LENNOX®
Service Literature

UNIT INFORMATION
Corp. 9822-L12
Revised 09/2001

LGA/LCA
3.0 to 6.0 TON
10.5 to 21 kW

LGA / LCA SERIES

The LGA / LCA 3, 3.5, 4, 5 and 6 ton (10.5, 12.3, 14, 17.5 and 21 kW) units are configure to order units (CTO) with a wide selection of factory installed options. The LGA/042/048/060/072 gas/electric packaged rooftop units are available in 78,000, 92,000 or 125,000 Btuh (22.85, 27, or 36.6 kW) heating inputs, with the LGA036 available only in 78,000 heating input. Gas heat sections are designed with Lennox' aluminized or optional stainless steel tube heat exchangers. The LCA cooling packaged rooftop units are equipped with the same cooling sections as the LGA units. Optional electric heat is factory-or field-installed in LCA units.

Electric heat operates in single or multiple stages depending on the kW input size. 7.0 kW through 30kW heat sections are available. LGA and LCA units have identical refrigerant circuits with 3, 3.5, 4, 5 and 6 ton (10.5, 12.3, 14, 17.5 and 21 kW) cooling capacities. LGA/LCA units utilize one compressor.

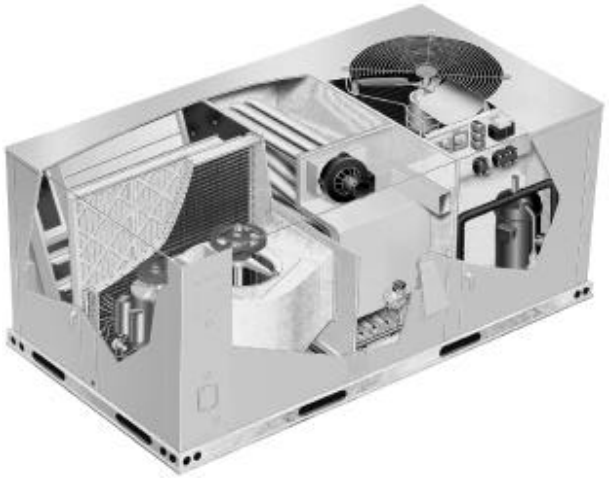
The LGA and LCA units are designed to accept any of several different energy management thermostat control systems with minimum field wiring. Factory or field provided control options connect to the unit with jack plugs. When "plugged in" the controls become an integral part of the unit wiring.

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

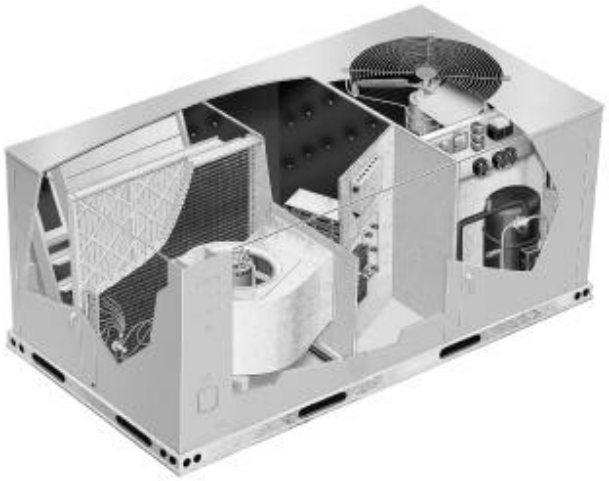
If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

⚠ WARNING

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.



LGA060 (5 TON) SHOWN



LCA060 (5 TON) SHOWN

TABLE OF CONTENTS

SPECIFICATIONS 3-4 TON

Model No.			LCA/LGA036		LCA/LGA042		LCA/LGA048	
Cooling Ratings	Cooling Efficiency type		**Standard**	**High**	**Standard**	**High**	**Standard**	**High**
	Gross Cooling Capacity — Btuh (kW)		38,000 (11.1)	38,000 (11.1)	44,200 (12.9)	44,500 (13.0)	50,500 (14.8)	50,200 (14.7)
	[1]Net Cooling Capacity — Btuh (kW)		36,000 (10.6)	35,800 (10.5)	42,000 (12.3)	42,500 (12.5)	48,000 (14.1)	48,000 (14.1)
	Total Unit Power (kW)		3.9	3.4	4.6	4.0	5.0	4.6
	[1]SEER (Btuh/Watt)		10.0	12.0	10.0	12.0	10.0	12.0
	EER (Btuh/Watt)		9.2	10.5	9.1	10.6	9.6	10.4
[2]Sound Rating Number (db)			82					
Refrigerant Charge Furnished (HCFC-22)			6 lbs. 10 oz. (3.01 kg)	8 lbs. 6 oz. (3.80 kg)	6 lbs. 10 oz. (3.01 kg)	8 lbs. 13 oz. (4.00 kg)	7 lbs. 9 oz. (3.43 kg)	9 lbs. 8 oz. (4.31 kg)
LGA Models Only Two Stage Heating Capacity (Natural or LPG/Propane Gas (at Sea Level)	**Model No.**		**LGA036**		**LGA042**		**LGA048**	
	Heat Input Type		**Standard**		**Standard**	**Dual or High**	**Standard**	**Dual or High**
	Input (low) — Btuh (kW)		- - - -		- - - -	92,000 (27.0)	- - - -	92,000 (27.0)
	Output (low) — Btuh (kW)		- - - -		- - - -	72,700 (21.3)	- - - -	72,700 (21.3)
	Input (High) — Btuh (kW)		78,000 (22.9)		78,000 (22.9)	125,000 (36.6)	78,000 (22.9)	125,000 (36.6)
	Output (High) — Btuh (kW)		61,600 (18.1)		61,600 (18.1)	98,750 (29.0)	61,600 (18.1)	98,750 (29.0)
	A.G.A./C.G.A. Thermal Efficiency / AFUE		80.0% / 78.0%					
Gas Supply Connections npt — in. - Natural or LPG/Propane			1/2					
Recommended Gas Supply Pressure — wc. in. (kPa)		Natural	7 (1.7)					
		LPG/Propane	11 (2.7)					
Evaporator Blower and Drive Selection	Blower wheel nominal dia. x width — in. (mm)		11-1/2 X 9 (292 X 229)					
	Direct Drive Motor	Nominal Motor output hp (W)	.75 (560)					
		Voltage & phase	208/230v - 1ph or 3 ph or 460v, 575v-3ph					
	1.5 hp (1.1 kW) [3]Motor & Drives	Motor output hp(kW) Nominal	1.5 (1.1)					
		Motor output hp(kW) Max. usable	1.72 (1.3)					
		Voltage & phase	208/230v - 1ph, 208/230v, 460v or 575v-3ph					
		(Drive kit #) RPM range	(1) 615 - 920 or (2) 800-1105					
	2 hp (1.5 kW) [3]Motor & Drives	Motor output hp (kW) Nominal	2 (1.5)					
		Motor output hp (kW) Max. usable	2.3 (1.7)					
		Voltage & phase	208/230v, 460v or 575v-3ph					
		(Drive kit #) RPM range	(3) 920 - 1230					
	3 hp (2.2 kW) [3]Motor & Drives	Motor output hp (kW) Nominal	3 (2.2)					
		Motor output hp (kW) Max. usable	3.45 (2.6)					
		Voltage & phase	208/230v, 460v or 575v-3ph					
		(Drive kit #) RPM range	(4) 1070 - 1325					
Evaporator Coil	Net face area — sq. ft. (m^2)		6.25 (0.58)					
	Tube diameter — in. (mm) & No. of rows		3/8 (9.5) - 2			3/8 (9.5) - 3	3/8 (9.5) - 2	3/8 (9.5) - 3
	Fins per inch (m)		15 (591)					
	Drain connection no. & size - in. (mm) fpt		(1) 3/4 (19)					
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head					
Condenser Coil	Net face area — sq. ft. (m^2)		14.6 (1.35)					
	Tube diameter — in. (mm) & No. of rows		3/8 (9.5) - 1.3	3/8 (9.5) - 2	3/8 (9.5) - 1.3	3/8 (9.5) - 2		
	Fins per inch (m)		20 (787)					
Condenser Fans	Diameter — in. (mm) & No. of blades		24 (610) - 3					
	Total Air volume — cfm (L/s)		4000 (1890)				4200 (1980)	
	Motor horsepower (W)		1/3 (224)					
	Motor rpm		1075					
	Total Motor watts		320				360	
Filters (furnished)	Type of filter		Disposable Commercial Grade Pleated					
	No. and size — in. (mm)		(2) 16 x 25 x 2 (406 x 635 x 51)					
Electrical characteristics			208/203v -— 60 hertz — 1 phase 208/230v, 460v or 575v — 60 hertz — 3 phase					

[1]Rated in accordance with ARI Standard 210/240 and certified to ARI; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.
[2]Sound Rating Number rated in accordance with test conditions included in ARI Standard 270.
[3]Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished by Lennox are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.
NOTE — Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

SPECIFICATIONS 5-6 TON

Model No.			LCA/LGA060		LCA/LGA072	
Cooling Ratings	Cooling Efficiency Type		**Standard**	**High**	**Standard**	**High**
	Gross Cooling Capacity — Btuh (kW)		60,500 (17.7)	63,000 (18.5)	76,000 (22.3)	74,500 (21.8)
	[1]Net Cooling Capacity — Btuh (kW)		57,500 (16.9)	60,000 (17.6)	72,000 (21.1)	71,500 (21.0)
	Total Unit Power (kW)		6.5	5.8	7.6	6.85
	[1]SEER (Btuh/Watt)		10.0	12.0	- - - -	- - - -
	EER (Btuh/Watt)		8.8	10.3	9.0	10.5
[2]Sound Rating Number (db)			82			
Refrigerant Charge Furnished (HCFC-22)			7 lbs. 14 oz. (3.57 kg)	10 lbs. 0 oz. (4.54 kg)	9 lbs. 5 oz. (4.22 kg)	9 lbs. 13 oz. (4.45 kg)
LGA Models Only Two Stage Heating Capacity (Natural or LPG/Propane Gas (at Sea Level)	**Model No.**		**LGA060**		**LGA072**	
	Heat Input Type		**Standard**	**Dual or High**	**Standard**	**Dual or High**
	Input (low) — Btuh (kW)		- - - -	92,000 (27.0)	- - - -	92,000 (27.0)
	Output (low) — Btuh (kW)		- - - -	72,700 (21.3)	- - - -	72,700 (21.3)
	Input (High) — Btuh (kW)		78,000 (22.9)	125,000 (36.6)	78,000 (22.9)	125,000 (36.6)
	Output (High) — Btuh (kW)		61,600 (18.1)	98,750 (28.9)	61,600 (18.1)	98,750 (28.9)
	A.G.A./C.G.A. Thermal Efficiency / AFUE		80.0% / 78.0%			
Gas Supply Connections npt — in. - Natural or LPG/Propane			1/2			
Recommended Gas Supply Pressure — wc. in. (kPa)		Natural	7			
		LPG/Propane	11			
Evaporator Blower and Drive Selection	Blower wheel nominal dia. x width — in. (mm)		11-1/2 x 9 (292 x 229)			
	Direct Drive Motor	Nominal motor output — hp (kW)	.75 (.56)		- - - -	
		Voltage & phase	208/230v -1 or 3ph or 460, 575v-3ph		- - - -	
	1.5 hp (1.1 kW) [3]Motor & Drives	Nominal motor horsepower (kW)	1.5 (1.1)			
		Max. usable motor output — hp (kW)	1.72 (1.3)			
		Voltage & phase	208/230v - 1ph, 208/230v, 460v or 575v-3ph			
		(Drive kit #) RPM range	(1) 615 - 920 or (2) 800 - 1105			
	2 hp (1.5 kW) [3]Motor & Drives	Nominal motor output — hp (kW)	2 (1.5)			
		Max. usable motor output — hp (kW)	2.3 (1.7)			
		Voltage & phase	208/230v, 460v or 575v-3ph			
		(Drive kit #) RPM range	(3) 920 - 1230			
	3 hp (2.2 kW) [3]Motor & Drives	Nominal motor horsepower (kW)	3 (2.2)			
		Max. usable motor output — hp (kW)	3.45 (2.6)			
		Voltage & phase	208/230v, 460v or 575v-3ph			
		(Drive kit #) RPM range	(4) 1070 -1325			
Evaporator Coil	Net face area — sq. ft. (m^2)		6.25 (0.58)			
	Tube diameter — in. (mm) & No. of rows		3/8 (9.5) — 2	3/8 (9.5) — 3	3/8 (9.5) — 3	3/8 (9.5) — 4
	Fins per inch (m)		15 (591)			
	Drain connection no. & size — in. (mm) fpt		(1) 3/4 (19)			
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head			
Condenser Coil	Net face area — sq. ft. (m^2)		14.6 (1.35)			
	Tube diameter — in. (mm) & No. of rows		3/8 (9.5) — 2			
	Fins per inch (m)		20 (788)			
Condenser Fans	Diameter — in. (mm) & No. of blades		24 — 3			
	Total Air volume — cfm (L/s)		4200			
	Motor horsepower (W)		1/3 (248)			
	Motor rpm		1075			
	Total Motor watts		360			
Filters (furnished)	Type of filter		Disposable Commercial Grade Pleated			
	No. and size — in. (mm)		(2) 16 x 25 x 2 (406 x 635 x 51)			
Electrical characteristics			208/203v -— 60 hertz — 1 phase 208/230v, 460v or 575v 60 hertz — 3 phase		208/230v, 460v or 575v 60 hertz — 3 phase	

[1]Rated in accordance with ARI Standard 210/240 and certified to ARI; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.
[2]Sound Rating Number rated in accordance with test conditions included in ARI Standard 270.
[3]Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished by Lennox are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.
NOTE — Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

ELECTRICAL DATA 3-31/2 TON

Model No.			LCA/LGA036													
Line voltage data — 60 Hz			208/230v - 1 phase		208/230v- 3 phase				460v 3 phase				575v 3 phase			
Outdoor Fan Motor	Full load amps		2.4						1.3				1.0			
	Locked rotor amps		4.7						2.4				1.9			
Indoor Blower Motor	Motor Output	hp	0.75	1.5	0.75	1.5	2	3	0.75	1.5	2	3	0.75	1.5	2	3
		kW	0.56	1.1	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2
	Full load amps		4.6	11.5	4.6	5.7	7.5	10.6	2.3	2.8	3.4	4.8	2.3	2.4	2.7	3.9
	Locked rotor amps		10	55	10	40	46.9	66	5.4	20	20.4	26.8	5.4	15	16.2	23.4
Optional Power Exhaust Fan	Horsepower (W)		1/2 (363)													
	Full load amps		4.4						1.7							
	Locked rotor amps		4.7						4.1							
Service Outlet (2) 115 volt GFCI (amp rating)			15													
LCA/LGA036S MODELS																
Compressor	Rated load amps		14.8		10.6				4.8				4.2			
	Locked rotor amps		78.8		65.1				32.8				26.0			
Rec. max. fuse size (amps)	With Exhaust Fan		45	50	35	35	35	40	15	15	15	15	15	15	15	15
	Less Exhaust Fan		40	45	30	30	30	35	15	15	15	15	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		30	37	25	26	28	31	12	12	13	14	11	11	11	12
	Less Exhaust Fan		26	33	21	22	24	27	10	11	11	13	9	9	9	11
LCA/LGA036H MODELS																
Compressor	Rated load amps		12.4		10.3				5.8				4.2			
	Locked rotor amps		88.0		77.0				39.0				30.6			
Rec. max. fuse size (amps)	With Exhaust Fan		35	45	30	35	35	40	15	15	20	20	15	15	15	15
	Less Exhaust Fan		35	40	30	30	30	35	15	15	15	20	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		27	34	25	26	28	31	13	14	14	16	11	11	11	12
	Less Exhaust Fan		23	30	20	21	23	26	11	12	12	14	9	9	9	11
Model No.			**LCA/LGA042**													
Line voltage data — 60 Hz			208/230v 1 phase		208/230v 3 phase				460v 3 phase				575v 3 phase			
Outdoor Fan Motor	Full load amps		2.4						1.3				1.0			
	Locked rotor amps		4.7						2.4				1.9			
Indoor Blower Motor	Motor Output	hp	0.75	1.5	0.75	1.5	2	3	0.75	1.5	2	3	0.75	1.5	2	3
		kW	0.56	1.1	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2
	Full load amps		4.6	11.5	4.6	5.7	7.5	10.6	2.3	2.8	3.4	4.8	2.3	2.4	2.7	3.9
	Locked rotor amps		10.1	55	10	40	46.9	66	5.4	20	20.4	26.8	5.4	15	16.2	23.4
Optional Power Exhaust Fan	Horsepower (W)		1/2 (363)													
	Full load amps		4.4						1.7							
	Locked rotor amps		4.7						4.1							
Service Outlet (2) 115 volt GFCI (amp rating)			15													
LCA/LGA042S MODELS																
Compressor	Rated load amps		18.0		11.4				5.8				5.0			
	Locked rotor amps		92.0		84.0				42.0				35.0			
Rec. max. fuse size (amps)	With Exhaust Fan		50	50	35	35	40	40	15	15	15	20	15	15	15	15
	Less Exhaust Fan		45	50	30	30	35	35	15	15	15	15	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		34	41	26	27	29	32	13	14	14	16	12	12	12	13
	Less Exhaust Fan		30	37	22	23	25	28	11	12	12	14	10	10	10	12
LCA/LGA042H MODELS																
Compressor	Rated load amps		17.9		12.4				5.8				4.8			
	Locked rotor amps		104.0		88.0				44.0				34.0			
Rec. max. fuse size (amps)	With Exhaust Fan		50	50	35	40	40	45	15	15	20	20	15	15	15	15
	Less Exhaust Fan		45	50	35	35	35	40	15	15	15	15	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		34	41	27	29	30	33	13	14	14	16	12	12	12	13
	Less Exhaust Fan		30	37	23	24	26	29	11	12	12	14	10	10	10	11

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus and minus 10 % of line voltage.
NOTE — Where current does not exceed 100 amps, HACR type circuit breaker may be used in place of fuse (U.S. only).

ELECTRICAL DATA 4-5 TON

Model No.			LCA/LGA048													
Line voltage data — 60 Hz			208/230v 1 phase		208/230v 3 phase				460v 3 phase				575v 3 phase			
Outdoor Fan Motor	Full load amps		2.4						1.3				1.0			
	Locked rotor amps		4.7						2.4				1.9			
Indoor Blower Motor	Motor Output	hp	0.75	1.5	0.75	1.5	2	3	0.75	1.5	2	3	0.75	1.5	2	3
		kW	0.56	1.1	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2
	Full load amps		4.6	11.5	4.6	5.7	7.5	10.6	2.3	2.8	3.4	4.8	2.3	2.4	2.7	3.9
	Locked rotor amps		10	55	10	40	46.9	66	5.4	20	20.4	26.8	5.4	15	16.2	23.4
Optional Power Exhaust Fan	Horsepower (W)		1/2 (363)													
	Full load amps		4.4						1.7							
	Locked rotor amps		4.7						4.1							
Service Outlet (2) 115 volt GFCI (amp rating)			15													
LCA/LGA048S MODELS																
Compressor	Rated load amps each		23.4		12.2				7.1				5.8			
	Locked rotor amps each		110.0		90.0				46.0				37.0			
Rec. max. fuse size (amps)	With Exhaust Fan		60	70	35	35	40	40	20	20	20	20	15	15	15	15
	Less Exhaust Fan		60	60	30	35	35	40	20	20	20	20	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		41	48	27	28	30	33	15	15	16	17	13	13	13	14
	Less Exhaust Fan		37	44	23	24	26	29	13	13	14	15	11	11	11	13
LCA/LGA048H MODELS																
Compressor	Rated load amps each		23.7		13.5				7.4				5.8			
	Locked rotor amps each		129.0		99.0				49.5				40.0			
Rec. max. fuse size (amps)	With Exhaust Fan		60	70	40	40	40	45	20	20	20	20	15	15	15	15
	Less Exhaust Fan		60	60	35	35	40	40	20	20	20	20	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		42	48	29	30	32	35	15	16	16	18	13	13	13	14
	Less Exhaust Fan		37	44	24	25	27	30	13	14	14	16	11	11	11	13
Model No.			**LCA/LGA060**													
Line voltage data — 60 Hz			208/230v - 1 phase		208/230v 3 phase				460v 3 phase				575v 3 phase			
Outdoor Fan Motor	Full load amps		2.4						1.3				1.0			
	Locked rotor amps		4.7						2.4				1.9			
Indoor Blower Motor	Motor Output	hp	0.75	1.5	0.75	1.5	2	3	0.75	1.5	2	3	0.75	1.5	2	3
		kW	0.56	1.1	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2	0.56	1.1	1.5	2.2
	Full load amps		4.6	11.5	4.6	5.7	7.5	10.6	2.3	2.8	3.4	4.8	2.3	2.4	2.7	3.9
	Locked rotor amps		10	55	10	40	46.9	66	5.4	20	20.4	26.8	5.4	15	16.2	23.4
Optional Power Exhaust Fan	Horsepower (W)		1/2 (363)													
	Full load amps		4.4						1.7							
	Locked rotor amps		4.7						4.1							
Service Outlet (2) 115 volt GFCI (amp rating)			15													
LCA/LGA060S MODELS																
Compressor	Rated load amps each		26.9		16.7				8.6				6.0			
	Locked rotor amps each		141.0		110.0				55.0				44.0			
Rec. max. fuse size (amps)	With Exhaust Fan		70	70	45	50	50	50	20	25	25	25	15	15	15	20
	Less Exhaust Fan		60	70	40	45	45	50	20	20	20	25	15	15	15	15
*Minimum Circuit Ampacity	With Exhaust Fan		46	52	33	34	36	39	17	17	18	19	13	13	13	15
	Less Exhaust Fan		41	48	28	29	31	34	15	15	16	17	11	11	12	13
LCA/LGA060H MODELS																
Compressor	Rated load amps each		28.8		17.3				9.0				7.1			
	Locked rotor amps each		169.0		123.0				62.0				50.0			
Rec. max. fuse size (amps)	With Exhaust Fan		70	70	50	50	50	50	25	25	25	25	20	20	20	20
	Less Exhaust Fan		70	70	45	45	45	50	20	20	20	25	15	15	15	20
*Minimum Circuit Ampacity	With Exhaust Fan		48	55	34	35	36	40	17	18	18	20	14	14	15	16
	Less Exhaust Fan		44	50	29	30	32	35	15	16	16	18	13	13	13	14

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus and minus 10 % of line voltage.
NOTE — Where current does not exceed 100 amps, HACR type circuit breaker may be used in place of fuse (U.S. only).

ELECTRICAL DATA 6 TON

Model No.			LCA/LGA072								
Line voltage data — 60 Hz			208/230v 3 phase			460v 3 phase			575v 3 phase		
Outdoor Fan Motor	Full load amps		2.4			1.3			1.0		
	Locked rotor amps		4.7			2.4			1.9		
Indoor Blower Motor	Motor Output	hp	1.5	2	3	1.5	2	3	1.5	2	3
		kW	1.1	1.5	2.2	1.1	1.5	2.2	1.1	1.5	2.2
	Full load amps		5.7	7.5	10.6	2.8	3.4	4.8	2.4	2.7	3.9
	Locked rotor amps		40	46.9	66	20	20.4	26.8	15	16.2	23.4
Optional Power Exhaust Fan	Horsepower (W)		1/2 (363)								
	Full load amps		4.4			1.7					
	Locked rotor amps		4.7			4.1					
Service Outlet (2) 115 volt GFCI (amp rating)			15								
LCA/LGA072S MODELS											
Compressor	Rated load amps each		20.7			9.0			7.4		
	Locked rotor amps each		156.0			70.0			54.0		
Rec. max. fuse size (amps)	With Exhaust Fan		50	60	60	25	25	25	20	20	20
	Less Exhaust Fan		50	50	50	20	20	25	20	20	20
*Minimum Circuit Ampacity	With Exhaust Fan		39	41	44	18	18	20	15	15	16
	Less Exhaust Fan		34	36	39	16	16	18	13	13	15
LCA/LGA072H MODELS											
Compressor	Rated load amps each		19.9			9.0			7.4		
	Locked rotor amps each		156.00			70.0			54.0		
Rec. max. fuse size (amps)	With Exhaust Fan		50	50	60	25	25	25	20	20	20
	Less Exhaust Fan		50	50	50	20	20	25	20	20	20
*Minimum Circuit Ampacity	With Exhaust Fan		38	40	43	18	18	20	15	15	16
	Less Exhaust Fan		33	35	38	16	16	18	13	13	15

*Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
NOTE — Extremes of operating range are plus and minus 10 % of line voltage.
NOTE — Where current does not exceed 100 amps, HACR type circuit breaker may be used in place of fuse (U.S. only).

OPTIONAL ELECTRIC HEAT ACCESSORIES-LCA UNITS

UNIT FUSE BLOCKS WITH ELECTRIC HEAT													
Unit Model No.				**LCA036 S**	**LCA036 H**	**LCA042 S**	**LCA042 H**	**LCA048 S**	**LCA048 H**	**LCA060 S**	**LCA060 H**	**LCA072 S**	**LCA072H**
Electric Heat		Model No.		EHA (see Electric Heat Data tables for additional information)									
		kW Input Range		7, 10 15 & 20						7, 10, 15, 20 & 25		10, 15, 20, 25, & 30	
Unit Fuse Block	**Without** Power Exhaust Fans	.75 hp (.56 kW)	208/230v - 1ph	**26L27**	**26L26**	**26L29**	**26L29**	**26L32**	**26L32**	**26L33**	**26L34**	**- - - -**	**- - - -**
			208/230v - 3ph	**26L35**	**26L35**	**26L35**	**26L36**	**26L36**	**26L36**	**26L37**	**26L39**	**- - - -**	**- - - -**
			460v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**	**26L44**	**- - - -**	**- - - -**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**- - - -**	**- - - -**
		1.5 hp (1.1 kW)	208/230v - 1ph	**26L30**	**26L28**	**26L31**	**26L31**	**26L33**	**26L33**	**26L34**	**26L34**	**- - - -**	**- - - -**
			208/230v - 3ph	**26L35**	**26L35**	**26L35**	**26L36**	**26L36**	**26L36**	**26L39**	**26L39**	**26L41**	**26L41**
			460v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**	**26L44**	**26L44**	**26L44**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**
		2 hp (1.5 kW)	208/230v - 3ph	**26L35**	**26L35**	**26L36**	**26L36**	**26L36**	**26L37**	**26L40**	**26L40**	**26L41**	**26L41**
			460v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**	**26L44**	**26L44**	**26L44**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**
		3 hp (2.2 kW)	208/230v - 3ph	**26L36**	**26L36**	**26L36**	**26L37**	**26L37**	**26L37**	**26L41**	**26L41**	**26L41**	**26L41**
			460v - 3ph	**26L43**	**26L44**	**26L43**	**26L43**	**26L44**	**26L44**	**26L45**	**26L45**	**26L45**	**26L45**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**
	With Power Exhaust Fans	.75 hp (.56 kW)	208/230v - 1ph	**26L30**	**26L26**	**26L31**	**26L31**	**26L33**	**26L33**	**26L34**	**26L34**	**- - - -**	**- - - -**
			208/230v - 3ph	**26L35**	**26L36**	**26L36**	**26L36**	**26L36**	**26L37**	**26L40**	**26L41**	**- - - -**	**- - - -**
			460v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**	**26L45**	**- - - -**	**- - - -**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**- - - -**	**- - - -**
		1.5 hp (1.1 kW)	208/230v - 1ph	**26L31**	**26L30**	**26L31**	**26L31**	**26L34**	**26L34**	**26L34**	**26L34**	**- - - -**	**- - - -**
			208/230v - 3ph	**26L36**	**26L36**	**26L36**	**26L37**	**26L37**	**26L37**	**26L41**	**26L41**	**26L41**	**26L41**
			460v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L45**	**26L45**	**26L45**	**26L45**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**
		2 hp (1.5 kW)	208/230v - 3ph	**26L36**	**26L36**	**26L37**	**26L37**	**26L37**	**26L38**	**26L41**	**26L41**	**26L41**	**26L41**
			460v - 3ph	**26L43**	**26L44**	**26L43**	**26L44**	**26L44**	**26L44**	**26L45**	**26L45**	**26L45**	**26L45**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**
		3 hp (2.2 kW)	208/230v - 3ph	**26L36**	**26L38**	**26L37**	**26L40**	**26L38**	**26L40**	**26L41**	**26L41**	**26L42**	**26L42**
			460v - 3ph	**26L43**	**26L44**	**26L44**	**26L44**	**26L44**	**26L44**	**26L45**	**26L45**	**26L45**	**26L45**
			575v - 3ph	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L43**	**26L44**	**26L44**	**26L44**	**26L44**
LTB2 ELECTRIC HEAT TERMINAL BLOCK — LTB2-175 (1 ph) (32L76) 175 amps, **LTB2-175-(3 ph) (32L77)** 175 amps **(Required For Units Without Disconnect/Circuit Breaker But With Single Point Power Source)**													
LTB2 Terminal Block	7, 10, 15, 20 and 25 kW 1ph	.75 hp (.56 kW)		**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**
		1.5 hp (1.1 kW)		**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**	**32L76**
	7, 10, 15, 20, 25 and 30 kW 3ph	1.5 hp (1.1 kW)		**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**
		2 hp (1.5 kW)		**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**
		3 hp (2.2 kW)		**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**	**32L77**

NOTE — Terminal Block is factory installed in units with factory installed electric heat without disconnect/circuit breaker but with single point power source.

