COMPLETE COMFORT

in one convenient package

LRP16/LRP14 | PACKAGED UNITS

Compact packaged units for residential applications

ENERGY-SAVING EFFICIENCY

Ideal for homes built on a crawlspace instead of a basement, LRP16 packaged air conditioners and heat pumps provide year-round comfort and energy savings. With efficiency ratings of up to 16 SEER, LRP16 packaged units are as efficient as they are versatile.

EFFICIENCIES OF UP TO

16.00 SEER,* 8.20 HSPF* & 81% AFUE*

The LRP16 has earned the ENERGY STAR® certification, which means it meets or exceeds guidelines set forth by the U.S. Environmental Protection Agency.

EFFICIENCY INNOVATIONS

TWO-STAGE COMPRESSOR
Delivers more even temperatures, enhanced dehumidification and reduced energy consumption for lower operating costs.

VARIABLE-SPEED FAN
Efficient and quiet, the variable-speed fan reduces drafts in your home, controls humidity and improves air quality.

EFFICIENT BLOWER MOTOR
Maximizes comfort and reliability.

ENHANCED COIL GUARD
Protects the condenser coil, maintaining the efficiency of the unit.

SMART DESIGN

LRP16 packaged units have a compact footprint that allows for quick installation and blends in with your outdoor environment. An optional Healthy Climate® air purification accessory is also offered to improve indoor air quality.

DESIGN INNOVATIONS

INTERNALLY-MOUNTED OUTDOOR FAN
Significantly reduces operating sound.

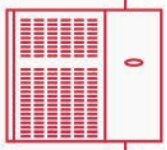
OPTIONAL AIR PURIFICATION ACCESSORY
Removes volatile organic compounds and odors from sources like cooking smells, cleaning products, pet odors and fumes from carpeting or furniture solvents.

COMPACT COMFORT

LRP14 packaged air conditioners and heat pumps offer energy-efficient comfort in one self-contained system. With efficiency ratings of up to 14 SEER, they also deliver year-round energy savings.

EFFICIENCIES OF UP TO

14.00 SEER,* 8.00 HSPF* & 81% AFUE*



COMFORT INNOVATIONS

INTERNALLY-MOUNTED FAN
Reduces vibrations and helps to keep operating sounds to a minimum, so you can enjoy uninterrupted peace and comfort.

BLOWER MOTOR
Maximizes comfort and efficiency.

DEPENDABLE COMPRESSOR
Provides years of proven comfort.

RELIABLE COMFORT

LRP16 and LRP14 packaged units are constructed from the highest-quality materials to ensure season after season of reliable operation. Their rugged design includes steel louvered coil protection for added durability.

20 YEAR LIMITED WARRANTY	10 YEAR LIMITED WARRANTY	10 YEAR LIMITED WARRANTY
HEAT EXCHANGER	COMPRESSOR	WITH PRODUCT REGISTRATION

PEACE-OF-MIND PROTECTION
LRP16GE and LRP14GE/DF packaged units come with a 20-year limited warranty on the heat exchanger. All units come with a 10-year limited warranty on the compressor and a 5-year limited warranty on all remaining covered components.**

*The cooling efficiency rating for air conditioners and heat pumps is Seasonal Energy Efficiency Ratio, or SEER. The heating rating is Heating Seasonal Performance Factor, or HSPF. The higher the SEER and HSPF, the better the energy performance, and the more you save. AFUE, or Annual Fuel Utilization Efficiency, is a measure of how much usable heat is generated when natural gas is burned in the unit. The higher the AFUE, the more heat you'll get from your natural gas, and the less gas you'll have to use to stay warm.

**Covered components may be eligible to receive a 10-year limited warranty. Online equipment registration at www.lennoxregistration.com is required within 60 days of installation (except in California and Quebec) or Lennox' base warranty will apply. Applies to residential applications only. See actual warranty certificate for details.
Note: Due to Lennox' ongoing commitment to quality, specifications and ratings are subject to change without notice.

