condenser fans are used in all units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field-installed economizer. The evaporators are slab type and are stacked. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by low ambient switches and freezestats (on each evaporator).

1-Compressors B1, B2, B13, B20

WARNING

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

All units use four scroll compressors. 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. Compressor electrical specifications can be found in the SPECIFICATIONS section in this manual. Each compressor is energized by a corresponding compressor contactor.

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

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

IMPORTANT

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

2-Crankcase Heaters HR1, HR2, HR5, HR11

All units use bellyband-type crankcase heaters. Heater HR1 is installed around compressor B1, heater HR2 compressor B2, HR5 compressor B13, and HR11 compressor B20. Crankcase heater wattage varies by compressor size.

3-High Pressure Switches S4, S7, S28, S96

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. The switch is located in the liquid line and is wired in series with the compressor contactor coil through A55 Unit Controller or A178 Compressor 3 and 4 Controller. S4 (first circuit), S7 (second circuit), S28 (third circuit), and S96 (fourth circuit) are wired in series with the respective compressor contactor coils.

When liquid 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 liquid pressure drops to 475 ± 15 psig (3275 ± 103 kPa) the pressure switch will close.

Unit Controller A55 has a three-strike counter before locking out the particular compressor circuit. 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 Pressure Switches S87, S88, S98, S97

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line. S87 (compressor one), S88 (compressor two), S98 (compressor three), and S97 (compressor four) are wired in series with the contactor coils through the A55 Unit Controller.

The Unit Controller A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during 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 ± 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 ± 5 psig (620 ± 34 kPa), due to many causes such as refrigerant being added.

6-Filter Drier (all units)

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

7-Condenser Fans B4, B5, B21, B22, B23, B24

See Specifications section in this manual for specifications of condenser fans. All condenser fans used have singlephase motors. All units are equipped with six condenser fans. The complete fan assembly may be removed for servicing and cleaning by removing the fan grill and turning the complete assembly until the motor brackets line up with the notches in the top panel. Lift the fan assembly out of the unit and disconnect the jack plug located on the motor.

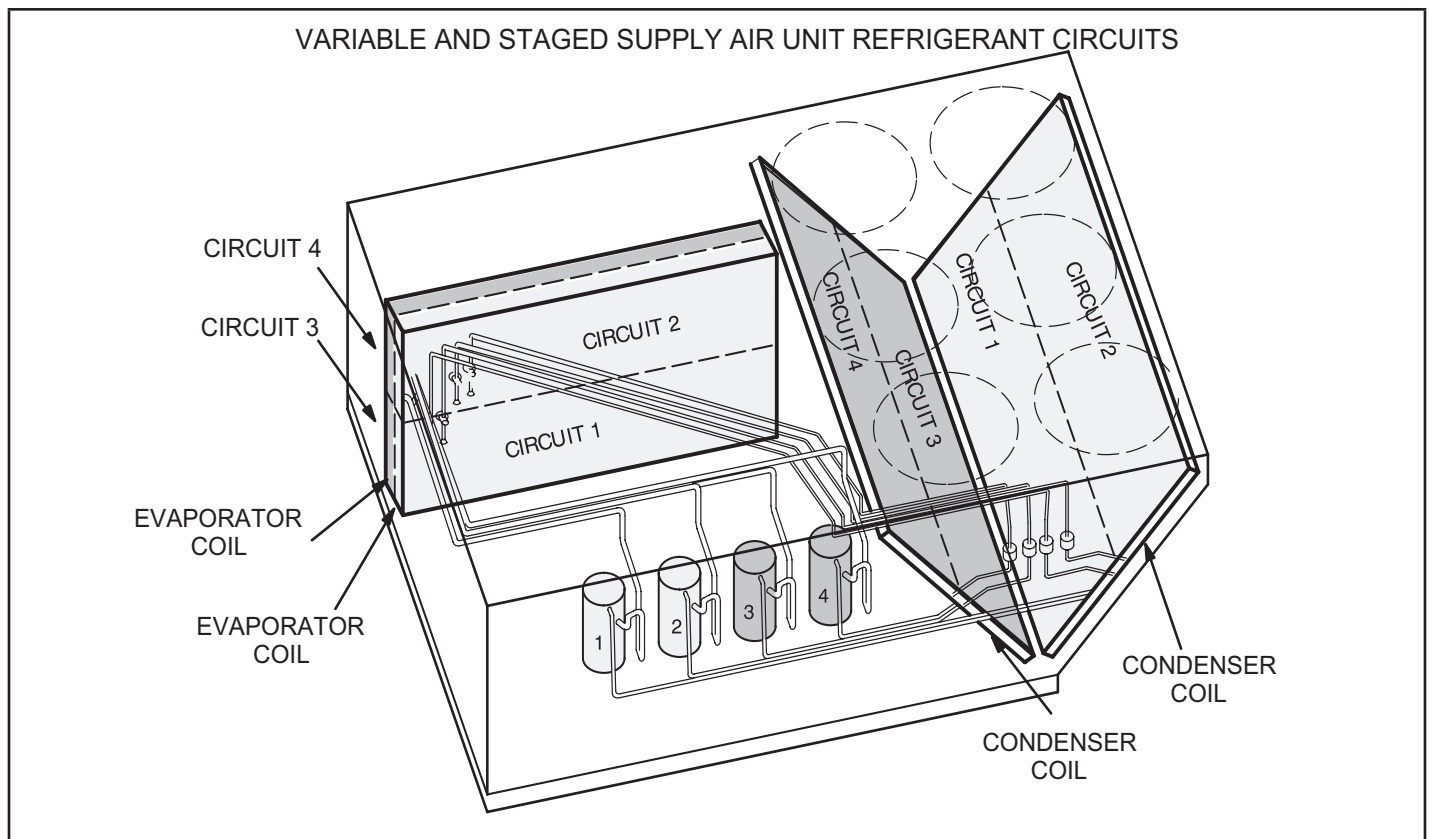


FIGURE 7

8-Diagnostic Sensors

Units are equipped with factory-installed thermistors located on different points on the refrigerant circuit.

The thermistors provide the Unit Controller with constant temperature readings of two specific locations on the refrigeration circuit. These temperatures are used as feedback in certain modes of unit operation.

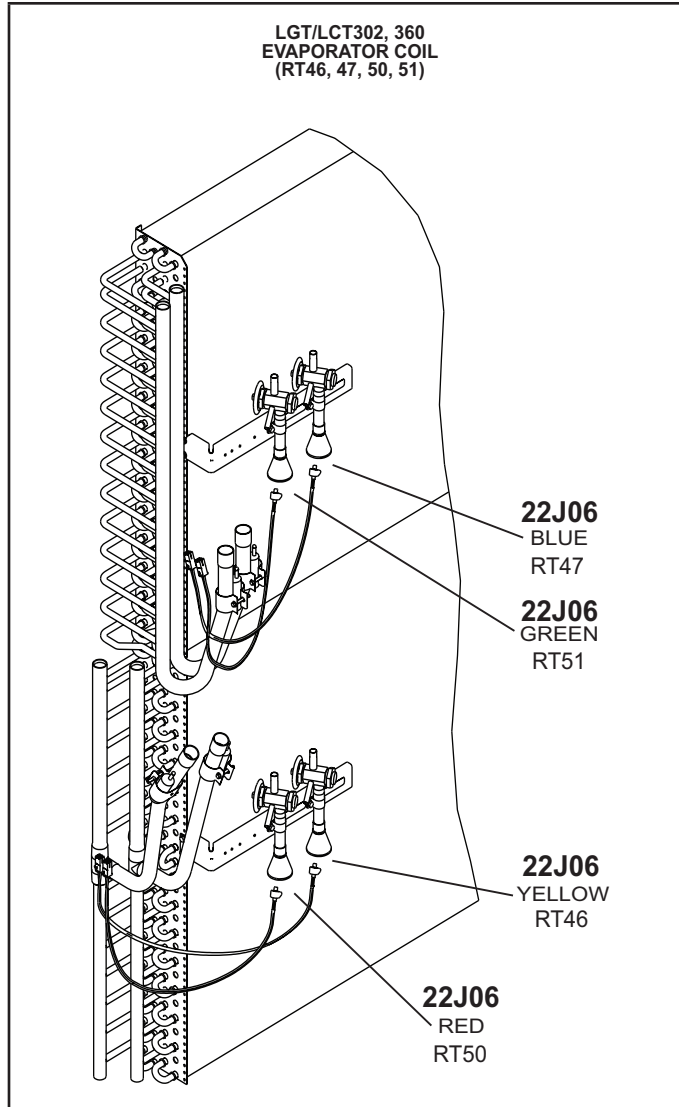


FIGURE 8

In addition, the Unit Controller uses these temperatures to initiate alarms such as loss of condenser or evaporator airflow and loss of charge.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See FIGURE 8 (RT46, RT47, RT50, RT51) and FIGURE 9 (RT48, RT49, RT52, RT53) for proper locations.

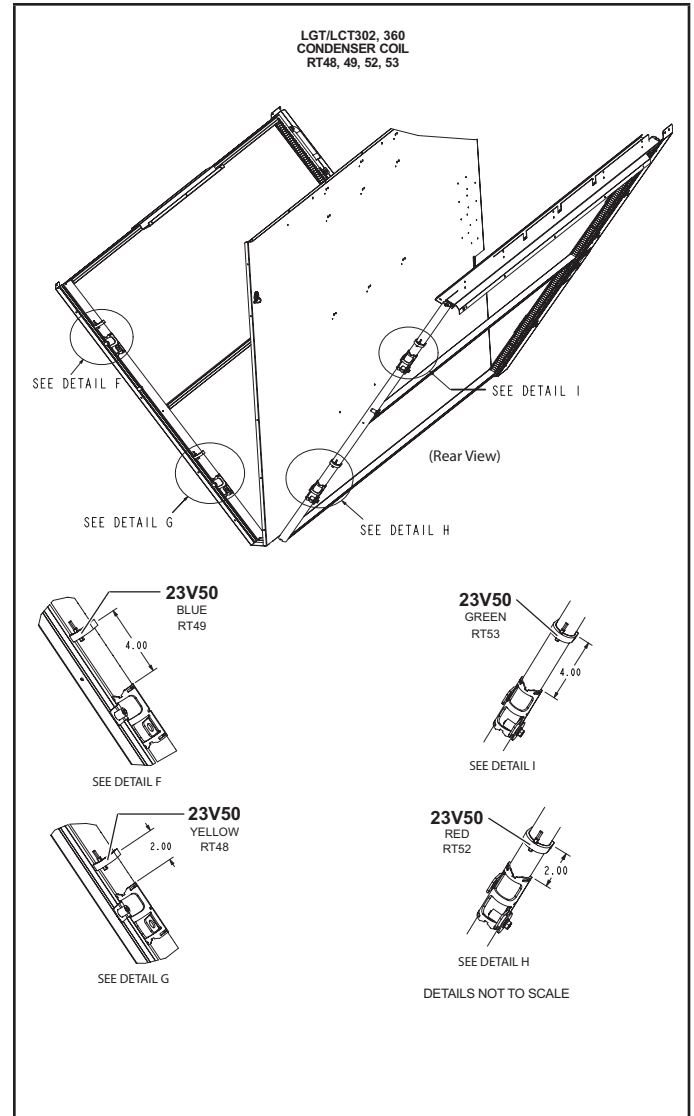


FIGURE 9

9-RDS Sensors

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources.

In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. See FIGURE 10 and FIGURE 11 for sensor locations.

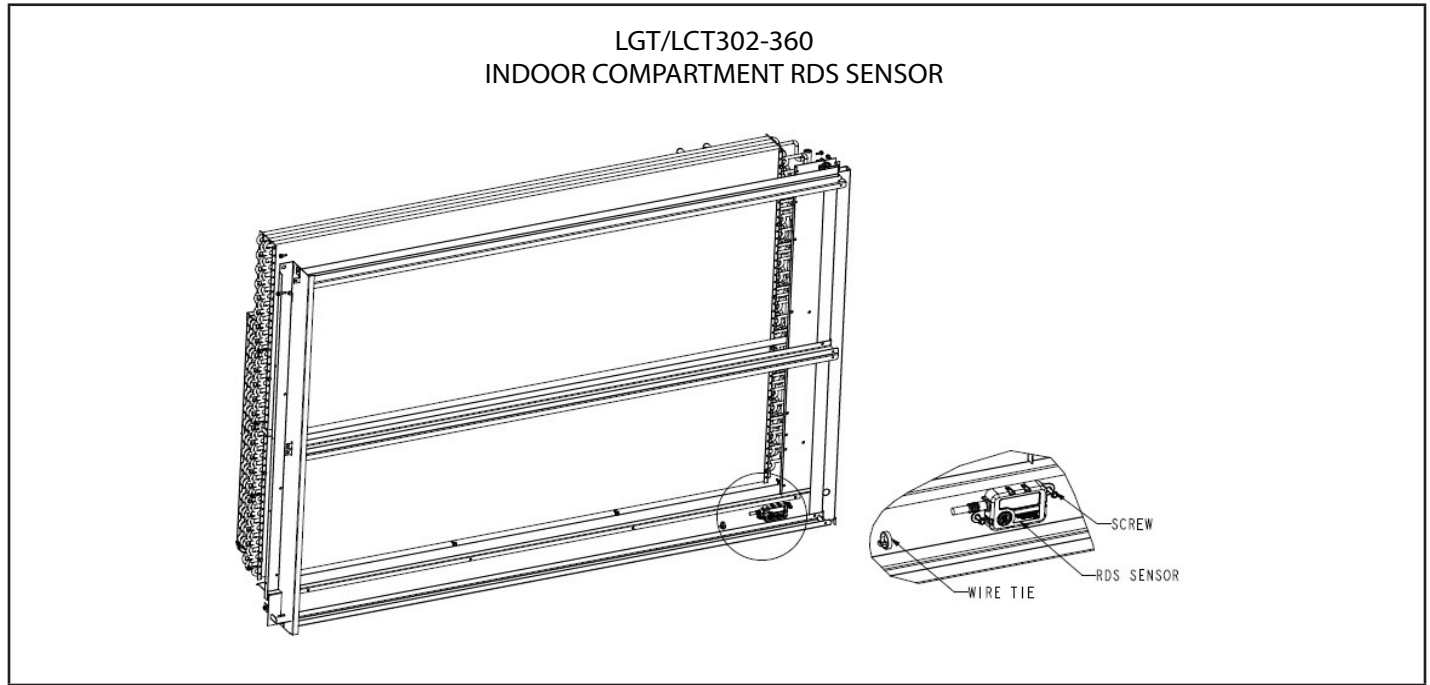


FIGURE 10

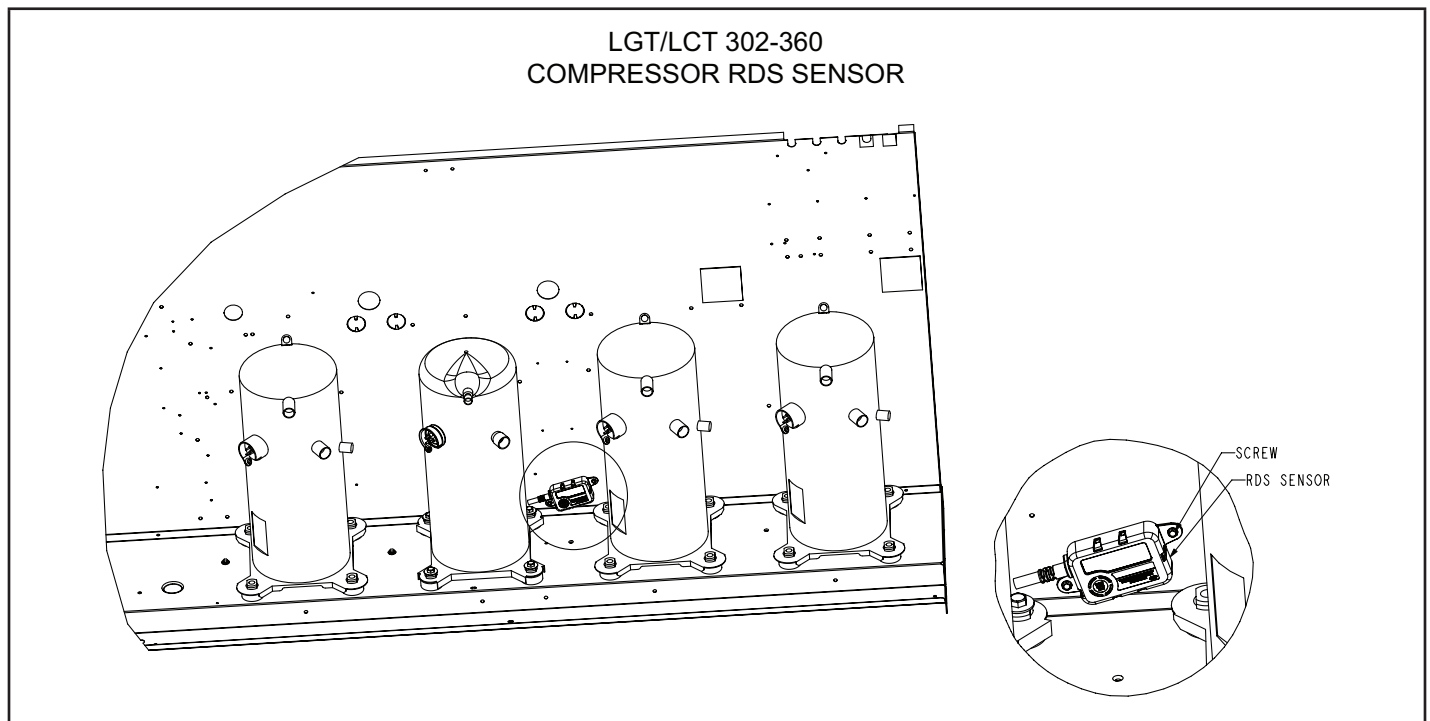


FIGURE 11

C-Blower Compartment

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

1-Blower Wheels (all units)

All units have two 18 in. x 15 in. (457 mm x 381 mm) blower wheels. Both wheels are driven by one motor.

2-Indoor Blower Motor B3 (all units)

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

A-Blower Operation

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. The only exception is immediately after a heating demand when the blower control keeps the blower on until all heat is extracted from the heat exchanger.

B-Blower Access

- 1 - Disconnect wiring connected to heating limit switches and mixed air sensor in units with an economizer. Disconnect blower harness at K3 contactor (CAV) or A96 inverter (VAV/Staged). Failure to do so could damage harness or components.
- 2 - Remove screws on either side of blower assembly sliding base. See FIGURE 12.
- 3 - Pull base toward outside of unit

C-Determining Unit CFM

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

Variable Air Volume Units - Refer to the Variable Air Volume Start-Up section.

- 1 - The following measurements must be made with a dry indoor coil. Run blower (G demand) without a cooling demand. Measure the indoor blower shaft RPM. Air filters must be in place when measurements are taken.
- 2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 13.