BELTDRIVE BLOWER DATA

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

ADD: 1 - Wet indoor coil air resistance of selected unit.
2 - Any factory installed options air resistance (electric 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 26 for blower motors and drives and Page 27 for wet coil and options/accessory air resistance data.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT
7, 10, 15, 20 kW Electric Heat - 1400 cfm (660 L/s) 208/230 volt, 1500 cfm (710 L/s) 460 & 575 volt
25 kW Electric Heat - 2000 cfm (945 L/s)
30 kW Electric Heat - 2400 cfm (1135 L/s)

NOTE - LCA UNITS ARE NOT U.L. APPROVED FOR OPERATION ABOVE 1325 RPM.

BOLD ITALICS INDICATE FIELD FURNISHED DRIVE.

LCA BASE UNIT

Air Volume cfm (L/s)	Total Static Pressure — Inches Water Gauge (Pa)																	
	.00 (00)		.20 (50)		.40 (100)		.60 (150)		.80 (200)		1.00 (250)		1.20 (300)		1.40 (350)		1.60 (400)		1.80 (450)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
900 (427)	***310***	***0.05 (0.04)***	***455***	***0.10 ((0.07)***	***595***	***0.15 (0.11)***	720	0.25 (0.19)	825	0.40 (0.30)	925	0.55 (0.41)	1015	0.70 (0.52)	1100	0.90 (0.67)	1180	1.10 (0.82)	1255	1.30 (0.97)
1000 (474)	***330***	***0.05 (0.04)***	***470***	***0.10 (0.07)***	***605***	***0.20 (0.15)***	725	0.30 (0.22)	830	0.40 (0.30)	925	0.55 (0.41)	1015	0.70 (0.52)	1095	0.90 (0.67)	1175	1.10 (0.82)	1250	1.30 (0.97)
1200 (568)	***375***	***0.10 (0.07)***	***505***	***0.15 (0.11)***	630	0.25 (0.19)	740	0.35 (0.26)	840	0.45 (0.34)	930	0.60 (0.45)	1015	0.75 (0.56)	1095	0.90 (0.67)	1170	1.10 (0.82)	1240	1.30 (0.97)
1400 (663)	***425***	***0.15 (0.11)***	***545***	***0.20 (0.15)***	660	0.30 (0.22)	760	0.40 (0.30)	855	0.50 (0.37)	940	0.65 (0.48)	1020	0.80 (0.60)	1100	0.95 (0.71)	1170	1.10 (0.82)	1240	1.35 (1.01)
1600 (757)	***475***	***0.20 (0.15)***	***590***	***0.30 (0.22)***	695	0.40 (0.30)	790	0.50 (0.37)	875	0.60 (0.45)	960	0.75 (0.56)	1035	0.90 (0.67)	1110	1.05 (0.78)	1180	1.25 (0.93)	1245	1.40 (1.04)
1800 (850)	***535***	***0.30 (0.22)***	640	0.40 (0.30)	735	0.50 (0.37)	820	0.60 (0.45)	905	0.70 (0.52)	980	0.85 (0.63)	1055	1.00 (0.75)	1125	1.15 (0.86)	1195	1.35 (1.01)	1255	1.50 (1.12)
2000 (945)	***595***	***0.40 (0.30)***	690	0.50 (0.37)	775	0.60 (0.45)	860	0.70 (0.52)	935	0.85 (0.63)	1010	1.00 (0.75)	1080	1.15 (0.86)	1145	1.30 (0.97)	1210	1.50 (1.12)	1270	1.65 (1.23)
2200 (1040)	655	0.55 (0.41)	740	0.65 (0.48)	820	0.75 (0.56)	895	0.85 (0.63)	970	1.00 (0.75)	1040	1.15 (0.86)	1105	1.30 (0.97)	1170	1.45 (1.08)	1230	1.65 (1.23)	1290	1.85 (1.38)
2400 (1135)	710	0.70 (0.52)	790	0.80 (0.60)	870	0.95 (0.71)	940	1.05 (0.78)	1010	1.20 (0.90)	1075	1.35 (1.01)	1135	1.50 (1.12)	1200	1.70 (1.27)	1260	1.85 (1.38)	1315	2.05 (1.53)
2600 (1229)	770	0.90 (0.67)	845	1.00 (0.75)	915	1.15 (0.86)	985	1.30 (0.97)	1050	1.40 (1.04)	1110	1.55 (1.16)	1170	1.75 (1.31)	1230	1.90 (1.42)	1285	2.10 (1.57)	- - - -	
2800 (1323)	830	1.10 (0.82)	900	1.25 (0.93)	965	1.35 (1.01)	1030	1.50 (1.12)	1090	1.65 (1.23)	1150	1.85 (1.38)	1210	2.00 (1.49)	1265	2.20 (1.64)	1320	2.35 (1.75)	- - - -	
3000 (1418)	890	1.35 (1.01)	955	1.50 (1.12)	1015	1.65 (1.23)	1075	1.80 (1.34)	1135	1.95 (1.45)	1190	2.10 (1.57)	1245	2.30 (1.72)	1300	2.50 (1.87)	- - - -		- - - -	

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

ADD: 1 - Wet indoor coil air resistance of selected unit.
2 - Any factory installed options air resistance (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 26 for blower motors and drives and Page 27 for wet coil and options/accessory air resistance data.

NOTE - LGA UNITS ARE NOT U.L. APPROVED FOR OPERATION ABOVE 1325 RPM.

BOLD ITALICS INDICATE FIELD FURNISHED DRIVE.

LGA BASE UNIT

Air Volume cfm (L/s)	Total Static Pressure — Inches Water Gauge (Pa)																	
	.00 (00)		.20 (50)		.40 (100)		.60 (150)		.80 (200)		1.00 (250)		1.20 (300)		1.40 (350)		1.60 (400)		1.80 (450)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
900 (425)	***350***	***0.05 (0.04)***	***495***	***0.10 (0.07)***	630	0.20 (0.15)	750	0.30 (0.22)	855	0.40 (0.30)	950	0.60 (0.45)	1035	0.75 (0.56)	1120	1.00 (0.75)	1195	1.25 (0.93)	1270	1.50 (1.12)
1000 (470)	***375***	***0.10 (0.07)***	***515***	***0.15 (0.11)***	645	0.20 (0.15)	760	0.30 (0.22)	860	0.45 (0.34)	955	0.60 (0.45)	1040	0.75 (0.56)	1120	1.00 (0.75)	1195	1.20 (0.90)	1270	1.45 (1.08)
1200 (565)	***430***	***0.15 (0.11)***	***560***	***0.20 (0.15)***	680	0.25 (0.19)	785	0.35 (0.26)	885	0.50 (0.37)	970	0.65 (0.48)	1055	0.80 (0.60)	1130	1.00 (0.75)	1205	1.20 (0.90)	1275	1.45 (1.08)
1400 (660)	***490***	***0.20 (0.15)***	615	0.30 (0.22)	725	0.35 (0.26)	820	0.45 (0.34)	910	0.55 (0.41)	995	0.70 (0.52)	1075	0.85 (0.63)	1150	1.05 (0.78)	1220	1.25 (0.93)	1285	1.45 (1.08)
1600 (755)	***560***	***0.35 (0.26)***	670	0.40 (0.30)	770	0.50 (0.37)	860	0.60 (0.45)	945	0.70 (0.52)	1025	0.80 (0.60)	1100	0.95 (0.71)	1170	1.15 (0.86)	1240	1.30 (0.97)	1305	1.50 (1.12)
1800 (850)	630	0.50 (0.37)	730	0.55 (0.41)	820	0.65 (0.48)	905	0.75 (0.56)	985	0.85 (0.63)	1060	1.00 (0.75)	1130	1.10 (0.82)	1200	1.30 (0.97)	1265	1.45 (1.08)	1325	1.65 (1.23)
2000 (945)	700	0.65 (0.48)	790	0.75 (0.56)	875	0.85 (0.63)	955	0.95 (0.71)	1030	1.05 (0.78)	1100	1.20 (0.90)	1165	1.30 (0.97)	1230	1.45 (1.08)	1295	1.65 (1.23)	- - - -	
2200 (1040)	770	0.85 (0.63)	855	0.95 (0.71)	930	1.05 (0.78)	1005	1.15 (0.86)	1075	1.30 (0.97)	1140	1.40 (1.04)	1205	1.55 (1.16)	1265	1.70 (1.27)	1325	1.85 (1.38)	- - - -	
2400 (1135)	840	1.15 (0.86)	920	1.25 (0.93)	990	1.35 (1.01)	1060	1.45 (1.08)	1125	1.55 (1.16)	1190	1.70 (1.27)	1250	1.85 (1.38)	1305	2.00 (1.49)	- - - -		- - - -	
2600 (1225)	910	1.45 (1.08)	980	1.55 (1.16)	1050	1.65 (1.23)	1115	1.75 (1.31)	1175	1.90 (1.42)	1235	2.05 (1.53)	1295	2.20 (1.64)	- - - -		- - - -		- - - -	
2800 (1320)	980	1.80 (1.34)	1050	1.90 (1.42)	1110	2.05 (1.53)	1170	2.15 (1.60)	1230	2.30 (1.72)	1285	2.40 (1.79)	- - - -		- - - -		- - - -		- - - -	
3000 (1415)	1050	2.20 (1.64)	1115	2.35 (1.75)	1175	2.45 (1.83)	1230	2.60 (1.94)	1285	2.70 (2.01)	- - - -		- - - -		- - - -		- - - -		- - - -	

BELTDRIVE BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS							
Motor Outputs				RPM Range			
Nominal hp	Maximum hp	Nominal kW	Maximum kW	Drive 1	Drive 2	Drive 3	Drive 4
Standard or High Efficiency - 1.5	1.72	1.1	1.3	615 - 920	800 - 1105	- - - -	- - - -
Standard or High Efficiency - 2	2.3	1.5	1.7	- - - -	- - - -	920 - 1230	- - - -
Standard Efficiency Only - 3	3.45	2.2	2.6	- - - -	- - - -	- - - -	1070 - 1325

*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 by Lennox 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.

DIRECTDRIVE BLOWER DATA

LGA/LCA036-060 DIRECT DRIVE BLOWER PERFORMANCE @ 208 VOLTS (Downflow)											
External Static Pressure		Air Volume at Various Blower Speeds									
		High		Medium-High		Medium		Medium-Low		Low	
in. w.g.	Pa	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
0	0	2530	1195	2265	1070	1970	930	1720	810	1440	680
.10	25	2495	1175	2235	1055	1945	920	1700	800	1430	675
.20	50	2450	1155	2200	1040	1915	905	1670	790	1415	670
.30	75	2405	1135	2160	1020	1880	890	1640	775	1390	655
.40	100	2355	1110	2115	1000	1840	870	1605	755	1360	640
.50	125	2300	1085	2065	975	1795	845	1565	740	1330	630
.60	150	2235	1055	2010	950	1745	825	1515	715	1290	610
.70	175	2165	1020	1945	920	1690	800	1460	690	1245	590
.80	200	2090	985	1875	885	1620	765	1400	660	1195	565
.90	225	2000	945	1790	845	1550	730	1330	630	1130	535
1.00	250	1895	895	1695	800	1460	690	1250	590	1055	500
1.10	275	1770	835	1580	745	1360	640	1160	545	975	460
1.20	300	1620	765	1440	680	1240	585	1055	500	870	410

NOTE — All air data is measured external to unit with 2 row dry coil and 2 inch (51 mm) filters.

LGA/LCA036-060 DIRECT DRIVE BLOWER PERFORMANCE @ 230 VOLTS (Downflow)											
External Static Pressure		Air Volume at Various Blower Speeds									
		High		Medium-High		Medium		Medium-Low		Low	
in. w.g.	Pa	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
0	0	2750	1300	2500	1180	2245	1060	1955	925	1630	770
.10	25	2705	1275	2470	1165	2215	1045	1925	910	1600	755
.20	50	2650	1250	2430	1145	2180	1030	1890	890	1570	740
.30	75	2585	1220	2390	1130	2140	1010	1850	875	1535	725
.40	100	2535	1195	2340	1105	2100	990	1810	855	1500	710
.50	125	2475	1170	2290	1080	2050	965	1760	830	1455	685
.60	150	2405	1135	2225	1050	1995	940	1705	805	1405	665
.70	175	2330	1100	2155	1015	1930	910	1640	775	1365	645
.80	200	2245	1060	2075	980	1865	880	1575	745	1310	620
.90	225	2155	1015	1975	930	1780	840	1495	705	1240	585
1.00	250	2050	965	1860	880	1690	800	1405	665	1150	545
1.10	275	1935	915	1720	810	1585	750	1290	610	1040	490
1.20	300	1805	850	1560	735	1450	685	1160	545	915	430

NOTE — All air data is measured external to unit with 2 row dry coil and 2 inch (51 mm) filters.

LGA/LCA036-060 DIRECT DRIVE BLOWER PERFORMANCE @ 460/575 VOLTS (Downflow)							
External Static Pressure		Air Volume at Various Blower Speeds					
		High		Medium		Low	
in. w.g.	Pa	cfm	L/s	cfm	L/s	cfm	L/s
0	0	2820	1330	2460	1160	1975	930
.10	25	2770	1305	2430	1145	1950	920
.20	50	2720	1285	2395	1130	1920	905
.30	75	2670	1260	2345	1105	1885	890
.40	100	2610	1230	2310	1090	1845	870
.50	125	2545	1200	2260	1065	1800	850
.60	150	2475	1170	2200	1040	1755	830
.70	175	2400	1130	2140	1010	1700	800
.80	200	2315	1090	2065	975	1635	770
.90	225	2220	1045	1980	935	1565	740
1.00	250	2115	1000	1880	885	1480	700
1.10	275	2000	945	1760	830	1370	647
1.20	300	1860	875	1615	760	1260	595

NOTE — All air data is measured external to unit with 2 row dry coil and 2 inch (51 mm) filters.

BLOWER DATA

AIR RESISTANCE - FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORIES

Air Volume		Total Resistance — inches water gauge (Pa)				
		Wet Indoor Coil			Electric Heat (LCA Models)	Economizer
cfm	L/s	LCA/LGA 036S/036H/042S/ 042H/048S/060S (2 row)	LCA/LGA 048H/060H/072S (3 row)	LCA/LGA072H (4 row)		
800	380	0.02 (4)	0.04 (9)	0.05 (13)	0.04 (10)	0.04 (10)
1000	470	0.02 (4)	0.05 (12)	0.07 (18)	0.06 (15)	0.04 (10)
1200	565	0.03 (8)	0.06 (16)	0.09 (24)	0.09 (22)	0.04 (10)
1400	660	0.04 (10)	0.08 (21)	0.12 (31)	0.12 (30)	0.04 (10)
1600	755	0.05 (13)	0.10 (26)	0.15 (38)	0.16 (40)	0.04 (10)
1800	850	0.06 (16)	0.12 (31)	0.18 (46)	0.21 (52)	0.05 (12)
2000	945	0.07 (18)	0.14 (36)	0.21 (53)	0.25 (62)	0.05 (12)
2200	1040	0.09 (21)	0.17 (42)	0.25 (62)	0.31 (77)	0.05 (12)
2400	1135	0.11 (27)	0.19 (48)	0.28 (70)	0.37 (92)	0.05 (12)
2600	1225	0.13 (32)	0.22 (54)	0.31 (77)	0.43 (107)	0.06 (15)
2800	1320	0.16 (40)	0.25 (63)	0.36 (88)	0.50 (125)	0.06 (15)
3000	1415	0.20 (50)	0.29 (71)	0.41 (101)	0.58 (144)	0.06 (15)

AIR RESISTANCE - CEILING DIFFUSERS

Air Volume		Total Resistance — inches water gauge (Pa)							
		RTD9 Step-Down Diffuser			FD9 Flush Diffuser	RTD11 Step-Down Diffuser			FD11 Flush Diffuser
cfm	L/s	2 Ends Open	1 Side 2 Ends Open	All Ends & Sides Open		2 Ends Open	1 Side 2 Ends Open	All Ends & Sides Open	
800	380	0.15 (37	0.13 (32)	0.11 (27)	0.11 (27)	- - - -	- - - -	- - - -	- - - -
1000	470	0.19 (47	0.16 (40)	0.14 (35)	0.14 (35)	- - - -	- - - -	- - - -	- - - -
1200	565	0.25 (62	0.20 (50)	0.17 (42)	0.17 (42)	- - - -	- - - -	- - - -	- - - -
1400	660	0.33 (82	0.26 (65)	0.20 (50)	0.20 (50)	- - - -	- - - -	- - - -	- - - -
1600	755	0.43 (107	0.32 (80)	0.20 (50)	0.24 (60)	- - - -	- - - -	- - - -	- - - -
1800	850	0.56 (139	0.40 (100)	0.30 (75)	0.30 (75)	0.13 (32)	0.11 (27)	0.09 (22)	0.09 (22)
2000	945	0.73 (182	0.50 (125)	0.36 (90)	0.36 (90)	0.15 (37)	0.13 (32)	0.11 (27)	0.10 (25)
2200	1040	0.95 (237	0.63 (157)	0.44 (110)	0.44 (110)	0.18 (45)	0.15 (37)	0.12 (30)	0.12 (30)
2400	1135	- - - -	- - - -	- - - -	- - - -	0.21 (52)	0.18 (45)	0.15 (37)	0.14 (35)
2600	1225	- - - -	- - - -	- - - -	- - - -	0.24 (60)	0.21 (52)	0.18 (45)	0.17 (42)
2800	1320	- - - -	- - - -	- - - -	- - - -	0.27 (67)	0.24 (60)	0.21 (52)	0.20 (50)
3000	1415	- - - -	- - - -	- - - -	- - - -	0.32 (80)	0.29 (72)	0.25 (62)	0.25 (62)

AIR THROW DATA - RTD9-65 CEILING DIFFUSER

Air Volume		[1] Effective Throw	
cfm	L/s	ft.	m
1000	470	10-17	3-5
1200	565	11-18	3-5
1400	660	12-19	4-6
1600	755	12-20	4-6
1800	850	13-21	4-6
2000	945	14-23	4-7
2200	1040	16-25	5-8

AIR THROW DATA - RTD11-95 CEILING DIFFUSER

2600	1225	24-29	7-9
2800	1320	25-30	8-9
3000	1415	27-33	8-10
3200	1510	28-35	9-11
3400	1605	30-37	9-11

[1] Effective throw based on terminal velocities of 75 ft. (22.9 m) per minute.

AIR THROW DATA - FD9-65 CEILING DIFFUSER

Air Volume		[1] Effective Throw — ft. (m)	
cfm	L/s	ft.	m
1000	470	15-20	5-6
1200	565	16-22	5-7
1400	660	17-24	5-7
1600	755	18-25	5-7
1800	850	20-28	6-9
2000	945	21-29	6-9
2200	1040	22-30	7-9

AIR THROW DATA - FD11-95 CEILING DIFFUSER

2600	1225	19-24	6-7
2800	1320	20-28	6-9
3000	1415	21-29	6-9
3200	1510	22-29	7-9
3400	1605	22-30	7-9

[1] Effective throw based on terminal velocities of 75 ft. (22.9 m) per minute.

LGA PARTS ARRANGEMENT

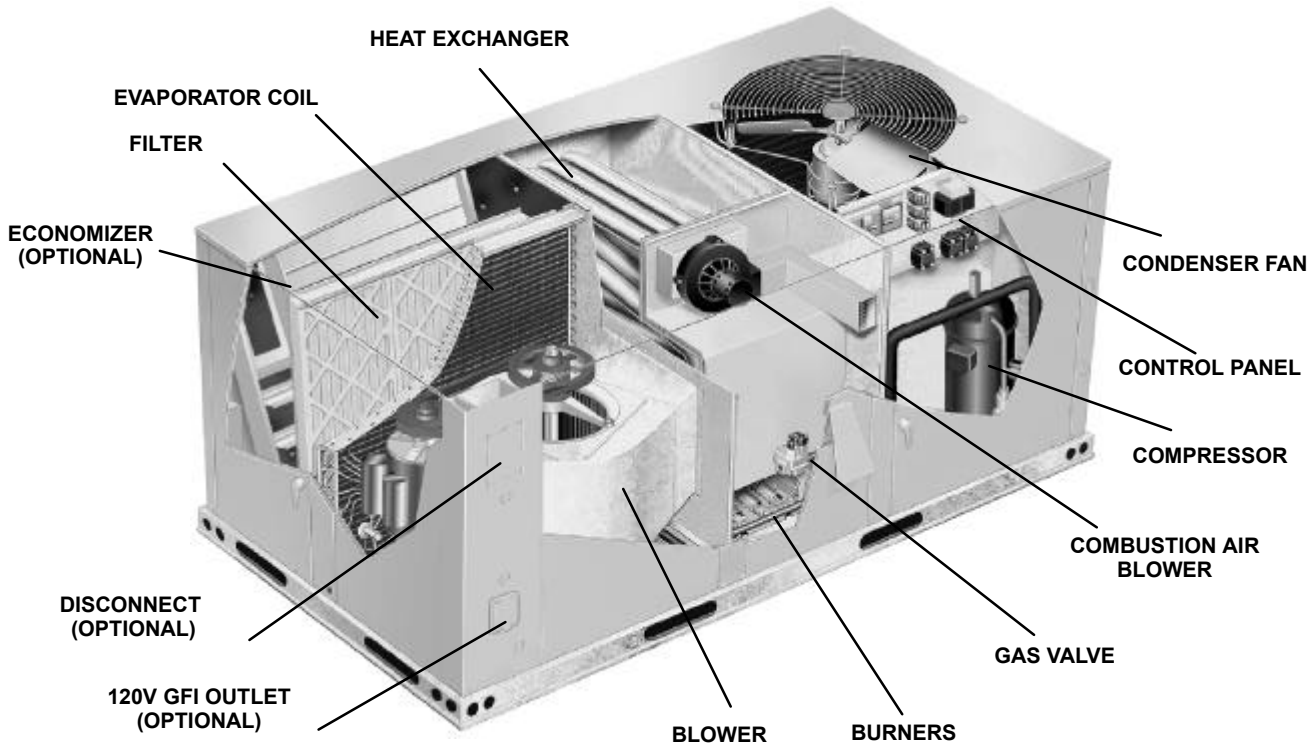


FIGURE 1

LCA PARTS ARRANGEMENT

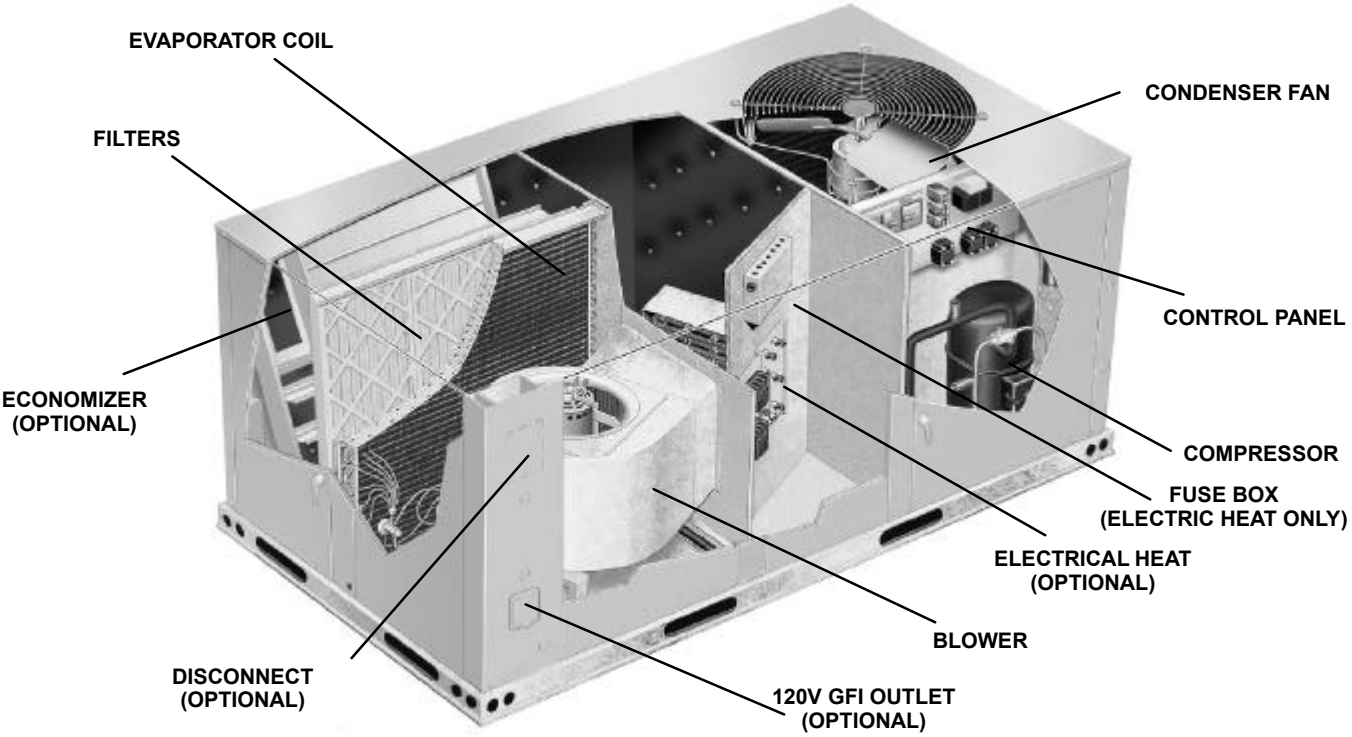
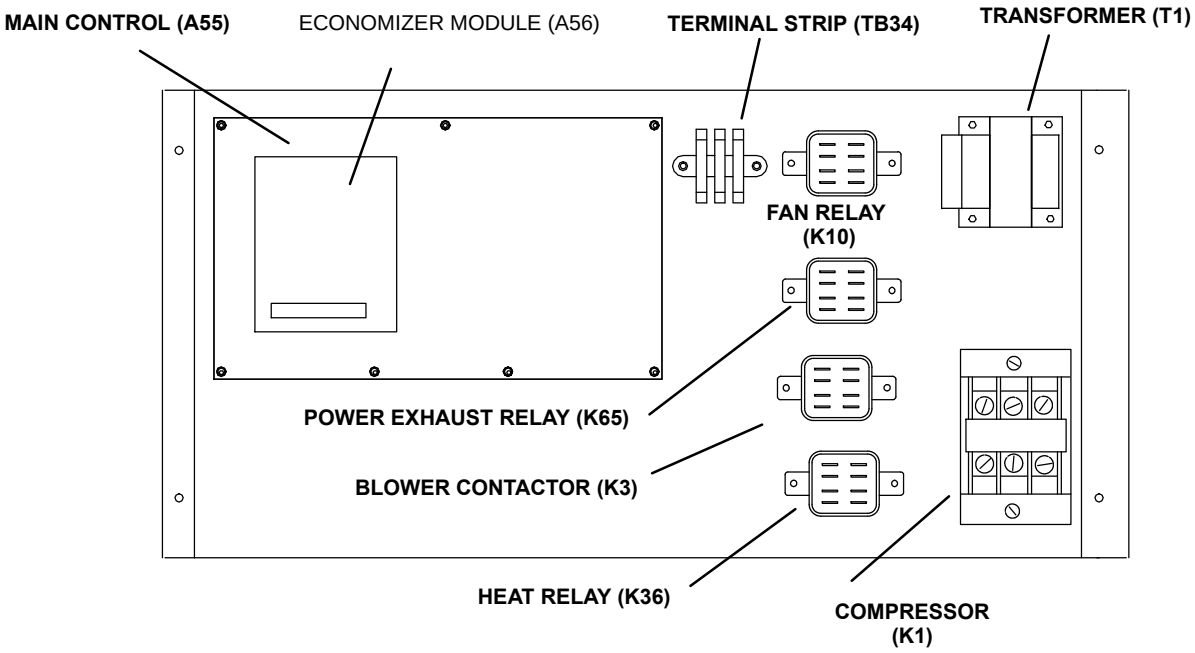