Innovation never felt so good.®

STREAMLINED INNOVATION

Comfort and efficiency in one streamlined package

COMFORT YOUR WAY

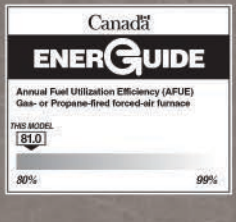
With a range of packaged units to choose from, you're sure to find one that meets your comfort needs. Ask your Lennox® Dealer which unit will work best for you.

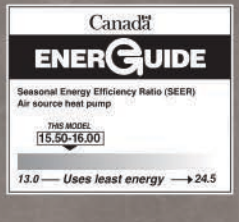
FINANCING YOUR COMFORT

Enjoy more comfort and purchasing power. Take advantage of flexible financing options that allow you to enjoy the innovation, precision and efficiency of Lennox on your terms.*

*Subject to credit approval. Minimum monthly payments required. See your Lennox Dealer for details.

Intertek





LENNOX

www.lennox.com
1-800-9-LENNOX

PC87288 05/17 (16C57)

LENNOX Service Literature®

UNIT INFORMATION

Corp. 1501-L2
August 2016
Revised March 2017

LRP14HP/DF/AC/GE LRP16GE/HP

2 to 5 Ton (7.0 to 17.6 kW)

LRP14HP/LRP14DF/LRP14AC/LRP14GE/LRP16GE/LRP16HP SERIES UNITS

The LRP14/16 series packaged units are available in sizes ranging from 2 through 5 tons (7.0 through 17.6 kW). The LRP14/16 unit is designed for HFC-410A refrigerant and for outdoor residential use only. Units can be installed at ground level or on rooftops. The LRP14 units utilize a scroll compressor. LRP16GE/HP units utilize a two-stage compressor.

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.

⚠ WARNING

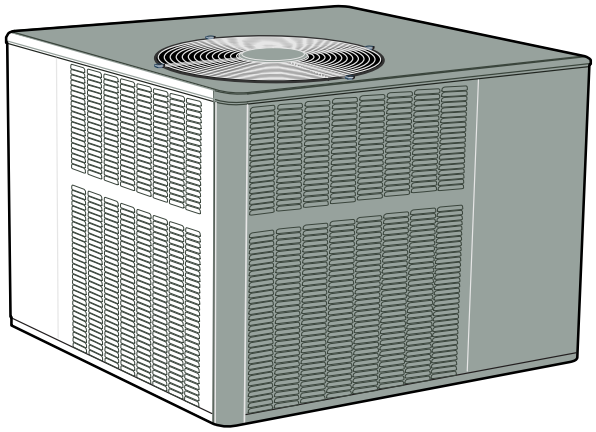
Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent), service agency or the gas supplier.

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

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



⚠ IMPORTANT

Operating pressures and pressure switch settings in HFC-410A units are higher than pressures and switch settings in HCFC-22 units. Always use service equipment rated for HFC-410A if servicing a HFC-410A unit.

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SPECIFICATIONS — LRP14 HP and DF Models