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

- 3 - See "BLOWER DATA" section (table of contents) to use static pressure and RPM readings to determine unit CFM, and when installing units with any of the optional accessories listed.
- 4 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 12 . Do not exceed minimum and maximum number of pulley turns as shown in TABLE 5.

TABLE 5

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

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

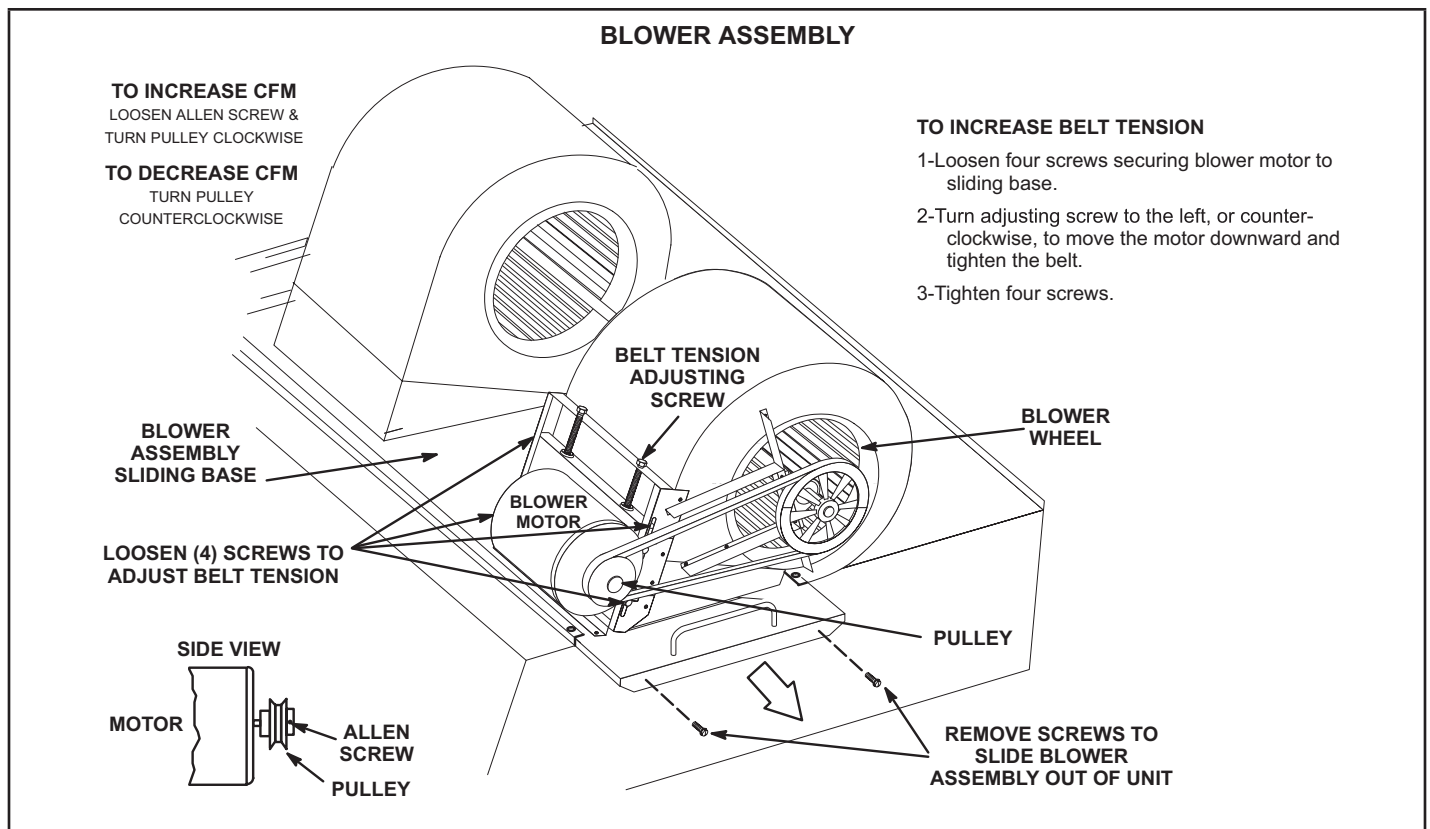


FIGURE 12

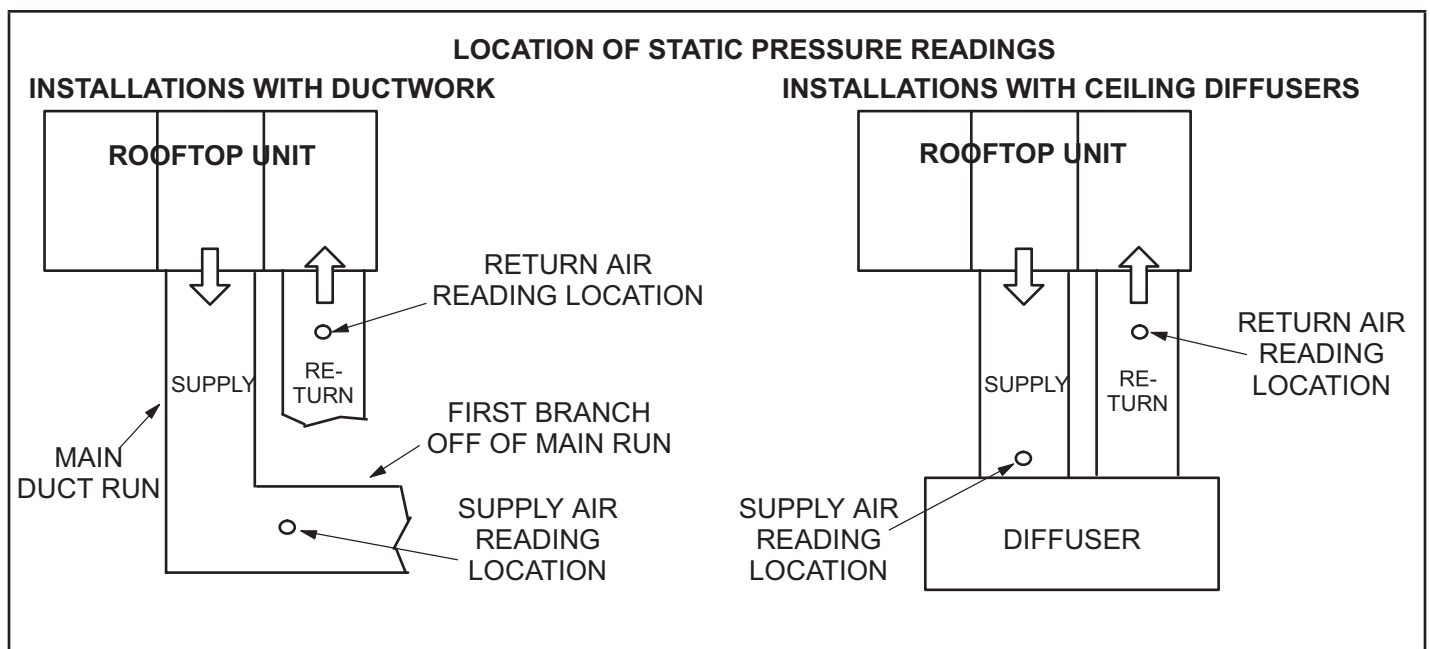


FIGURE 13

D-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat into pulley grooves. Make sure blower and motor pulley are aligned. See FIGURE 14.

- 1 - Loosen four screws securing blower motor to sliding base. See FIGURE 12.
- 2 - To increase belt tension -
Turn belt tension adjusting screw to the left, or counterclockwise, to tighten the belt. This increases the distance between the blower motor and the blower housing.
To loosen belt tension -
Turn the adjusting screw to the right, or clockwise to loosen belt tension.
- 3 - Tighten four screws securing blower motor to sliding base once adjustments have been made.

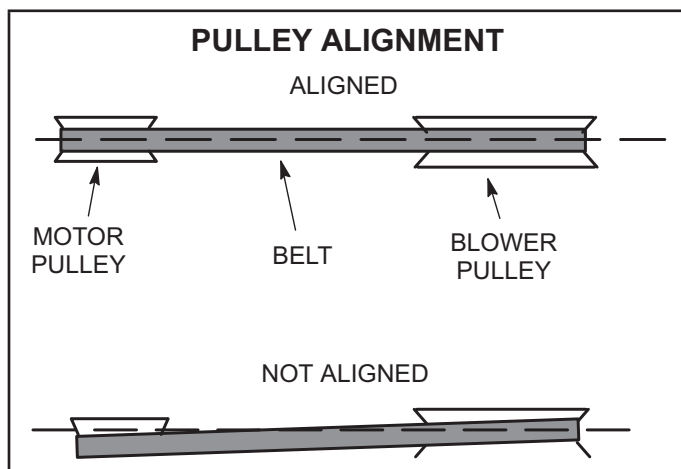


FIGURE 14

E-Check Belt Tension

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

- 1 - Measure span length X. See FIGURE 15.
- 2 - Apply perpendicular force to center of span (X) with enough pressure to deflect belt $1/64$ " for every inch of span length 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 used belt, the deflection force should be 5 lbs. (35kPa). A new belt deflection force should be 7 lbs. (48kPa). A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

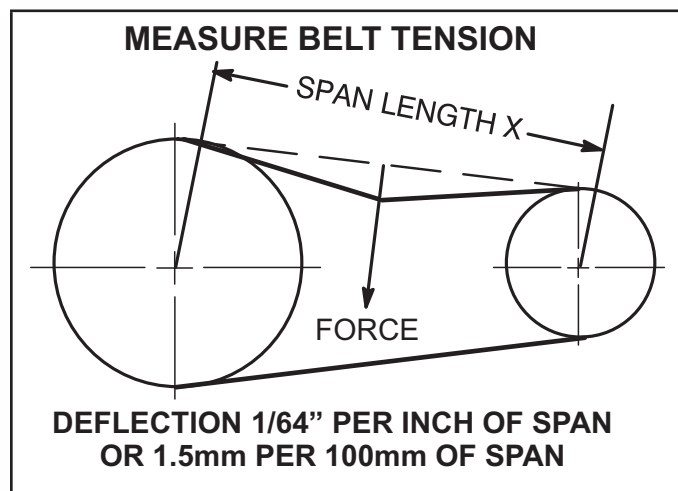


FIGURE 15

F-Field-Furnished Blower Drives

For field furnished blower drives, see BLOWER DATA (table of contents) for CFM and RPM. The BLOWER DATA section also has tables for drive numbers and manufacturer's model numbers. Reference the manufacturer's model numbers in the table below..

MANUFACTURER'S NUMBERS (60 HZ)

Drive No.	DRIVE COMPONENTS							
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS		SPLIT BUSHING	
	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
1	1VP71x1-3/8	100239-06	BK140H	100788-13	BX78	100245-44	H - 1-3/16	105616-02
2	1VP71x1-1/8	100239-06	BK120H	100788-07	BX75	31K9801	H - 1-3/16	105616-02
3	1VP65x1-3/8	78M7101	BK130H	100788-08	BX75	31K9801	H - 1-3/16	105616-02
4	1VP60x1-3/8	78L5501	BK110H	100788-06	BX71	31K9701	H - 1-3/16	105616-02
5	1VP56x1-1/8	P-8-1492	BK120H	100788-07	BX71	31K9701	H - 1-3/16	105616-02
6	1VP60x1-1/8	41C1301	BK110H	100788-06	BX70	31K9601	H - 1-3/16	105616-02
7	1VP50x1-1/8	P-8-1977	BK120H	100788-07	BX70	31K9601	H - 1-3/16	105616-02
8	1VP44x1-1/8	36C0701	BK120H	100788-07	BX70	31K9601	H - 1-3/16	105616-02
9	1VP44x1-1/8	36C0701	BK140H	100788-13	BX73	100245-41	H - 1-3/16	105616-02

E-Optional Electric Heat Components

See ELECTRICAL/ELECTRIC HEAT DATA tables for possible LCT match-ups and electrical ratings.

EHA parts arrangement is shown in figures 27 and 28. All electric heat sections consist of electric heating elements exposed directly to the air stream. Two electric heat sections (first section and second section) are used in all 30kW through 120kW heaters. See figure 29. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Main Control Box Components A55, K9, A178

The main control box (see figure 2) houses the A55, A178 Unit Controller and the K9 electric heat relay. For a description of the components see section I-A.

2-Terminal Block TB3

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

3-Contactors K15, K16, K17 and K18

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

4-High Temperature Limits S15 and S107 (Primary)

S15 and S107 are SPST N.C. auto-reset thermostats located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the first electric heat section, while S107 is the high temperature limit for the second electric heat section. Both thermostats are identical and are wired to the A55 Unit Controller. When either S15 or S107 opens, indicating a problem in the system, contactor K15 is de-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. The thermostats used on EHA360-45-2 Y/G/J volt are factory set to open at $200\text{F} \pm 5\text{F}$ ($93.3\text{C} \pm 2.8\text{C}$) on a temperature rise and automatically reset at $160\text{F} \pm 6\text{F}$ ($71.14\text{C} \pm 3.3\text{C}$) on a temperature fall. All other electric heat sections thermostats are factory-set to open at $170\text{F} \pm 5\text{F}$ ($76.7\text{C} \pm 2.8\text{C}$) on a temperature rise and automatically reset at $13\text{F} \pm 6\text{F}$ ($54.4\text{C} \pm 3.3\text{C}$) on a temperature fall. The thermostats are not adjustable.

5-Heating Elements HE1 through HE14

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

6-Fuse F3

Fuse F3 are housed in a fuse block which holds three fuses. Each F3 fuse is connected in series with each leg of electric heat. Figure 28 and table 7 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1 through F3 - 8.

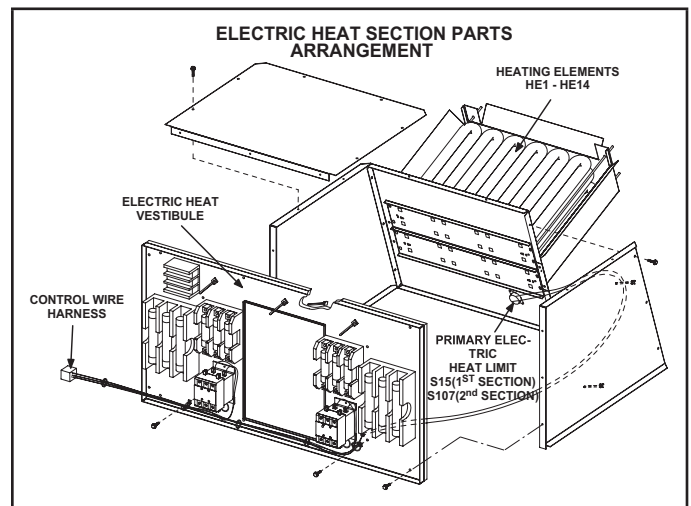


FIGURE 16

ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

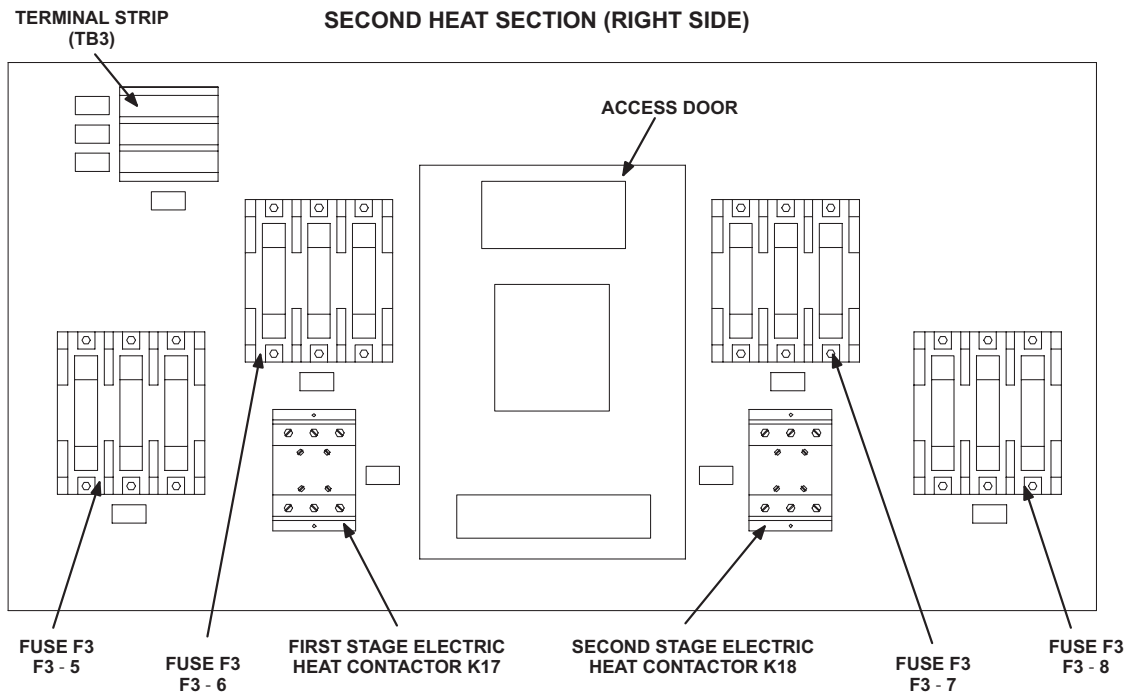
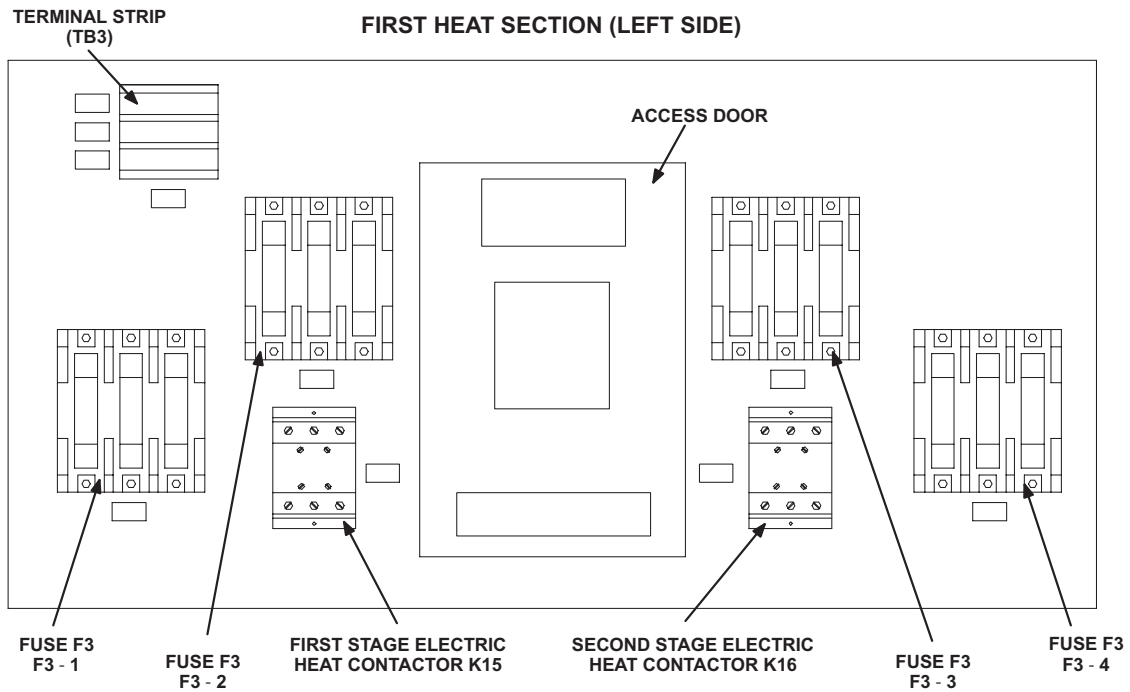


FIGURE 17

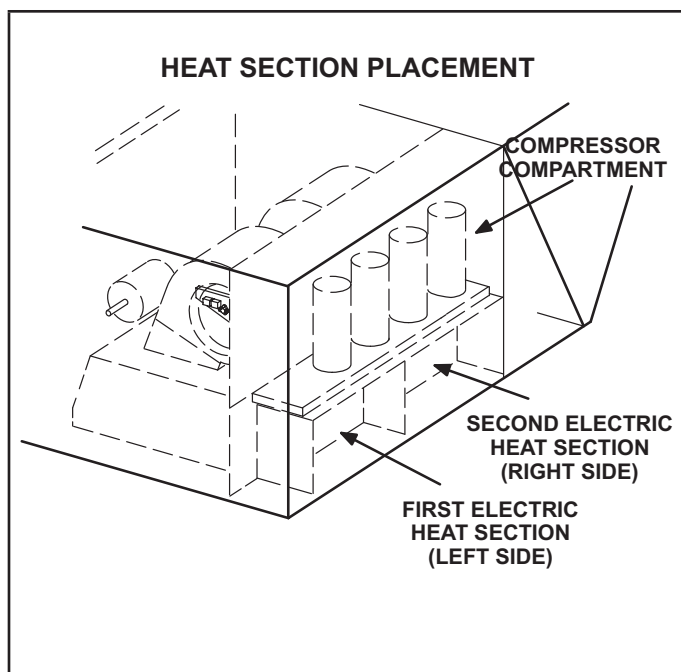


FIGURE 18

TABLE 6

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

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (LARMF18/36 or LARMFH30/36).