FIGURE 2

LCA/LGA036-042-048-060-072
DIRECT DRIVE MOTOR



LCA/LGA036-042-048-060-072
BELT DRIVE MOTOR

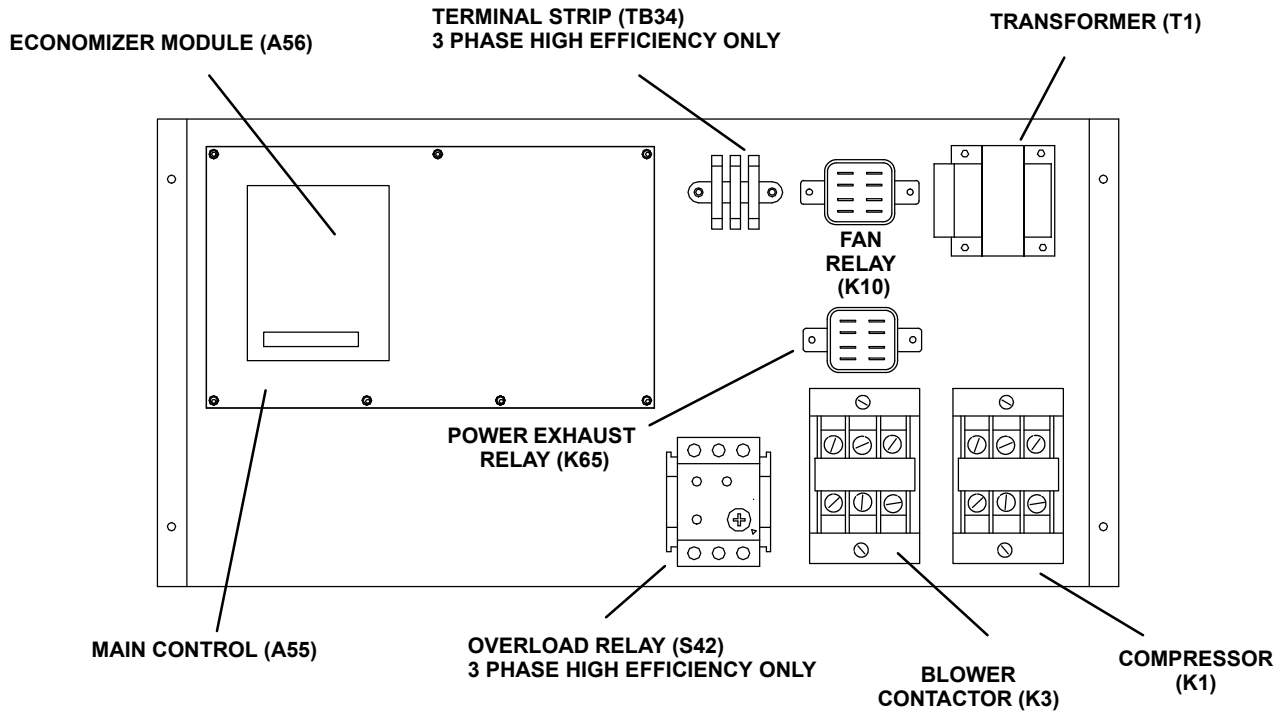


FIGURE 3

I-UNIT COMPONENTS

LGA / LCA units are configure to order units (CTO). The LGA and LCA unit components are shown in figures 1 and 2. L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue.

A-Control Box Components

LGA/LCA control box components are shown in figure 3. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48 (Optional all units)

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

2-Control Transformer T1 (all units)

All LGA/LCA series 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 4, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

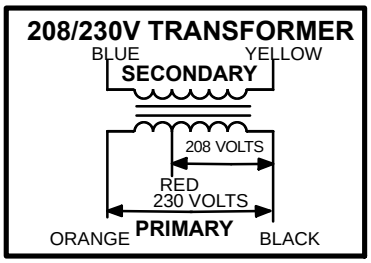


FIGURE 4

3-C. A. B. Transformers T3 (LGA 460V & 575V units)

All LGA 460 (G) and 575 (J) voltage units use one auto voltage to 230VAC transformer mounted in the compressor compartment. The transformer has an output rating of 0.5A. T3 transformer supplies 230 VAC power to combustion air blower motor (B6).

4-Terminal Strips TB1 and TB34 (all units)

TB1 terminal strip distributes 24V power and common from the thermostat to the control box components. TB34 terminal strip distributes 24V power from T1 to the control box components.

5-Unit Fuse Block & Fuses F4 (LCA units)

Line voltage fuses F4 provide short circuit and ground fault protection to all cooling components in the LCA units with electric heat. Single phase units use two fuses and three phase units use three fuses. The fuses are rated in accordance with the amperage of the cooling components.

6-Outdoor Fan Capacitor C1 (three phase units)

Fan capacitor C1 is used to assist in the start up of condenser fan B4. See table 1 for ratings

TABLE 1

Unit Voltage	Capacitor Rating
208/230	10MF 370V
460V	10MF 370V
575V	10MF 370V

7-Compressor Contactor K1 (all units)

K1 is a 24V to line voltage contactor used to energize the compressor and condenser fan in response to thermostat demand. Three-phase units use three-pole-double-break contactors. Single-phase units use two-pole double break contactors.

NOTE-Contactor K1 is energized by the IMC Control system. Refer to the operation sequence for the control system installed. There may be a 5 minute delay depending on the system installed.

8-Blower Contactor K3 (all units)

Blower contactor K3 is used in all units. In direct drive units, K3 is DPDT relay. In single phase belt drive units, K3 is a DP contactor while three-phase belt drive units use a 3PDB contactor. K3 has a 24VAC coil used to energize the indoor blower motor B3, in response to blower demand. K3 is energized by main control panel (A55).

9-Outdoor Fan Relay K10 (all units)

Outdoor fan relay K10, used in all units, is a DPDT relay with a 24VAC coil. In all units K10 (energized by A55), energizes condenser fan B4 in response to thermostat demand. Once discharge pressure of 275 $\pm$ psig achieved, operation is controlled by Low ambient switch (S11).

10-Combustion Air Blower Relay K13 (LGA units)

Combustion air blower relay K13, used in all LGA units, is a DPDT relay with a 24VAC coil. K13 is energized by the main control module A55 after a heating demand from the thermostat. K13 remains energized throughout the heating demand. When energized, K13 N.O. contacts close to energize the combustion air blower and begin a heating sequence. Pressure switch S18, located in the gas heat compartment, closes as combustion air static pressure falls to “prove” combustion air blower operation. When S18 closes, the ignition controls and gas valves are energized to begin a heating sequence.

11-Power Exhaust Relay K65 (PEF units)

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

12-Blower Motor Overload Relay S42 (units with high efficiency motors)

The blower motor overload relay is used in all L series units equipped with high efficiency motors. 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 #9 in plug 110 of the A55 main control module. A55 de-energizes all outputs. The overload relay has an adjustable setting and is set per the nameplate current of the motor. All units are equipped with a relay manufactured by Siemens which is detailed in figure 5.

13-Start Capacitor C7 (single-phase)

Single-phase units use a start capacitor (C7) wired in parallel with the compressor side of the dual capacitor. The start capacitor is located to the side of the control-panel. C7 is engaged during compressor start-up and is switched off by the potential relay as the compressor nears full speed. Capacitor ratings may be different for each motor, but the rating and repair part number will be printed on the side of the capacitor.

14-Potential Relay K31 (single-phase)

Single-phase units use a potential relay which controls the operation of the starting circuit. The potential relay is located to the side of the unit control panel. The relay is normally closed when the compressor (contactor K1) is de-energized. Capacitor (C7) is connected to a set of N.C. K31 contacts and is used to assist the compressor in starting. When K1 energizes, the compressor immediately begins start-up. K31 remains de-energized during compressor start-up and the start capacitor (C7) remains in the circuit. As the compressor gains speed, K31 is energized by electromotive forces generated by the compressor. When K31 energizes, its contacts open to take the start capacitor out of the circuit.

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

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

INTEGRATED MODULAR CONTROL BOARDS

The Integrated Modular Control (IMC) is a series of control boards which integrates most control functions required for the LGA/LCA units. The control boards are located in the upper left hand corner of the control box. The control includes complete unit diagnostics with permanent code storage, field programmable control parameters and control options, on-site testing, and serial communications. Two different printed circuit boards (see figure 6) make-up the modular configurations for the LGA/LCA units. See table 2 for a list of control panels used for each unit. For further information refer to Integrated Modular Control Guide sent with each unit.

TABLE 2

UNIT	CONTROL PANELS	
	A55	A56
LGA	X	OPT
LCA	X	OPT

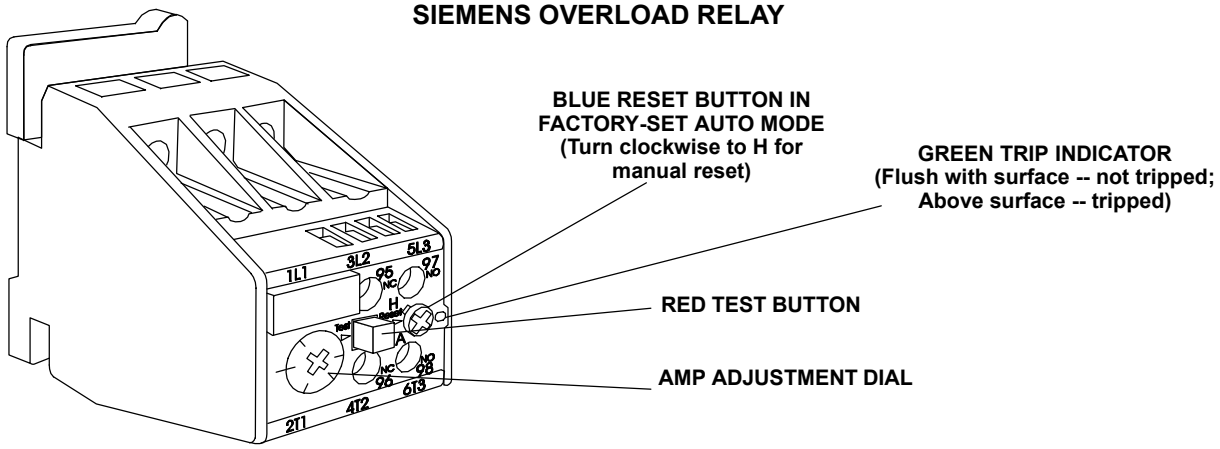
15-Main Control Module A55 (all units)

The main control module A55 is the heart of the system. It controls one compressor, one single or two stage gas valve, one bank of electric heat, one outdoor fan, and one blower. A55 includes the thermostat inputs, serial communications ports, diagnostic code display, control pushbutton, system configuration dip switches, and four expansion ports. A diagnostic code list is located on the back side of the access panel.

16-Economizer Control Module A56 (Economizer only)

The economizer control module A56 controls the economizer. A56 has four different cooling modes, sensible temperature, outdoor enthalpy, differential enthalpy, and global control.

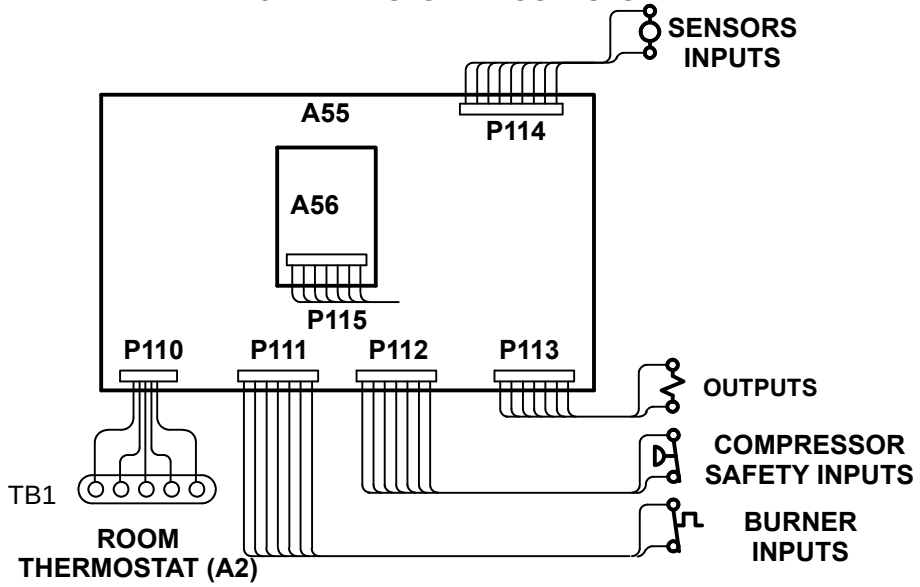
SIEMENS OVERLOAD RELAY



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

FIGURE 5

IMC BOARD INPUTS AND OUTPUTS



TB1 connects to P110. Room thermostat connects to TB1.

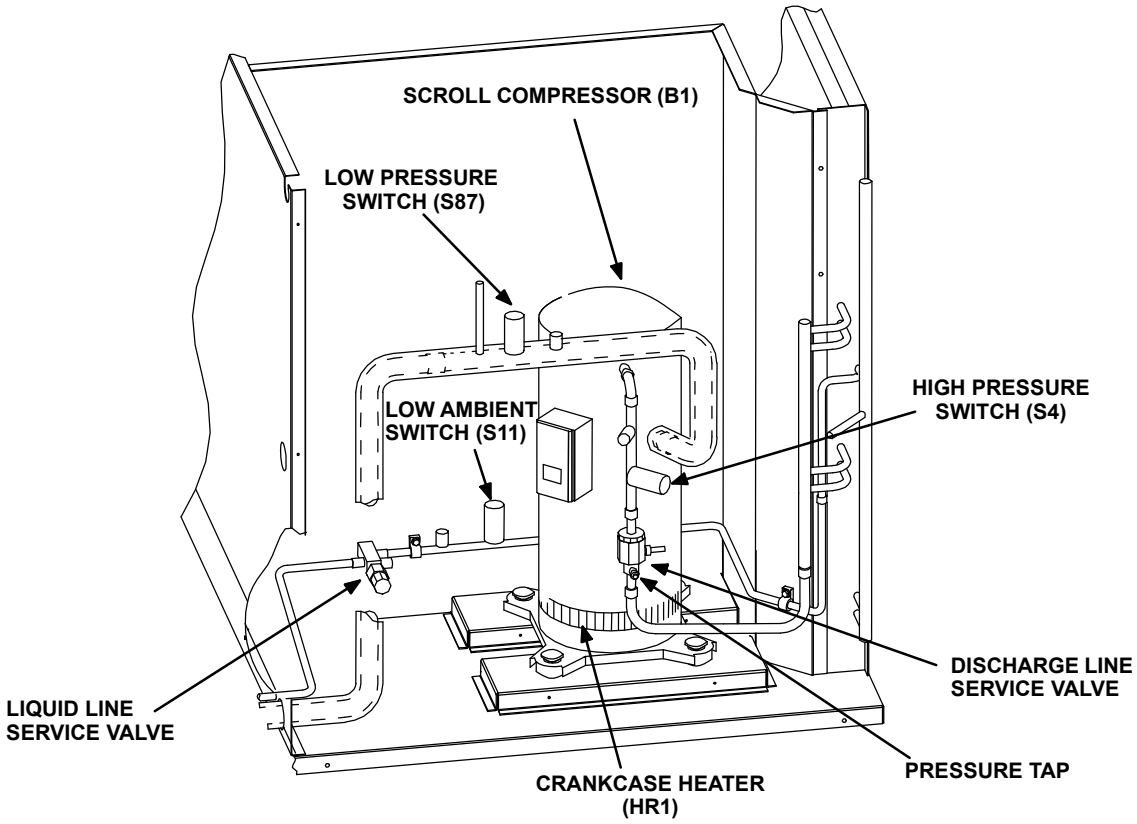
IMC AND ADD-ON BOARD LOCATION AND OPERATION

A55:
1 Blower
1 Compressor
1 Outdoor fan
1 Gas valve
1 Electric heat section

A56:
Optional Economizer and/or Power Exhaust Fan

FIGURE 6

LGA/LCA PLUMBING COMPONENTS



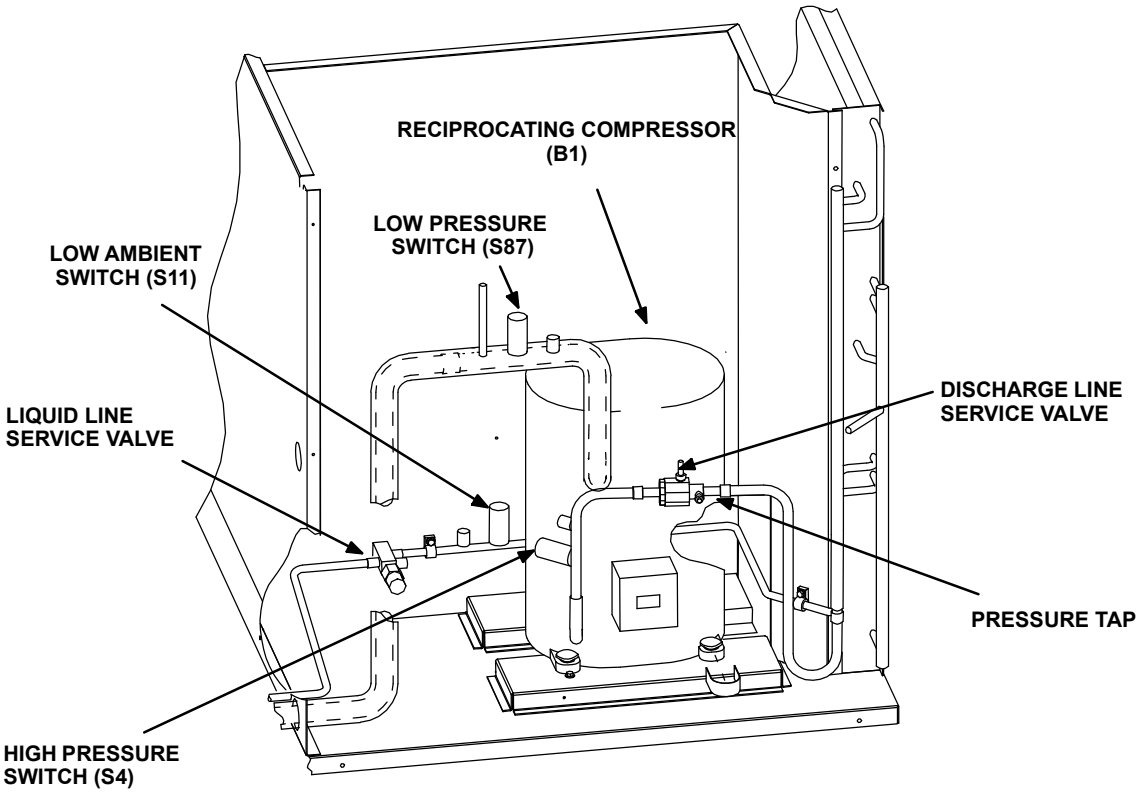


FIGURE 7

B-Cooling Components

LGA/LCA units use independent cooling circuits consisting of separate compressor, condenser coil and evaporator coil. See figure 7. Units are equipped with a draw-through type condenser fan. All units are equipped with either belt-drive or direct drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field-installed economizer. The evaporator is slab type and 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 the low ambient switch and freezestat.

1-Compressors B1 (all units)

All LGA/LCA 3 through 5 ton (10.5 to 17.6 kW) standard efficiency units use one reciprocating type compressor. All LGA/LCA 6 ton (21kW) standard efficiency units use one scroll compressor. All LGA/LCA 3 through 6 ton (10.5 to 21 kW) high efficiency units use one scroll compressor. Compressors are supplied by various manufacturers. Compressor electrical specifications vary by manufacturer.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

2-Compressor Run Capacitor (C12)

Single-phase units use single-phase PSC compressor motors. PSC motors require a run capacitor C12.

The run capacitor is a “dual” capacitor which is shared with the condenser fan motor. A dual capacitor functions as two capacitors in a single can. One side of the dual capacitor is connected to the compressor and the other side of the capacitor is connected to the condenser fan. Each side of the capacitor has a different rating.

Capacitor ratings may be different for each motor, but the rating and repair part number is printed on the capacitor.

3-Crankcase Heaters HR1 (all units)

All LGA/LCA units with scroll compressors use belly-band type crankcase heaters, while all LGA/LCA units with reciprocating compressors use insertion type heaters. Heater HR1 is used on compressor B1. Crankcase heater wattage varies by compressor manufacturer.

4-High Pressure Switch S4 (all units)

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All LGA/LCA units are equipped with this switch. The switch is located in the compressor discharge line. S4 is wired in series with the compressor contactor coil.

When discharge pressure rises to 450 $\pm$ 10 psig (3103 $\pm$ 69 kPa) (indicating a problem in the system) the switch opens and the compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 310 $\pm$ 20 psig (2147 $\pm$ 138 kPa) the pressure switch will close.

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

5-Low Ambient Switches S11 (all units)

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. All LGA/LCA units are equipped with this switch. In all models a switch is located in each liquid line prior to the indoor coil section.

When liquid pressure rises to 275 $\pm$ 10 psig (1896 $\pm$ 69 kPa), the switch closes and the condenser fan is energized. When discharge pressure in both refrigerant circuits drop to 140 $\pm$ 10 psig (965 $\pm$ 69 kPa), the switch opens and the condenser fan is de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

6-Low Pressure Switches S87 (all units)

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 LGA/LCA units are equipped with this switch. The switch is located in the compressor suction line.

S87 is wired directly to the main control module A55.

The main control module 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 25 ± 5 psig (172 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 55 ± 5 psig (379 34 kPa).

7-Service Valves (optional on LGA/LCA units)

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

8-Filter Drier (all units)

LGA/LCA units have a filter drier located in the liquid line of each refrigerant circuit upstream of the TXV in the blower compartment. The drier removes contaminants and moisture from the system.

9-Freezestats S49 (all units)

Each unit is equipped with a low temperature switch (freezestat) S49 located on a return bend of each evaporator coil.

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

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

10-Condenser Fan B4 (all units)

Refer to Specifications section of this manual for specifications of condenser fan B4 used in LGA/LCA units. The condenser fan used is a single-phase motor. The fan may be removed for servicing and cleaning by removing the fan grill.

C-Blower Compartment

Overview

Units may be equipped with direct-drive or belt-drive blowers. See unit nameplate for blower type. Direct drive blowers will use a 3/4 hp. motor. Belt drive blowers will use a 1 1/2, 2 or 3 hp. motor.

The blower housing in belt-drive models can be removed for cleaning and inspection. In addition, removing blower allows access to the heat exchanger tubes for inspection.

Line and low voltage make-up in all models is located in the upper corner of the blower compartment. Electrical entrance is made through the base pan of the unit or through the corner mullion for horizontal position units. Lower voltage connections can be accessed by removing the blower compartment front panel. High voltage can be accessed through the makeup box cover on corner mullion.

Access (Figure 8)

In all models, the blower can be accessed by removing the unit front panel or end panel. In belt-drive models, the blower motor can most easily be accessed by removing the blower compartment end panel.

In all models, the evaporator coil, expansion valve and drain pan can be accessed by removing the blower compartment end panel.

1-Terminal Strip TB1

All units are equipped with a low voltage terminal strip (TB1) located above the line voltage make-up box inside the blower compartment. The strip is equipped with screw terminals which are used for making all indoor thermostat and unit low voltage control wiring connections.

2-Line Voltage Terminal Strip TB2

TB2 is a terminal strip which provides a means for connecting all line voltage wiring. The strip is located in the line voltage make-up box inside the blower compartment

3-Blower Wheel (all units)

All 3 to 6 ton (10.5 to 21 kW) LGA/LCA units have one 11 1/2 in. x 9 in. (292 to 228 mm) blower wheel.

4-Indoor Blower Motor B3 (all units)

All direct-drive LGA/LCA units use single-phase PSC motors. Belt-drive units use single or three-phase motors (same as supply voltage).

Single-phase Direct-drive 208/230V motors

Direct-drive motors are equipped with five speed taps for adjusting blower speed. All motors are ball bearing type and use a single capacitor (C4) located on the blower housing.

Single-phase Direct-drive 460V motors

All LGA/LCA 460V and 575V units use a 460V single-phase PSC blower motor. The motor has three cap-plugs (J38) for adjusting blower speed. All motors are ball bearing type and use a capacitor (C4) located on the blower housing.

The blower motor in 575V units uses an auto-transformer (T4) to step-down 575V to 460V. T4 is located in the blower compartment and is powered at all times.

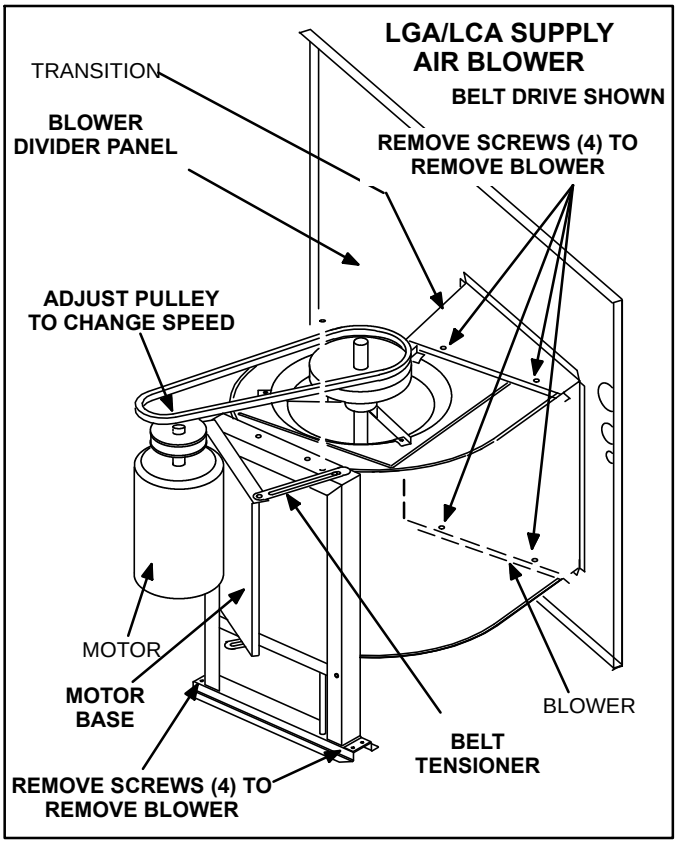


FIGURE 8

Three-phase and Single-phase Belt drive motors

Belt-drive blower motors used in LGA/LCA units are single or three-phase. Three-phase motors do not use run capacitors. Single phase motor run capacitors are integral to the motor. All motors are single-speed ball-bearing type which use an adjustable pulley for adjusting blower speed.