General Data		Model No.	LRP14HP LRP14DF -24	LRP14HP LRP14DF -30	LRP14HP LRP14DF -36	LRP14HP LRP14DF -42	LRP14HP LRP14DF -48	LRP14HP LRP14DF -60
		Nominal Tonnage	2	2.5	3	3.5	4	5
Cooling/ Heating Performance	Cooling	Total Capacity - Btuh	22,600	28,600	34,000	40,000	46,000	57,000
		Total unit watts - DF only	2055	2600	3090	3635	4180	5180
		[1] SEER (Btuh/Watt)	14.0	14.0	14.0	14.0	14.0	14.0
		EER (Btuh/Watt)	11.0	11.0	11.0	11.0	11.0	11.0
	High Temp Heat	Total Capacity - Btuh	22,000	27,000	33,400	39,000	45,000	56,000
		Total unit watts	1700	2140	2645	3175	3565	4440
		COP	3.8	3.7	3.7	3.6	3.7	3.7
		HSPF - Region IV / Region V	8.0 / 6.95	8.0 / 6.95	8.0 / 6.95	8.0 / 6.95	8.0 / 6.95	8.0 / 6.95
	Low Temp Heat	Total Capacity - Btuh	12,300	15,900	20,000	23,600	27,000	33,600
		Total unit watts	1570	2025	2550	3010	3445	4105
		COP	2.3	2.3	2.3	2.3	2.3	2.4
		[2] Sound Rating Number (dB)	78	78	78	78	78	78
		Refrigerant Type	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A
		Refrigerant Charge	5 lbs. 11 oz.	6 lbs. 0 oz.	5 lbs. 12 oz.	10 lbs. 5 oz.	10 lbs. 3 oz.	10 lbs. 1 oz.
Gas Heat Available — Dual Fuel Models Only			**-072(X)**	**-072(X)**	**-072(X), -090**	**-072(X), -090**	**-126(X)**	**-126(X)**
Outdoor Coil		Net face area - sq. ft.	16.4	16.4	16.4	16.6	16.6	16.6
		Tube dia. - in. & No. of rows	5/16 - 1	5/16 - 1	5/16 - 1	5/16 - 2	5/16 - 2	5/16 - 2
		Fins per inch	22	22	22	22	22	22
Outdoor Coil Fan		Diameter - in. & No. of blades	22 - 4	22 - 4	22 - 4	24 - 3	24 - 3	24 - 3
		Motor horsepower	1/6	1/6	1/6	1/4	1/4	1/4
Indoor Coil		Net face area - sq. ft.	4.4	4.4	4.4	6.8	6.8	6.8
		Tube dia. - in. & No. of rows	5/16 - 3	3/8 - 3	3/8 - 3	3/8 - 3	3/8 - 3	3/8 - 3
		Fins per inch	15	15	15	15	15	15
Indoor Blower		Blower wheel size dia. x width - in.	10 x 6	10 x 6	10 x 8	10 x 10	10 x 10	12 x 9
		Motor horsepower	1/4	1/4	1/3	1/3	1/2	1
Net weight of basic unit			333	342	352	455	460	482
Shipping weight of basic unit (1 Pkg.)			396	405	415	528	533	555
Electrical characteristics (60 Hz)			208/230V-1ph-60Hz					

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.
[2] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

SPECIFICATIONS — LRP14 AC Model

General Data	Model No.	LRP14AC -24	LRP14AC -30	LRP14AC -36	LRP14AC -42	LRP14AC -48	LRP14AC -60
	Nominal Tonnage	2	2.5	3	3.5	4	5
Cooling Performance	Total Cooling Capacity - Btuh	22,600	28,400	34,000	40,000	46,000	57,000
	Total unit watts	- - -	- - -	- - -	- - -	- - -	- - -
	[1] SEER (Btuh/Watt)	14.0	14.0	14.0	14.0	14.0	14.0
	EER (Btuh/Watt)	11.5	11.5	12.0	11.5	11.5	12.0
	[2] Sound Rating Number (dB)	78	78	78	78	78	78
Refrigerant	Type	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A
	Charge	4 lbs. 6 oz.	4 lbs. 13 oz.	4 lbs. 15 oz.	6 lbs. 12 oz.	6 lbs. 10 oz.	7 lbs. 13 oz.
Condensate drain size (fpt) - in.		3/4	3/4	3/4	3/4	3/4	3/4
Outdoor Coil Fan	Diameter - in. & No. of blades	22 - 4	22 - 4	22 - 4	24 - 3	24 - 3	24 - 3
	Motor horsepower	1/6	1/6	1/6	1/4	1/4	1/4
Indoor Blower	Blower wheel size dia. x width - in.	10 x 6	10 x 6	10 x 8	10 x 10	10 x 10	12 x 9
	Motor horsepower	1/4	1/4	1/3	1/3	1/2	1
Net weight of basic unit - lbs.		331	343	351	424	428	467
Shipping weight of basic unit (1 Pkg.)		394	406	414	497	501	540
Electrical characteristics (60 Hz)		208/230V-1ph-60Hz					