III-STARTUP - OPERATION - CHARGING

Refrigerant Charge R-454B		
Unit	M _c (lbs)	M _c (kg)
LGT/LCT302 Stage 1	6.75	3.06
LGT/LCT302 Stage 2	6.50	2.95
LGT/LCT302 Stage 3	6.69	3.03
LGT/LCT302 Stage 4	6.81	3.09
LGT/LCT360 Stage 1	6.38	2.89
LGT/LCT360 Stage 2	6.81	3.09
LGT/LCT360 Stage 3	6.63	3.01
LGT/LCT360 Stage 4	6.38	2.89

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.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, the following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating unit is earthed prior to charging the system with refrigerant.
 - Label the system when charging is complete (if not already).
 - Extreme care shall be taken not to overfill the refrigerating unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt

- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site

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

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

- 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 - Compare the normal operating pressures 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 charging curve to determine a target liquid temperature.

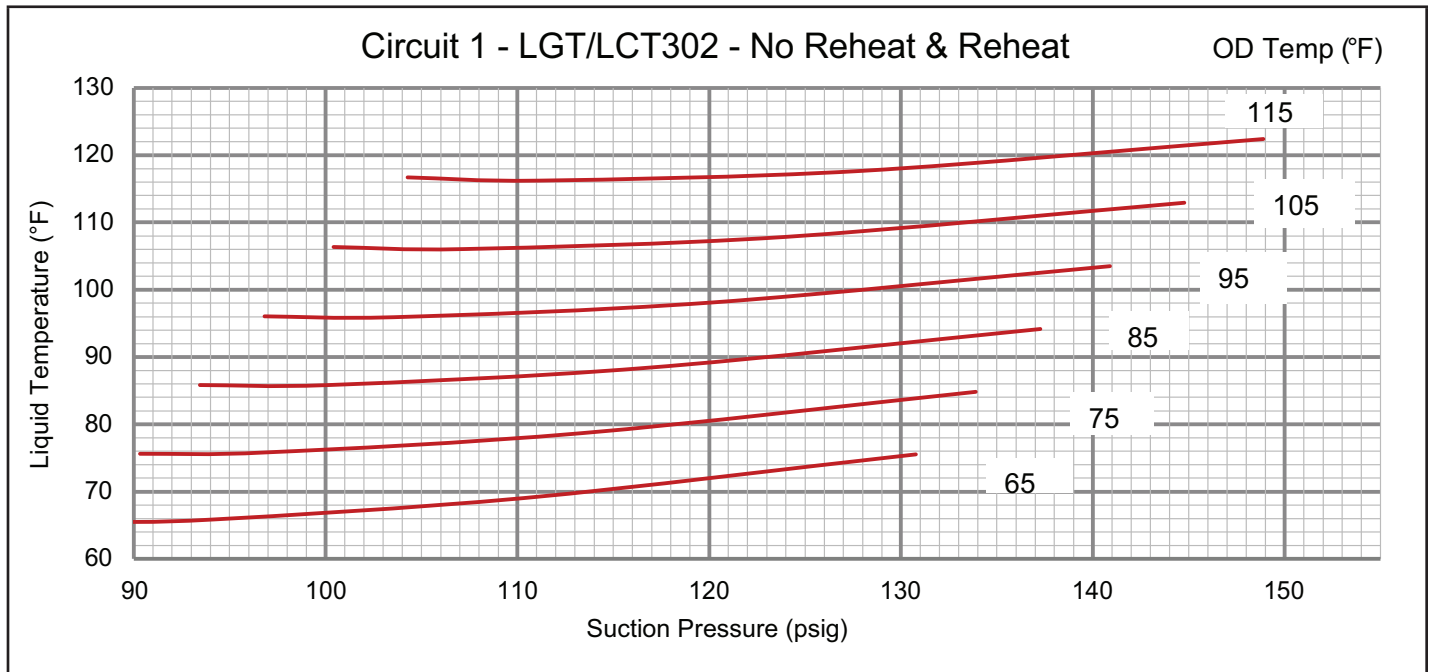
Note - *Pressures are listed for sea level applications.*

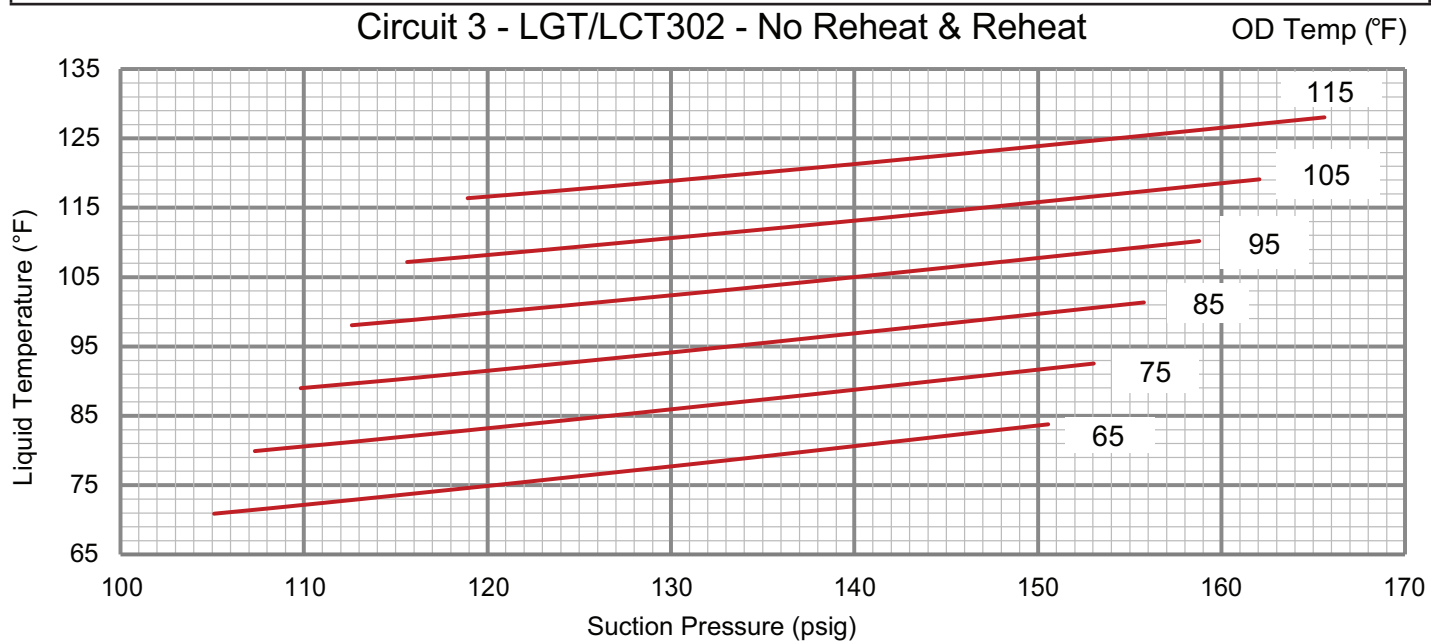
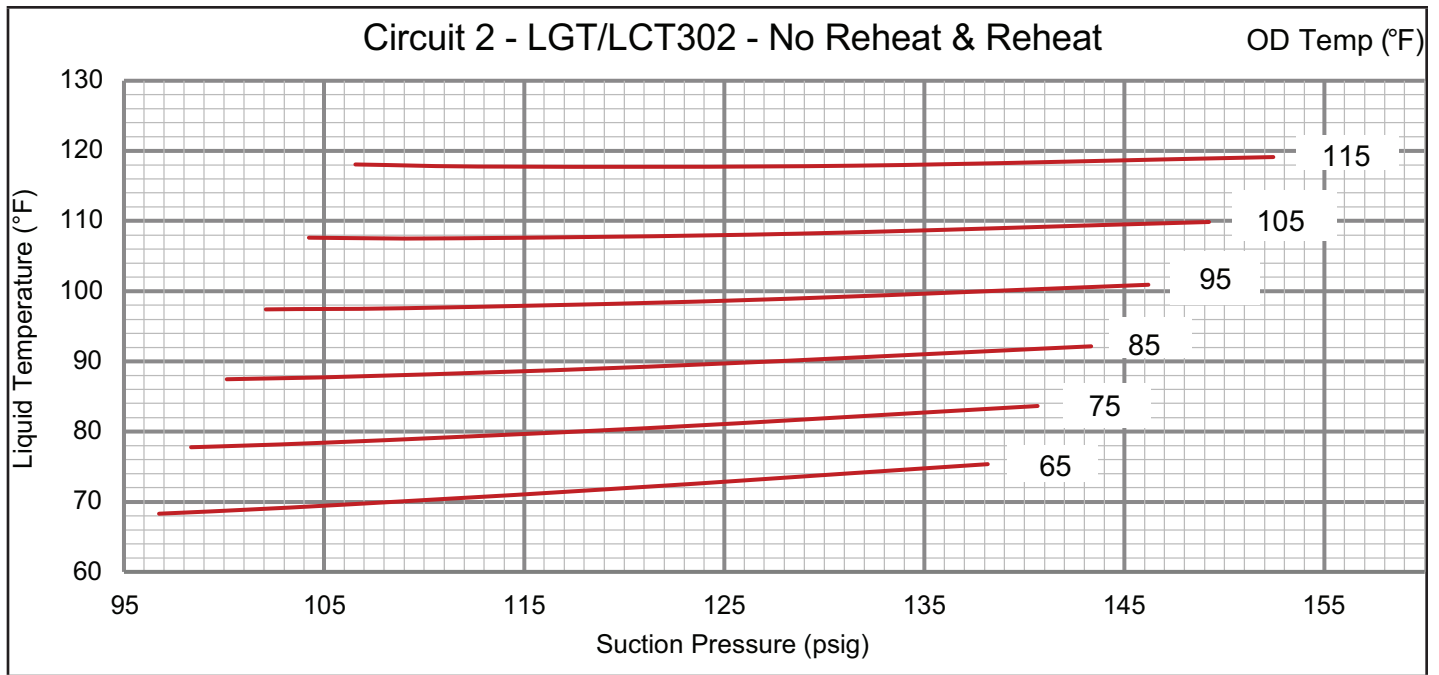
- 4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).
 - If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
 - If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.
 - When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
 - The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
 - The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
 - If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.
- 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 LGT/LCT302H Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 128 psig, the target liquid temperature is 100°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 7
LGT/LCT302H Normal Operating Pressures

	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	87	227	90	264	93	306	97	352	100	404	104	459
	94	229	97	266	100	308	104	355	107	406	111	462
	110	235	113	272	117	314	120	360	124	412	128	467
	131	244	134	280	137	322	141	368	145	419	149	475
Circuit 2	97	220	98	256	100	297	102	345	104	398	107	458
	103	221	105	256	107	298	109	345	112	398	114	457
	119	227	121	261	123	302	126	348	129	400	131	458
	138	237	141	271	143	310	146	355	149	406	152	463
Circuit 3	105	238	107	276	110	319	113	366	116	418	119	475
	113	241	115	279	118	321	120	368	123	420	127	477
	130	249	133	286	135	327	138	374	141	425	145	481
	151	259	153	295	156	336	159	382	162	432	166	488
Circuit 4	110	237	111	275	113	319	115	369	117	425	120	488
	117	240	119	277	121	320	123	370	125	425	128	487
	134	247	136	283	138	325	140	373	143	427	146	487
	154	257	156	292	158	332	161	379	163	432	167	491





Circuit 4 - LGT/LCT302 - No Reheat & Reheat

OD Temp (°F)

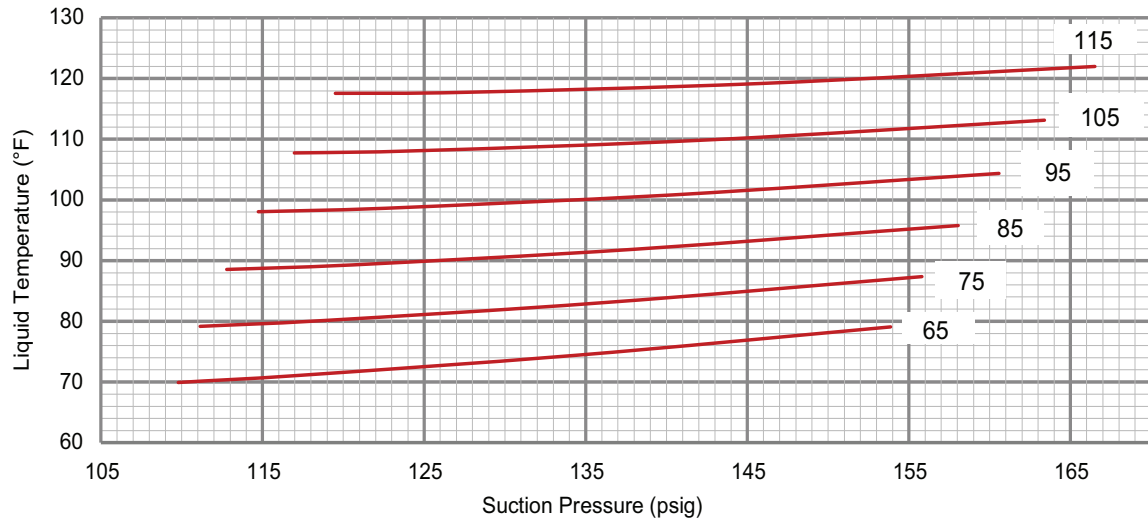
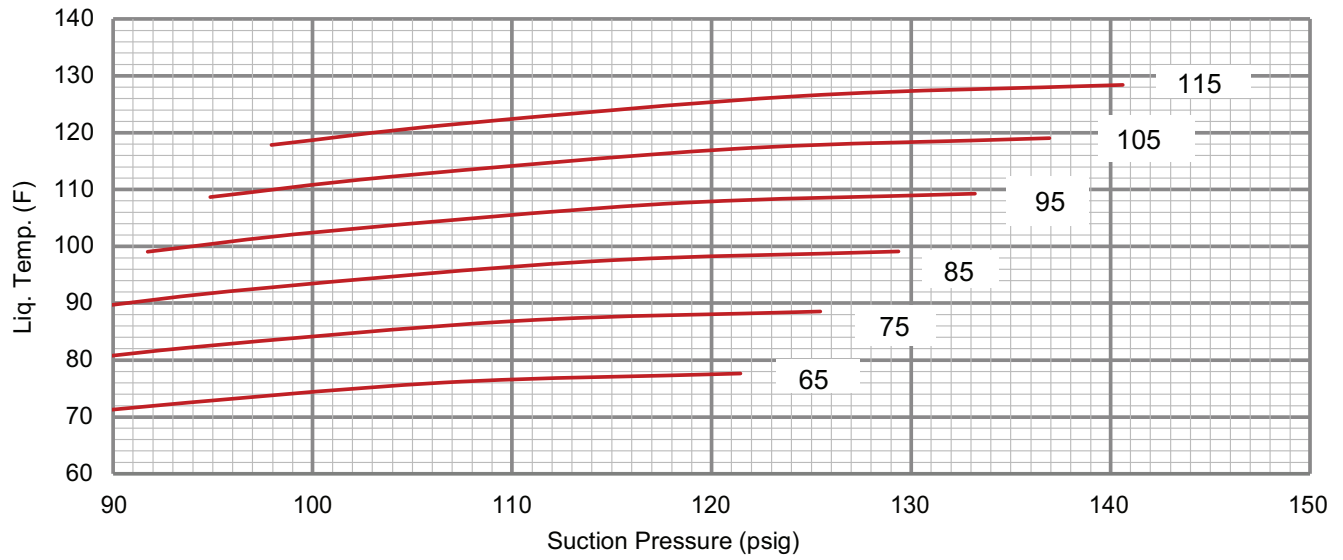


TABLE 8
LGT/LCT360H Normal Operating Pressures

	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	82	232	85	269	89	309	92	355	95	404	98	457
	90	237	94	274	97	315	101	360	104	410	107	463
	107	247	110	284	114	325	118	370	121	420	125	473
	121	254	125	291	129	333	133	378	137	428	141	481
Circuit 2	91	228	93	265	94	307	96	354	98	406	99	463
	98	232	100	269	103	311	105	358	106	410	108	467
	114	240	117	276	119	318	122	364	124	415	126	472
	130	247	133	282	136	323	139	369	142	420	145	476
Circuit 3	99	254	101	293	103	337	105	386	107	439	109	497
	108	258	111	297	113	341	115	389	117	442	119	500
	126	268	129	306	131	350	134	398	136	450	138	508
	144	280	147	318	150	361	152	409	155	461	157	518
Circuit 4	105	245	106	283	107	325	109	372	110	425	111	482
	113	248	114	285	116	327	118	374	119	426	121	483
	128	256	131	293	134	334	136	381	138	432	141	489
	144	269	148	305	151	346	154	392	157	443	160	499