5- Motor Fuses F27

Blower motors in 575V direct-drive units are protected by line voltage fuses located in the upper portion of the blower compartment.

6- Blower Motor Capacitor C4

All single-phase blower motors are PSC type which require a run capacitor. Capacitor ratings may be different for each motor, but the rating and repair part number will be printed on the side of the capacitor.

7-Transformer T4

575 (J) voltage direct-drive voltage units use a line voltage to 460V auto-transformer to power the indoor blower and outdoor fan. This autotransformer is also connected directly to line voltage and is powered at all times. It has a maximum rating of 3.4A.

D-BLOWER OPERATION / ADJUSTMENT

1-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 LGA/LCA 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.

2-Temperature Rise

Temperature rise for LGA/LCA units depends on unit input, blower speed, blower horsepower and static pressure as marked on the unit rating plate. The blower speed must be set for unit operation within the range of “AIR TEMP. RISE °F” listed on the unit rating plate.

To Measure Temperature Rise:

1- Place plenum thermometers in the supply and return air plenums. Locate supply air thermometer in horizontal run of the plenum, close to unit, yet far enough away it will not pick up radiant heat from the heat exchanger.

2- Set thermostat to highest setting.

3- After plenum thermometers have reached their highest and steadiest readings, subtract the return temperature from the supply temperature. The difference should be in the range listed on the unit rating plate. If the temperature is too low, decrease blower speed. If temperature is too high, first check the firing rate. Provided the firing rate is acceptable, increase blower speed to reduce temperature.

3-External Static Pressure

1- Measure tap locations as shown in figure 9.

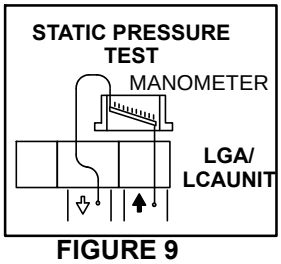


FIGURE 9

2- Punch a 1/4” diameter hole in supply and return air plenums. Insert manometer hose flush with inside edge of hole or insulation. Seal around the hose with permagum. Connect the zero end of the manometer to the discharge (supply) side of the system. On ducted systems, connect the other end of manometer to the return duct as above.

3- With only the blower running and the evaporator coil dry, observe the manometer reading. Adjust blower motor speed to deliver the air desired according to the job requirements.

4- Seal around the hole when the check is complete.

4-Blower Speed Adjustment

To Change Blower Speed:

(208/230V Direct-Drive Units)

1- Referring to blower performance tables in front of this manual, use the static pressure and blower speed tap to determine unit CFM.
2- Turn off electric power to unit.
3- Remove blower access door.
4- Disconnect blower motor harness from motor.
5- Select desired speeds for heating and cooling. (Pin 6 = Low, Pin 5 = Med-Low, Pin 4 = Medium, Pin 3 = Med-High, Pin 2 = High).
6- Depress harness connector tab to release wire terminal (J43). Select connector location for new speed (refer to unit wiring diagram). Insert wire terminal until it is securely in place. See figure 10.
7- Replace harness connector to motor .

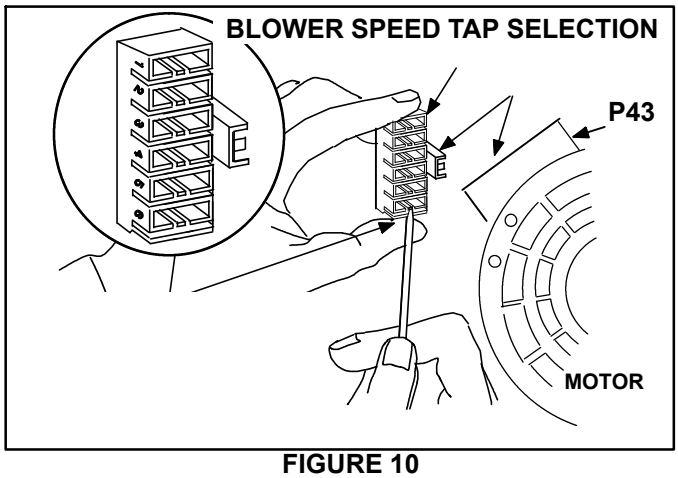


FIGURE 10

To Change Blower Speed:

(460V and 575V Direct-Drive Units)

1- Referring to blower performance tables in front of this manual, use the static pressure and blower speed tap to determine unit CFM.
2- Turn off electric power to unit.
3- Remove blower access door.
4- Disconnect J38 plug from P38.
5- Table 3 shows the speeds associated with each cap plug in the harness. Choose the blower speed desired and make appropriate cap plug changes.
6- Insert new plug until securely in place.

TABLE 3

Leadless 460V Blower Motor Speed Plug (J38)			
Cooling		J38	
Cooling	Heating	Plug	Wire Color
Low	Low	Lo-Lo	Red
Med	Low	Med-Lo	Yellow
Med	Med	Med-Med	Blue

⚠ CAUTION

Motor can be damaged if speed change is made improperly. Use table 3 as a guide and remember:
Black Lead = Speed Tap
Orange Lead = Common
Blue Lead = Internal circuit, connected to high speed (pin 2) *only* when medium speed (pin 3) or low speed (pin4) are connected to black wire.

To Change Blower Speed:

(Belt Drive Drive Units)

1- Measure indoor blower wheel RPM.
2- Refer to unit nameplate to determine the blower motor horsepower.
3- Referring to blower performance table in the front of this manual, use the static pressure and RPM to determine unit CFM.
4- The CFM can be adjusted at the motor pulley by adjusting the pulley diameter.

Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained.

Important-Tension new belt after a 24-48 hour period of operation. This will allow belts to stretch and seat into grooves. To increase belt tension, loosen two locking bolts and pull mounting plate. Tighten motor mounting plate in vertical position. See figure 11.

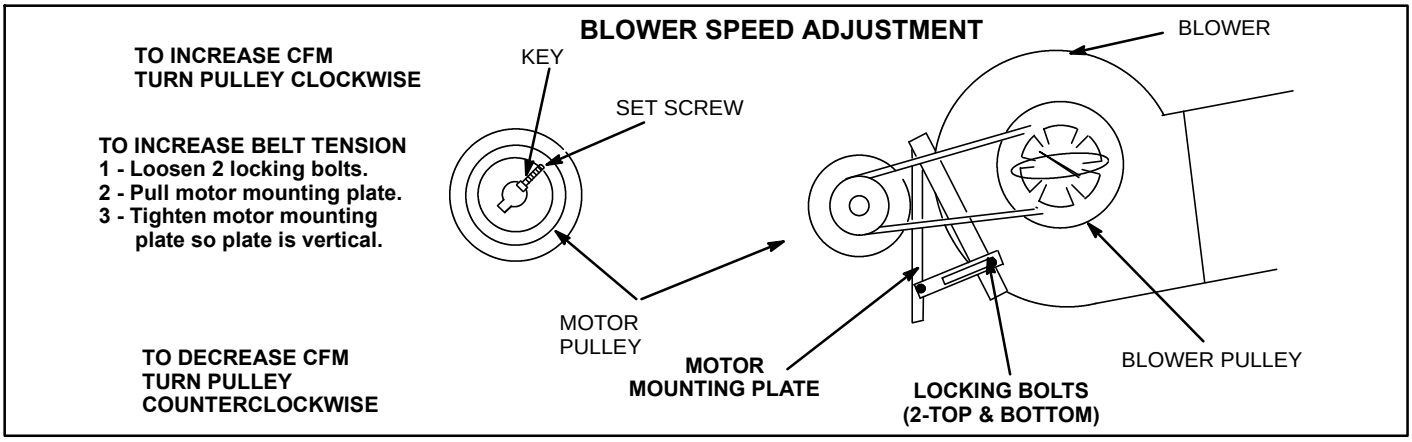


FIGURE 11

Check Belt Tension

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

1- Measure span length X. See figure 12.

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

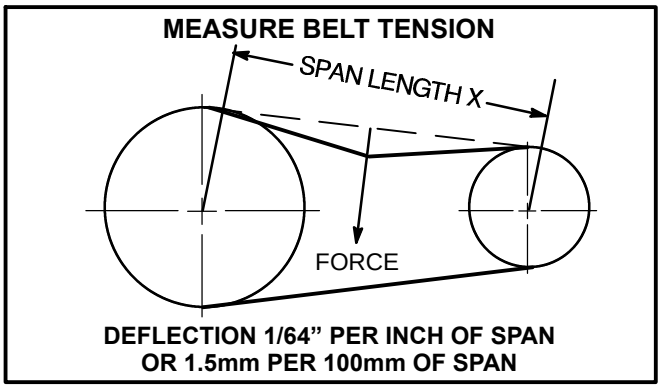


FIGURE 12

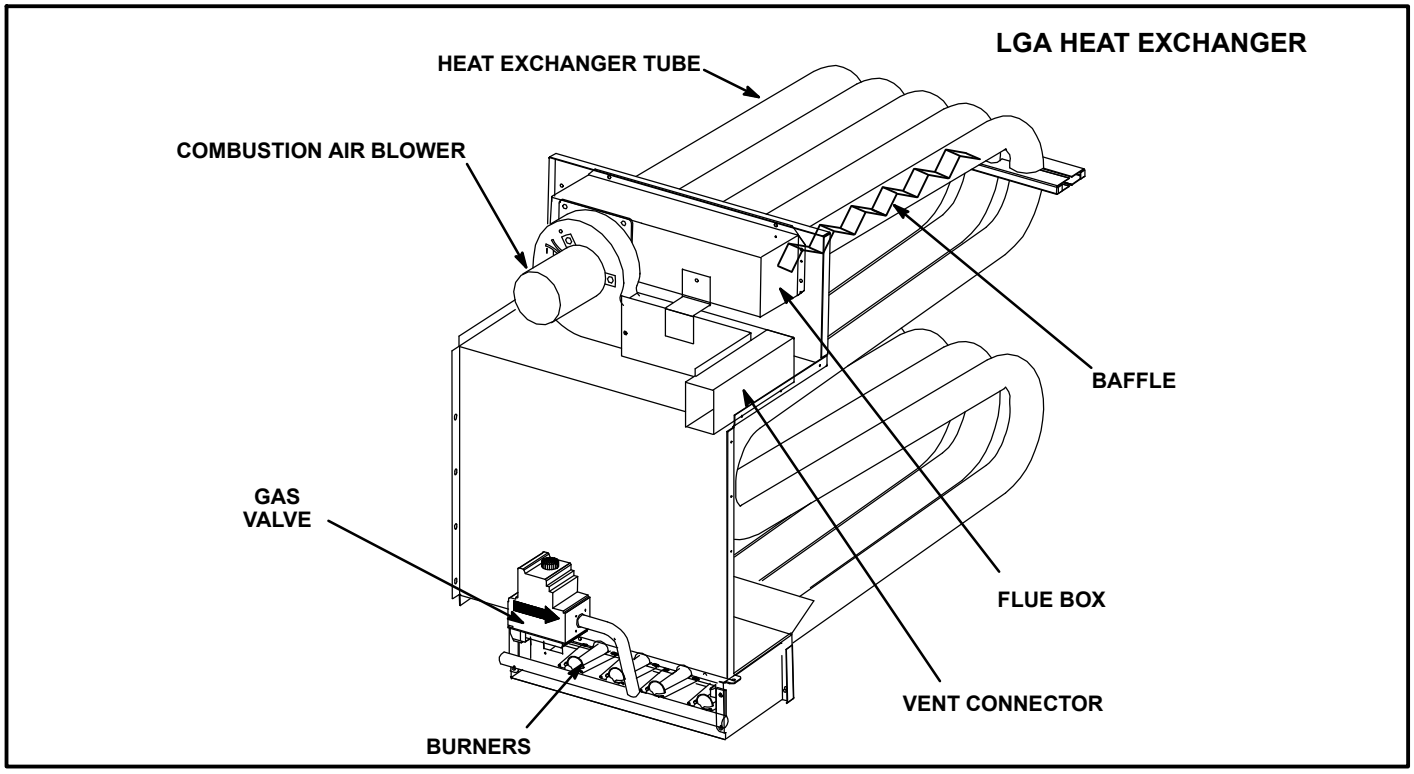


FIGURE 13

E-GAS HEAT COMPONENTS (LGA units)

LGA036 units are available in 78,000 Btuh (22.9 kW) (standard gas heat only). LGA042/048/060/072 units are available in 78,000 Btuh (22.9 kW) (standard gas heat); 125,000 Btuh (36.6 kW) (high gas heat) or 92,000 Btuh / 125,000 Btuh (27 / 36.6 kW) (two-stage gas heat) sizes.

1-Burner Ignition Control A3

The ignition control is located below the control box. Three different manufacturers' (Fenwal, Johnson Controls, and RAM) controls are used in the LGA units. All three ignition controls operate the same.

The ignition control provides three main functions: gas valve control, ignition, and flame sensing. The unit will usually ignite on the first attempt; however, the ignition attempt sequence provides three trials for ignition before locking out. The lockout time for the Johnson control is 5 minutes. The lockout time for the Ram control and Fenwall control is 1 hour. After lockout the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires breaking and remaking power to the ignition control. See figure 15 for a normal ignition sequence and figure 16 for the ignition attempt sequence with retrials (nominal timings given for simplicity). Specific timings for the ignition controls are shown in figure 17.

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

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

On a heating demand, the ignition control is energized by the main control module A55. The ignition control then allows 30 seconds for the combustion air blower to vent exhaust gases from the burners. When the combustion air blower is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air blower is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates gas valve, the spark electrode and the flame sensing electrode. Sparking stops immediately after flame is sensed. The combustion air blower continues to operate throughout the heating demand. If the flame fails or if the

burners do not ignite, the ignition control will attempt to ignite the burners up to two more times. If ignition cannot be obtained after the third attempt, the control will lock out. The ignition control is not adjustable.

The Johnson control is illustrated in figure 14. The four spade connections are used to connect the control to unit. Each of the four spade terminals are identified by function. The spark electrode wire connects to the spark-plug-type connector on top of the control.

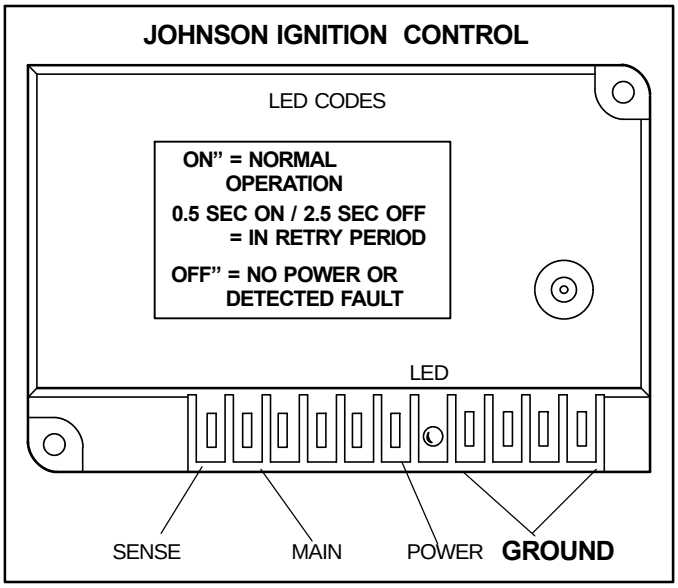


FIGURE 14

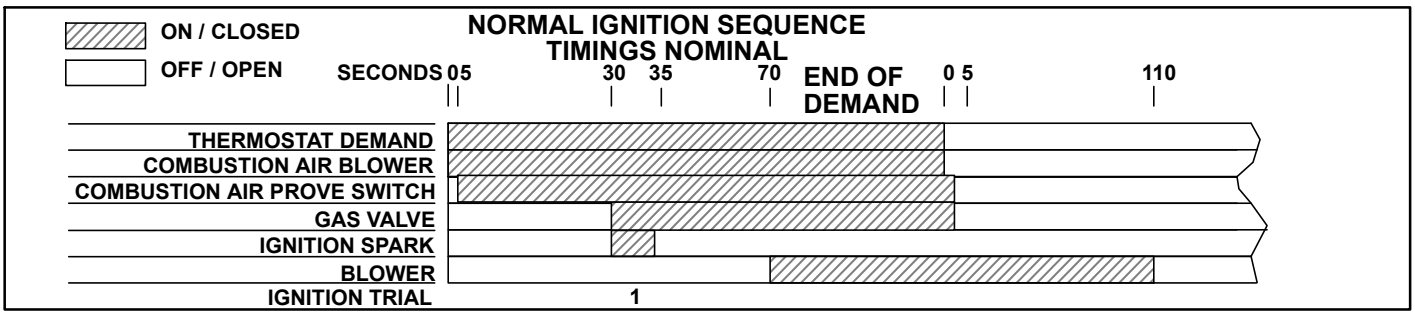


FIGURE 15

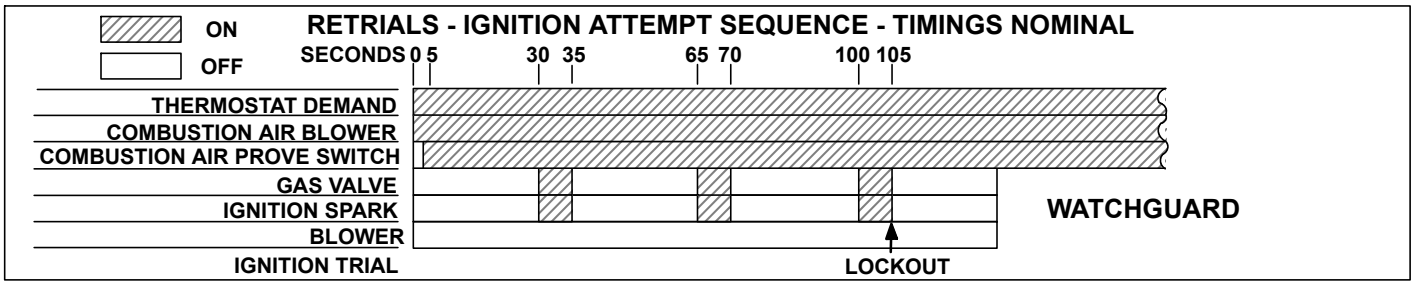


FIGURE 16

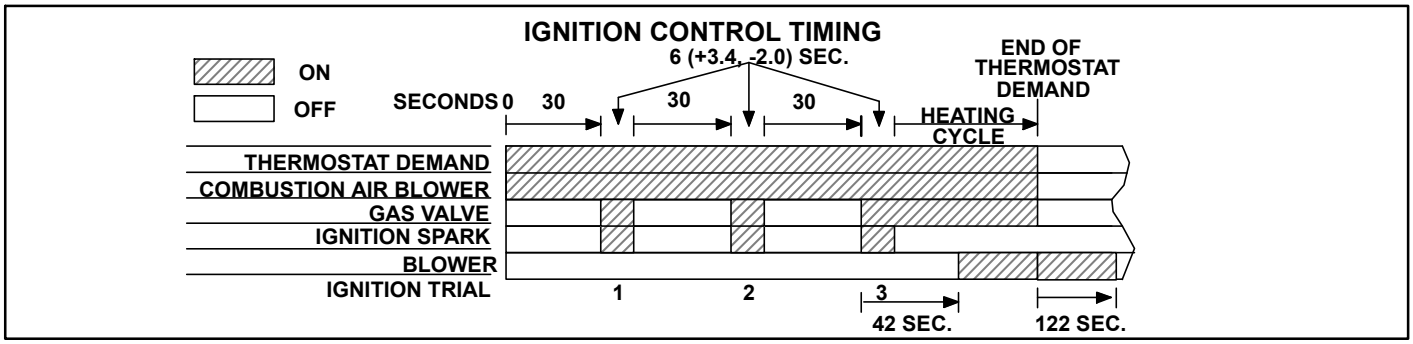


FIGURE 17

⚠ WARNING

SHOCK HAZARD. SPARK RELATED COMPONENTS CONTAIN HIGH VOLTAGE WHICH CAN CAUSE PERSONAL INJURY OR DEATH. DISCONNECT POWER BEFORE SERVICING. CONTROL IS NOT FIELD REPAIRABLE. UNSAFE OPERATION WILL RESULT. IF THE CONTROL IS INOPERABLE, SIMPLY REPLACE THE ENTIRE CONTROL.

2-Heat Exchanger (Figure 13)

The LGA units use aluminized steel inshot burners with matching tubular aluminized or optional stainless steel heat exchangers and either a one or two-stage redundant gas valve. LGA uses one five tube/burners for high heat and one three tube/burners for low heat. Each burner uses a burner venturi to mix gas and air for proper combustion. Combustion takes place at each tube entrance. As hot combustion gases are drawn upward through each tube by the combustion air blower, exhaust gases are drawn out the top and fresh air/gas mixture is drawn in at the bottom. Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blowers, controlled by the main control panel A55, force air across all surfaces of the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange.

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

3-Burner Assembly (Figure 18)

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

Burners

All units use inshot burners (see figure 18). Burners are factory set and do not require adjustment. A peep hole with cover is furnished in the heating access panel for flame viewing. Always operate the unit with the access panel in place. Burners can be removed individually for service. Burner maintenance and service is detailed in the SERVICE CHECKS sections of this manual.

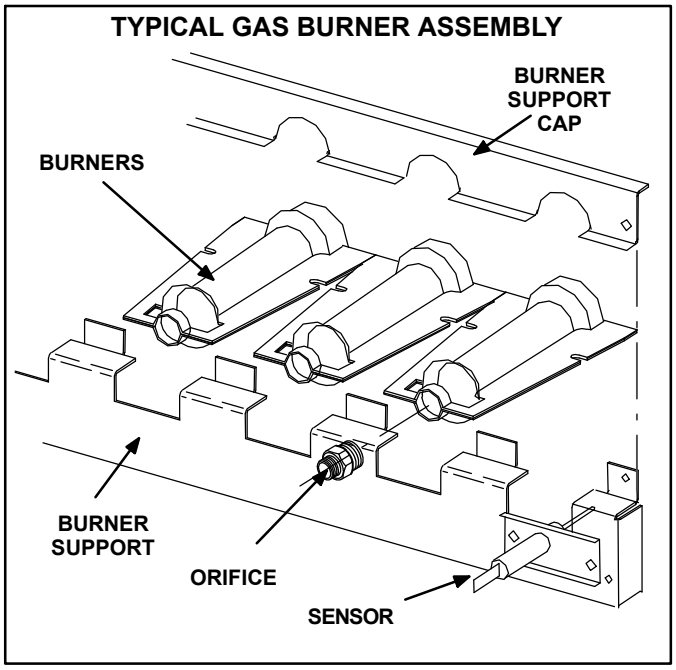


FIGURE 18

Orifice

Each burner uses an orifice which is precisely matched to the burner input. The orifice is threaded into the burner manifold. The burner is supported by the orifice and will easily slide off for service.

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

Each orifice and burner are sized specifically to the unit. Refer to Lennox Repair Parts Listing for correct sizing information.

4-Primary High Temperature Limits S10, S130, S131

S10 (standard heat units), S130 and S131 (high heat units) are the primary high temperature limits for gas heat. Primary limits S10, S130 and S131 are wired in series to the main control panel A55 which energizes burner control (A3). Its N.C. contacts open to de-energize the ignition control when excessive temperature is reached in the blower compartment. At the same time, the N.O. contacts of primary limit close keeping the blower relay coil K3 under the control of A55. If either limit trips the blower will be energized. See figure 19 for limit location and table 4 for limit settings.

TABLE 4
Limit Settings

LGA Unit	Standard Heat S10	Hi Heat S130, S131	Hi Heat S10
Direct Drive	210 6 F (93 3.3 C)	N/A	210 6 F (93 3.3 C)
Belt Drive	200 6 F (93 3.3 C)	210 6 F (93 3.3 C)	N/A

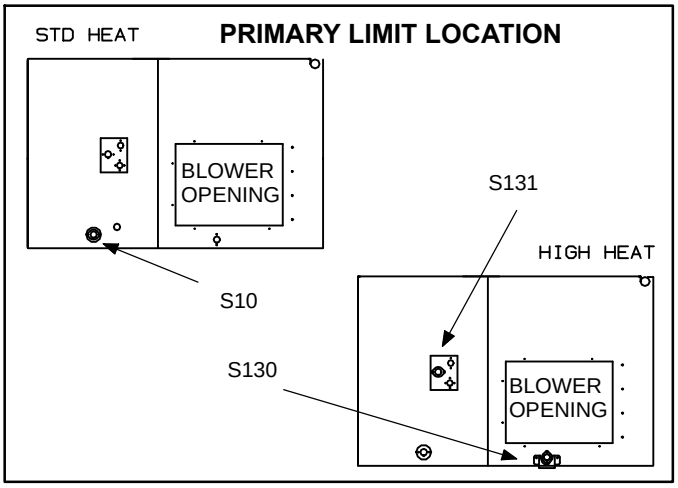


FIGURE 19

5-Secondary High Temperature Limit S21

S21 is the secondary high temperature limit for gas heat. The secondary limit S21 is located on the blower transition. Secondary limit S21 is also wired to the main control panel A55. The secondary limit functions in the same manner as the primary limit, but is factory set to actuate at different temperatures. The N.O. contacts of S21 is connected to the blower relay coil K3 through control A55. If the limit trips the burners and combustion air blower will de-energize but the blower will remain energized. All limits used are SPDT N.C. auto-reset limits.

Limit S21 in standard and high heat units are factory preset to open at 175°F ± 5°F (79°C ± 2.8°C) on a temperature rise and automatically reset at 135°F ±7°F (57°C ± 3.9°C) on a temperature fall.

6-Flame Rollout Limit S47

Flame rollout limit S47 is a SPST N.C. high temperature limit located just above the burner air intake opening in the burner enclosure (see figure 13). S47 is wired to the main control panel A55. When S47 senses flame rollout (indicating a blockage in the combustion air passages), the flame rollout limit trips, and the ignition control immediately closes the gas valve.

Limit S47 is factory preset to open at 200°F ± 12°F (93°C ± 6.7°C) on a temperature rise. All flame rollout limits are manual reset.

7-Combustion Air Prove Switch S18

The combustion air prove switch S18 is a SPST N.O. pressure switch located in the vestibule area. The switch is used to monitor combustion air blower operation. Switch S18 is wired to the main control panel A55. The switch actuates at 0.31" W.C. negative pressure ± 0.05" W.C. (77Pa± 12.4 Pa) on a pressure fall which allows power to the ignition control (proves, by closing, that the combustion air blower is operating before allowing the ignition control to energize). The combustion air prove switch is factory set and not adjustable.

8-Combustion Air Inducer B6

Combustion air inducer B6 provides fresh air to the burners while clearing the combustion chamber of exhaust gases. The inducer begins operating immediately upon receiving a thermostat demand and is de-energized immediately when thermostat demand is satisfied.

The combustion air inducer uses a 208/230V single-phase PSC motor and a 4.72in. x 1.31in. (120mm x 33.3mm) blower wheel. The motor operates at 3200RPM and is equipped with auto-reset overload protection. Blowers are supplied by various manufacturers. Ratings may vary by manufacturer. Specific blower electrical ratings can be found on the unit rating plate.

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

9-Combustion Air Motor Capacitor C3

The combustion air blower motor in all LGA units requires a run capacitor. Capacitor C3 is connected to combustion air blower B6. All capacitors are rated at 3 MFD and 370VAC.