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.
[2] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

SPECIFICATIONS — LRP14 GE Model

General Data	Model No.	LRP14GE -24	LRP14GE -30	LRP14GE -36	LRP14GE -42	LRP14GE -48	LRP14GE -60
	Nominal Tonnage	2	2.5	3	3.5	4	5
Gas Heat Available		-054(X), -072	-054(X), -072	-054, -072(X), -090	-072(X), -090	-108(X), -126	-108(X), -126
Cooling Performance	Total Cooling Capacity - Btuh	22,600	28,400	34,000	40,000	46,000	57,000
	Total unit watts	2055	2580	3090	3635	4180	5180
	[1] SEER (Btuh/Watt)	14.0	14.0	14.0	14.0	14.0	14.0
	EER (Btuh/Watt)	11.0	11.0	11.0	11.0	11.0	11.0
	[2] Sound Rating Number (dB)	78	78	78	78	78	78
Refrigerant	Type	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A	HFC-410A
	Charge	4 lbs. 6 oz.	4 lbs. 13 oz.	4 lbs. 15 oz.	6 lbs. 12 oz.	6 lbs. 10 oz.	7 lbs. 13 oz.
Condensate drain size (fpt) - in.		3/4	3/4	3/4	3/4	3/4	3/4
Outdoor Coil	Net face area - sq. ft.	14.6	16.4	16.4	19.5	19.5	16.6
	Tube dia. - in. & No. of rows	5/16 - 1	5/16 - 1	5/16 - 1	5/16 - 1	5/16 - 1	5/16 - 2
	Fins per inch	26	26	26	26	26	22
Outdoor Coil Fan	Diameter - in. & No. of blades	22 - 4	22 - 4	22 - 4	24 - 3	24 - 3	24 - 3
	Motor horsepower	1/6	1/6	1/6	1/4	1/4	1/4
Indoor Coil	Net face area - sq. ft.	4.4	4.4	4.4	6.8	6.8	6.8
	Tube dia. - in. & No. of rows	3/8 - 2	3/8 - 2	3/8 - 3	3/8 - 3	3/8 - 3	3/8 - 3
	Fins per inch	16	16	15	15	15	15
Indoor Blower	Blower wheel size dia. x width - in.	10 x 6	10 x 6	10 x 8	10 x 10	10 x 10	12 x 9
	Motor horsepower	1/4	1/4	1/3	1/3	1/2	1
Net weight of basic unit - lbs.		358	370	389	460	476	513
Shipping weight of basic unit (1 Pkg.)		421	433	452	533	549	586
Electrical characteristics (60 Hz)		208/230V-1ph-60Hz					

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.
[2] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