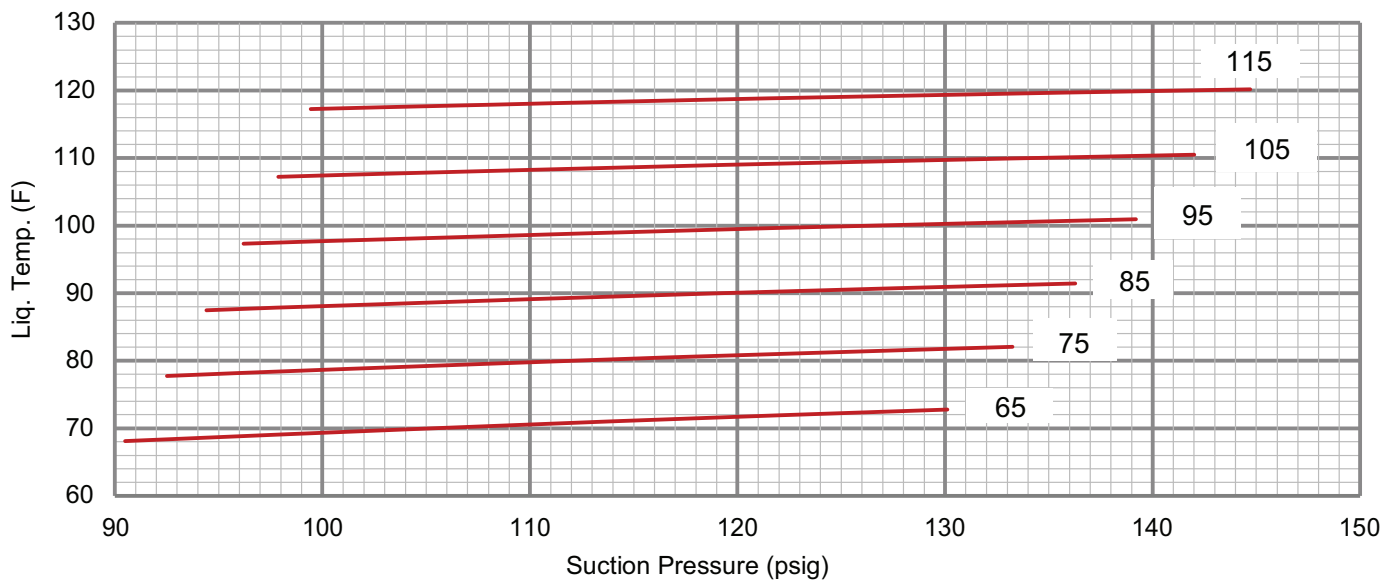
Circuit 1 - LGT/LCT360 - No Reheat

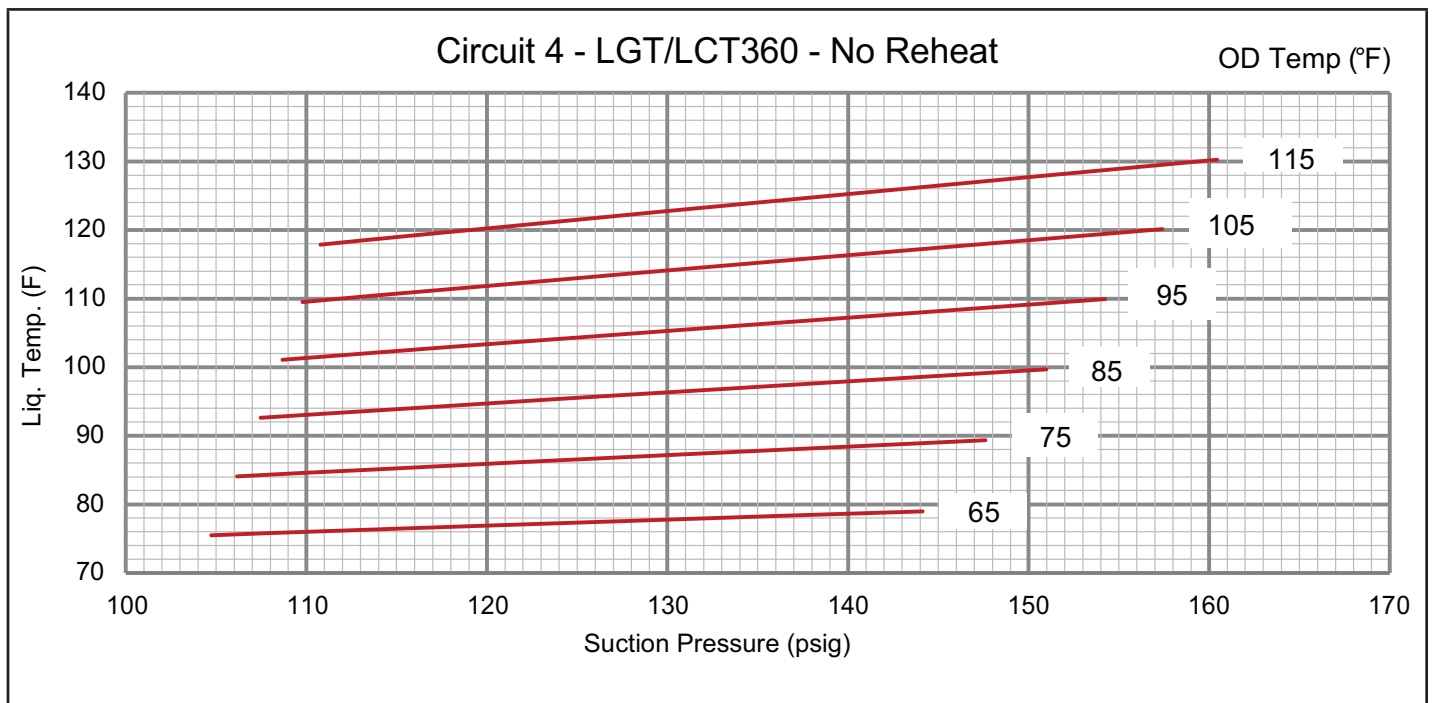
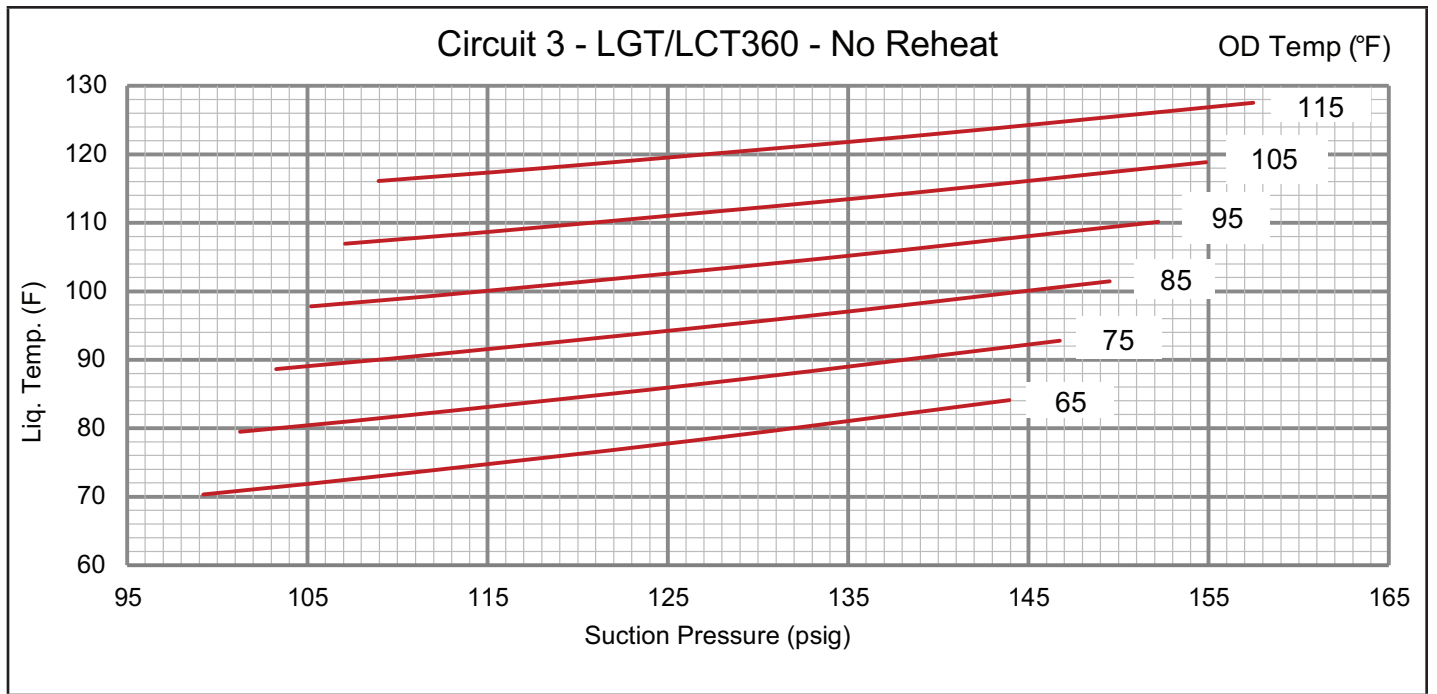
OD Temp (°F)



Circuit 2 - LGT/LCT360 - No Reheat

OD Temp (°F)





IV- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

All units are factory charged and require no further adjustment; however, charge should be checked periodically using the normal operating pressure method.


1-Gauge Manifold Attachment

Attach high pressure line to discharge line Schrader port and the low pressure line to the suction line Schrader port.

NOTE-When unit is properly charged discharge line pressures should approximate those in Refrigerant Check and Charge section.

V-MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠ 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.

⚠ WARNING	
Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants	

Prior to beginning work on systems containing refrigerant to ensure the risk of ignition is minimized:

- All work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Where electrical components are being changed, service technicians shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flameable refrigerants as applicable:

- 1 - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
 - 2 - The ventilation machinery and outlets are operating adequately and are not obstructed.
 - 3 - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
 - 4 - Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.
 - 5 - Refrigerating pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- For systems containing refrigerant all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the equipment, so all parties are advised.

NOTE - Sealed electrical components shall be replaced, not repaired.

NOTE - Intrinsically safe components must be replaced, not repaired.

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:
 - Safely remove refrigerant following local and national regulations,
 - Evacuate the circuit,
 - Purge the circuit with inert gas,
 - Evacuate,
 - Purge with inert gas,
 - Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

A-Filters

All units are equipped with twelve 20" x 20" x 2" (508mm x 508mm x 51mm) pleated throw-away type filters. Filters may be accessed through the economizer / filter access door (left of the blower door). All filters are removed by pulling on the pull tab, located on the bottom of each row of filters. Filters should be checked monthly (or more frequently in severe use) and cleaned or replaced regularly. Take note of the "AIR FLOW DIRECTION" marking on the filter frame when re-installing.

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

CAUTION

Be careful when servicing unit to avoid accidental contact with sharp metallic edges which may cause personal injury.

B-Lubrication

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

C-Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel. If balancing clips are removed, make sure they are reinstalled in the same location when cleaning is completed.

NOTE-*Do not lose balancing clips.*

D-Evaporator Coil

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

E-Condenser Coil

Clean condenser coil annually with water and inspect monthly during the cooling season. Access panels are provided on front and back of condenser section.

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

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

F-Electrical

- Check all wiring for loose connections.
- Check for correct voltage at unit (unit operating).
- 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.

A-LARMF18/36-14, 24 or LARMFH30/36-30, 41

Mounting Frames

When installing the LCT units on a combustible surface for downflow discharge applications, the Lennox LARMF18/36 14-inch or 24-inch (356 mm or 610mm) height roof mounting frame is used. For horizontal discharge applications, use LARMFH30/36 30-inch or 41-inch (762mm or 1041mm) height roof mounting frame. This frame converts unit from down-flow to horizontal air flow. The 14 and 24 inch (356 and 610mm) downflow and 41 inch (1041mm) horizontal frame meets National Roofing Code requirements. The roof mounting frames are recommended in all other applications but not required. If the 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 LARMF18/36 mounting frame is shown in FIGURE 19. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame **MUST** be squared to the roof and level before mounting. Plenum system **MUST** be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 20. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-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.

C-Transitions

Optional supply/return transitions LASRT30/36 are available for use with LCT series units utilizing optional LARMF18/36 roof mounting frame. Transition must be installed in the LARMF18/36 mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

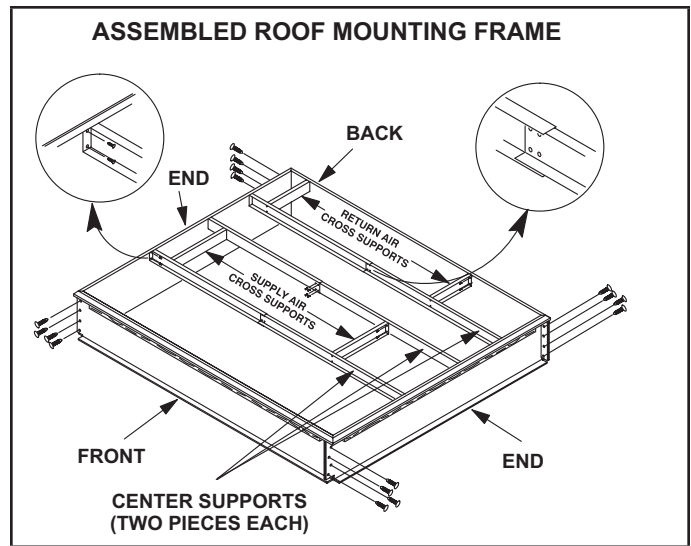


FIGURE 19

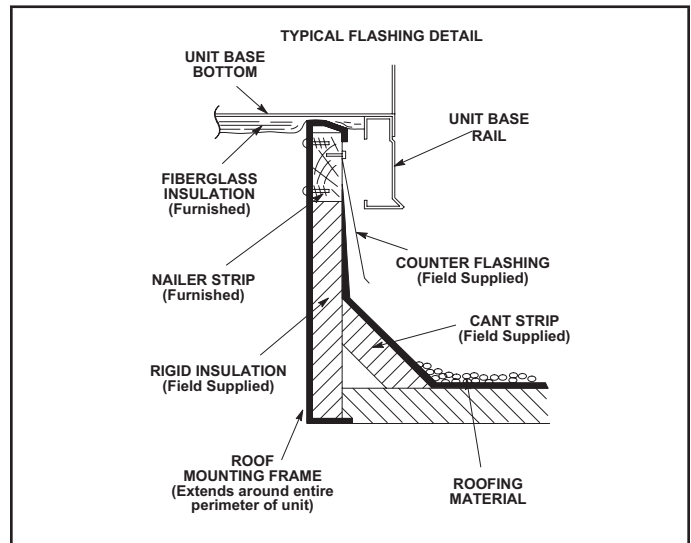


FIGURE 20

D-Supply and Return Diffusers

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

E-E1DAMP25D-1 & E1DAMO15D-1 Outdoor

Air Dampers

E1DAMP25D-1- & E1DAMO15D-1 consists of a set of dampers which may be manually or motor operated to allow up to 25 percent outside air into the system at all times (FIGURE 21). Either air damper can be installed in LGT 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 Lennox Part No. P-8-5069.

F-E1ECON15D-1 Economizer

(Field or Factory Installed)

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

NOTE - Gravity exhaust dampers are required with power exhaust.

The economizer is controlled by the A55 Unit Controller. The economizer will operate in one of four modes. These settings are available through the main menu at SETUP > TEST & BALANCE > DAMPER. Each mode also requires different sensors.

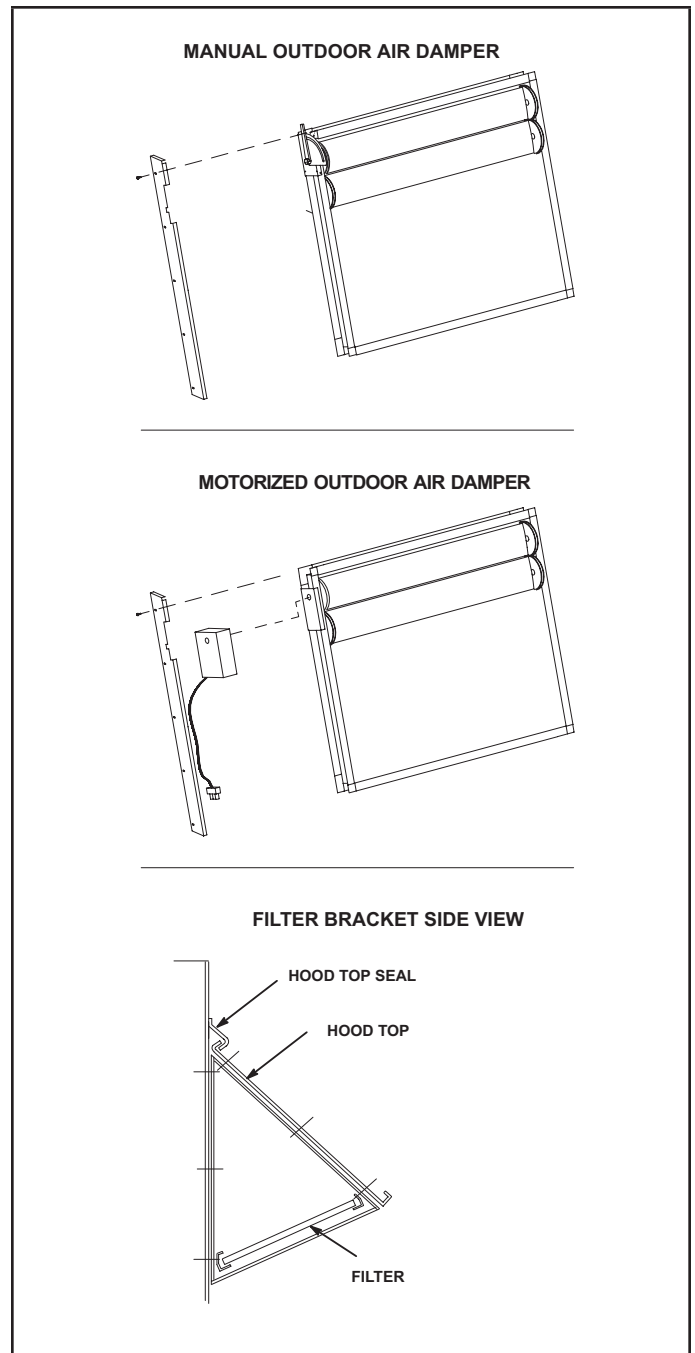


FIGURE 21

1-“TMP” MODE (SENSIBLE TEMPERATURE)

In the “TMP” mode, the A55 Unit Controller uses input from the factory installed RT6 Supply Air Sensor, RT16 Return Air Sensor, and RT17 Outdoor Air Sensor to determine suitability of outside air and economizer damper operation. When outdoor sensible temperature is less than return air sensible temperature, outdoor air is used for cooling. This may be supplemented by mechanical cooling to meet comfort demands. This application does not require additional optional sensors.