10-Gas Valve GV1

Gas valve GV1 is a one or two-stage redundant gas valve used in all LGA units. Single stage units are equipped with valves manufactured by Honeywell. Two-stage (low / high fire) units, are equipped with valves manufactured by Honeywell or White Rodgers. For both valves first stage (low fire) is quick opening (on and off in less than 3 seconds). Second stage on the White Rodgers is slow opening (on to high fire pressure in 40 seconds and off to low fire pressure in 30 seconds). Second stage on the Honeywell valve is quick opening. On a call for first stage heat (low fire), the valve is energized by the ignition control simultaneously with the spark electrode. On a call for second stage heat (high fire), the second stage operator is energized directly from A55. The WhiteRodgers two stage valve is adjustabel for high fire only. Low fire is not adjustable. The Honeywell two stage valve is adjustable for both high fire and low fire. A manual shut-off knob is provided on the valve for shut-off. Manual shut-off knob immediately closes both stages without delay. Figures 20 and 21 show gas valve components. Tables 5 and 6 show factory set gas valve manifold pressures for LGA series units.

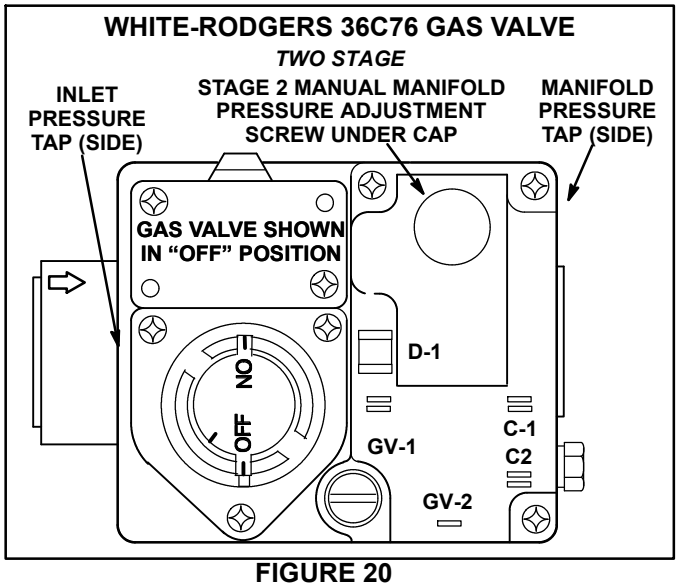


FIGURE 20

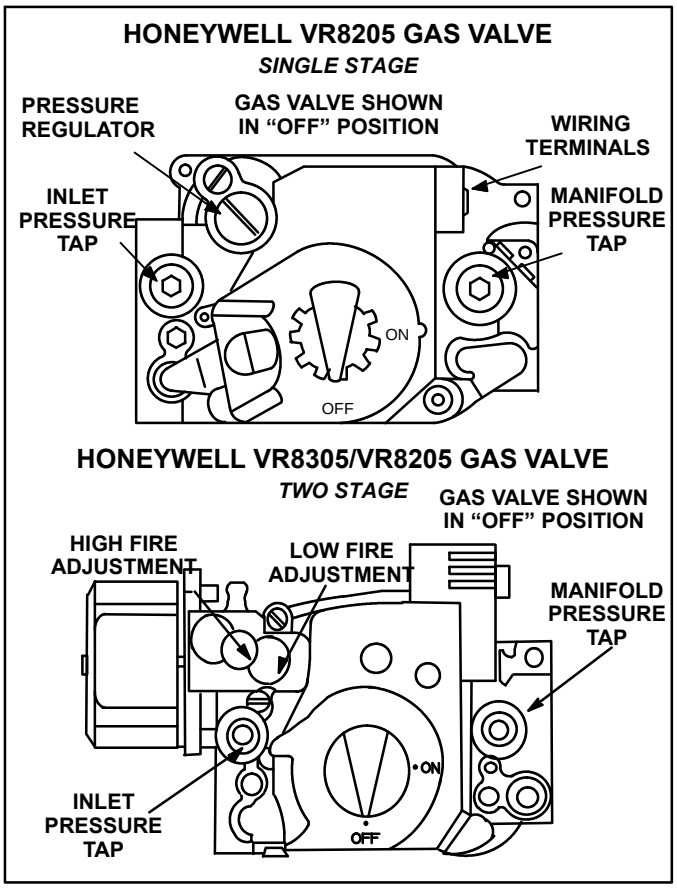


FIGURE 21

TABLE 5

SINGLE STAGE GAS VALVE FACTORY SETTING	
Natural (inlet-5.5" to 10.5")	L.P (inlet-11.0" to 13.0")
3.5" ± 0.3"	10.5" ± 0.3"

TABLE 6

TWO STAGE GAS VALVE FACTORY SETTING			
Natural (inlet-5.5" to 10.0")		L.P. (11.0" to 13.0")	
High Fire	Low Fire	High Fire	Low Fire
3.7" ± 0.3"	1.9" ± 0.2	10.5" ± 0.3	5.32" ± 0.2

11-Spark Electrodes

An electrode assembly is used for ignition spark. The electrode is mounted through holes on the left-most end of the burner support. The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

During ignition, spark travels through the spark electrode (figure 22) and ignites the left burner. Flame travels from burner to burner until all are lit.

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

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

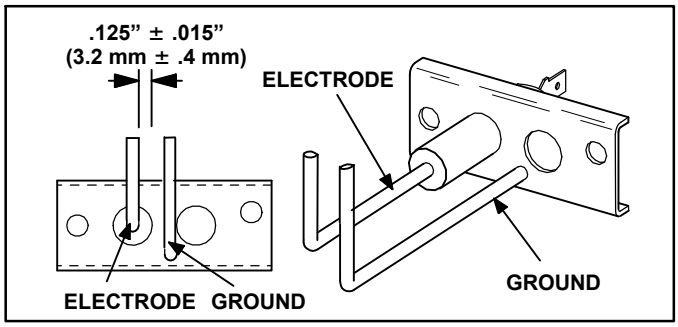


FIGURE 22

12-Flame Sensors

A flame sensor (figure 23) is located on the right side of the burner support. The sensor is mounted through a hole in the burner support and the tip protrudes into the flame envelope of the right most burner. The sensor assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

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

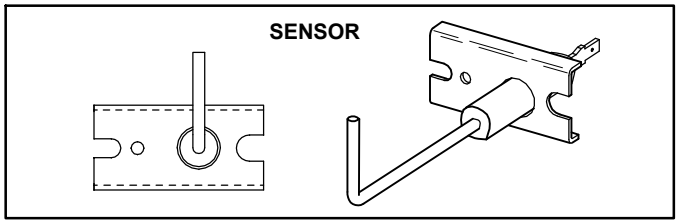


FIGURE 23

TABLE 7

ELECTRIC HEAT DATA LCA036(S)(H), LCA042(S)(H), LCA048(S)(H)

kW Size Required	Electric Heat Model No., Voltage & Net Weight	*Heater Only Sub-Fuse Box (Required)	No. of Steps	Volts Input	kW Input	Btuh Output	†Total Unit (with Power Exhaust Fan) & Electric Heat Minimum Circuit Ampacity			
							.75 hp (.56 kW)	1.5 hp (1.1 kW)	2 hp (1.5 kW)	3 hp (2.2 kW)
7 kW 1PH	EHA060-7 208/230v - 1 ph (**23L62**) 9 lbs. (4 kg)	EHAFB-7 208/230v - 1 ph **(27L01)**	1	208	5.3	18,100	42	51	- - - -	- - - -
			1	220	5.9	20,100	47	56		
			1	230	6.4	21,900				
			1	240	7.0	23,900				
10 kW 1PH	EHA060-10 208/230v - 1 ph (**23L63**) 9 lbs. (4 kg)	EHAFB-10 208/230v - 1 ph **(27L02)**	‡2	208	7.5	25,600	56	64	- - - -	- - - -
			‡2	220	8.4	28,700	63	72		
			‡2	230	9.2	31,400				
			‡2	240	10.0	34,200				
15 kW 1PH	EHA060-15 208/230v - 1 ph (**23L64**) 9 lbs. (4 kg)	EHAFB-15 208/230v - 1 ph **(27L03)**	‡2	208	11.3	38,600	78	87	- - - -	- - - -
			‡2	220	12.6	43,000	89	97		
			‡2	230	13.8	47,100				
			‡2	240	15.0	51,200				
20 kW 1PH	EHA060-20 208/230v - 1 ph (**23L65**) 12 lbs. (6 kg)	EHAFB-20 208/230v - 1 ph **(27L04)**	‡2	208	15.0	51,200	101	110	- - - -	- - - -
			‡2	220	16.8	57,400	115	123		
			‡2	230	18.4	62,800				
			‡2	240	20.0	68,300				
7 kW 3PH	EHA060-7 208/230v - 3 ph (**23L67**) 460v - 3 ph (**23L73**) 575v - 3 ph (**23L79**) 9 lbs. (4 kg)	EHAFB-7 208/230v - 3 ph **(27L06)** 460/575v - 3 ph **(27L12)**	1	208	5.3	18,100	29	30	33	36
			1	220	5.9	20,100	32	33	35	39
			1	230	6.4	21,900				
			1	240	7.0	23,900				
			1	440	5.9	20,100	16	16	17	19
			1	460	6.4	21,900				
			1	480	7.0	23,900				
			1	550	5.9	20,100	13	14	14	15
			1	575	6.4	21,900				
			1	600	7.0	23,900				
10 kW 3PH	EHA072-10 208/230v - 3 ph (**23L68**) 460v - 3 ph (**23L74**) 575v - 3 ph (**23L80**) 9 lbs. (4 kg)	EHAFB-10 208/230v - 3 ph **(27L07)** 460v - 3 ph **(27L13)** 575v - 3 ph **(27L18)**	1	208	7.5	25,600	37	38	40	44
			1	220	8.4	28,700	41	42	44	48
			1	230	9.2	31,400				
			1	240	10.0	34,200				
			1	440	8.4	28,700	20	21	21	23
			1	460	9.2	31,400				
			1	480	10.0	34,200				
			1	550	8.4	28,700	17	17	18	19
			1	575	9.2	31,400				
			1	600	10.0	34,200				
15 kW 3PH	EHA072-15 208/230v - 3 ph (**23L69**) 460v - 3 ph (**23L75**) 575v - 3 ph (**23L81**) 9 lbs. (4 kg)	EHAFB-15 208/230v - 3 ph **(27L08)** EHAFB-15/20 460v - 3 ph **(27L14)** EHAFB-15 575v - 3 ph **(27L19)**	1	208	11.3	38,600	50	51	53	57
			1	220	12.6	43,000	56	57	59	63
			1	230	13.8	41,700				
			1	240	15.0	51,200				
			1	440	12.6	43,000	28	28	29	31
			1	460	13.8	47,100				
			1	480	15.0	51,200				
			1	550	12.6	43,000	23	23	24	25
			1	575	13.8	47,100				
			1	600	15.0	51,200				
20 kW 3PH	EHA072-20 208/230v - 3 ph (**23L70**) 460v - 3 ph (**23L76**) 575v - 3 ph (**23L82**) 12 lbs. (6 kg)	EHAFB-20 208/230v - 3 ph **(27L09)** EHAFB-20/25 460v - 3 ph **(27L15)** EHAFB-15/20 575v - 3 ph **(27L14)**	‡2	208	15.0	51,200	63	64	66	70
			‡2	220	16.8	57,400	71	72	74	78
			‡2	230	18.4	62,800				
			‡2	240	20.0	68,300				
			1	440	16.8	57,400	35	36	37	38
			1	460	18.4	62,800				
			1	480	20.0	68,300				
			1	550	16.8	57,400	29	29	30	31
			1	575	18.4	62,800				
			1	600	20.0	68,300				

†Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F (75°C).

‡May be used with two stage control.

*NOTE — Heater Sub-Fuse Box is required for fusing electric heat and must be ordered extra. Factory installed heaters will have fuse box installed. Also requires LTB2 Terminal Block.

TABLE 8

ELECTRIC HEAT DATA LCA060(S)(H)

kW Size Required	Electric Heat Model No., Voltage & Net Weight	*Heater Only Sub-Fuse Box (Required)	No. of Steps	Volts Input	kW Input	Btuh Output	†Total Unit (with Power Exhaust Fan) & Electric Heat Minimum Circuit Ampacity			
							.75 hp (.56 kW)	1.5 hp (1.1 kW)	2 hp (1.5 kW)	3 hp (2.2 kW)
7 kW 1PH	EHA060-7 208/230v - 1 ph (**23L62**) 9 lbs. (4 kg)	EHAFB-7 208/230v - 1 ph **(27L01)**	1	208	5.3	18,100	48	56	- - - -	- - - -
			1	220	5.9	20,100				
			1	230	6.4	21,900				
			1	240	7.0	23,900				
10 kW 1PH	EHA060-10 208/230v - 1 ph (**23L63**) 9 lbs. (4 kg)	EHAFB-10 208/230v - 1 ph **(27L02)**	‡2	208	7.5	25,600	56	64	- - - -	- - - -
			‡2	220	8.4	28,700	63	72		
			‡2	230	9.2	31,400				
			‡2	240	10.0	34,200				
15 kW 1PH	EHA060-15 208/230v - 1 ph (**23L64**) 9 lbs. (4 kg)	EHAFB-15 208/230v - 1 ph **(27L03)**	‡2	208	11.3	38,600	78	87	- - - -	- - - -
			‡2	220	12.6	43,000	89	97		
			‡2	230	13.8	47,100				
			‡2	240	15.0	51,200				
20 kW 1PH	EHA060-20 208/230v - 1 ph (**23L65**) 12 lbs. (6 kg)	EHAFB-20 208/230v - 1 ph **(27L04)**	‡2	208	15.0	51,200	101	110	- - - -	- - - -
			‡2	220	16.8	57,400	115	123		
			‡2	230	18.4	62,800				
			‡2	240	20.0	68,300				
25 kW 1PH	EHA060-25 208/230v - 1 ph (**23L66**) 12 lbs. (6 kg)	EHAFB-25 208/230v - 1 ph **(27L05)**	‡2	208	18.8	64,200	123	132	- - - -	- - - -
			‡2	220	21.0	71,700	141	149		
			‡2	230	23.0	78,500				
			‡2	240	25.0	85,400				
7 kW 3PH	EHA060-7 208/230v - 3 ph (**23L67**) 460v - 3 ph (**23L73**) 575v - 3 ph (**23L79**) 9 lbs. (4 kg)	EHAFB-7 208/230v - 3 ph **(27L06)** 460/575v - 3 ph **(27L12)**	1	208	5.3	18,100	34(H) 33(S)	35(H) 34(S)	36(H) 35(S)	40(H) 39(S)
			1	220	5.9	20,100				
			1	230	6.4	21,900				
			1	240	7.0	23,900				
			1	440	5.9	20,100	17	18(H) 17(S)	18	20(H) 19(S)
			1	460	6.4	21,900				
			1	480	7.0	23,900				
			1	550	5.9	20,100	14(H) 13(S)	14	15(H) 14(S)	16(H) 15(S)
			1	575	6.4	21,900				
			1	600	7.0	23,900				
10 kW 3PH	EHA072-10 208/230v - 3 ph (**23L68**) 460v - 3 ph (**23L74**) 575v - 3 ph (**23L80**) 9 lbs. (4 kg)	EHAFB-10 208/230v - 3 ph **(27L07)** 460v - 3 ph **(27L13)** 575v - 3 ph **(27L18)**	1	208	7.5	25,600	37	38	40	44
			1	220	8.4	28,700	41	42	44	48
			1	230	9.2	31,400				
			1	240	10.0	34,200				
			1	440	8.4	28,700	20	21	21	23
			1	460	9.2	31,400				
			1	480	10.0	34,200				
			1	550	8.4	28,700	17	17	18	19
			1	575	9.2	31,400				
			1	600	10.0	34,200				
15 kW 3PH	EHA072-15 208/230v - 3 ph (**23L69**) 460v - 3 ph (**23L75**) 575v - 3 ph (**23L81**) 9 lbs. (4 kg)	EHAFB-15 208/230v - 3 ph **(27L08)** EHAFB-15/20 460v - 3 ph **(27L14)** EHAFB-15 575v - 3 ph **(27L19)**	1	208	11.3	38,600	50	51	53	57
			1	220	12.6	43,000	56	57	59	63
			1	230	13.8	47,100				
			1	240	15.0	51,200				
			1	440	12.6	43,000	28	28	29	31
			1	460	13.8	47,100				
			1	480	15.0	51,200				
			1	550	12.6	43,000	23	23	24	25
			1	575	13.8	47,100				
			1	600	15.0	51,200				
20 kW 3PH	EHA072-20 208/230v - 3 ph (**23L70**) 460v - 3 ph (**23L76**) 575v - 3 ph (**23L82**) 12 lbs. (6 kg)	EHAFB-20 208/230v - 3 ph **(27L09)** EHAFB-20/25 460v - 3 ph **(27L15)** EHAFB-15/20 575v - 3 ph **(27L14)**	‡2	208	15.0	51,200	63	64	66	70
			‡2	220	16.8	57,400	71	72	74	78
			‡2	230	18.4	62,800				
			‡2	240	20.0	68,300				
			1	440	16.8	57,400	35	36	37	38
			1	460	18.4	62,800				
			1	480	20.0	68,300				
			1	550	16.8	57,400	29	29	30	31
			1	575	18.4	62,800				
			1	600	20.0	68,300				
25 kW 3PH	EHA072-25 208/230v - 3 ph (**23L71**) 460v - 3 ph (**23L77**) 575v - 3 ph (**23L83**) 12 lbs. (6 kg)	EHAFB-25 208/230v - 3 ph **(27L10)** EHAFB-25/30 460v - 3 ph **(27L16)** EHAFB-20/25 575v - 3 ph **(27L15)**	‡2	208	18.8	64,200	76	77	79	83
			‡2	220	21.0	71,700	86	87	89	93
			‡2	230	23.0	78,500				
			‡2	240	25.0	85,400				
			1	440	21.0	71,700	43	43	44	46
			1	460	23.0	78,500				
			1	480	25.0	85,400				
			1	550	21.0	71,700	35	35	36	37
			1	575	23.0	78,500				
			1	600	25.0	85,400				

NOTE — (H) indicates high efficiency units, (S) indicates standard efficiency units

‡May be used with two stage control.

†Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F (75°C).

*NOTE — Heater Sub-Fuse Box is required for fusing electric heat and must be ordered extra. Factory installed heaters will have fuse box installed. Also requires LTB2 Terminal Block.

TABLE 9

ELECTRIC HEAT DATA LCA072(S)(H)

kW Size Required	Electric Heat Model No., Voltage & Net Weight	*Heater Only Sub-Fuse Box (Required)	No. of Steps	Volts Input	kW Input	Btuh Output	†Total Unit (with Power Exhaust Fan) & Electric Heat Minimum Circuit Ampacity		
							1.5 hp (1.1 kW)	2 hp (1.5 kW)	3 hp (2.2 kW)
10 kW	EHA072-10 208/230v - 3 ph (**23L68**) 460v - 3 ph (**23L74**) 575v - 3 ph (**23L80**) 9 lbs. (4 kg)	EHAFB-10 208/230v - 3 ph **(27L07)** 460v - 3 ph **(27L13)** 575v - 3 ph **(27L18)**	1	208	7.5	25,600	39	41	44
			1	220	8.4	28,700	42	44	48
			1	230	9.2	31,400			
			1	240	10.0	34,200			
			1	440	8.4	28,700	21	21	23
			1	460	9.2	31,400			
			1	480	10.0	34,200			
			1	550	8.4	28,700	17	18	19
			1	575	9.2	31,400			
			1	600	10.0	34,200			
15 kW	EHA072-15 208/230v - 3 ph (**23L69**) 460v - 3 ph (**23L75**) 575v - 3 ph (**23L81**) 9 lbs. (4 kg)	EHAFB-15 208/230v - 3 ph **(27L08)** EHAFB-15/20 460v - 3 ph **(27L14)** EHAFB-15 575v - 3 ph **(27L19)**	1	208	11.3	38,600	51	53	57
			1	220	12.6	43,000	57	59	63
			1	230	13.8	47,100			
			1	240	15.0	51,200			
			1	440	12.6	43,000	28	29	31
			1	460	13.8	47,100			
			1	480	15.0	51,200			
			1	550	12.6	43,000	23	24	25
			1	575	13.8	47,100			
			1	600	15.0	51,200			
20 kW	EHA072-20 208/230v - 3 ph (**23L70**) 460v - 3 ph (**23L76**) 575v - 3 ph (**23L82**) 12 lbs. (6 kg)	EHAFB-20 208/230v - 3 ph **(27L09)** EHAFB-20/25 460v - 3 ph **(27L15)** EHAFB-15/20 575v - 3 ph **(27L14)**	‡2	208	15.0	51,200	64	66	70
			‡2	220	16.8	57,400	72	74	78
			‡2	230	18.4	62,800			
			‡2	240	20.0	68,300			
			1	440	16.8	57,400	36	37	38
			1	460	18.4	62,800			
			1	480	20.0	68,300			
			1	550	16.8	57,400	29	30	31
			1	575	18.4	62,800			
			1	600	20.0	68,300			
25 kW	EHA072-25 208/230v - 3 ph (**23L71**) 460v - 3 ph (**23L77**) 575v - 3 ph (**23L83**) 12 lbs. (6 kg)	EHAFB-25 208/230v - 3 ph **(27L10)** EHAFB-25/30 460v - 3 ph **(27L16)** EHAFB-20/25 575v - 3 ph **(27L15)**	‡2	208	18.8	64,200	77	79	83
			‡2	220	21.0	71,700	87	89	93
			‡2	230	23.0	78,500			
			‡2	240	25.0	85,400			
			1	440	21.0	71,700	43	44	46
			1	460	23.0	78,500			
			1	480	25.0	85,400			
			1	550	21.0	71,700	35	36	37
			1	575	23.0	78,500			
			1	600	25.0	85,400			
30 kW	EHA072-30 208/230v - 3 ph (**23L72**) 460v - 3 ph (**23L78**) 575v - 3 ph (**23L84**) 12 lbs. (6 kg)	EHAFB-30 208/230v - 3 ph **(27L11)** 460v - 3 ph **(27L17)** EHAFB-25/30 575v - 3 ph **(27L16)**	‡2	208	22.5	76,800	90	92	96
			‡2	220	25.2	86,100	102	104	108
			‡2	230	27.6	94,300			
			‡2	240	30.0	102,500			
			1	440	25.2	86,100	51	52	53
			1	460	27.6	94,300			
			1	480	30.0	102,500			
			1	550	25.2	86,100	41	42	43
			1	575	27.6	94,300			
			1	600	30.0	102,500			

NOTE — (H) indicates high efficiency units, (S) indicates standard efficiency units

†Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F (75°C).

‡May be used with two stage control.

*NOTE — Heater Sub-Fuse Box is required for fusing electric heat and must be ordered extra. Factory installed heaters will have fuse box installed. Also requires LTB2 Terminal Block.

F-Optional Electric Heat Components

Tables 7 through 9 show all possible LCA to EHA matchups and electrical ratings.

EHA parts arrangement is shown in figure 25. All electric heat sections consist of electric heating elements exposed directly to the airstream. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactor K15

All EHA electric heat sections are equipped with K15, located on the electric heat faceplate. Four different N.O. contactors are used for K15. All four contactors have slightly different ratings: two are three-pole double-break and two are single-pole single-throw. The contactor used depends upon the size and voltage of the heat section. K15 is equipped with a 24VAC coil which is energized on first-stage heat demand (W1). When K15 is energized, the heating elements (first-stage heating elements if equipped with multi-stage heater) are energized.

2-Contactor K16

Contactor K16 is used in all the 7 through 25 kW single-phase and EHA72-20/25/30-1-Y electric heat sections. K16 is located on the electric heat faceplate. Four different N.O. contactors are used for K16. All four contactors have slightly different ratings: two are three-pole double-break and two are single-pole single-throw. The contactor used depends upon the size and voltage of the heat section. K16 is equipped with a 24VAC coil which is energized on second-stage heat demand (W2) in all single-phase electric heat sections. When K16 is energized, the second-stage heating elements are energized.

3-Contactor K17

Contactor K17 is used in all the 15 through 25 KW single-phase electric heat sections, and is located in the electric heat faceplate. Two different SPST N.O. contactors are used for K17. Each has a slightly different rating. The contactor used depends upon the size of the heat section. K17 is equipped with a 24VAC coil which is energized on second-stage heat demand (W2). When K17 is energized, the third-stage heating elements are energized.

4-High Temperature Limits S15 (Primary)

S15 is a SPST N.C. auto-reset thermostat located on the electric heat section . S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactor K15, K16 and K17 is de-energized.

5-High Temperature Limit S20 (Secondary)

S20 is a SPST N.C. non-reusable “one time” limit. Like the primary temperature limit, S20 is wired in series with the first stage contactor coil (K15) and second stage contactor coil (K16) and (K17). When S20 opens, contactors (K15, K16and K17) are de-energized. When the contactors are de-energized, first stage and all subsequent stages of heat are de-energized. The thermostat is factory set to open at185°F ± 7 °F (85°C ± 3.8°C) on a temperature rise and must be replaced once the limit opens.

6-Heating Elements HE1, HE2, HE3, HE4, HE5, HE6

HE1 and HE2 are used in all EHA units. HE3 is used in 15 through 25kW single phase electric heat sections. HE4, HE5 and HE6 are used in 20 and 25kW single phase electric heat sections. Heating elements are composed of helix wound bare nichrome wire exposed directly to the airstream. Heating elements are energized directly by contactors on the EHA faceplate. Once energized, heat transfer to the air stream is instantaneous. Overtemperature protection is provided by primary and secondary high temperature switches. Overcurrent protection is provided by current limiting fuses.

7-Electric Heat Sub-Fuse Box EHAFB

EHAFB series fuse box assembly (figure 24) is required for single disconnect switch application and provides fuse protection for both the EHA series heaters and the LCA unit. The EHAFB contains F3 and F4 fuses. F3 fuses protect the electric heat section while F4 fuses protect the unit. F3 is a current-limiting fuse connected in series with each leg of electric heat (each stage of electric heat uses three fuses). F4 is also a current-limiting fuse, but it is connected in series with unit line voltage L1, L2, and L3. F4 fuses and fuse block are ordered separately and field installed.