SPECIFICATIONS — LRP16 GE Model

General Data	Model No.	LRP16GE -24	LRP16GE -36	LRP16GE -48	LRP16GE -60
	Nominal Tonnage	2	3	4	5
Gas Heat Available		-72(X)	-72(X), -90(X)	-108(X)	-126(X)
Cooling Performance	Total Cooling Capacity - Btuh	23,800	35,400	47,500	57,000
	Total unit watts	1900	2950	3960	4750
	[1] SEER (Btuh/Watt)	16.0	16.0	16.0	16.0
	EER (Btuh/Watt)	12.5	12.0	12.0	12.0
	[2] Sound Rating Number (dB)	74	75	75	74
Refrigerant	Type	HFC-410A	HFC-410A	HFC-410A	HFC-410A
	Charge	5 lbs. 7 oz.	5 lbs. 12 oz.	6 lbs. 10 oz.	9 lbs. 1 oz.
Condensate drain size (fpt) - in.		3/4	3/4	3/4	3/4
Outdoor Coil	Net face area - sq. ft.	14.6	16.4	19.5	19.1
	Tube dia. - in. & No. of rows	5/16 - 1	5/16 - 1	5/16 - 1	5/16 - 2
	Fins per inch	26	26	26	22
Outdoor Coil Fan	Diameter - in. & No. of blades	22 - 3	22 - 3	24 - 3	24 - 3
	Motor horsepower	1/6	1/6	1/4	1/4
Indoor Coil	Net face area - sq. ft.	4.4	4.4	6.8	6.8
	Tube dia. - in. & No. of rows	3/8 - 3	3/8 - 3	3/8 - 3	3/8 - 3
	Fins per inch	15	15	15	15
Indoor Blower	Blower wheel size dia. x width - in.	10 x 6	10 x 8	10 x 10	12 x 9
	Motor horsepower	1/2	1/2	3/4	1
Net weight of basic unit - lbs.		375	384	486	522
Shipping weight of basic unit (1 Pkg.)		445	456	528	595
Electrical characteristics (60 Hz)		208/230V-1ph-60Hz			

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.
[2] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

SPECIFICATIONS — LRP16 HP Model

General Data	Model No.	LRP16HP -24	LRP16HP -36	LRP16HP -48	LRP16HP -60
	Nominal Tonnage	2	3	4	5
	Total unit watts	1910	2910	3910	4950
Cooling Performance	Total Capacity - Btuh	23,000	35,000	47,000	57,000
	[1] SEER (Btuh/Watt)	16.0	16.0	16.0	15.5
	EER (Btuh/Watt)	12.0	12.0	12.0	11.5
	[2] Sound Rating Number (dB)	71	71	74	74
Heating Performance	High Temp. Heat Total Capacity - Btuh	22,000	34,000	46,000	56,000
	Total unit watts	1791	2770	3740	4440
	COP	3.60	3.60	3.60	3.70
	HSPF (Region IV)	8.20	8.20	8.20	8.20
	Low Temp. Heat Total Capacity - Btuh	11,900	19,700	26,600	37,200
	Total unit watts	1480	2530	3500	4250
	COP	2.36	2.28	2.23	2.57
Refrigerant	Type	HFC-410A	HFC-410A	HFC-410A	HFC-410A
	Charge	5 lbs. 5 oz.	8 lbs. 0 oz.	10 lbs. 8 oz.	10 lbs. 8 oz.
Condensate drain size (fpt) - in.		3/4	3/4	3/4	3/4
Outdoor Coil	Net face area - sq. ft.	16.3	15.5	18.6	18.6
	Tube dia. - in. & No. of rows	5/16 - 1	5/16 - 2	5/16 - 2	5/16 - 2
	Fins per inch	22	22	22	22
Outdoor Coil Fan	Diameter - in. & No. of blades	22 - 3	22 - 3	24 - 3	24 - 3
	Motor horsepower	1/2	1/2	1/2	1/2
Indoor Coil	Net face area - sq. ft.	4.4	4.4	6.8	6.8
	Tube dia. - in. & No. of rows	5/16 - 3	3/8 - 3	3/8 - 3	3/8 - 3
	Fins per inch	15	15	15	15
Indoor Blower	Blower wheel size dia. x width - in.	10 x 6	10 x 8	10 x 10	12 x 9
	Motor horsepower	1/2	1/2	3/4	1
Net weight of basic unit - lbs.		375	410	490	505
Shipping weight of basic unit (1 Pkg.)		438	473	563	578
Electrical characteristics (60 Hz)		208/230V-1ph-60Hz			