2-“ODE” MODE (OUTDOOR ENTHALPY)

The “ODE” or outdoor enthalpy mode requires a factory or field-provided and -installed Honeywell C7400 enthalpy sensor (53W64). The sensor monitors outdoor air temperature and humidity (enthalpy). When outdoor air enthalpy is below the enthalpy control setpoint, the economizer modulates to allow outdoor air for free cooling.

3-“DIF” MODE (DIFFERENTIAL ENTHALPY)

The “DIF” or differential enthalpy mode requires two factory or field-provided and -installed Honeywell C7400 enthalpy sensors (53W64). One sensor is installed in the outside air opening and the other sensor is installed in the return air opening. When the outdoor air enthalpy is below the return air enthalpy, the economizer opens to bring in outdoor air for free cooling.

4-“GLO” MODE (GLOBAL)

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

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

NOTE - All economizer modes of operation will modulate dampers to 55F (13C) supply air.

G-Gravity Exhaust Dampers

E1DAMP60D-1 dampers are used in downflow and LAGEDH30/ 36 are used in horizontal air discharge applications. E1DAMP60D-1 dampers are installed in the return air compartment of the unit (FIGURE 22). LAGEDH30/ 36 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 LGT series units. An exhaust hood is furnished with any type of gravity exhaust damper.

Gravity exhaust dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail. LAGED(H)30/36 dampers are used with LGT series units. See installation instructions for more detail.

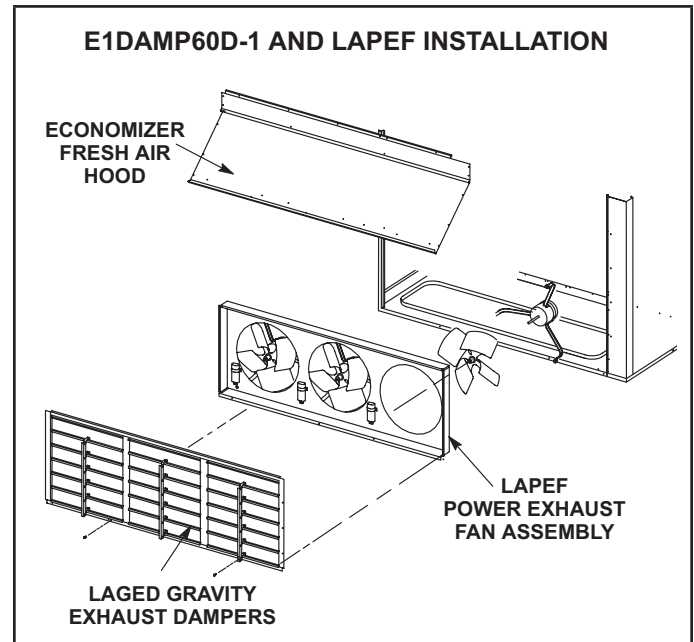


FIGURE 22

H- E1PWRE40D-1 Power Exhaust Fans

Power exhaust fans are used with LGT in downflow applications only. E1PWRE40D-1 power exhaust fans require optional E1DAMP60D-1 downflow gravity exhaust dampers and E1ECON15D-1 economizer. Power exhaust fans provide exhaust air pressure relief and run when return air dampers are closed and supply air blowers are operating. FIGURE 22 shows location of the power exhaust fans. See installation instructions for more detail.

I-Smoke Detectors A171, A172, A173

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

J-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at 0.15" W.C. (37.4 Pa) The switch is mounted on the middle left corner of the blower support panel. Wiring for the blower proving switch is shown on the temperature control section (C) wiring diagram in back of this manual.

K-Dirty Filter Switch S27

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 0.85" W.C. (211.7 Pa). The switch is mounted on the top corner of the economizer. Wiring for the dirty filter switch is shown on the temperature control section (C) wiring diagram in back of this manual. Actuation of this switch does not affect unit operation.

L-Indoor Air Quality (CO2) Sensor A63

The indoor air quality sensor monitors CO2 levels and reports the levels to the Unit Controller A55. The board adjusts the economizer dampers according to the CO2 levels.

The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment. Wiring for the indoor air quality switch is shown on the temperature control section (C) wiring diagram in back of this manual.

M-Supply Air Variable Frequency Drive VAV units only

NOTE - Units equipped a Variable Frequency Drive (VFD) are designed to operate on balanced, three-phase power. Operating units on unbalanced three-phase power will reduce the reliability of all electrical components in the unit.

Unbalanced power is a result of the power delivery system supplied by the local utility company. Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. If unbalanced three-phase power is supplied; the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance.

Refer to the installation instructions for additional information and available replacements. VAV units contain a supply air blower equipped with a variable frequency drive A96 (VFD) which varies supply air CFM. As duct static increases, the supply air volume will decrease. As duct static decreases, the supply air volume will increase.

In VAV units, the Unit Controller uses input from a field-installed pressure transducer (A30) to maintain a 1.0" w.c. (default) static pressure. Refer to the Unit Controller manual parameter 388 and 389 to adjust the static pressure setpoint.

The pressure transducer is shipped in a box in the blower compartment. Install the transducer according to manufacturer's instructions.

Note -Make sure the transducer is installed in the main duct at least 2/3 of the distance away from the unit.

The supply air VFD (A96) is located near the compressors.

The Unit Controller will lock-out the unit for 5 minutes(default) if static pressure exceeds 2.0"w.c. for 20 seconds. The Unit Controller will permanently shut down the unit after three occurrences. Use the following parameters to adjust the default values:

Parameter 110; Error time off delay.

Parameter 42; Air Supply Static Shutdown Set Point.

Parameter 43; Static Pressure Lockout Counter Set Point.

VAV By-Pass Operation (Optional)

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

- 1 - Turn off all power to unit.
- 2- Locate K3, K203, J248 and J249 connectors near the VFD. See FIGURE 26.
- 3- Disconnect J248 from P248 and connect connect P248 jumper plug to J248. P248 jumper plug is attached to the J248 wire harness near the J248 jack connector. See FIGURE 24.
- 4- Disconnect P247 from J247 and connect J249 to P247. See FIGURE 25.
- 5 - Locate VFD control relay K203 on the lower control panel. See FIGURE 26.
- 6- Disconnect wires marked K203-A and K203-B
- 7- Connect K3-A (female terminal) to K203-A (male terminal) and K3-B (female terminal) to K3-B (male terminal)
- 8- Restore power to unit. Blower will operate in constant air volume (CAV) mode.
- 9- Check the indoor blower motor nameplate for full load amperage (FLA) value. Measure the amp readings from the indoor blower motor operating in bypass mode. If measured amps are higher than nameplate FLA value, decrease the CFM by opening (turning counterclockwise) the motor pulley. Refer to the Indoor Blower Motor section. Do not exceed minimum and maximum number of pulley turns as shown in table 1.

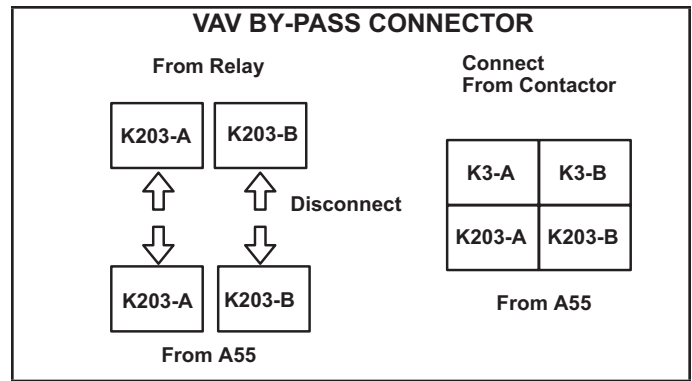


FIGURE 23

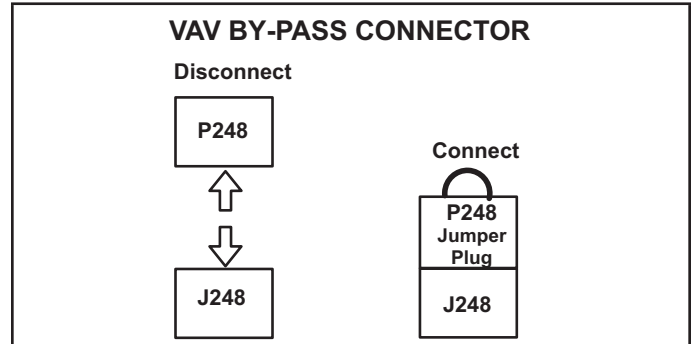


FIGURE 24

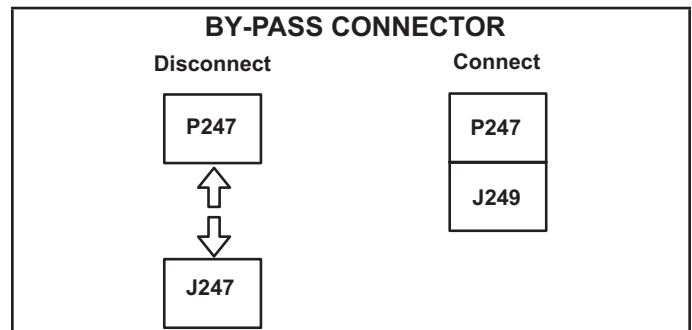


FIGURE 25

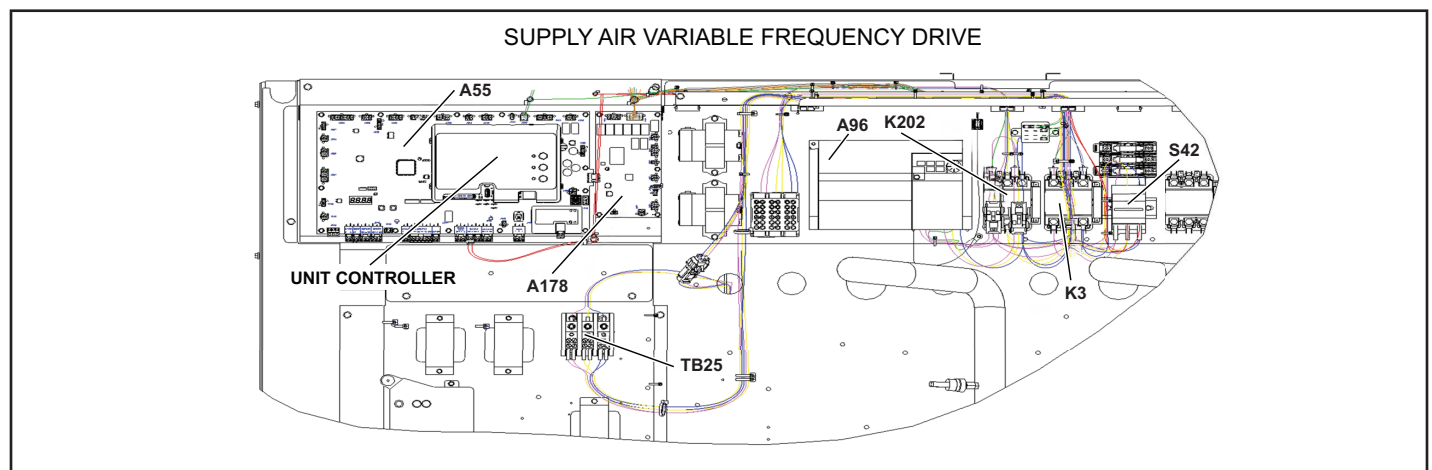


FIGURE 26

N-Drain Pan Overflow Switch S149 (optional)

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

O-Hot Gas Reheat Start-Up and Operation

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 valves, L14 and L30, route hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air.

See FIGURE 27 for reheat refrigerant routing. See FIGURE 28 for cooling only refrigerant routing.

L14/L30 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14/L30 reheat valve is energized (Unit Controller P269-3 or P269-4) 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.

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.

A91 Humidity Sensor

Relative humidity should correspond to the sensor (A91) output voltage listed in the table below. For example: if indoor air relative humidity is 80% \pm 3%, the humidity sensor output should read 8.00VDC.

Check the sensor output annually for accuracy. Keep the air intake openings on the sensor clean and free of obstructions and debris.

Relative Humidity (%RH \pm 3%)	Sensor Output (VDC)
20	2.00
30	3.00
40	4.00
50	5.00
60	6.00
70	7.00
80	8.00
90	9.00

Check-Out

Test reheat operation using the following procedure.

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

Make sure unit is in local thermostat mode.

Use the Unit Controller key pad to elect **SERVICE** → **TEST** → **DEHUMIDIFIER**

300, 360 - The blower, compressor 1, and compressor 2 (reheat) should be operating. L14 and L30 LEDs on the Unit Controller should also be ON, indicating the reheat valves are energized, REHEAT MODE will be appear on the Unit Controller display.

Press **BACK** on the Unit Controller display to stop the testing mode.

Default Reheat Operation

Reheat will operate as shown in TABLE 9 once three conditions are met.

- 1 - Blower must be operating.

System must be in occupied mode.

System must NOT be operating in heating mode.

IMPORTANT - Free cooling does not operate during reheat.

For other reheat control options, refer to the Unit Controller manual.

Additional Cooling Stages (3-Stage)

Units are shipped from the factory to provide two stages of cooling.

Three stages of cooling is available in zone sensor mode. Three stages of cooling is also available by installing a transfer relay and a three-stage thermostat. Refer to the Main Control Operation section in the Unit Controller manual when using the transfer relay.

Additional Cooling Stages (4-Stage)

Four stages of cooling is available in zone sensor mode on units with four compressors.

Compressors are not de-energized when unit operation changes from cooling to reheat or from reheat to cooling. Instead, L14 and L30 reheat valves are energized (reheat) or de-energized (cooling).

NOTE - Another thermostat staging option is available which allows both compressors to be energized during free cooling. See Unit Controller manual for details.