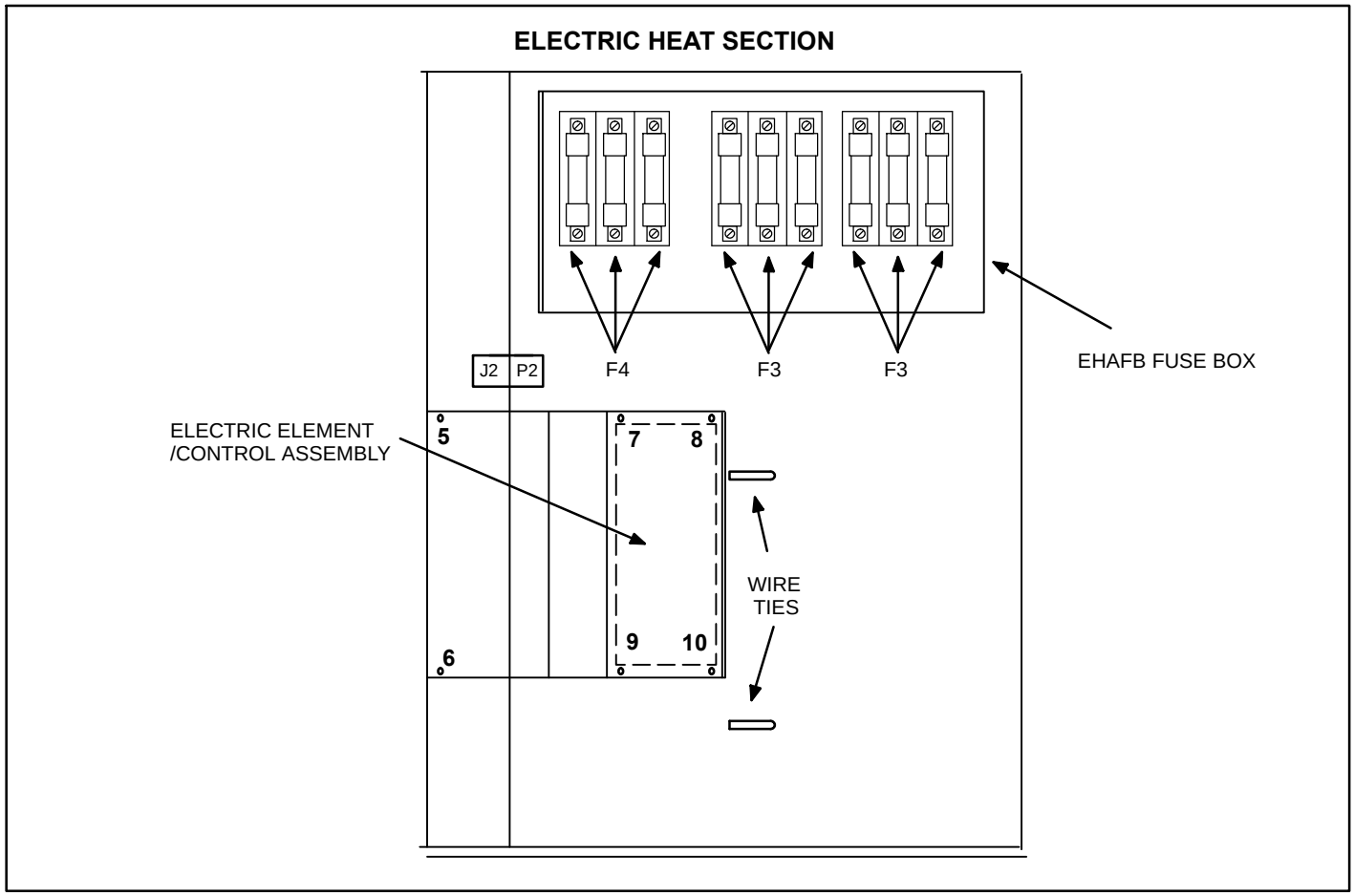


FIGURE 24

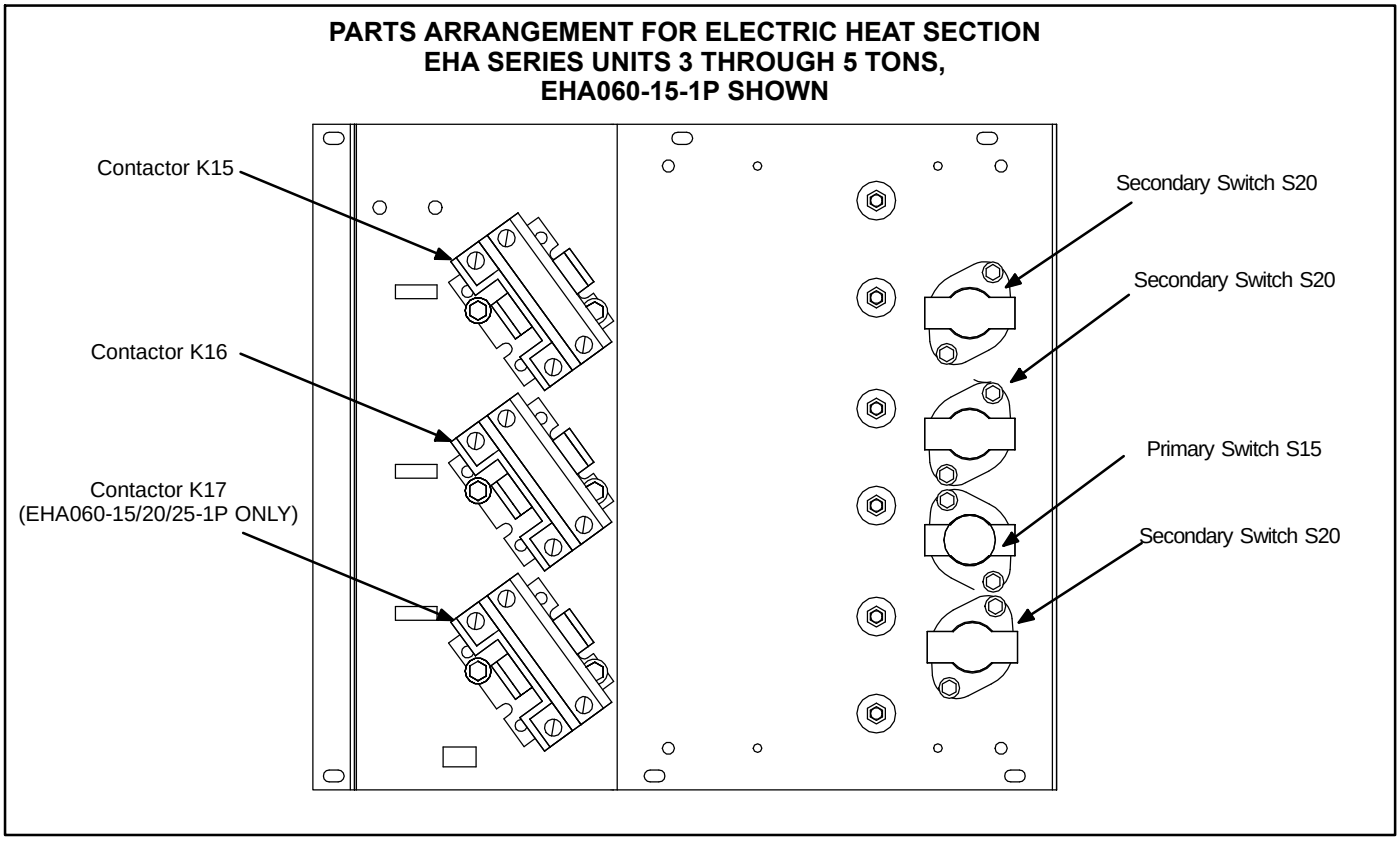


FIGURE 25

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 (LARMF 03/07).

III-CHARGING

WARNING-Do not exceed nameplate charge under any condition.

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

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

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

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

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

3- Apply the outdoor temperature to tables 10 through 15 to determine normal operating pressures.

4- Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. **Correct any system problems before proceeding.**

5- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.

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

6- Use the following sub-cooling method along with the normal operating pressures to confirm readings.

TABLE 10
LGA/LCA036H

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	155	79
75°F	178	81
85°F	210	82
95°F	234	84
105°F	265	85
115°F	300	87

TABLE 11
LGA/LCA036S

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	167	78
75°F	197	80
85°F	226	82
95°F	256	84
105°F	286	86
115°F	315	87

TABLE 12
LGA/LCA042H

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	161	78
75°F	185	81
85°F	213	83
95°F	243	84
105°F	274	86
115°F	310	87

TABLE 13
LGA/LCA042S

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	176	75
75°F	206	77
85°F	237	78
95°F	267	80
105°F	297	82
115°F	328	84

TABLE 14
LGA/LCA048H

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	171	76
75°F	194	77
85°F	219	78
95°F	248	79
105°F	280	81
115°F	315	82

TABLE 15
LGA/LCA048S

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	161	73
75°F	191	74
85°F	221	76
95°F	251	78
105°F	281	80
115°F	311	82

TABLE 16
LGA/LCA060H

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	165	75
75°F	192	76
85°F	221	78
95°F	253	80
105°F	287	82
115°F	323	83

TABLE 17
LGA/LCA060S

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	175	69
75°F	206	71
85°F	237	73
95°F	267	75
105°F	298	76
115°F	328	78

TABLE 18
LGA/LCA072H

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	185	76
75°F	210	77
85°F	238	78
95°F	269	80
105°F	304	81
115°F	338	83

TABLE 19
LGA/LCA072S

Outdoor Coil Entering Air Temp	DIscharge ±10psig	Suction ±5 psig
65°F	191	71
75°F	224	72
85°F	258	74
95°F	292	75
105°F	326	77
115°F	360	78

Charge Verification - Sub-Cooling Method

If ambient temperature is above 60°F (15°C), read liquid line temperature. Read liquid line pressure from gauge and convert to condensing temperature using standard R-22 temperature/pressure conversion chart (or conversion scale on gauge). The difference between the condensing temperature and the liquid line temperature is subcooling (subcooling = condensing temperature minus liquid line temperature). The subcooling should approximate the value given in table 20. Add refrigerant to increase subcooling and remove refrigerant to reduce subcooling.

NOTE - Outdoor air dampers should be closed when charging.

TABLE 20
SUBCOOLING

Unit	Circuit 2
LGA/LCA036S, 036H, 042H, 048S, 048H, 072H	10°F ± 1(5.6°C ± 1)
LGA/LCA042S, 060H	11°F ± 1(6.1°C ± 1)
LGA/LCA060S	16°F ± 1(9°C ± 1)
LGA/LCA072S	19°F ± 1(11°C ± 1)

IV-STARTUP - OPERATION

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

A-Preliminary and Seasonal Checks

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

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

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

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

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

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

B-Cooling Startup LGA/LCA

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

1- Initiate cooling demand according to instructions provided with thermostat.

2- Thermostat demand will energize compressor. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressor 1.

3- The unit is charged with HCFC-22 refrigerant. See unit rating plate for correct amount of charge.

4- Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge.

Three Phase Scroll Compressor Voltage Phasing

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

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

2- Suction pressure must drop, discharge pressure must rise, and blower rotation must match rotation marking.

If pressure differential is not observed or blower rotation is not correct:

3- Disconnect all remote electrical power supplies.

4- Reverse any two field-installed wires connected to the line side of S48 disconnect or TB2 terminal strip. Do not reverse wires at blower contactor.

5- Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

C-Heating Startup LGA

FOR YOUR SAFETY READ BEFORE LIGHTING

WARNING

Electric shock hazard. Can cause injury or death. Do not use this furnace if any part has been under water. Immediately call a qualified service technician to inspect the furnace and to replace any part of the control system and any gas control which has been under water.

WARNING

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

WARNING

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

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

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

WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

This unit is equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to **OFF** and return the thermostat switch to **HEAT** to reset ignition control.

1-Placing Furnace In Operation

WARNING

Danger of explosion and fire. Can cause injury or product or property damage. You must follow these instructions exactly.

Gas Valve Operation for White Rodgers 36C Series Valve (Figure 26)

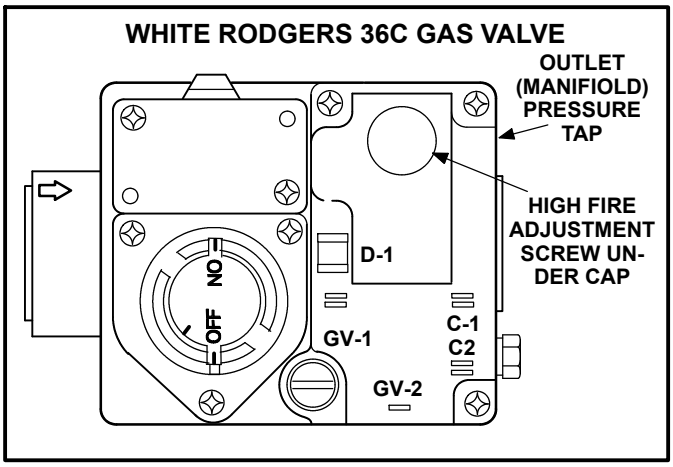


FIGURE 26

1- Set thermostat to lowest setting.

2- Turn off all electrical power to appliance.

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

4- Remove heat section access panel.

5- Turn knob on gas valve clockwise to **OFF**. Do not force.

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

7- Turn knob on gas valve counterclockwise to **ON**.

8- Replace heat section access panel.

9- Turn on all electrical power to unit.

10-Set thermostat to desired setting.

11-If the appliance will not operate, follow the instructions "To Turn Off Gas To Unit" and call your service technician or gas supplier.

Gas Valve Operation for Honeywell VR8205 and VR8305 Series Valve (Figure 27)

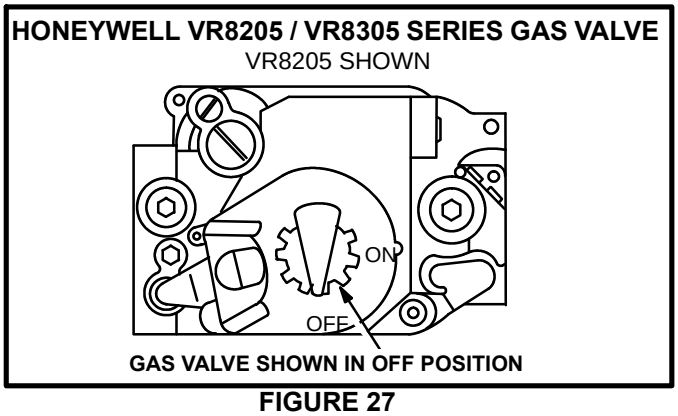


FIGURE 27

1- Set thermostat to lowest setting.

2- Turn off all electrical power to appliance.

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

4- Remove heat section access panel.

5- Turn knob on gas valve clockwise ↷ to **OFF** and release.

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

7- Turn knob on gas valve 90° counterclockwise ↶ to on.

8- Replace heat section access panel.

9- Turn on electrical power to unit.

10-Set thermostat to desired setting.

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

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

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

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

2-To Turn Off Gas To Unit

1- Set thermostat to lowest setting.

2- Turn off all electrical power to unit if service is to be performed.

3- Remove heat section access panel.

4- Turn knob on gas valve clockwise ↷ to **OFF**. Depress knob and turn clockwise ↷ to **OFF**.

D-Safety or Emergency Shutdown

Turn off power to the unit.

V- SYSTEMS SERVICE CHECKS

A-LGA Heating System Service Checks

All LGA units are U.L. and U.L.C. design certified without modification.

Before checking piping, check with gas company or authorities having jurisdiction for local code requirements. Refer to the LGA Installation, Operation and Adjustments instruction for more information.

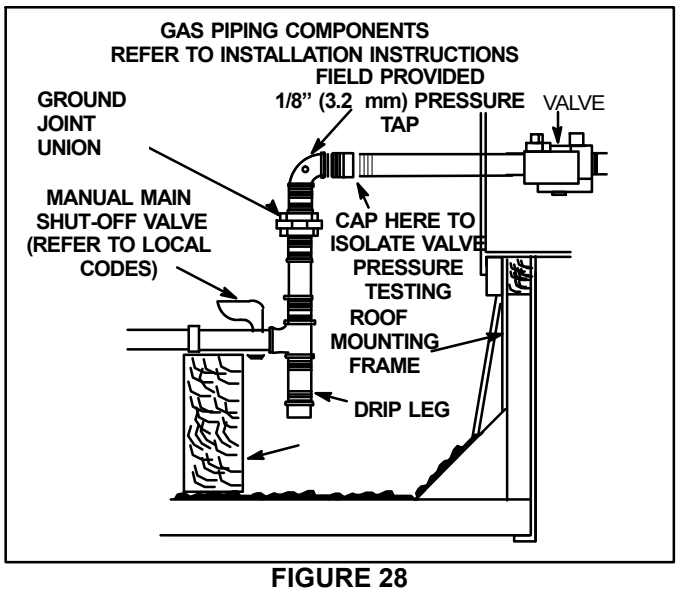


FIGURE 28

1-Gas Piping

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

2-Testing Gas Piping

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

When pressure testing gas lines, the gas valve must be disconnected and isolated. **Gas valves can be damaged if subjected to more than 0.5 psig [14"W.C. (3481 Pa)].** See figure 28.

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping. The use of specialty Gas Leak Detector is strongly recommended. It is available through Lennox under part number **31B2001**.

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

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap (field provided - figure 28). Test supply gas pressure with unit firing at maximum rate (both stages energized). Make sure the reading falls within the range of the following values. Low pressure may result in erratic operation or "underfire." High pressure can result in permanent damage to the gas valve or "overfire." For natural gas units, operating pressure at the unit gas connection must be between 5.5"W.C. and 10.5"W.C. (1367 Pa and 2610 Pa) For L.P. gas units, operating pressure at the unit gas connection must be between 10.8"W.C. and 13.5"W.C. (2685.3 Pa and 3356.7 Pa).

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

4-Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move test gauge to the manifold outlet pressure tap located on unit gas valve GV1. See figure 20 or 21 for location of pressure tap on the gas valve.

The manifold pressure is factory set and should not require adjustment. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. Refer to figure 20 or 21 for location of gas valve (manifold pressure) adjustment screw. See tables below for normal operating manifold pressure. White Rodgers two stage valves are adjustable for high fire only. Honeywell two stage vavles are adjustable for both high fire and low fire.

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

TABLE 21

SINGLE STAGE GAS VALVE FACTORY SETTING	
Natural (inlet-5.5" to 10.5")	**L.P (inlet-11.0" to 13.0")**
3.5" ± 0.3"	**10.5" ± 0.3"**

TABLE 22

TWO STAGE GAS VALVE FACTORY SETTING			
Natural (inlet-5.5" to 10.0")		**L.P. (11.0" to 13.0")**	
High Fire	**Low Fire**	**High Fire**	**Low Fire**
3.7" ± 0.3"	**1.9" ± 0.2"**	**10.5" ± 0.3"**	**5.32" ± 0.2"**

⚠ CAUTION

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

Manifold Adjustment Procedure

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

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

3- After allowing the unit to stabilize for five minutes, record the manifold pressure and compare to the values given for gas supply pressure (above).

⚠ CAUTION

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

5-Proper Gas Flow

To check for proper gas flow to burners, determine Btuh input from unit rating plate or the gas heating capacity table on page 3. Divide this input rating by the Btuh per cubic foot of available gas. Result is the number of cubic feet per hour required. Determine the flow of gas through gas meter for two minutes and multiply by 30 to get hourly flow of gas to the burners.

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

6-High Altitude Derate

Natural gas units may be installed at altitudes up to 2000 feet (610m) above sea level without any modification. At altitudes above 2000 feet (610 m), units must be derated to match gas manifold pressures shown in the following table.

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

TABLE 23

Altitude - ft. (m)	Gas Manifold Pressure - in. w.g. (kPa)
2001 - 3000 (610 - 915)	3.4 (0.85)
3001 - 4000 (915 - 1220)	3.2 (0.807)
4001 - 5000 (1220 - 1525)	2.9 (0.72)
5001 - 6000 (1525 - 1830)	2.7 (0.67)
6001 - 7000 (1830 - 2135)	2.5 (0.62)
7001 - 8000 (2135 - 2440)	2.3 (0.57)

Derate Procedure:

1- Check manifold pressure at the gas valve pressure tap with unit operating at high fire (second stage).

2- To reduce maximum input, turn regulator adjusting screw (figure 20) counterclockwise.

3- Re-check manifold pressure.

7-Inshot Burner

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

Figure 29 shows how to remove burner assembly.

1- Turn off power to unit and shut off gas supply.
2- Remove screws holding the burner support cap.
3- Slide each burner off its orifice.
4- Clean and reassemble (reverse steps 1-3).
5- Be sure to secure all wires and check plumbing.
6- Turn on power to unit. Follow lighting instructions attached to unit and operate unit in heating mode. Check burner flames. They should be blue with yellow streaks.

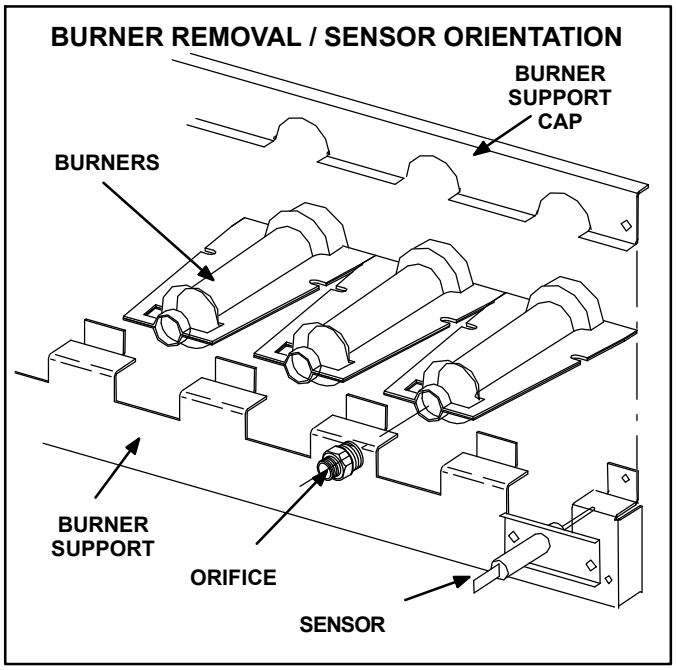


FIGURE 29

8-Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1- Turn off gas and electric power.
2- Remove access panel(s) and unit center mullions.
3- Disconnect combustion air blower. Draw wires through divider panel to allow for clearance of vest panel. Remove access panel(s) and unit center mullions.
4- Remove screws supporting heat exchanger.
5- To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. (4N.m) to ensure proper operation. Recaulk corners of vest panel

9-Spark Electrode Gap

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

For proper unit operation, electrodes must be positioned and gapped correctly.

Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125" $\pm$ 0.015" (3.2 mm $\pm$ .4 mm). See figure 22.

10-Flame Sensing

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

⚠ DANGER

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

1- Disconnect power to unit.
2- Remove lead from sensing electrode and install a 0-50 DC microamp meter in series between the sensing electrode and the sensing lead.
3- Reconnect power and adjust thermostat for heating demand.
4- When flame is established, compare to table 24. Do not bend electrodes.
5- Disconnect power to unit before disconnecting meter. Make sure sensor wire is securely reconnected before reconnecting power to unit.

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

TABLE 24

Manufacturer	Nominal Signal Microamps	Drop Out
RAM	1.7-3.6	0.5
JOHNSON	0.5-1.0	.09
FENWALL	1.7-3.6	0.7

11-Combustion Air Blower

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

On a heating demand, the ignition control is energized by the main control module A55. The ignition control then allows a pre-purge of 30 to 40 seconds for the combustion air blower to vent exhaust gases from the burners. When the combustion air blower is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air blower is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates the gas valve, the spark and flame sense electrode. The spark will end when flame is sensed. Units with the White Rodgers gas valve will activate on first stage (low fire) with the spark and the flame sensing electrode. Sparking stops immediately after flame is sensed.

B-Cooling System Service Checks

LGA / LCA units are factory charged and require no further adjustment; however, charge should be checked periodically using the subcooling method. The subcooling method compares actual liquid temperature with the condensing temperature of the refrigerant.

1-Gauge Manifold Attachment

Service gauge ports are identified in figure 7. 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 and suction line pressures should approximate those in tables 10 through 14.

VI-MAINTENANCE

⚠ CAUTION

Electrical shock hazard. Turn off power to unit before performing any maintenance, cleaning or service operation on the unit.

A-Filters

LGA / LCA units are equipped with two 16” x 25” x 2” (406mm x 635mm x 51mm) pleated throw-away type filters. Filters may be accessed through the economizer / filter access door at the end of the unit. Filters should be checked monthly (or more frequently in severe use) and replaced regularly. Take note of the “AIR FLOW DIRECTION” marking on the filter frame when re-installing.

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

B-Lubrication

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

C-Supply Air Blower Wheel

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

⚠ CAUTION

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

D-Evaporator Coil

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

E-Condenser Coil

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

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

F-Electrical

1- Check all wiring for loose connections.

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

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

VII-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to either the LGA / LCA units.

A-LARMF03/07-14,24 Mounting Frames

When installing either the LGA / LCA units on a combustible surface for downflow discharge applications, the Lennox LARMF03/07 14-inch or 24-inch height roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the LGA / LCA units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

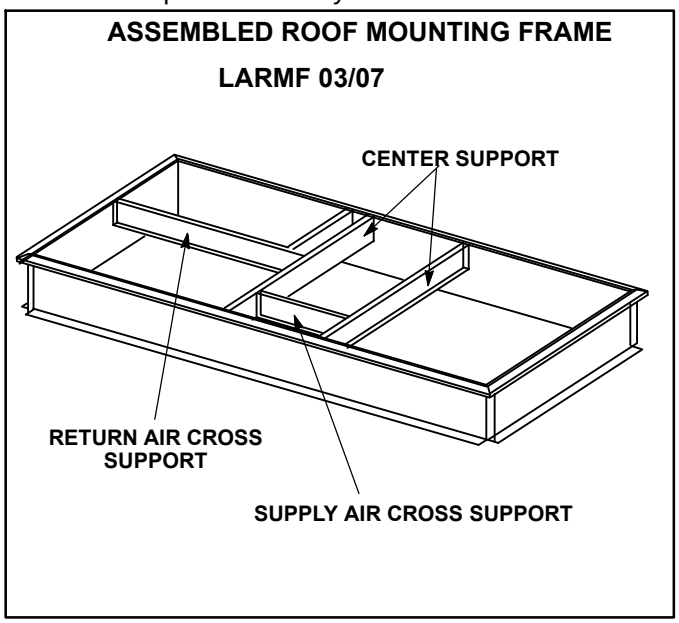


FIGURE 30

The assembled LARMF03/07 mounting frame is shown in figure 30. 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 31. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

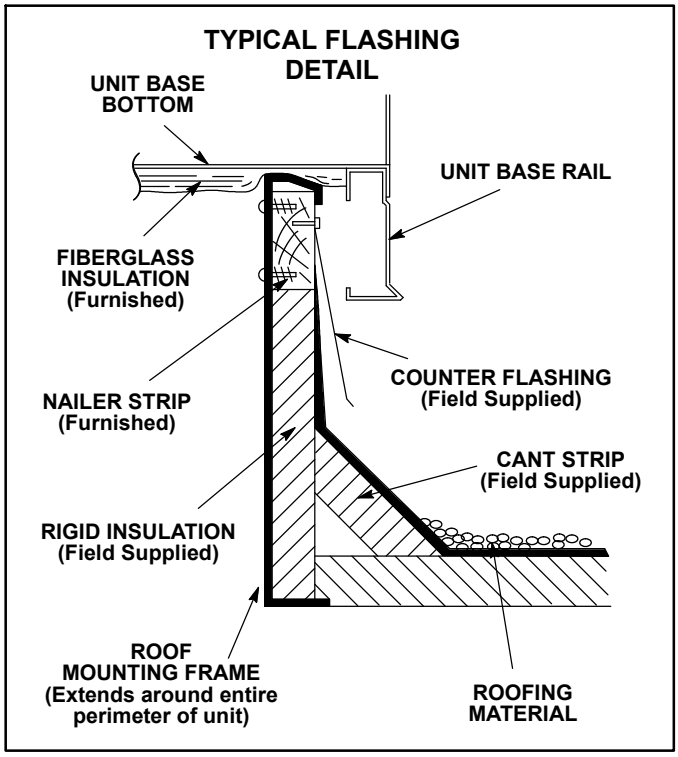


FIGURE 31

B-Transitions

Optional supply/return transitions LASRT 03/06 or LASRT 07 are available for use with LGA / LCA series units utilizing optional LARMF 03/07 roof mounting frame. Transition must be installed in the LARMF mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

C-Supply and Return Diffusers

Optional flush mount diffusers/returns FD9 or FD11 and extended mount diffusers/returns RTD9 or RTD11 are available for use with the LGA / LCA units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

D-LAOADM03/07 and LAOD03/07 Outdoor Air Dampers

LAOADM 03/07 and LAOAD03/07 consists of dampers which may be manually or motor (M) operated to allow up to 25 percent outside air into the system at all times (see figure 32). Washable filters 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.**

E-LAREMD03/07 Economizer

(Field or Factory Installed)

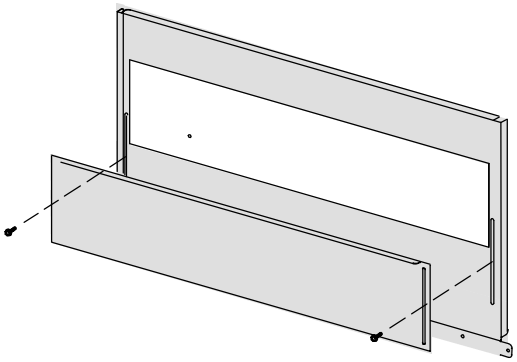
The optional LAREMD03/07 economizer can be used with LGA / LCA units in downflow and horizontal air discharge applications. The LAREMD03/07 economizer uses outdoor air for free cooling when temperature and/or humidity is suitable. An economizer hood is required and must be ordered separately.

NOTE - Gravity exhaust dampers are optional with economizers.