[1] AHRI Certified to AHRI Standard 210/240:
Cooling Ratings - 95ºF outdoor air temperature and 80ºF db/67ºF wb entering indoor coil air.
High Temperature Heating Ratings - 47ºF db/43ºF wb outdoor air temperature and 70ºF entering indoor coil air.
Low Temperature Heating Ratings - 17ºF db/15ºF wb outdoor air temperature and 70ºF entering indoor coil air.
[2] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

ELECTRIC HEAT CAPACITIES – LRP14 HP and AC Models – LRP16 HP

Input Voltage	5 kW			7.5 kW			10 kW			15 kW			20 kW		
	No of Steps	kW input	Btuh Output	No of Steps	kW input	Btuh Output	No of Steps	kW input	Btuh Output	No of Steps	kW input	Btuh Output	No of Steps	kW input	Btuh Output
208	1	3.8	12,800	1	5.6	19,200	1	7.5	25,600	1	11.2	38,200	1	15.0	51,200
220	1	4.2	14,300	1	6.3	21,500	1	8.4	28,700	1	12.6	43,000	1	16.8	57,300
230	1	4.6	15,700	1	6.9	23,500	1	9.2	31,300	1	13.8	47,000	1	18.4	62,700
240	1	5.0	17,100	1	7.5	25,600	1	10.0	34,100	1	15.0	51,200	1	20.0	68,200

GAS HEAT CAPACITIES – LRP14DF Only

	Model	24, 30, 36, 42	36, 42	48, 60
	Heating Input	-072	-090	-126
Heating Capacity Btuh	Input	72,000	90,000	126,000
	Output	58,400	72,900	102,100
[1]AFUE		81%	81%	81%
Temperature Rise - °F		40-70	40-70	45-75
Gas Supply Connection (FPT) - in.		1/2	1/2	1/2
Min. Recommended Gas Supply Pressure		5 in. w.g. Natural Gas, 11 in. w.g LPG / Propane		

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.

GAS HEAT CAPACITIES – LRP14GE Only

	Model	24, 30, 36	24, 30	36, 42	36, 42	48, 60	48, 60
	Heating Input	**-054**	**-072**	**-072**	**-090**	**-108**	**-126**
Heating Capacity Btuh	Input	54,000	72,000	72,000	90,000	108,000	126,000
	Output	43,800	58,400	58,400	72,900	87,500	102,100
[1]AFUE		81%	81%	81%	81%	81%	81%
Temperature Rise - °F		30-60	40-70	35-65	40-70	40-70	45-75
Gas Supply Connection (FPT) - in.		1/2	1/2	1/2	1/2	1/2	1/2
Min. Recommended Gas Supply Pressure		5 in. w.g. Natural Gas, 11 in. w.g LPG / Propane					

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.

GAS HEAT CAPACITIES – LRP16GE Only

	Model	24, 36	36	48	60
	Heating Input	**-072**	**-090**	**-108**	**-126**
Heating Capacity Btuh	First Stage - Input	54,000	67,500	81,000	94,500
	Output	43,500	54,500	65,500	76,500
	Second Stage Input	72,000	90,000	108,000	126,000
	Output	58,000	73,000	88,000	102,000
[1]AFUE		81%	81%	81%	81%
Temperature Rise - °F	First Stage	35-45	35-45	45-55	45-55
	Second Stage	45-55	45-55	50-60	50-60
Gas Supply Connection (FPT) - in.		1/2	1/2	1/2	1/2
Min. Recommended Gas Supply Pressure		5 in. w.g. Natural Gas, 11 in. w.g LPG / Propane			

[1] Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations.