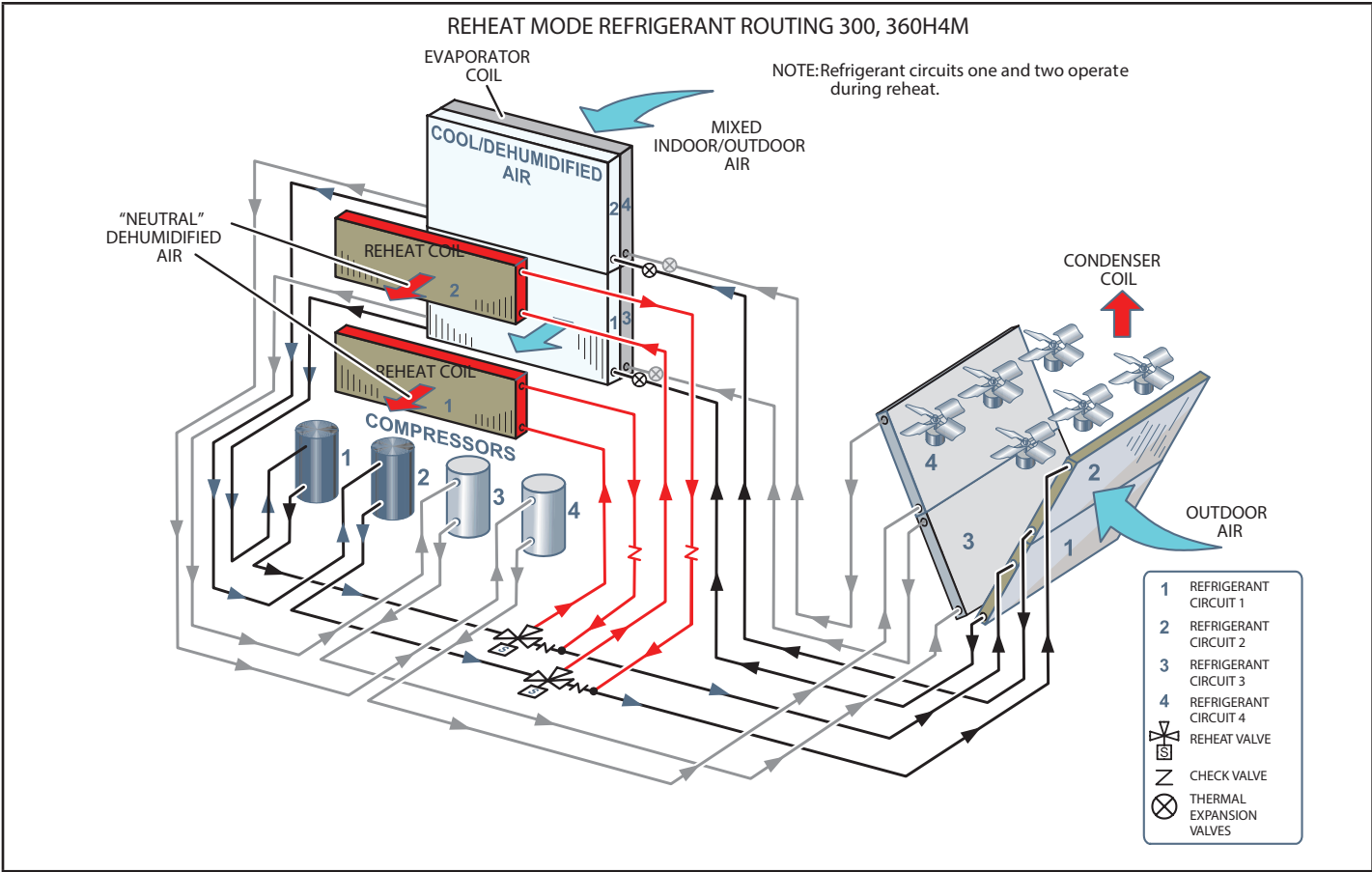


FIGURE 27

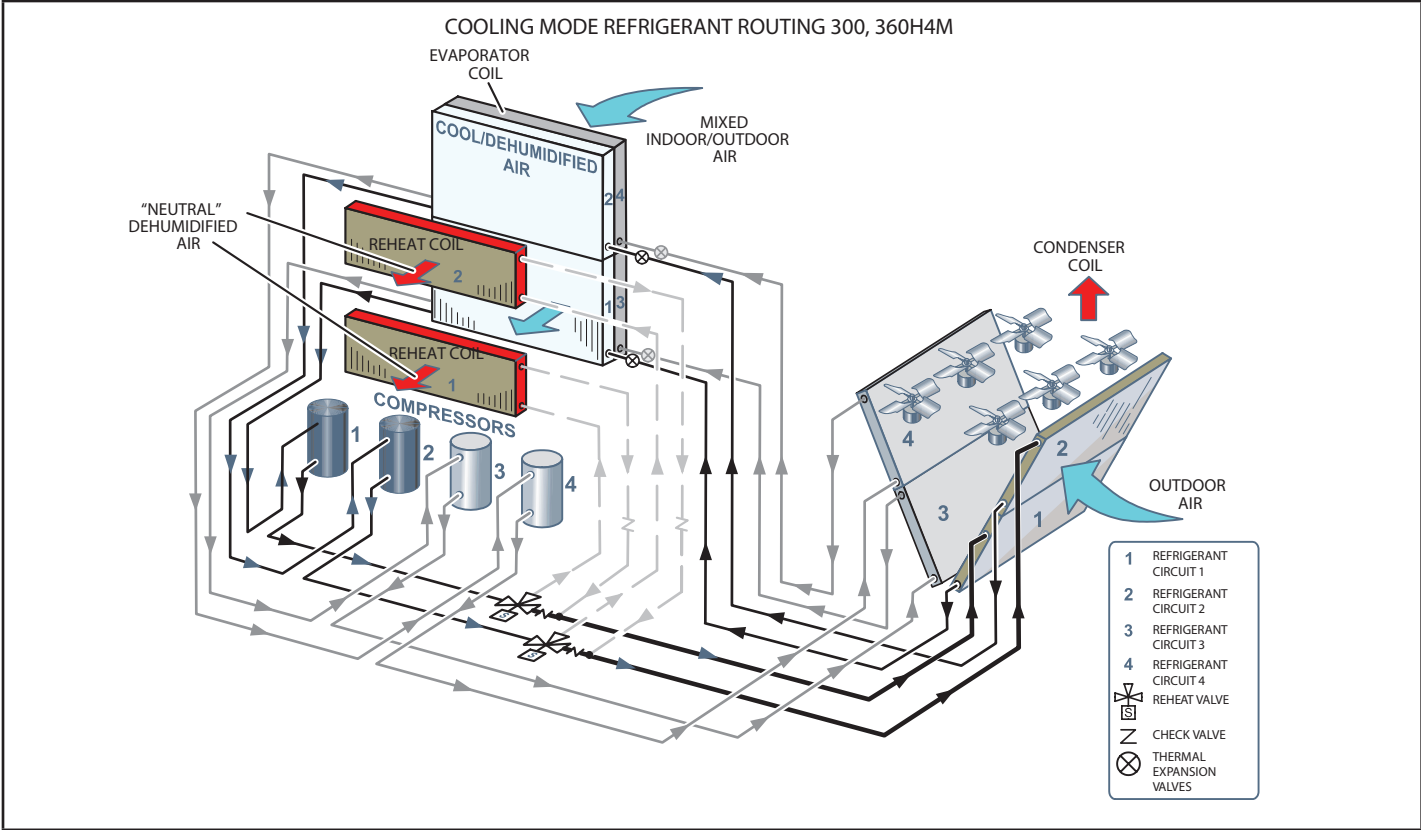


FIGURE 28

**TABLE 9
REHEAT OPERATION**

Two-Stage Thermostat - Default	
T'stat and Humidity Demands	Operation
	300, 360 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 Cooling ¹
Reheat & Y1 & Y2	Compressor 1, 2, 3, & 4 Cooling ³
Three-Stage Thermostat (Transfer relay required)	
T'stat and Humidity Demands	Operation
	300, 360 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 Cooling ¹
Reheat & Y1 & Y2	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ³
Reheat & Y1 & Y2 & Y3	Compressor 1, 2, 3, & 4 Cooling ⁴
Four-Stage Zone Sensor Mode	
Cooling* and Humidity** Demands	Operation
	300, 360 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 Cooling ¹
Reheat & Y1 & Y2	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ²
Reheat & Y1 & Y2 & Y3	Compressor 1 Reheat, Compressor 2, 3, & 4 Cooling ³
Reheat & Y1 & Y2 & Y3 & Y4	Compressor 1, 2, 3, & 4 Cooling ⁵

*Cooling stage is initiated when zone temperature is higher than the cooling setpoint plus the appropriate stage differential.

**Reheat demand is initiated when relative humidity is higher than relative humidity setpoint.

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

²If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 will operate.

³If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 and 2 will operate.

⁴If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1, 2, and 3 will operate.

⁵If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1, 2, 3, and 4 will operate.

The following conditions must be met before reheat will be energized:
(factory-default; see Unit Controller manual for other options)

1 - Blower must be operation.

System must be in occupied mode.

System must NOT be operating in heating mode.

VII-Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

Steps to ensure this are:

- Become familiar with the equipment and its operation,
- Isolate the system electrically,
- Ensure that before attempting the procedure that mechanical handling equipment is available, if required, for handling refrigerant cylinders, and that all personal protective equipment is available and being used correctly while the recovery process is supervised at all times by a competent person and that the recovery equipment and cylinders conform to the appropriate standards.

Additionally, pump down refrigerant system, if possible, and if a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system. Make sure that cylinders are situated on the scales before recovery takes place. Start the recovery machine and operate in accordance with instructions. Do not overfill cylinders (no more than 80 % volume liquid charge). Do not exceed the maximum working pressure of the cylinder, even temporarily. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

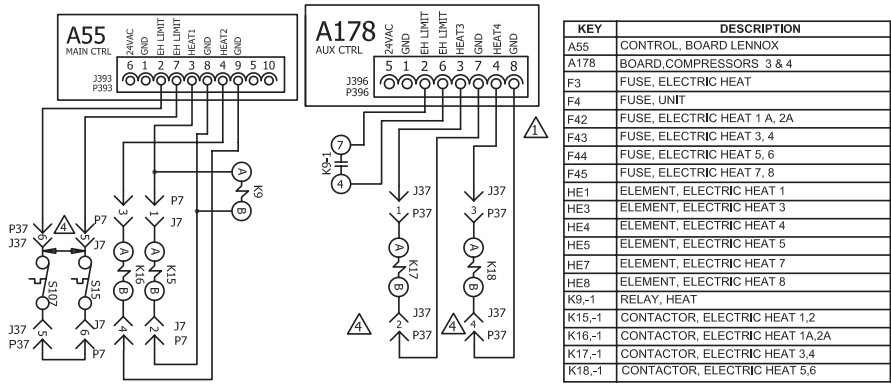
Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

VIII-WIRING DIAGRAMS AND OPERATION SEQUENCE

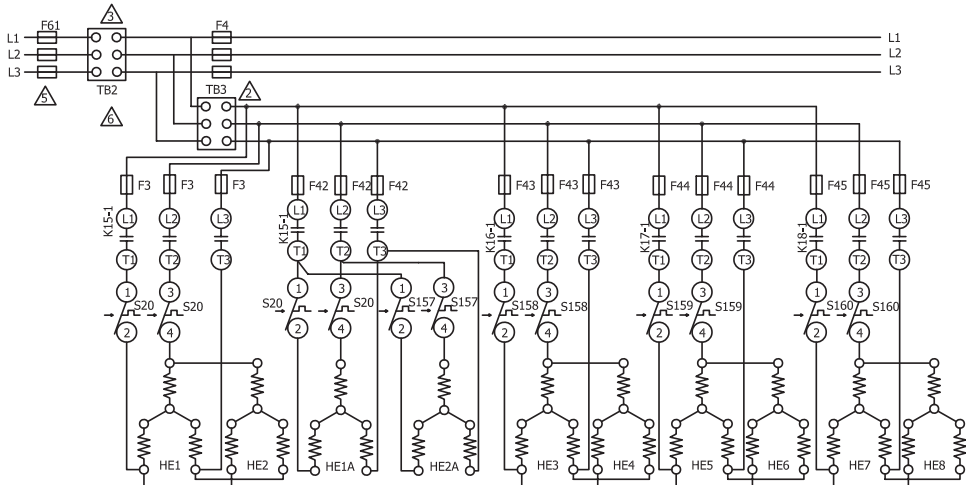


S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1,2
S107	SWITCH, PRIMARY ELECTRIC HEAT
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1A
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2A
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3,4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT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

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

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

- ⚠ NOT USED ON 15 AND 30KW UNITS
- ⚠ TB3 IS USED IN SOME UNITS
- ⚠ TB2, S48 OR CB10 MAY BE USED
- ⚠ REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT
- ⚠ F61 USED ON UNITS WITH SCCR OPTION
- ⚠ TB2 IS USED IN SOME SCCR OPTION UNITS ONLY



CHASSIS	KW	HE1	HE1A	HE2	HE2A	HE3	HE4	HE5	HE6	HE7	HE8
C	15		7,5		7,5						
D	20		10		10						
CD	30		15		15						
D	40		20		20						
CD	45	15				7,5		15		7,5	
CD	60	15				15		15		15	
D	80	20			20			20	20		
CD	90	15				15	15	15		15	15
D	120	15		15		15	15	15	15	15	15

2024/07

WIRING DIAGRAM

07/24

538126-03

HEATING

ELECTRIC HEAT LCT/LHT/LCX/LHX
E1EH,EHA-15, 20, 30, 40, 45,60, 80, 90, 120 - G, J

SECTION A

REV.0

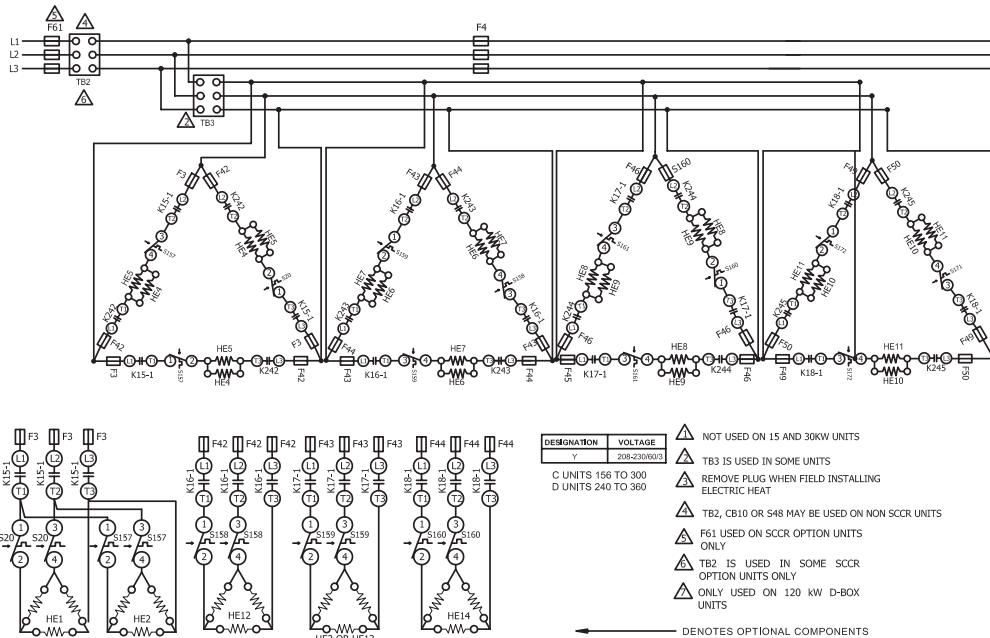
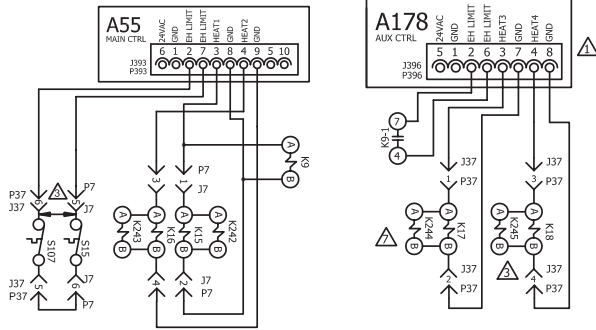
Supersedes
538126-02

New Form No.
538126-03


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

KEY	DESCRIPTION
A55	CONTROL, BOARD LENNOX
A178	BOARD, COMP 3 & 4, C3 2nd STAGE HEAT
F3	FUSE, ELECTRIC HEAT
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 1 A, 2A
F43	FUSE, ELECTRIC HEAT 3
F44	FUSE, ELECTRIC HEAT 4

F45	FUSE, ELECTRIC HEAT 5
F46	FUSE, ELECTRIC HEAT 6
F49	FUSE, ELECTRIC HEAT 7
F50	FUSE, ELECTRIC HEAT 8
F61	FUSE, UNIT - SCRR
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
HE7	ELEMENT, ELECTRIC HEAT 7
HE8	ELEMENT, ELECTRIC HEAT 8
HE9	ELEMENT, ELECTRIC HEAT 9
HE10	ELEMENT, ELECTRIC HEAT 10
HE11	ELEMENT, ELECTRIC HEAT 11
HE12	ELEMENT, ELECTRIC HEAT 12
HE13	ELEMENT, ELECTRIC HEAT 13
HE14	ELEMENT, ELECTRIC HEAT 14
K15-1	RELAY, HEAT
K15-1	CONTACTOR, ELECTRIC HEAT 1,2
K16-1	CONTACTOR, ELECTRIC HEAT 1A,2A
K17-1	CONTACTOR, ELECTRIC HEAT 3,4
K18-1	CONTACTOR, ELECTRIC HEAT 5,6
K242	CONTACTOR, ELECTRIC HEAT 1
K243	CONTACTOR, ELECTRIC HEAT 2
K244	CONTACTOR, ELECTRIC HEAT 3
K245	CONTACTOR, ELECTRIC HEAT 4
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S20	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1,2
S107	SWITCH, PRIMARY ELECTRIC HEAT
S157	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2
S158	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 3
S159	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 4
S160	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 5
S161	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 6
S171	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 7
S172	SWITCH, LIMIT SECONDARY ELECTRIC HEAT 8
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRIC HEAT



CHASSIS	KW	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14
C	15	7.5	7.5												
C-D	30			15	15								7.5	15	7.5
C-D	45	15											15	15	15
C-D	60	15		15									15	15	15
C-D	90	15		15		15	15				15	15			
D	120			15	15	15	15	15	15	15	15	15			

2024/03 	WIRING DIAGRAM		03/24
	538127-02		
	HEATING		
ELECTRIC HEAT E1EH, EHA - 15, 30, 45, 60, 90, 120 - Y			
SECTION A			REV 0
Supersedes 538127-01		New Form No. 538127-02	

SEQUENCE OF OPERATION EHA 15 - 90 Y & G

The Y voltage diagram use elements configured in a Wye. The G and J voltage diagram use elements configured in a Delta. Both diagrams follow the following sequence of operation:

NOTE: Two electric heat sections are used in all 15kW through 90kW heaters. The heat sections are labelled first electric heat section (left side) and second electric heat section (right side). See FIGURE 18.

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

HEATING ELEMENTS:

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

FIRST STAGE HEAT:

- 2 - Heating demand initiates at W1 in thermostat.
- 3 - 24VAC is routed to the main control module A55. After A55 proves N.C. primary limits S15 (heat section one, left side), S107 (heat section two, right side), the electric heat contactor K15 and heat relay K9 are energized.
- 4 - N.O. contact K15-1 closes allowing the first bank of elements in heat section one (left side) to be energized.
- 5 - At the same time, N.O. contacts K9-1 close. A N.O. contact in A55 closes, energizing electric heat relay K17.
- 6 - N.O. contacts K17-1 close allowing the first set of elements in heat section two (right side) to be energized.

SECOND STAGE HEAT:

- 7 - With the first stage heat operating, an additional heating demand initiates at W2 in the thermostat.
- 8 - 24VAC is routed through the main control module A55, which in turn energizes the electric heat contactor K16.
- 9 - N.O. contacts K16-1 close allowing the second set of elements in heat section one (left side) to be energized.
- 10 - Simultaneous with step eight, a N.O. contact in the A55 Unit controller closes, allowing 24VAC to energize electric heat contactor K18.
- 11 - N.O. contacts K18-1 close allowing the second set of elements in heat section two (right side) to be energized.

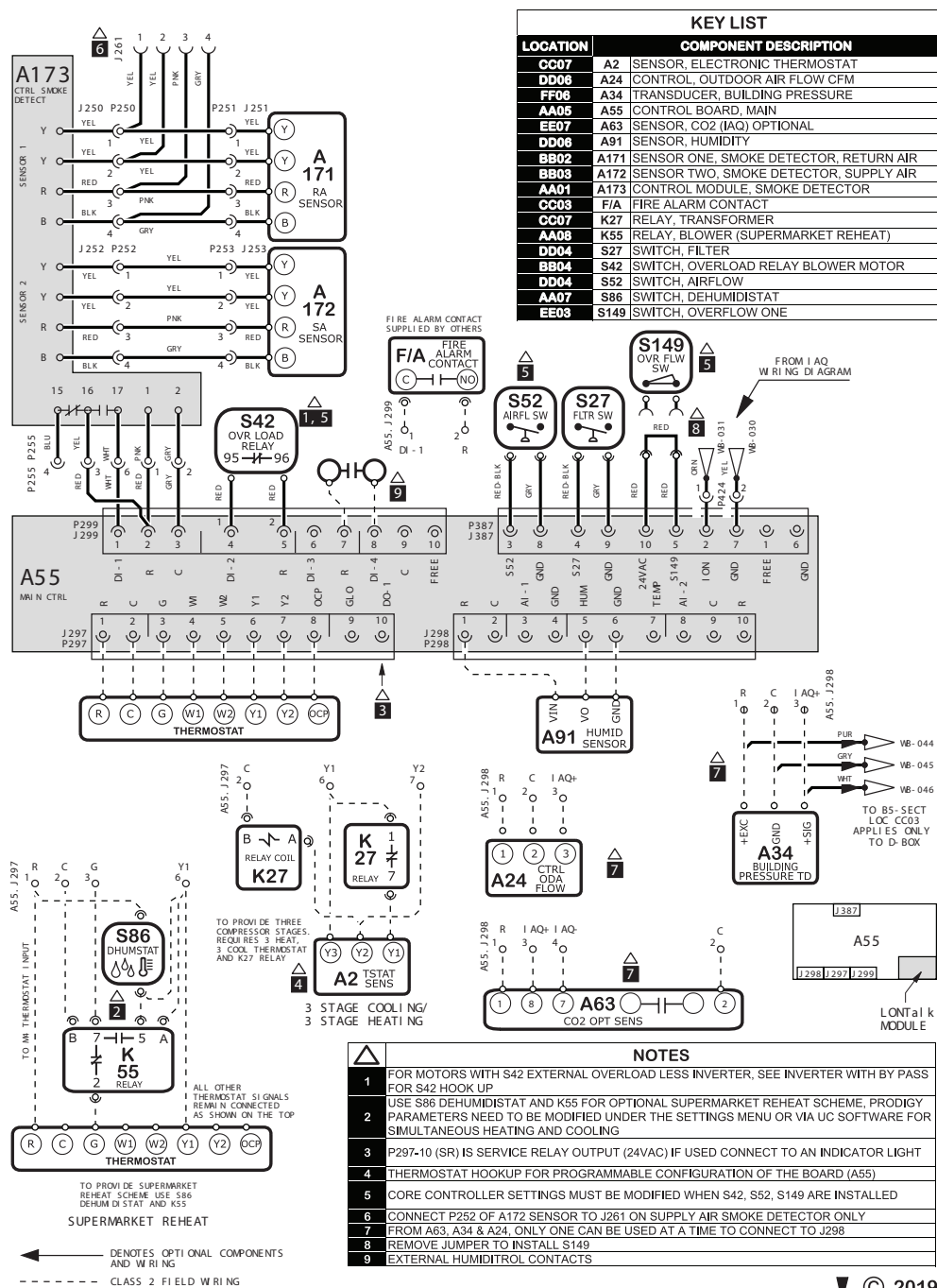
END OF SECOND STAGE HEAT:

- 12 - Heating demand is satisfied. Terminal W2 in the thermostat is de-energized.
- 13 - Electric heat contactors K16 and K18 are de-energized.
- 14 - The second set of electric heat elements in heat sections one (left side) and two (right side) are de-energized.