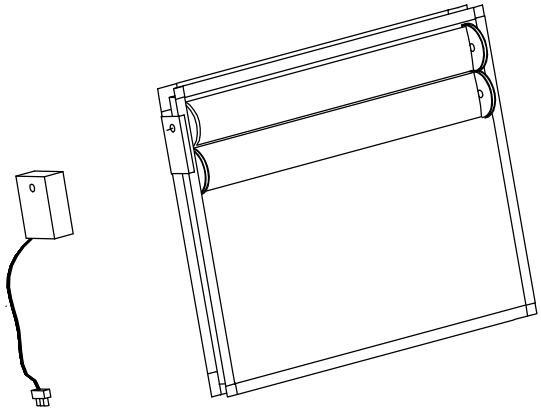
The economizer is controlled by the economizer control module A56 which connects to the main control module A55. Both boards are part of the Integrated Modular Control (IMC) which controls "L" series unit operation.

The economizer will operate in one of four modes. Each mode requires a different EM1 economizer DIP switch setting. Each mode also requires different sensors.

LAOAD MANUAL OUTDOOR AIR DAMPER



LAOADM MOTORIZED OUTDOOR AIR DAMPER



FILTER BRACKET SIDE VIEW

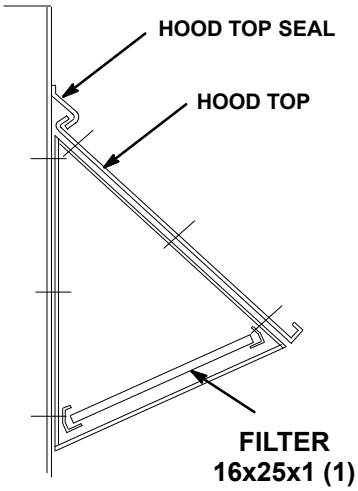


FIGURE 32

1-"TMP" MODE (SENSIBLE TEMPERATURE)

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

2-"ODE" MODE (OUTDOOR ENTHALPY)

The "ODE" or outdoor enthalpy mode requires a field or factory provided and installed Honeywell C7400 enthalpy sensor (16K96). The sensor monitors outdoor air temperature and humidity (enthalpy). When outdoor air enthalpy is below the enthalpy control setpoint, the economizer modulates to allow outdoor air for free cooling. See table 25 for enthalpy setpoints.

TABLE 25
ENTHALPY CONTROL SETPOINTS

CONTROL SETTING	ENTHALPY CONTROL SETPOINT AT 50% RELATIVE HUMIDITY APPROXIMATE °F (°C)
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)

"DIF" MODE ONLY

When the enthalpy setpoint is in the "DIF" position, the economizer board will compare outdoor air enthalpy to return air enthalpy. If outdoor air enthalpy is lower than return air enthalpy, dampers will allow use of outdoor air. If return air enthalpy is lower than outdoor air enthalpy, dampers will modulate to minimum position.

3-"DIF" MODE (DIFFERENTIAL ENTHALPY)

The "DIF" or differential enthalpy mode requires two field or factory provided and installed Honeywell C7400 enthalpy sensors (16K97). One sensor is installed in the outside air opening and the other sensor is installed in the return air opening. When the outdoor air enthalpy is below the return air enthalpy, the economizer opens to bring in 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 regardless of whether an energy management system is used.

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

F-LAGED03/07 and LAGEDH10/15 Gravity Exhaust Dampers

LAGED003/07 and LAGEDH10/15 dampers are used with LGA / LCA series units. LAGED dampers are used in downflow and LAGEDH are used in horizontal air discharge applications. LAGEDH gravity exhaust dampers are installed in the return air duct.

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

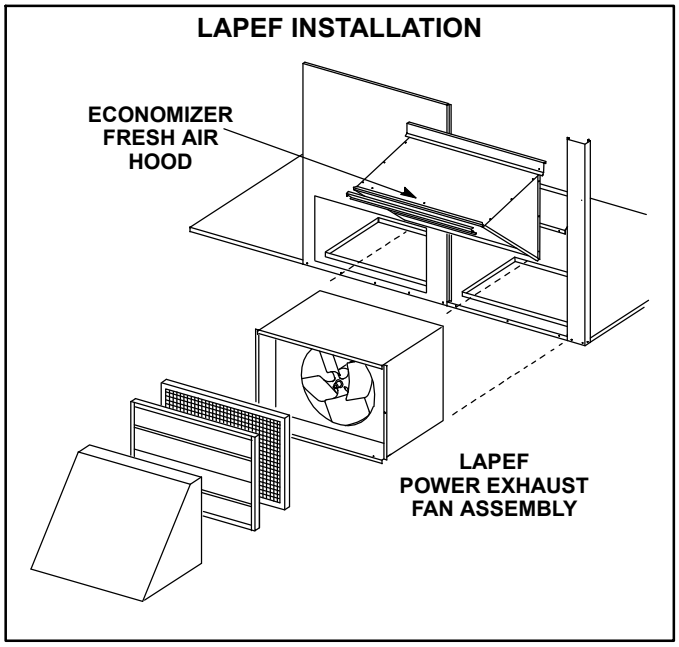


FIGURE 33

G-LAPEF03/07 Power Exhaust Fan

LAPEF03/07 power exhaust fan assembly is used with LGA / LCA series units. LAPEF (requires optional LAREMD economizers) is used in downflow applications only. The power exhaust fan provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. Figure 33 shows location of the LAPEF. See installation instructions for more detail.

H-Optional Cold Weather Kit (Canada only)

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

The kit includes the following parts:

1- Transformer (T20) is a 600V to 120/240V stepdown transformer mounted in the blower compartment.

2- T20 has two in line fuses (F20), one on each leg of the transformer. Both are rated at 15 amps.

3- The strip heater (HR6) is located as close as possible to the gas valve. It is wired in series with T20. The strip heater is rated at 500 Watts

4- A thermostat mounting box is installed on the vestibule of the heating compartment. Included in the box are the following thermostat switches:

a - Thermostat switch (S59) is an auto-reset SPST . switch which acts as a low limit and opens on a temperature drop. The switch is wired to open 24v power to the burner control. When the temperature drops below -35° C (-30° F) the switch opens and the gas heat section is de-energized. The switch automatically resets when the heating compartment temperature reaches -12° C (10° F).

b - Thermostat switch (S60) is an auto-reset SPST switch and is the controller of HR6. When the temperature rises above -7° C (20° F) the switch opens and the electric heater is de-energized. The switch automatically resets when the heating compartment temperature reaches -23.3° C (-10° F).

c -Thermostat switch (S61) is an auto-reset SPST switch which acts as a high limit and closes on a temperature drop. S61 remains closed during low ambient conditions and opens when temperatures rise. When temperature drops below -6.7° C (20° F) the switch closes. The switch automatically opens when heating compartment temperature reaches 24° C (76° F).

I-Control Systems

Three different types of control systems may be used with the LGA / LCA series units. All thermostat wiring is connected to terminal block TB1 located in the blower compartment of the unit. Each thermostat has additional control options available. See thermostat installation instructions for more detail.

1- Electro-mechanical thermostat (13F06)

The electro-mechanical thermostat is a two stage heat / two stage cool thermostat with dual temperature levers. A non-switching or manual system switch subbase may be used.

2- Electronic thermostat (see price book)

Any two stage heat / two stage cool electronic thermostat may be used.

3- Honeywell T7300 thermostat (81G59)

The Honeywell T7300 thermostat is a programmable, internal or optional remote temperature sensing thermostat. The T7300 provides occupied and unoccupied changeover control.

J-Smoke Detectors A17 and A64

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

K-Blower Proving Switch S52

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

L-Dirty Filter Switch S27

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

M-Indoor Air Quality (CO_2) Sensor A63

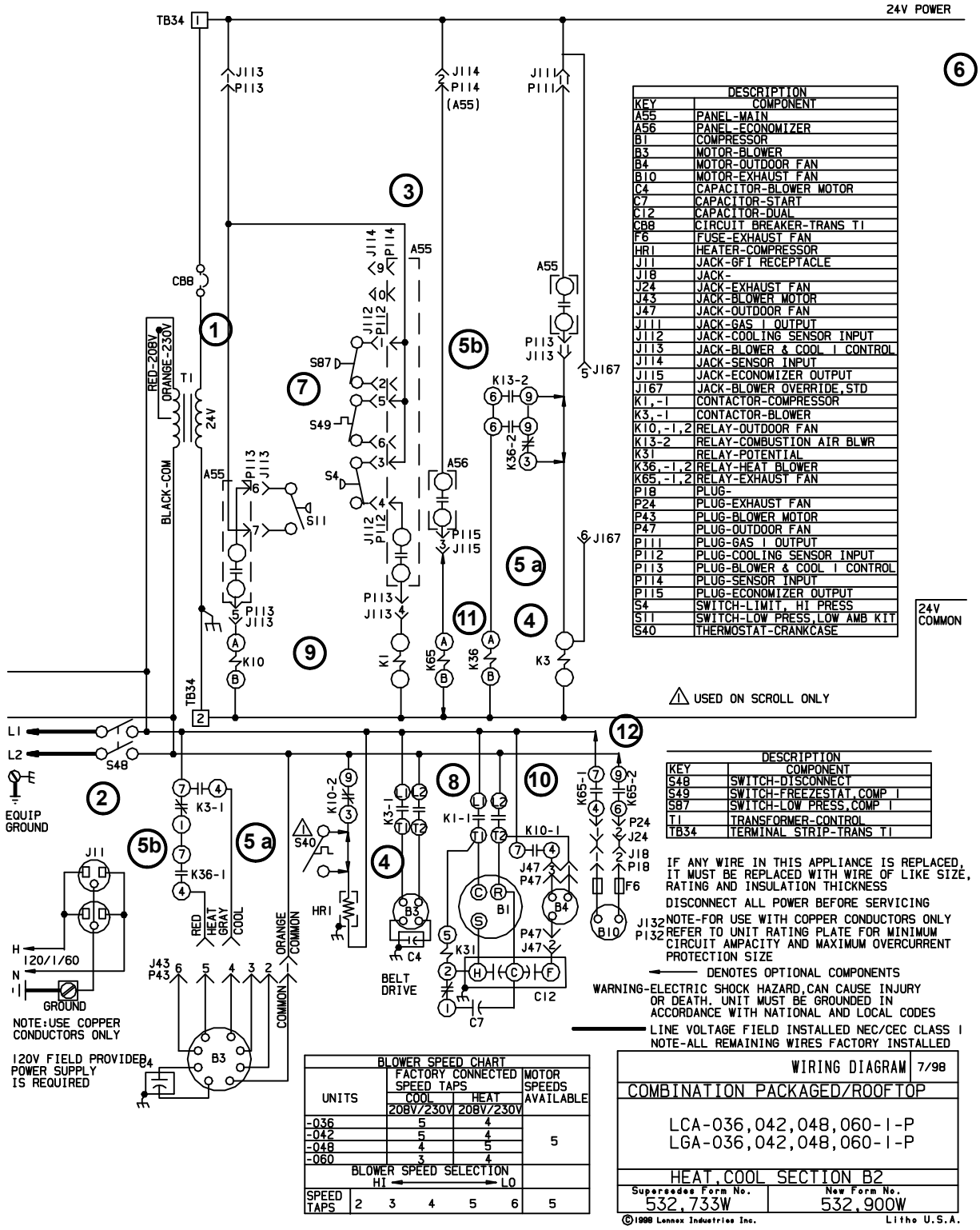
The indoor air quality sensor monitors CO_2 levels and reports the levels to the main control module A55. The board adjusts the economizer dampers according to the CO_2 levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation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

N-LP / Propane Kit

A natural to LP / propane gas changeover kit is required for gas conversion on LGA036/072 series units. The kit includes a gas valve and burner orifices.

VIII- WIRING DIAGRAMS / SEQUENCE OF OPERATION

LGA/LCA036/072 P VOLTAGE



DESCRIPTION	
KEY	COMPONENT
A55	PANEL-MAIN
A56	PANEL-ECONOMIZER
B1	COMPRESSOR
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN
B10	MOTOR-EXHAUST FAN
C4	CAPACITOR-BLOWER MOTOR
C7	CAPACITOR-START
C12	CAPACITOR-DUAL
CB8	CIRCUIT BREAKER-TRANS T1
F6	FUSE-EXHAUST FAN
HR1	HEATER-COMPRESSOR
J11	JACK-GFI RECEPTACLE
J18	JACK-
J24	JACK-EXHAUST FAN
J43	JACK-BLOWER MOTOR
J47	JACK-OUTDOOR FAN
J111	JACK-GAS I OUTPUT
J112	JACK-COOLING SENSOR INPUT
J113	JACK-BLOWER & COOL I CONTROL
J114	JACK-SENSOR INPUT
J115	JACK-ECONOMIZER OUTPUT
J167	JACK-BLOWER OVERRIDE,STD
K1,-1	CONTACTOR-COMPRESSOR
K3,-1	CONTACTOR-BLOWER
K10,-1,2	RELAY-OUTDOOR FAN
K13-2	RELAY-COMBUSTION AIR BLWR
K31	RELAY-POTENTIAL
K36,-1,2	RELAY-HEAT BLOWER
K65,-1,2	RELAY-EXHAUST FAN
P18	PLUG-
P24	PLUG-EXHAUST FAN
P43	PLUG-BLOWER MOTOR
P47	PLUG-OUTDOOR FAN
P111	PLUG-GAS I OUTPUT
P112	PLUG-COOLING SENSOR INPUT
P113	PLUG-BLOWER & COOL I CONTROL
P114	PLUG-SENSOR INPUT
P115	PLUG-ECONOMIZER OUTPUT
S4	SWITCH-LIMIT, HI PRESS
S11	SWITCH-LOW PRESS,LOW AMB KIT
S40	THERMOSTAT-CRANKCASE

DESCRIPTION	
KEY	COMPONENT
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT,COMP I
S87	SWITCH-LOW PRESS,COMP I
T1	TRANSFORMER-CONTROL
TB34	TERMINAL STRIP-TRANS T1

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

DISCONNECT ALL POWER BEFORE SERVICING

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

DENOTES OPTIONAL COMPONENTS

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

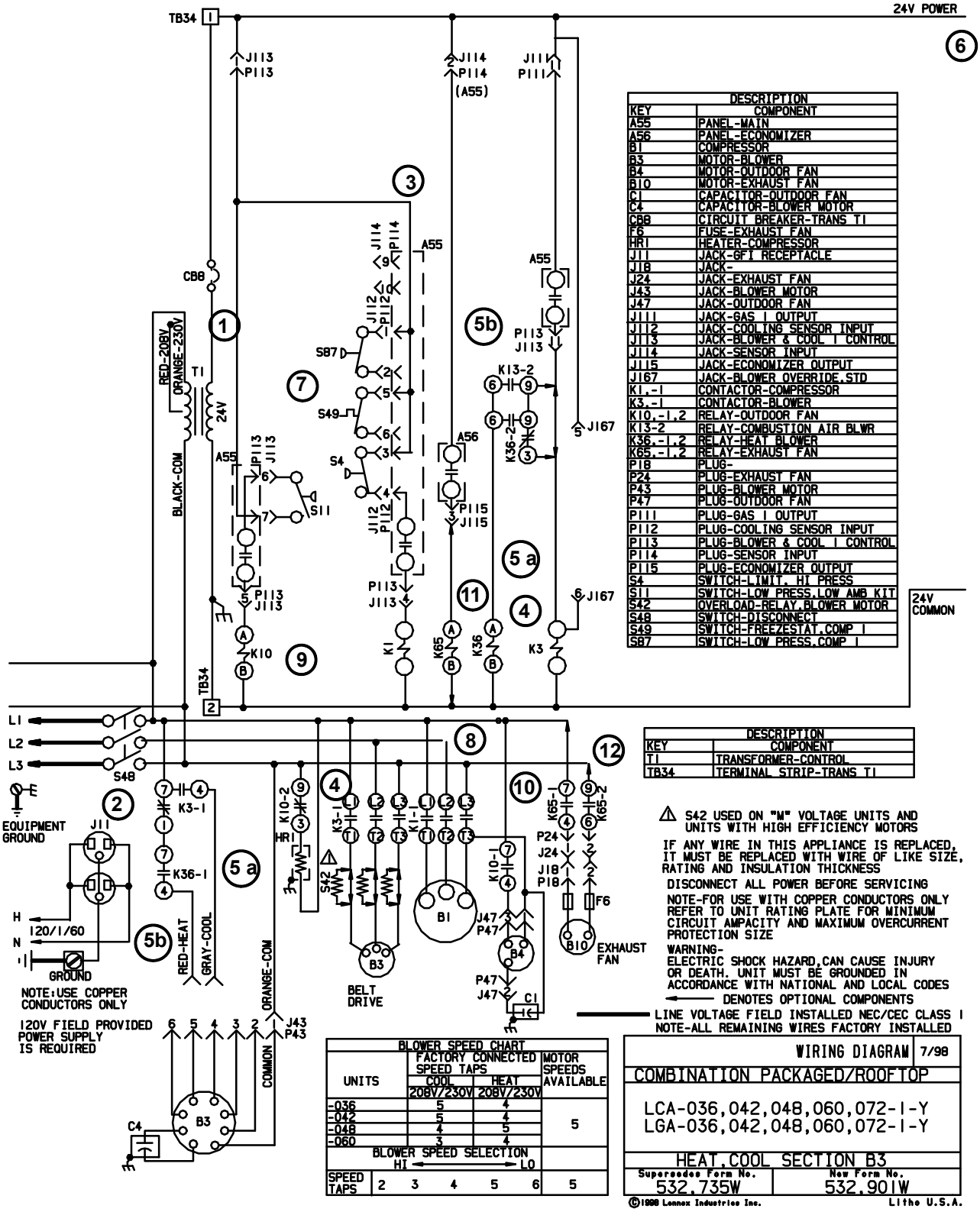
LINE VOLTAGE FIELD INSTALLED NEC/CEC CLASS I
NOTE-ALL REMAINING WIRES FACTORY INSTALLED

BLOWER SPEED CHART			
UNITS	FACTORY CONNECTED SPEED TAPS		MOTOR SPEEDS AVAILABLE
	COOL 208V/230V	HEAT 208V/230V	
-036	5	4	5
-042	5	4	
-048	4	5	
-060	3	4	
BLOWER SPEED SELECTION HI ← → LO			
SPEED TAPS 2 3 4 5 6			5

WIRING DIAGRAM	7/98
COMBINATION PACKAGED/ROOFTOP	
LCA-036,042,048,060-1-P LGA-036,042,048,060-1-P	
HEAT,COOL SECTION B2	
Supersedes Form No. 532,733W	New Form No. 532,900W

 Litho U.S.A.

LGA/LCA036/072 Y VOLTAGE



DESCRIPTION	
KEY	COMPONENT
A55	PANEL-MAIN
A56	PANEL-ECONOMIZER
B1	COMPRESSOR
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN
B10	MOTOR-EXHAUST FAN
C1	CAPACITOR-OUTDOOR FAN
C4	CAPACITOR-BLOWER MOTOR
CB8	CIRCUIT BREAKER-TRANS T1
F6	FUSE-EXHAUST FAN
HR1	HEATER-COMPRESSOR
J11	JACK-GFI RECEPTACLE
J18	JACK-
J24	JACK-EXHAUST FAN
J43	JACK-BLOWER MOTOR
J47	JACK-OUTDOOR FAN
J111	JACK-GAS 1 OUTPUT
J112	JACK-COOLING SENSOR INPUT
J113	JACK-BLOWER & COOL 1 CONTROL
J114	JACK-SENSOR INPUT
J115	JACK-ECONOMIZER OUTPUT
J167	JACK-BLOWER OVERRIDE.STD
K1,-1	CONTACTOR-COMPRESSOR
K3,-1	CONTACTOR-BLOWER
K10,-1,2	RELAY-OUTDOOR FAN
K13-2	RELAY-COMBUSTION AIR BLWR
K36,-1,2	RELAY-HEAT BLOWER
K65,-1,2	RELAY-EXHAUST FAN
P18	PLUG-
P24	PLUG-EXHAUST FAN
P43	PLUG-BLOWER MOTOR
P47	PLUG-OUTDOOR FAN
P111	PLUG-GAS 1 OUTPUT
P112	PLUG-COOLING SENSOR INPUT
P113	PLUG-BLOWER & COOL 1 CONTROL
P114	PLUG-SENSOR INPUT
P115	PLUG-ECONOMIZER OUTPUT
S4	SWITCH-LIMIT, HI PRESS
S11	SWITCH-LOW PRESS.LOW AMB KIT
S42	OVERLOAD-RELAY.BLOWER MOTOR
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT.COMP 1
S87	SWITCH-LOW PRESS.COMP 1

DESCRIPTION	
KEY	COMPONENT
T1	TRANSFORMER-CONTROL
TB34	TERMINAL STRIP-TRANS T1

BLOWER SPEED CHART			
UNITS	FACTORY CONNECTED SPEED TAPS COOL 208V/230V	HEAT 208V/230V	MOTOR SPEEDS AVAILABLE
-036	5	4	5
-042	5	4	
-048	4	5	
-060	3	4	
BLOWER SPEED SELECTION HI ⟷ LO			
SPEED TAPS	2 3 4 5 6		5

WIRING DIAGRAM 7/98

COMBINATION PACKAGED/ROOFTOP

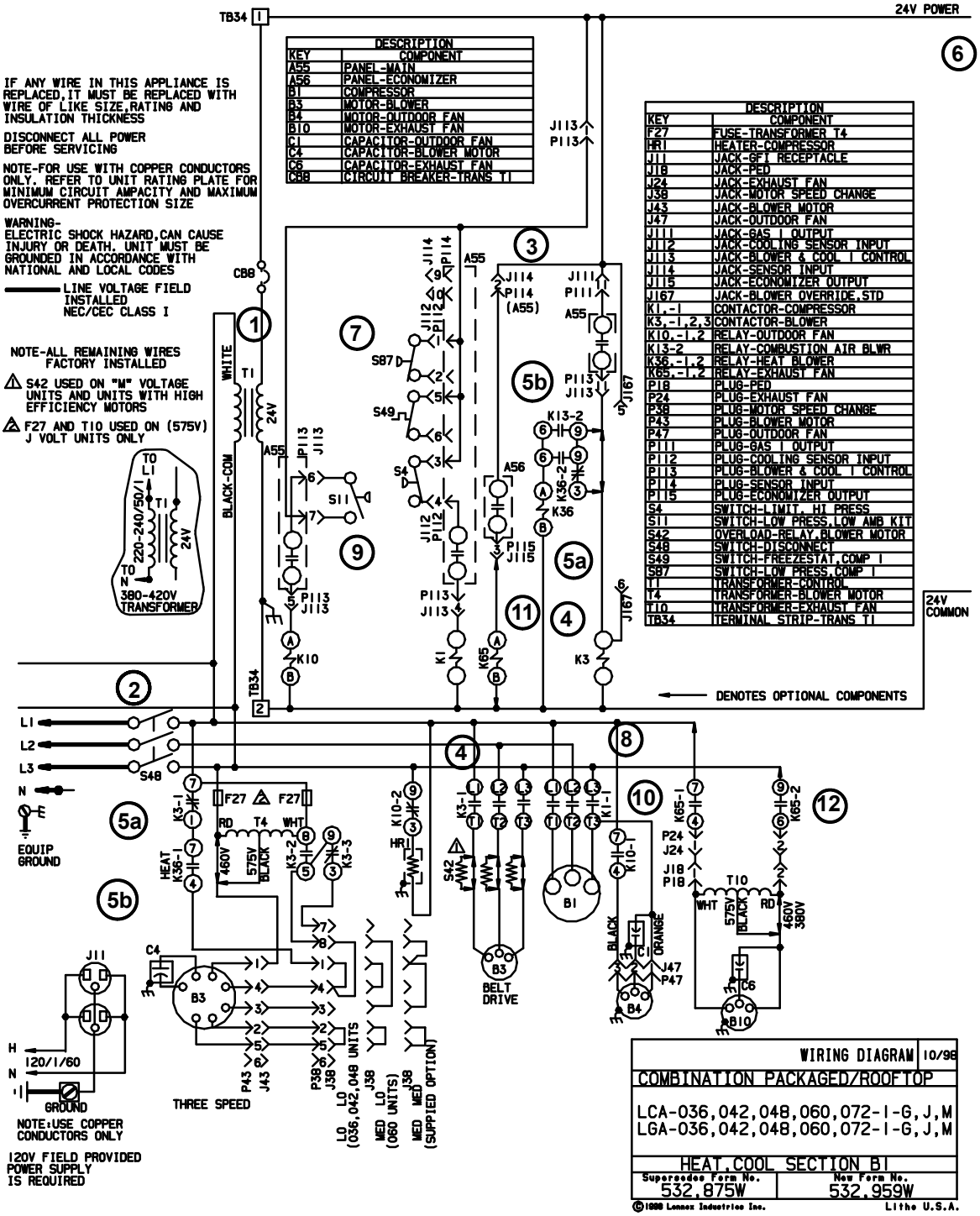
LCA-036,042,048,060,072-1-Y
LGA-036,042,048,060,072-1-Y

HEAT,COOL SECTION B3

Supersedes Form No.	New Form No.
532,735W	532,901W

Litho U.S.A.

LGA/LCA036/072 G, J, M, VOLTAGE



KEY	DESCRIPTION COMPONENT
A55	PANEL-MAIN
A56	PANEL-ECONOMIZER
B1	COMPRESSOR
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN
B10	MOTOR-EXHAUST FAN
C1	CAPACITOR-OUTDOOR FAN
C4	CAPACITOR-BLOWER MOTOR
C6	CAPACITOR-EXHAUST FAN
CBB	CIRCUIT BREAKER-TRANS T1

KEY	DESCRIPTION COMPONENT
F27	FUSE-TRANSFORMER T4
HR1	HEATER-COMPRESSOR
J11	JACK-GFI RECEPTACLE
J18	JACK-PED
J24	JACK-EXHAUST FAN
J38	JACK-MOTOR SPEED CHANGE
J43	JACK-BLOWER MOTOR
J47	JACK-OUTDOOR FAN
J111	JACK-GAS I OUTPUT
J112	JACK-COOLING SENSOR INPUT
J113	JACK-BLOWER & COOL I CONTROL
J114	JACK-SENSOR INPUT
J115	JACK-ECONOMIZER OUTPUT
J167	JACK-BLOWER OVERRIDE,STD
K1,-1	CONTACTOR-COMPRESSOR
K3,-1,2,3	CONTACTOR-BLOWER
K10,-1,2	RELAY-OUTDOOR FAN
K13-2	RELAY-COMBUSTION AIR BLWR
K36,-1,2	RELAY-HEAT BLOWER
K65,-1,2	RELAY-EXHAUST FAN
P18	PLUG-PED
P24	PLUG-EXHAUST FAN
P38	PLUG-MOTOR SPEED CHANGE
P43	PLUG-BLOWER MOTOR
P47	PLUG-OUTDOOR FAN
P111	PLUG-GAS I OUTPUT
P112	PLUG-COOLING SENSOR INPUT
P113	PLUG-BLOWER & COOL I CONTROL
P114	PLUG-SENSOR INPUT
P115	PLUG-ECONOMIZER OUTPUT
S4	SWITCH-LIMIT, HI PRESS
S11	SWITCH-LOW PRESS,LOW AMB KIT
S42	OVERLOAD-RELAY,BLOWER MOTOR
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT,COMP I
S87	SWITCH-LOW PRESS,COMP I
T1	TRANSFORMER-CONTROL
T4	TRANSFORMER-BLOWER MOTOR
T10	TRANSFORMER-EXHAUST FAN
TB34	TERMINAL STRIP-TRANS T1

SEQUENCE OF OPERATION LGA/LCA036/072

Power:

1. Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to terminal strip TB34. TB34 provides 24VAC to the unit thermostast cooling, heating and blower controls.
2. Line voltage from unit disconnect provides voltge to compressor crankcase heaters HR1 (through discharge line thermostat on single phase scroll compressors), compressor contactor K1, the blower motor contactor K3 and condenser fan relay K10.