ELECTRICAL/ELECTRIC HEAT DATA — LRP14HP Only

Model No.			LRP14HP24		LRP14HP30		LRP14HP36	
Line voltage data - 60hz - 1 phase			208/230V		208/230V		208/230V	
Compressor		Rated Load Amps	10.9		13.5		15.4	
		Locked Rotor Amps	59.3		72.5		83.9	
Outdoor Fan Motor		Full Load Amps	1.0		1.0		1.0	
		Locked Rotor Amps	1.9		1.9		1.9	
Indoor Blower Motor		Full Load Amps	2.8		2.8		4.1	
		Locked Rotor Amps	3.9		3.9		4.4	
[1] Maximum Overcurrent Protection		**Voltage**	**208V**	**240V**	**208V**	**240V**	**208V**	**240V**
	Unit only, no electric heat		25	25	30	30	35	35
		5 kW	30	30	30	30	30	35
		7.5 kW	40	45	40	45	40	45
		10 kW	50	60	50	60	50	60
	[3] 15 kW	Circuit 1	- - -	- - -	50	60	50	60
		Circuit 2	- - -	- - -	25	30	25	30
[1] Maximum Overcurrent Protection with Optional Single-Point Power Supply		**5 kW**	45	45	45	50	50	50
		7.5 kW	60	60	60	60	60	70
		10 kW	70	70	70	80	70	80
		15 kW	- - -	- - -	90	100	100	110
[2] Minimum Circuit Ampacity	Unit only, no electric heat		17.4	17.4	20.7	20.7	24.4	24.4
		5 kW	25.4	28.8	25.4	28.8	26.7	30.1
		7.5 kW	36.7	41.9	36.7	41.9	38	43.2
		10 kW	47.9	54.9	47.9	54.9	49.2	56.2
	[3] 15 kW	Circuit 1	- - -	- - -	47.9	54.9	49.2	56.2
		Circuit 2	- - -	- - -	22.6	26	22.6	26
[2] Minimum Circuit Ampacity with Optional Single-Point Power Supply		**5 kW**	39.1	42.4	42.3	45.7	46	49.4
		7.5 kW	50.3	55.6	53.6	58.8	57.2	62.5
		10 kW	61.6	68.6	64.8	71.8	68.5	75.5
		15 kW	- - -	- - -	87.4	97.8	91.1	101.5

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.
NOTE - Extremes of operating range are plus and minus 10% of line voltage.
1 HACR type breaker or fuse.
2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
3 A separate compressor circuit is required.

ELECTRICAL/ELECTRIC HEAT DATA — LRP14HP Only (Contd.)

Model No.			LRP14HP42		LRP14HP48		LRP14HP60	
Line voltage data - 60hz - 1 phase			208/230V		208/230V		208/230V	
Compressor	Rated Load Amps		15.9		18		24.3	
	Locked Rotor Amps		85		117		144.2	
Outdoor Fan Motor	Full Load Amps		1.7		1.7		1.7	
	Locked Rotor Amps		3.2		3.2		3.2	
Indoor Blower Motor	Full Load Amps		2.8		2.8		7.6	
	Locked Rotor Amps		5.4		6.8		- - -	
[1] Maximum Overcurrent Protection	**Voltage**		**208V**	**240V**	**208V**	**240V**	**208V**	**240V**
	Unit only, no electric heat		40	40	45	45	60	60
	5 kW		30	30	30	30	35	35
	7.5 kW		40	45	40	45	45	50
	10 kW		50	60	50	60	60	60
	[3] 15 kW	Circuit 1	50	60	50	60	60	60
		Circuit 2	25	30	25	30	25	30
	[3] 20 kW	Circuit 1	50	60	50	60	50	60
		Circuit 2	50	60	50	60	50	60
[1] Maximum Overcurrent Protection with Optional Single-Point Power Supply	**5 kW**		50	50	60	60	80	80
	7.5 kW		60	70	70	70	80	90
	10 kW		70	80	80	80	90	100
	15 kW		100	110	100	110	110	125
	20 kW		125	150	125	150	150	150
[2] Minimum Circuit Ampacity	Unit only, no electric heat		24.4	24.4	27	27	39.7	39.7
	5 kW		25.4	28.8	25.4	28.8	30.2	33.6
	7.5 kW		36.7	41.9	36.7	41.9	41.5	46.7
	10 kW		47.9	54.9	47.9	54.9	52.7	59.7
	[3] 15 kW	Circuit 1	47.9	54.9	47.9	54.9	52.7	59.7
		Circuit 2	22.6	26	22.6	26	22.6	26
	[3] 20 kW	Circuit 1	47.9	54.9	47.9	54.9	52.7	59.7
		Circuit 2	45.1	52.1	45.1	52.1	45.1	52.1
[2] Minimum Circuit Ampacity with Optional Single-Point Power Supply	**5 kW**		45.3	48.7	47.9	51.3	60.6	64
	7.5 kW		56.6	61.8	59.2	64.4	71.9	77.1
	10 kW		67.8	74.8	70.4	77.4	83.1	90.1
	15 kW		90.4	100.8	93.1	103.4	105.7	116.1
	20 kW		112.9	126.8	115.6	129.4	128.2	142.1