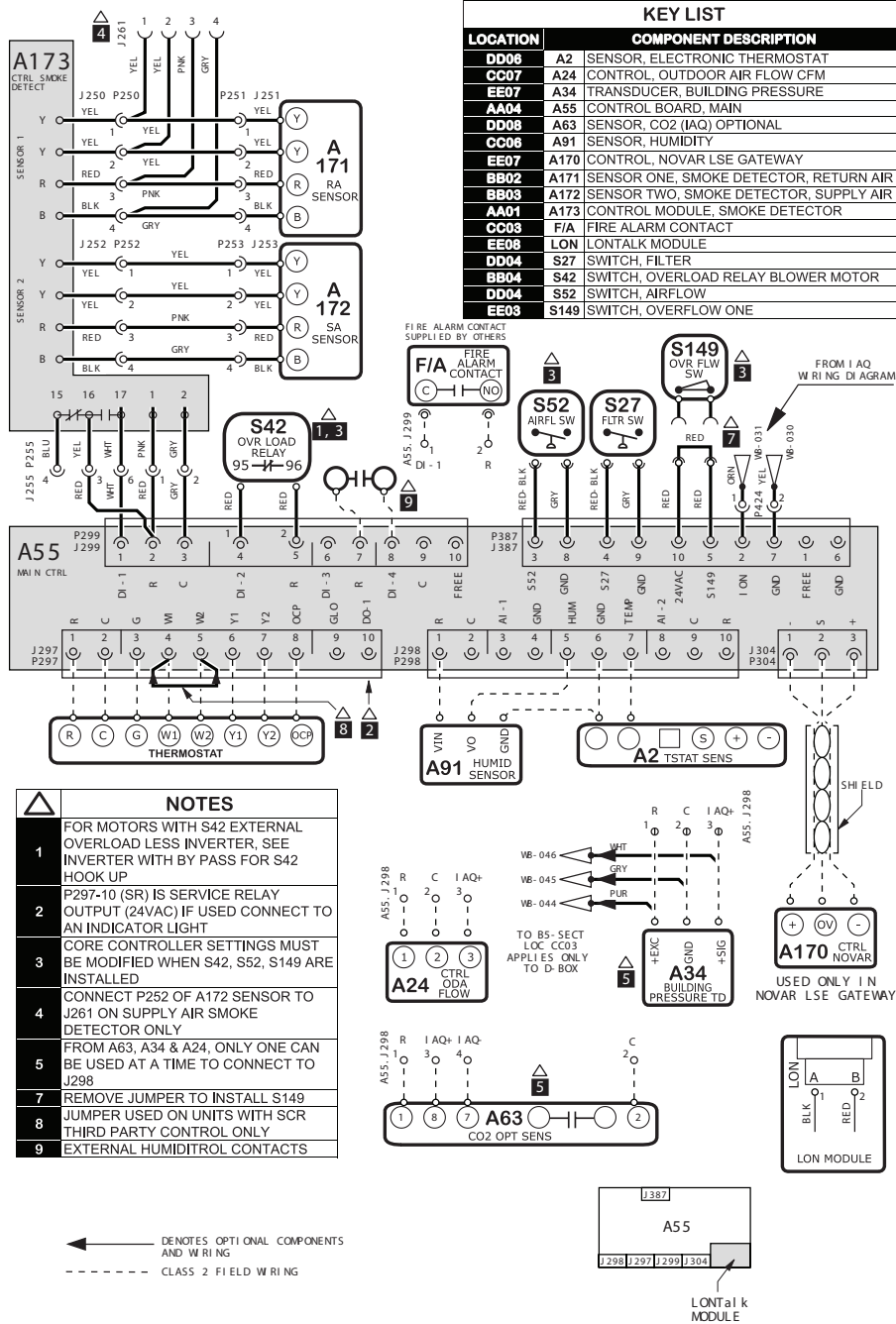
END OF FIRST STAGE HEAT:

- 15 - Heating demand is satisfied. Terminal W1 in the thermostat is de-energized.
- 16 - Electric heat contactors K15 and K17 are de-energized.
- 17 - The first set of electric heat elements in heat sections one (left side) and two (right side) are de-energized.

THERMOSTAT



GATEWAY THERMOSTAT

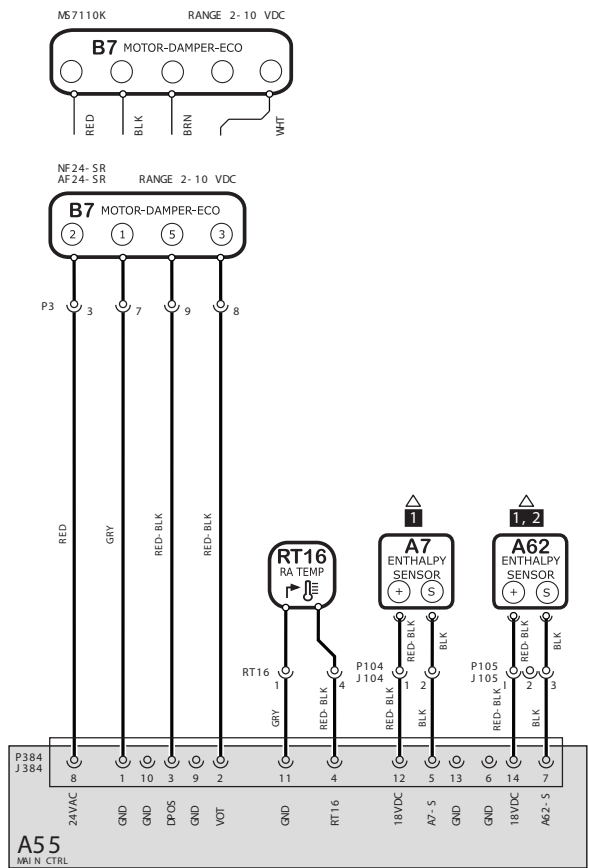


Model: LC, LG, LH, LD Series RTU
 Thermostat- GATEWAY Controls
 Voltage: All Voltages
 Supersedes: 538079-01 Form No: 538079- 02 Rev: 0

HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3/5	SECTION C	SECTION D

WIRING DIAGRAM FLOW

ECONOMIZER



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

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

Model:

LC, LG, LH, LD, SC, SG Series
Economizer & Motorized OAD

Voltage:

All Voltages

Supersedes:

N/A

Form No:

538072- 01

Rev:

2

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HTG
SEC
A

CLG
SEC
B

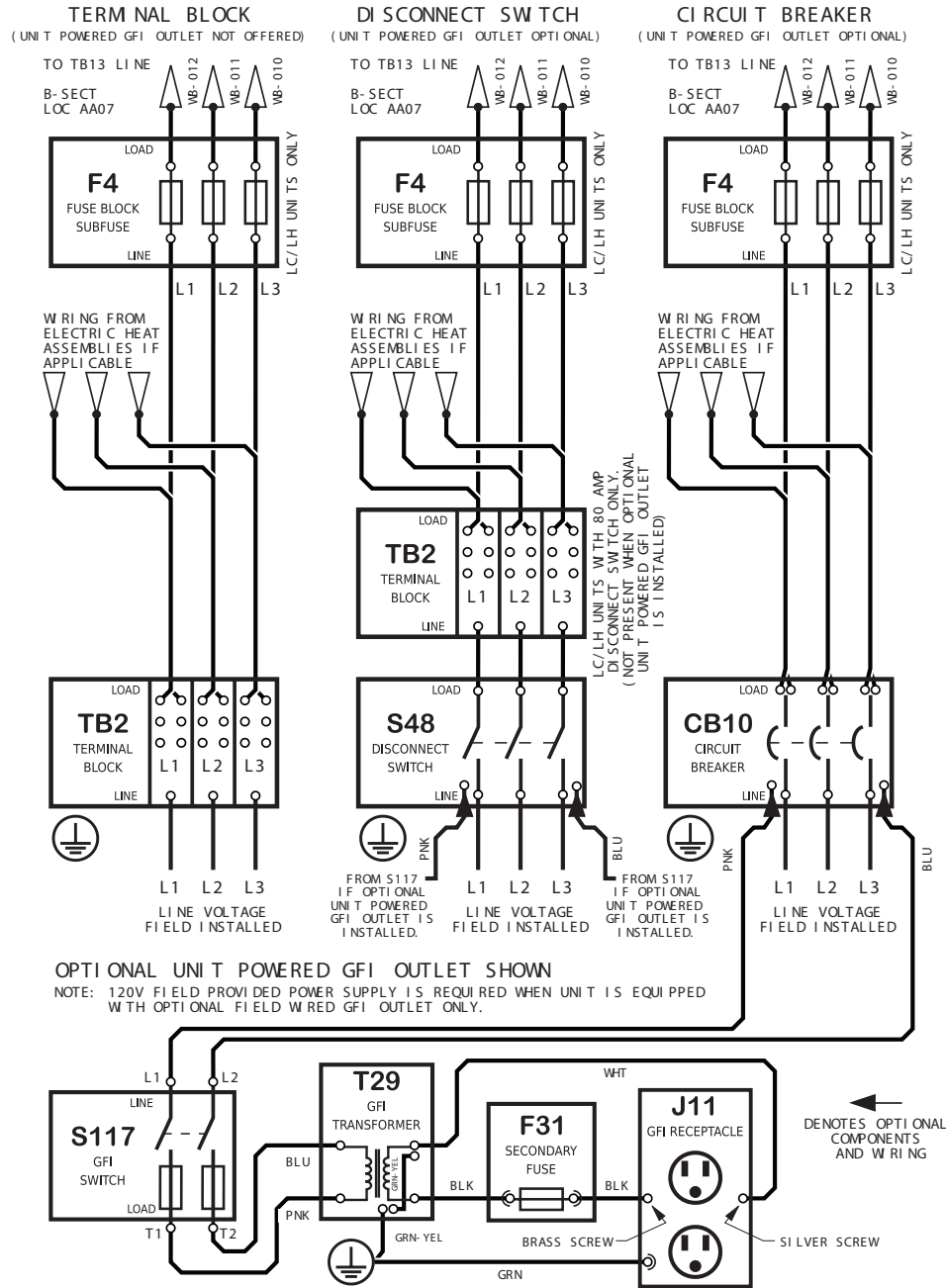
CLG
SEC
B3

ACCS
SEC
C

ACCS
SEC
D

WIRING DIAGRAM FLOW

POWER ENTRY

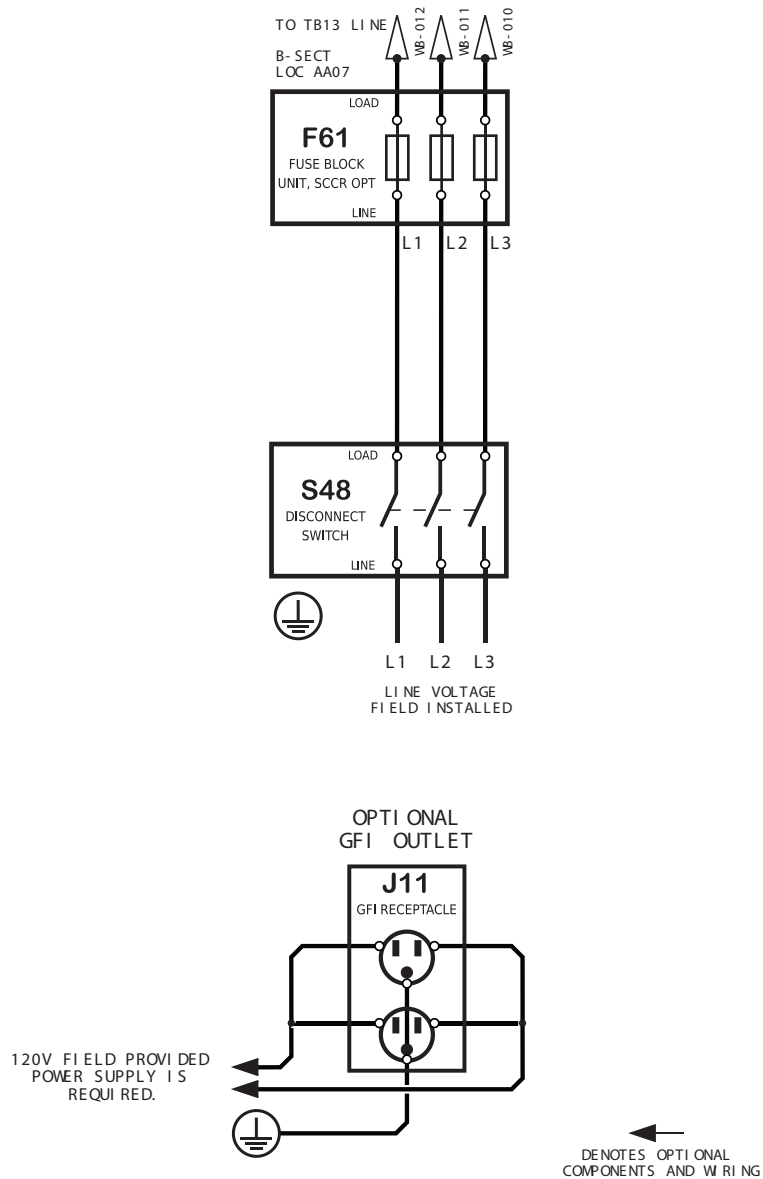


Model: LC, LG, LH, LD Series RTU
Power Entry Options 156 - 360

Voltage: All Voltages

Supersedes: 538103-01 Form No: 538103-02 Rev: 2

POWER ENTRY



Model: LG, LD Series RTU with SCCR
Power Entry Options 156 - 360

Voltage: All Voltages

Supersedes: 538104-01 Form No: 538104-02 Rev: 2



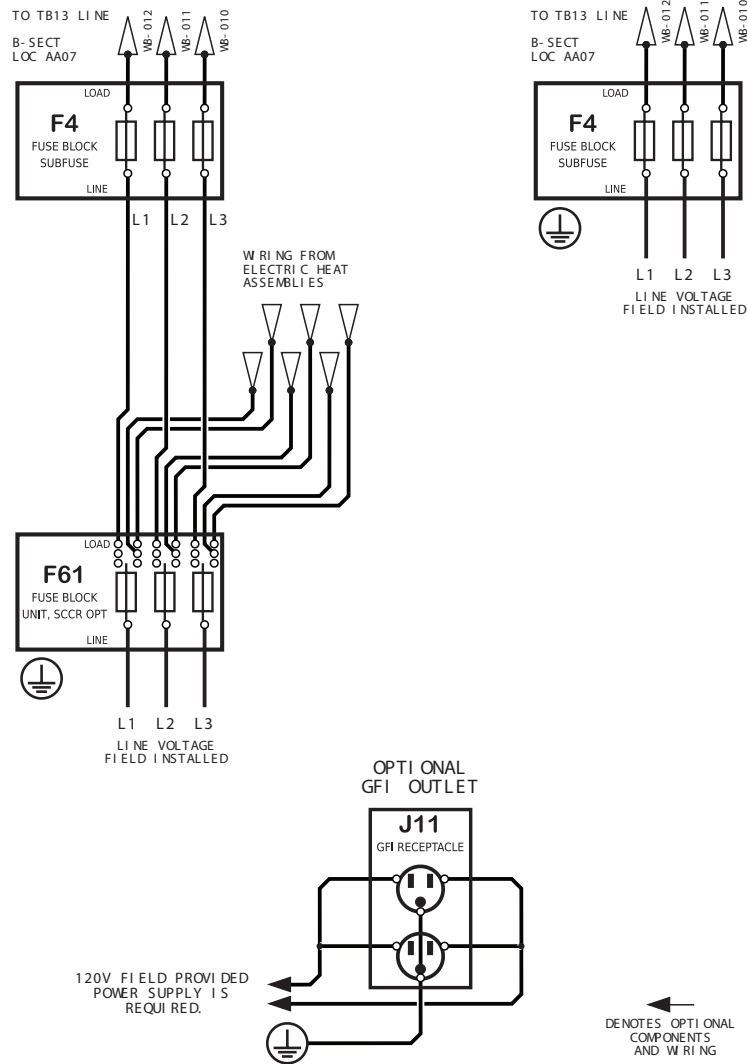
538104-02

Rev 2

POWER ENTRY

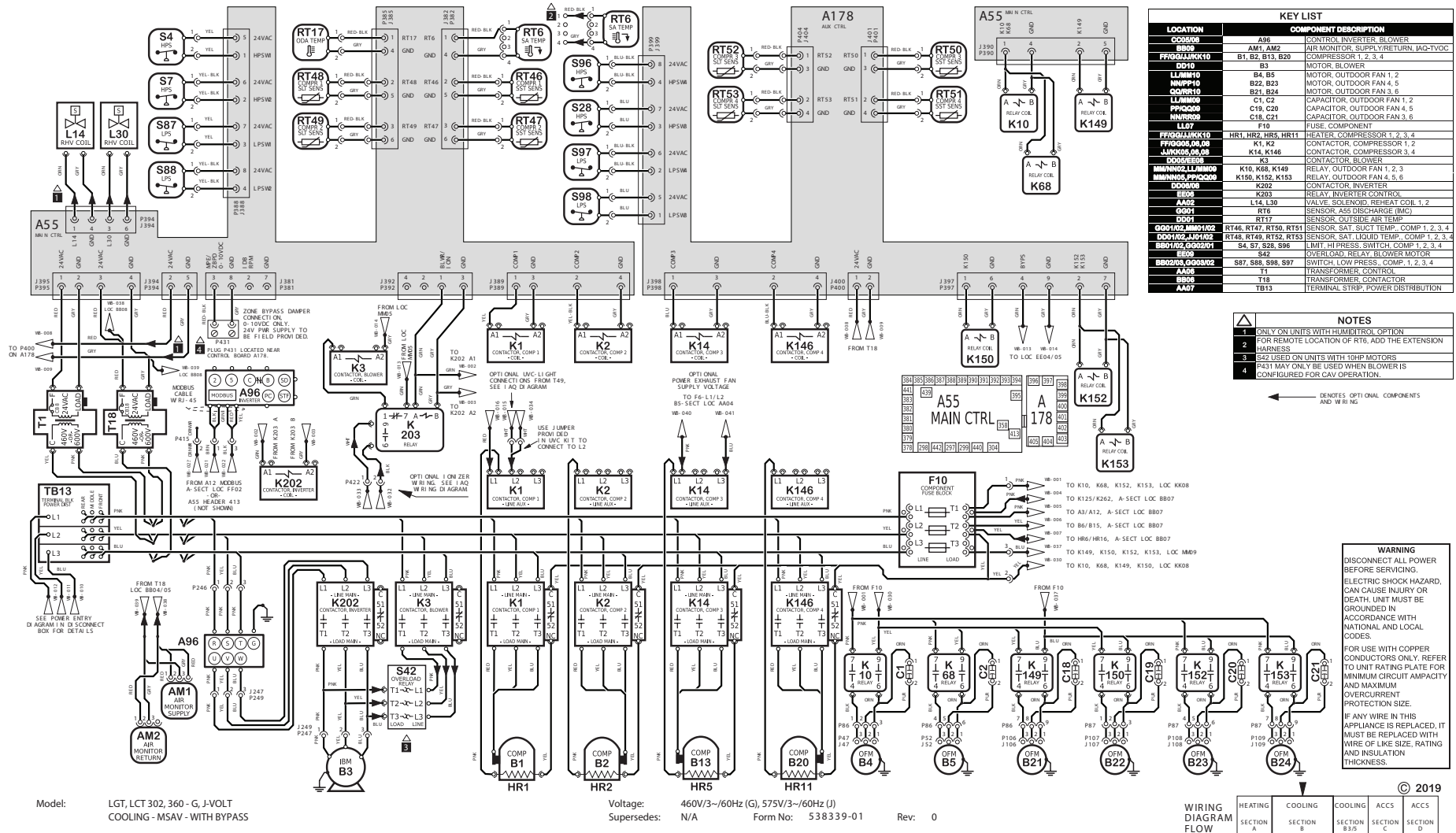
UNITS W/ ELECTRIC HEAT

UNITS W/O ELECTRIC HEAT

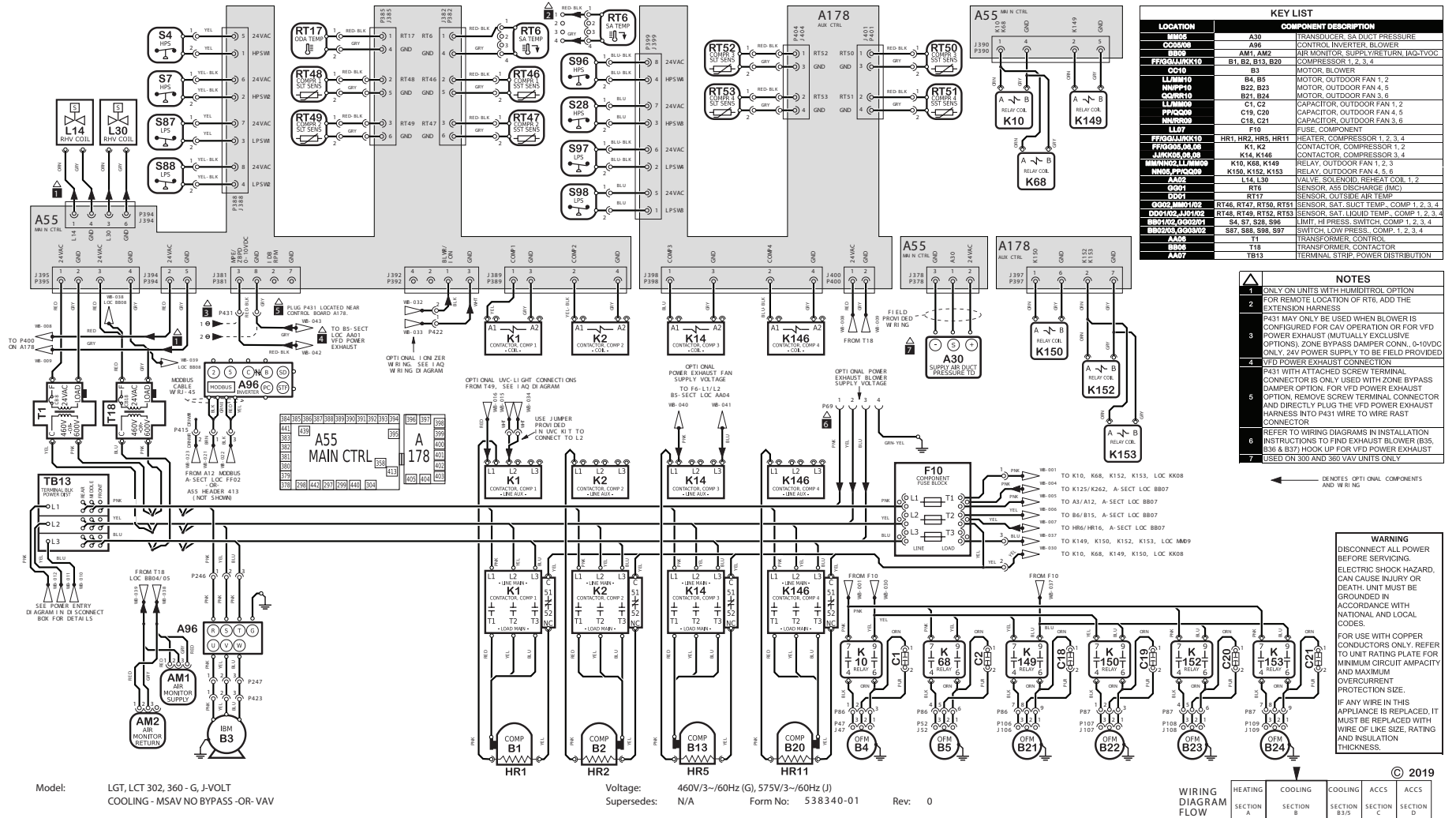


Model: LC, LH Series RTU with SCCR
 Power Entry Options 156 - 360
 Voltage: All Voltages
 Supersedes: 538105-01 Form No: 538105- 02 Rev: 2

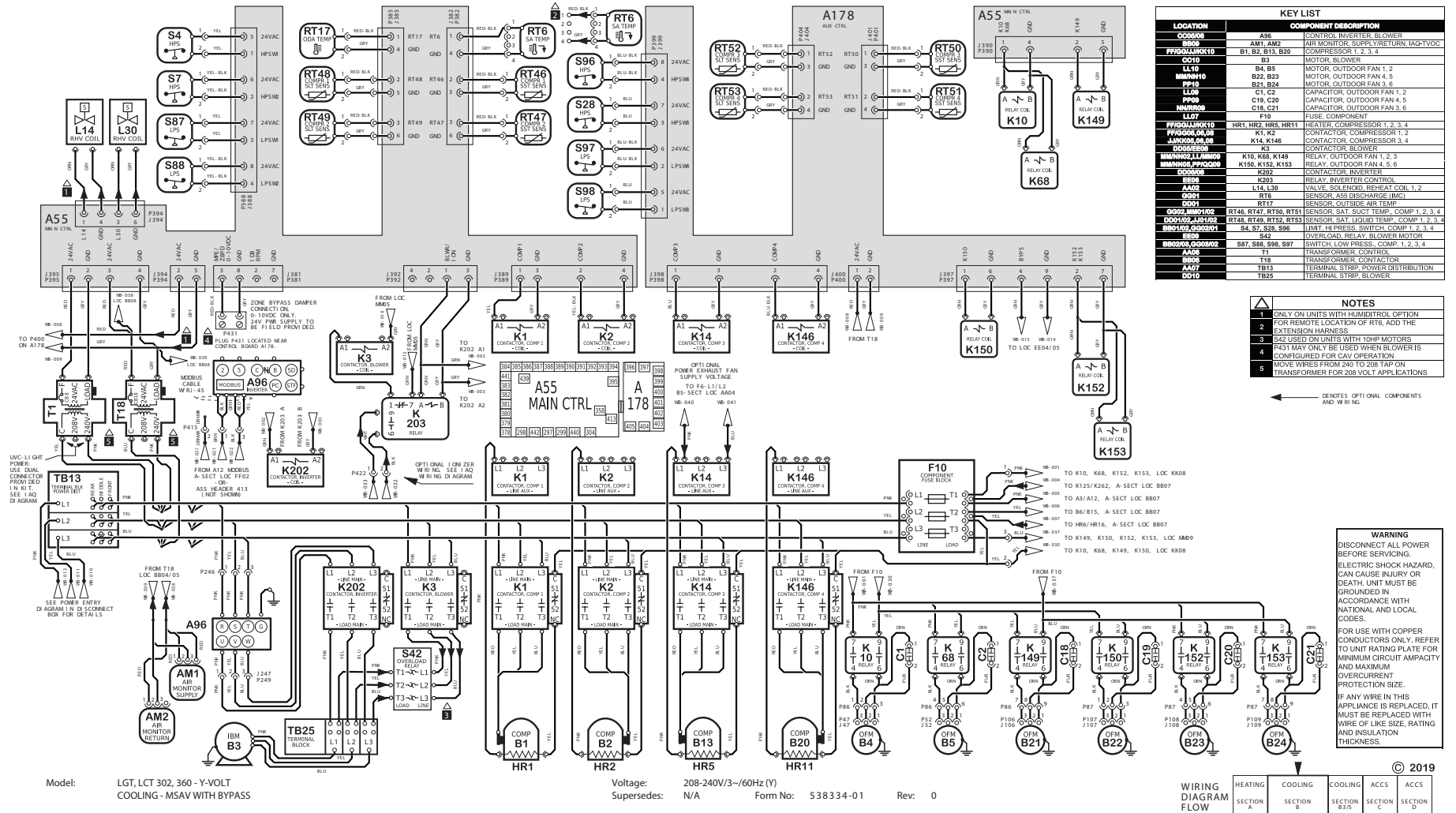
G / J VOLT WITH BY-PASS



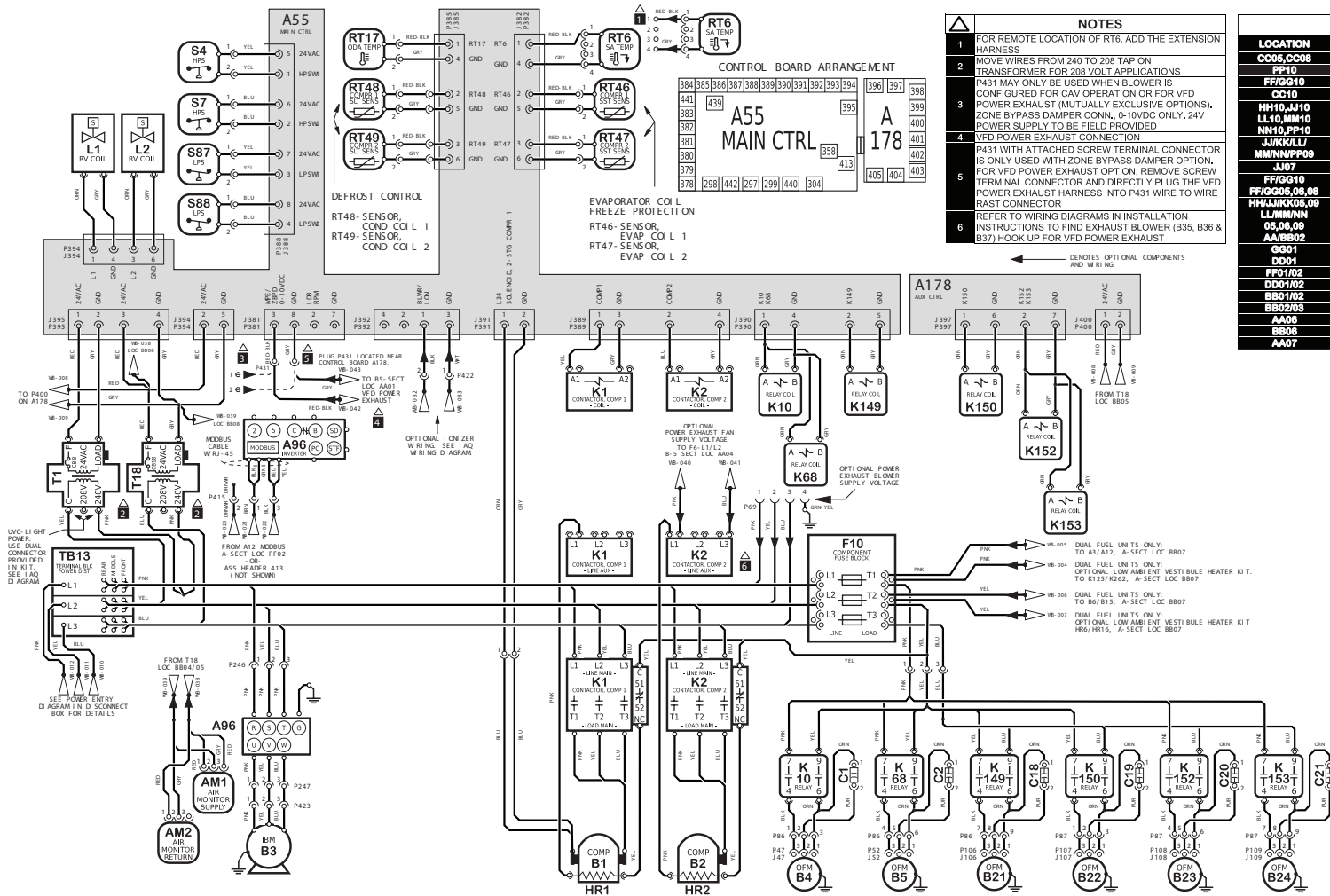
G / J VOLT NO BY-PASS



Y VOLT WITH BY-PASS



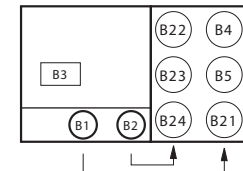
Y VOLT NO BYPASS



- | NOTES | |
|-------|---|
| 1 | FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS |
| 2 | MOVE WIRES FROM 240 TO 208 TP APPLICATION TRANSFORMER FOR 208 VOLT APPLICATION |
| 3 | P431 MAY ONLY BE USED WHEN BLU/BLK IS CONFIGURED FOR CAV OPERATION OR FOR VFD POWER EXHAUST (MUTUALLY EXCLUSIVE OPTIONS), ZONE BYPASS DAMPER CONN. 0-10VDC ONLY, 24V POWER SUPPLY TO FIELD TERMINAL |
| 4 | VFD POWER EXHAUST CONNECTION |
| 5 | P431 WITH ATTACHED SCREW TERMINAL CONNECTOR IS ONLY USED WITH ZONE BYPASS DAMPER OPTION, P431 POWER EXHAUST WITH FIELD TERMINAL CONNECTOR AND TERMINAL CONNECTOR AND DIRECTLY PLUG TO VFD POWER EXHAUST HARNESS INTO P431 WIRE TO WIRE RAST CONNECTOR |
| 6 | REFER TO WIRING DIAGRAMS IN INSTALLATION INSTRUCTIONS TO FIND EXHAUST FLOWMETER (B35, B36) B37/HOOK UP FOR VFD POWER EXHAUST |

KEY LIST	
LOCATION	COMPONENT DESCRIPTION
CO06, CO08	A91
PP10	AM1, AM2
FFFG10	B1, B2
OC10	B3
WH10, J110	B4, B5
L10, MM10	B21, B22
NN10, PP10	B23, B24
JY1KKLL/	C1, C2, C18,
MMNNPP09	C19, C20, C21
J07	F10
FFFG10	H11, H12
FFG006, 08	K1, K2
HHJJKKKK09	K10, K68, K149,
LJ/MMN05	K150, K152, K153
05.09.09	
AAVB502	L1, L2
GG01	RT6
DD01	RT17
FFD1102	RT46, RT147
FFD1102	RT48, RT149
BB01102	S4, S7
BB02103	S87, S88
AA06	T1
BB06	T18
AA07	TB13

BASIC RTU LAYOUT



WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

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

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

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

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WIRING DIAGRAM FLOW

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

Model: LHT, LDT 302 - Y-VOLT
COOLING - MSAV- NO BYPASS

Voltage: 208-240V/3~/60Hz (Y)
Supersedes: N/A Form

Form No: 538354-01 Rev: 0

SEQUENCE OF OPERATION LCT302 - 360

POWER:

- 1- Line voltage from TB2, unit disconnect S48, or other factory or field installed optional power disconnects, such as CB10, energizes transformer T1 and T18. Transformer T1 provides 24VAC power to the A55 Unit Controller and T18 provides 24VAC power to A178 Compressor 3 and 4 Controller. The two controllers provide 24VAC power to the unit cooling, heating and blower controls and thermostat.
- 2- Terminal block TB13 is also energized when the unit disconnect closes. TB13 supplies line voltage to compressor crankcase heaters, compressors, blower motors and fan motors.

BLOWER OPERATION (OCP INPUT MUST BE ON):

- 3- The A55 Unit Controller receives a demand from thermostat terminal G. A55 energizes blower contactor K3 with 24VAC. On VFD units, A55 energizes relay K203.
- 4- N.O. K3-1 closes, energizing blower B3. On VFD units, N.O. K203-2 closes, sending a signal to the inverter, A96, to start forward rotation. P259 pin #4 sends a 0 -10VDC signal to A96 to control blower B3 speed.

POWER EXHAUST FANS/BLOWERS:

- 5- The A55 Unit Controller receives a demand and energizes exhaust fan relay K65 OR exhaust blower contactor K205 or exhaust blower relay K207.

1ST STAGE COOLING (B1 AND B2 ARE ENERGIZED):

- 6- First stage cooling demand energizes Y1 and G in the thermostat. G energizes blower, if blower is not already running (see step 3).

7- 24VAC is routed to the A55 Unit Controller. After A55 proves N.C. low pressure switch S87 and S88, N.C. freezestat S49 and S50 and N.C. high pressure switch S4 and S7, compressor contactors K1 and K2 are energized.

8- N.O. contacts K1-1 and K2-1 close energizing compressor B1 and B2.

9- A55 Unit Controller and A178 Controller energize fan contactor K10, K68, and K149 based on low ambient switch S11 and S84 inputs and predefined control logic.

10- N.O. contact K10-1, K68-1, K149-1 close energizing fan B4, B5 and B21 respectively.

11- N.C. Contacts K1-2 and K2-2 open de-energizing compressor 1 and 2 crankcase heater HR1 and HR2.

2ND STAGE COOLING:

12- Second stage cooling demand energizes Y2.

13- 24VAC is routed to A178 Compressor 3 and 4 Controller. After A178 proves N.C. low pressure switches S98 and S97, N.C. freezestats S53 and S95 and N.C. high pressure switches S28 and S96, compressor contactors K14 and K146 are energized.

14- N.O. contacts K14-1 close energizing compressor B13.

15- N.O. contacts K146-1 close energizing compressor B20.

16- A178 Controller energizes fan contactor K150, K152, K153 based on low ambient switch S85 and S94 inputs and predefined control logic.

17- N.O. contacts K150-1, K152-1 and K153-1 close energizing condenser fan B22, B23 and B24 respectively.

18- N.C. contacts K14-2 and K146-2 open de-energizing compressor 3 and 4 crankcase heater HR5 and HR11.