Blower Operation:

3. The main control module A55 receives a demand from thermostat terminal G. A55 energizes blower motor circuit as follows:
4. *Belt Drive:*
   A55 energizes blower contactor K3 with 24VAC. N.O. contacts K3-1 close, energizing blower B3.
5. *Direct Drive:*
   a) On cooling or fan only demand, A55 energizes blower contactor K3. N.O. contacts K3-1 close energizing motor B3 on cool tap.
   b) On heating demand, A55 energizes combustion air blower relay K13. N.O. contacts K13-2 close, energizing heat blower relay K36. N.O. contacts K36-1 close, energizing blower B3.
   Note- Speed selection for Direct Drive motors are made through lead selection at P43/J43 cap-plug on B3 motor.

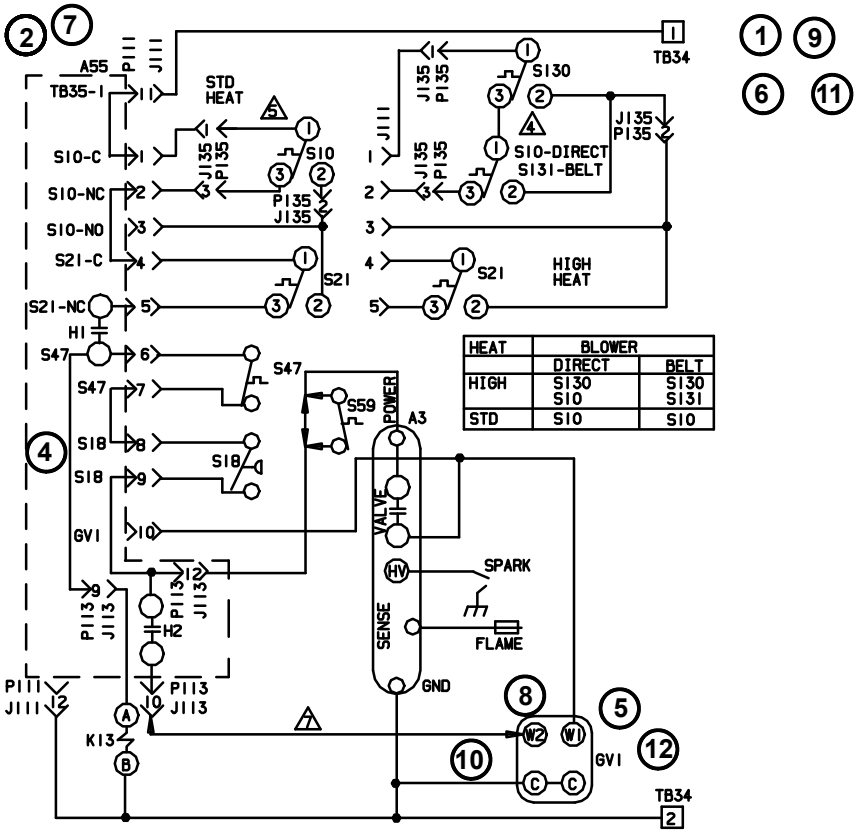
1st Stage Cooling

6. Cooling demand energizes Y1 and G in the thermostat. G energizes blower.
7. 24VAC is routed through TB34 to the main control module A55. After A55 proves N.C. low pressure switch S87, N.C. freezestat S49 and N.C. high pressure switch S4, compressor contactor K1 is energized.
8. N.O. contacts K1-1 close energizing compressor B1.
9. N.O. low ambient switch S11 closes to energize condenser fan relay K10.
10. N.O. contacts K10-1 close energizing condenser fan B4 and N.C. contacts K10-2 open, de-energizing compressor crankcase heater HR1.

Economizer Operation:

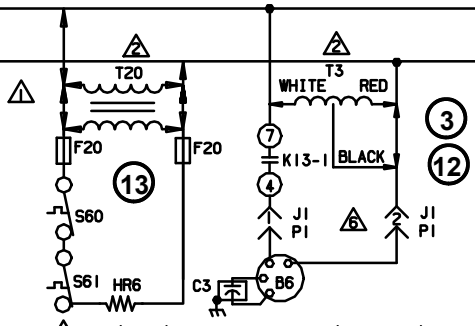
11. The economizer control module A56 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).
12. N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.
    Note- Speed selection for Direct Drive motors are made through lead selection at P43/J43 cap-plug on B3 motor.

LGA036/072 GAS HEAT UNIT WIRING DIAGRAM



HEAT	BLOWER	
	DIRECT	BELT
HIGH	S130 S10	S130 S131
STD	S10	S10

DENOTES OPTIONAL COMPONENTS



KEY	DESCRIPTION COMPONENT
A3	CONTROL-BURNER I
A55	PANEL-MAIN
B6	MOTOR-COMBUSTION AIR BLOWER I
C3	CAPACITOR-COMB AIR BLOWER,MOTOR I
F20	FUSE,-50C LOW AMBIENT KIT
GV1	VALVE-GAS I
HR6	HEATER,-50C LOW AMBIENT KIT
J1	JACK-GAS LIMIT
J111	JACK-GAS I,OUTPUT
J113	JACK-BLOWER & COOL I CONTROL
J135	JACK
K13.-1	RELAY-COMBUSTION AIR BLOWER
P1	PLUG-GAS LIMIT
P111	PLUG-GAS I,OUTPUT
P113	PLUG-BLOWER & COOL I CONTROL
P135	PLUG
S10	SWITCH-LIMIT, PRIMARY GAS
S18	SWITCH-COMB AIR BLOWER, PROVE
S21	SWITCH-LIMIT,SECONDARY GAS HEAT
S47	SWITCH-FLAME ROLLOUT, BURNER I
S59	THERMOSTAT,-35 C OPEN,-50 C
S60	THERMOSTAT,-23C CL,-7C OP,-50C LOW AMB KIT
S61	THERMOSTAT,+24C OPEN,-50C LOW AMB KIT
S130	SWITCH-LIMIT,PRIMARY UNDER
S131	SWITCH-LIMIT,PRIMARY DOWN
T3	TRANSFORMER-COMB AIR BLOWER I
T20	TRANSFORMER,-50C LOW AMBIENT KIT
TB34	TERMINAL STRIP-TRANSFORMER TI

1. CGA(-50C) LOW AMBIENT KIT (OPTIONAL)
2. T3 & T20 USED ON 460V & 575V UNITS ONLY
3. USED ON 6 TON AND SMALLER UNITS
4. S10,S21,S130 & S131 ARE USED FOR 036 TO 072 UNITS (HIGH HEAT) HOOKUP
5. S10 & S21 ARE USED FOR 036 TO 072 UNITS (LOW HEAT) HOOKUP
6. J1/P1 IS NOT USED ON -036, 042,048,060,072,088 AND 100 UNITS
7. W2 HOOKUP USED ON 92/125 UNITS ONLY

WIRING DIAGRAM	6/98
COMBINATION UNIT-ROOFTOP	
GAS HEAT FOR "L" SERIES,78 THRU 125 UNITS A BOX	
HEATING SECTION-AI	
Supersedes Form No. 532,632W	New Form No. 532,884W

 Litho U.S.A.

SEQUENCE OF OPERATION LGA036/072 GAS HEAT

First or Single Stage Heat:

1. Heating demand initiates at W1 in the thermostat.
2. 24VAC is routed through TB34 to the main control module A55. After A55 proves N.C. primary limit S21, the combustion air blower relay K13 is energized.
3. N.O. K13-1 contacts close allowing line voltage to energize combustion air blower B6.
4. After the combustion air blower B6 has reached full speed, the combustion air proving switch S18 contacts close. The A55 routes 24VAC through N.C. burner flame rollout switch S47 and the closed contacts of combustion air proving switch S18 to energize the ignition module A3.
5. After a 30 second delay A3 energizes the ignitor and W1 terminal (low fire) of two stage gas valve GV1.

Second Stage Heat:

6. With first stage heat operating, an additional heating demand initiates W2 in the thermostat.
7. A second stage heating demand is received by A55 control module.
8. A55 energizes W2 terminal (high fire) of gas valve GV1.

End of Second Stage Heat:

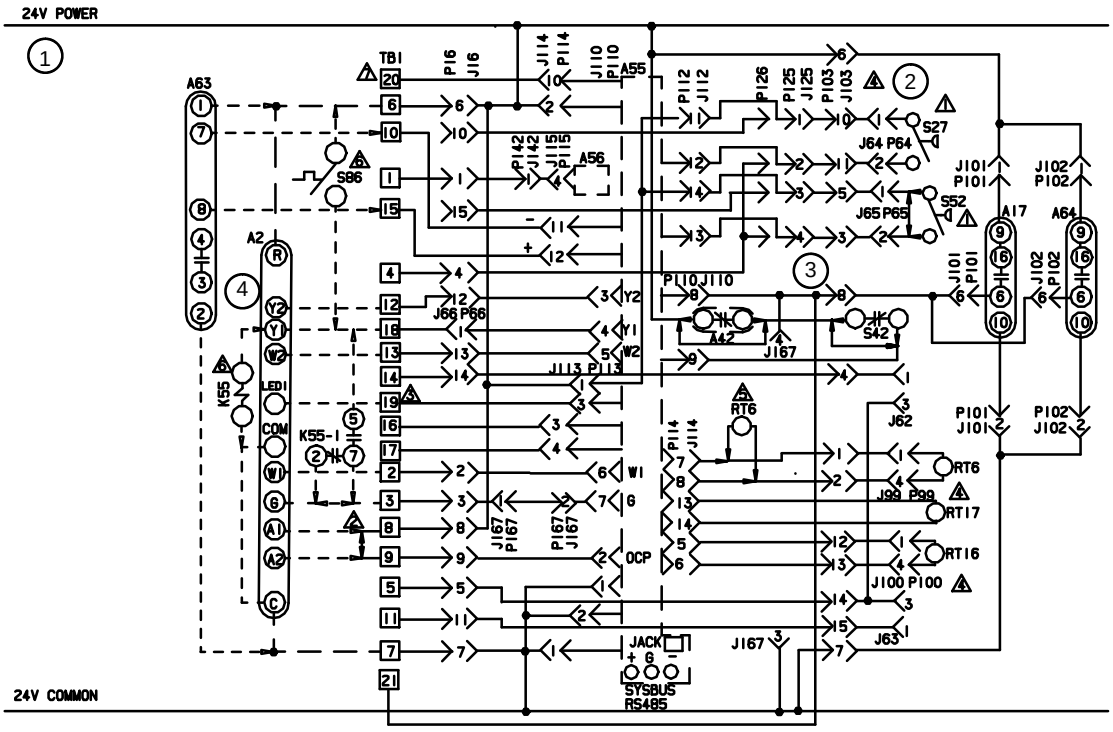
9. Heating demand is satisfied. Terminal W2 (high fire) is de-energized.
10. Terminal W2 of GV1 is de-energized by A55 control module.

End of First Stage Heat:

11. Heating demand is satisfied. Terminal W1 (low fire) is de-energized.
12. Ignition A3 is de-energized by control module A55 in turn de-energizing terminal W1 of GV1. Combustion air blower relay K13 is also de-energized.

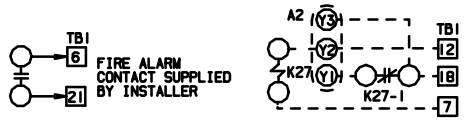
Optional Low Ambient Kit:
(C.G.A. -50° C Low Ambient Kit)

C2 diagram *ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT*



KEY	DESCRIPTION COMPONENT
A2	SENSOR-ELECTRONIC
A17	DETECTOR-SMOKE
A42	MONITOR-PHASE PROTECTION
A55	PANEL-MAIN
A56	PANEL-ECONOMIZER
A63	SENSOR-CO2(IAQ)
A64	DETECTOR-SMOKE,SUPPLY AIR
J16	JACK-UNIT
J62	JACK-A2 RETURN AIR SENSOR
J63	JACK-RT1 DISCH. AIR SENSOR
J64	JACK-S27 FILTER SWITCH
J65	JACK-S52 FAN SWITCH
J66	JACK-COOL 1 INTERFACE
J99	JACK-DISCHARGE TEMP SENSOR
J100	JACK-RETURN TEMP SENSOR
J101	JACK-SMOKE DETECTOR,RETURN AIR
J102	JACK-SMOKE DETECTOR,SUPPLY AIR
J103	JACK-SENSORS CONTROL
J110	JACK-THERMOSTAT INPUT
J112	JACK-COOLING SENSOR INPUT
J113	JACK-BLOWER & COOL 1 CONTROL
J114	JACK-SENSOR INPUT
J115	JACK-ECONOMIZER OUTPUT
J125	JACK-BLOWER PROVING
J126	JACK-JUMPER,BLOWER PROVING
J142	JACK-ECONOMIZER HARNESS
J167	JACK-BLOWER OVERRIDE,STD
K27,-1	RELAY-TRANSFER 2
K55,-1	RELAY-BLOWER
P16	PLUG-UNIT
P64	PLUG-S27 FILTER SWITCH
P65	PLUG-S52 FAN SWITCH
P66	PLUG-COOL ONE
P99	PLUG-DISCHARGE TEMP SENSOR
P100	PLUG-RETURN TEMP SENSOR
P101	PLUG-SMOKE DETECTOR,RETURN AIR
P102	PLUG-SMOKE DETECTOR,SUPPLY AIR

KEY	DESCRIPTION COMPONENT
P103	PLUG-SENSORS,CONTROL
P110	PLUG-THERMOSTAT INPUT
P112	PLUG-COOLING SENSOR INPUT
P113	PLUG-BLOWER & COOL 1 CONTROL
P114	PLUG-SENSOR INPUT
P115	PLUG-ECONOMIZER OUTPUT
P125	PLUG-BLOWER PROVING
P126	PLUG-JUMPER,BLOWER PROVING
P142	PLUG-ECONOMIZER HARNESS
P167	PLUG-BLOWER OVERRIDE,STD
RT6	SENSOR-A55 DISCHARGE (IMC)
RT16	SENSOR-RETURN AIR TEMP
RT17	SENSOR-OUTSIDE AIR TEMP
S27	SWITCH-FILTER
S42	OVERLOAD-RELAY,BLOWER MOTOR
S52	SWITCH-AIR FLOW
S86	SWITCH-DEHUMIDISTAT 65F860
TB1	TERMINAL STRIP-24V CLASS II



THERMOSTAT HOOKUP FOR SELECTABLE OPTION #3, ECTO 5.04 ON M1-5 IMC BOARD (A55)

TO PROVIDE THREE COMPRESSOR STAGES. REQUIRES 3 HEAT,3 COOL THERMOSTAT AND K27 RELAY

1. S27 AND S52 ARE OPTIONAL
2. REMOVE JUMPER WHEN OCCUPIED-UNOCCUPIED OPERATION IS DESIRED. UNIT REMAINS IN OCCUPIED OPERATION WITH JUMPER
3. TB1-19 IS SERVICE RELAY OUTPUT (24VAC). IF USED CONNECT TO A INDICATOR LIGHT OR RELAY COIL (MAX 4VA)
4. J99/P99,J100/P100 AND J103/P103 ARE NOT USED ON-036,042,048,060,072,088 AND 100 UNITS
5. ALTERNATE REMOTE LOCATION OF RT6
6. USE S86 DEHUMIDISTAT AND K55 RELAY FOR OPTIONAL REHEAT SCHEME. SET PARAMETER 4.24 TO CONTROL VALVE 1 FOR SIMULTANEOUS HEATING AND COOLING
7. TB1-20 FOR DEHUMIDIFICATION CONTROL

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

WIRING DIAGRAM	1/01
ACCESSORIES	
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT FOR "L" SERIES UNITS	
TEMPERATURE CONTROL SECTION C2	
Supersedes Form No. 532,583W	New Form No. 533,629W

SEQUENCE OF OPERATION
C2 DIAGRAM - ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT

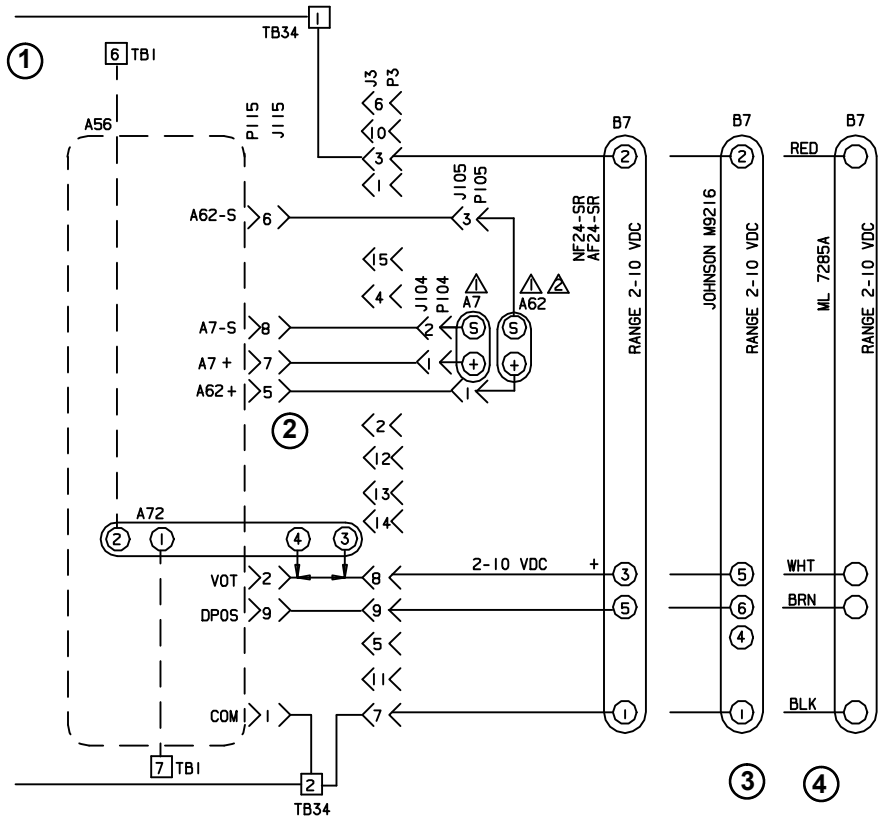
POWER:

1. Terminal strip TB34 energizes the thermostat components with 24VAC via TB1.

OPERATION:

2. The main control module A55 proves the optional N.O. filter switch S27(indicates dirty filter when closed), optional N.O. air flow switch S52(indicates no air [i.e. broken belt] system shuts down), and optional C.G.A. -50° C low ambient kit thermostat S59 (used in C.G.A. units only).
3. The main control module A55 receives data from the supply and return smoke detectors A17 and A64, optional phase protection monitor A42, blower motor overload relay S42, discharge sensor RT6, return air sensor RT16, and the outdoor air sensor RT17.
4. The main control module A55 receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP) and the CO_2 sensor (if economizer is used) via terminal strip TB1. A55 energizes the appropriate components.

"L" SERIES ECONOMIZER



⚠1 DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL

⚠2 FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR

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

WIRING DIAGRAM	8/97
ACCESSORIES	
"L" SERIES ECONOMIZER AND MOTORIZED OUTSIDE AIR DAMPER	
ECONOMIZER-SECTION DI	
Supersedes Form No. 531,713W	New Form No. 531,770W

 Litho U.S.A.

KEY	DESCRIPTION COMPONENT
A7	SENSOR-SOLID STATE ENTHALPY
A56	PANEL-ECONOMIZER
A62	SENSOR-ENTHALPY,INDOOR
A72	CONTROL-REMOTE,MIN POS(OPT)
B7	MOTOR-DAMPER
J3	JACK-UNIT ECONOMIZER
J104	JACK-SENSOR,OUTDOOR ENTHALPY
J105	JACK-SENSOR,RETURN AIR ENTHALPY
J115	JACK-ECONOMIZER,OUTPUT
P3	PLUG-UNIT ECONOMIZER
P104	PLUG-SENSOR,OUTDOOR ENTHALPY
P105	PLUG-SENSOR,RETURN AIR ENTHALPY
P115	PLUG-ECONOMIZER,OUTPUT
TB1	TERMINAL STRIP-CLASS II VOLTAGE
TB34	TERMINAL STRIP-TRANSFORMER TI

SEQUENCE OF OPERATION
L" SERIES ECONOMIZER

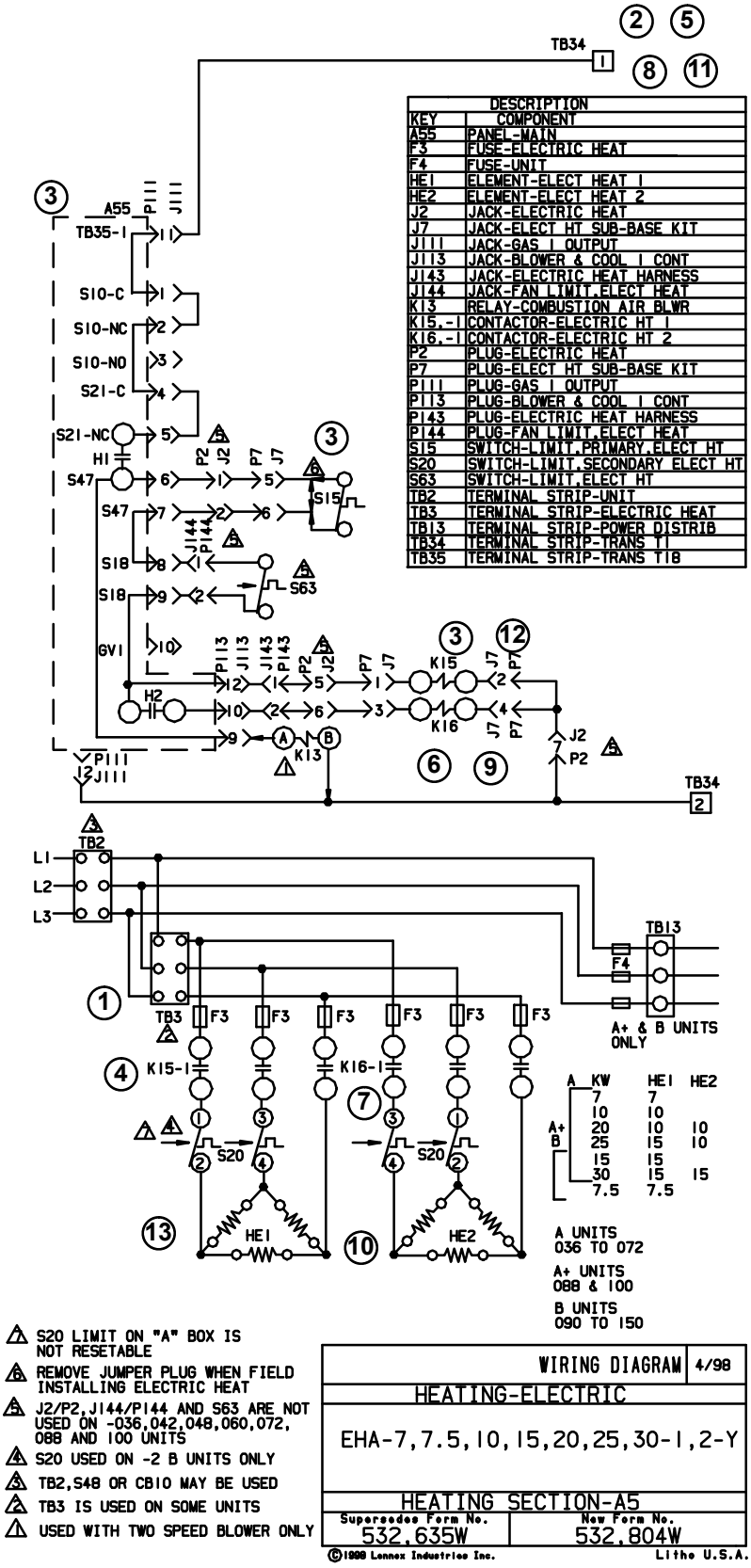
POWER:

1. Terminal strip TB34 energizes the economizer components with 24VAC.

OPERATION:

2. The main control module A55 along with outdoor enthalpy sensor A7 and indoor enthalpy sensor A62 (if differential enthalpy is used) communicates to the economizer control module A56 when to power the damper motor B7.
3. The economizer control module A56 supplies B7 with 0 - 10 VDC to control the positioning of economizer.
4. The damper actuator provides 2 to 10 VDC position feedback.

EHA-7 / 30kW Y VOLTAGE



KEY	DESCRIPTION COMPONENT
A55	PANEL-MAIN
F3	FUSE-ELECTRIC HEAT
F4	FUSE-UNIT
HE1	ELEMENT-ELECT HEAT 1
HE2	ELEMENT-ELECT HEAT 2
J2	JACK-ELECTRIC HEAT
J7	JACK-ELECT HT SUB-BASE KIT
J111	JACK-GAS 1 OUTPUT
J113	JACK-BLOWER & COOL 1 CONT
J143	JACK-ELECTRIC HEAT HARNESS
J144	JACK-FAN LIMIT,ELECT HEAT
K13	RELAY-COMBUSTION AIR BLWR
K15,-1	CONTACTOR-ELECTRIC HT 1
K16,-1	CONTACTOR-ELECTRIC HT 2
P2	PLUG-ELECTRIC HEAT
P7	PLUG-ELECT HT SUB-BASE KIT
P111	PLUG-GAS 1 OUTPUT
P113	PLUG-BLOWER & COOL 1 CONT
P143	PLUG-ELECTRIC HEAT HARNESS
P144	PLUG-FAN LIMIT,ELECT HEAT
S15	SWITCH-LIMIT,PRIMARY,ELECT HT
S20	SWITCH-LIMIT,SECONDARY ELECT HT
S63	SWITCH-LIMIT,ELECT HT
TB2	TERMINAL STRIP-UNIT
TB3	TERMINAL STRIP-ELECTRIC HEAT
TB13	TERMINAL STRIP-POWER DISTRIB
TB34	TERMINAL STRIP-TRANS T1
TB35	TERMINAL STRIP-TRANS T1B

A	KW	HE1	HE2
	7	7	
	10	10	
A+	20	10	10
B	25	15	10
	15	15	
	30	15	15
	7.5	7.5	

⚠ S20 LIMIT ON "A" BOX IS NOT RESETABLE

6 REMOVE JUMPER PLUG WHEN FIELD INSTALLING ELECTRIC HEAT

⚠ J2/P2,J144/P144 AND S63 ARE NOT USED ON -036,042,048,060,072, 088 AND 100 UNITS

⚠ S20 USED ON -2 B UNITS ONLY

⚠ TB2,S48 OR CB10 MAY BE USED

⚠ TB3 IS USED ON SOME UNITS

⚠ USED WITH TWO SPEED BLOWER ONLY

WIRING DIAGRAM	4/98
HEATING-ELECTRIC	
EHA-7,7.5,10,15,20,25,30-1,2-Y	
HEATING SECTION-A5	
Supersedes Form No. 532,635W	New Form No. 532,804W

 Litho U.S.A.

Sequence of Operation -EHA 7 / 30kW - Y and G, J, M

NOTE: This sequence of operation is for all Electric Heat kW ratings and Y through J voltages. Each step of operation is numbered and can be followed in sequence on the diagrams. Operation for G, J, and M voltages will be the same.

HEATING ELEMENTS:

1 - Terminal Strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to Heat Contactors K15 and K16, which supplies voltage to HE1 through HE6. Each element is protected by fuse F3.

FIRST STAGE HEAT:

2 - Heating demand initiates at W1 in thermostat.

3 - 24VAC is routed through TB34 to the main control module A55. After A55 proves N.C. primary limit S15 and secondary limit S20, the electric heat contactor K15 is energized.

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

SECOND STAGE HEAT:

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

6 - 24VAC is routed through the main control module A55, which in turn energizes the electric heat contactor K16.

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

END OF SECOND STAGE HEAT:

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

9 - Electric heat contactor K16 is de-energized.

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

END OF FIRST STAGE HEAT:

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

12- Electric heat contactor K15 is de-energized.

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

SERVICE NOTES