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.
NOTE - Extremes of operating range are plus and minus 10% of line voltage.
1 HACR type breaker or fuse.
2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
3 A separate compressor circuit is required.

ELECTRICAL DATA — LRP14DF Only

Model No.		LRP14DF24	LRP14DF30	LRP14DF36	LRP14DF42	LRP14DF48	LRP14DF60
Line voltage data - 60hz - 1 phase		208/230V		208/230V		208/230V	
[1] Maximum Overcurrent Protection (amps)		25	30	35	40	45	60
[2] Minimum Circuit Ampacity		17.4	20.7	24.4	24.4	27	39.7
Compressor	Rated Load Amps	10.9	13.5	15.4	15.9	18	24.3
	Locked Rotor Amps	59.3	72.5	83.9	85	117	144.2
Outdoor Coil Fan Motor	Full Load Amps	1.0	1.0	1.0	1.7	1.7	1.7
	Locked Rotor Amps	1.9	1.9	1.9	3.2	3.2	3.2
Indoor Blower Motor	Full Load Amps	2.8	2.8	4.1	2.8	2.8	7.6
	Locked Rotor Amps	- - -	- - -	- - -	5.4	6.8	- - -

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

ELECTRICAL/ELECTRIC HEAT DATA — LRP14AC Only

Model No.			LRP14AC24		LRP14AC30		LRP14AC36	
Line voltage data - 60Hz - 1 phase			208/230V		208/230V		208/230V	
Compressor		Rated Load Amps	10.9		13.5		15.4	
		Locked Rotor Amps	59.3		72.5		83.9	
Outdoor Fan Motor		Full Load Amps	1.0		1.0		1.0	
		Locked Rotor Amps	1.9		1.9		1.9	
Indoor Blower Motor		Rated Load Amps	2.8		2.8		4.1	
		Locked Rotor Amps	3.9		3.9		4.4	
[1] **Maximum Overcurrent Protection**		**Voltage**	**208V**	**240V**	**208V**	**240V**	**208V**	**240V**
	Unit only, no electric heat		25	25	30	30	30	30
		5 kW	25	30	25	30	25	30
		7.5 kW	40	45	40	45	40	45
		10 kW	50	60	50	60	50	60
	[3] **15 kW**	Circuit 1	- - -	- - -	50	60	50	60
		Circuit 2	- - -	- - -	25	30	25	30
[1] **Maximum Overcurrent Protection with Optional Single-Point Power Supply**		**5 kW**	25	30	30	30	30	30
		7.5 kW	40	45	40	45	40	45
		10 kW	50	60	50	60	50	60
		15 kW	- - -	- - -	70	80	70	90
[2] **Minimum Circuit Ampacity**	Unit only, no electric heat		16.7	16.7	18.7	18.7	20.6	20.6
		5 kW	24.3	27.7	24.3	27.7	24.6	28
		7.5 kW	35.6	40.8	35.6	40.8	35.9	41.1
		10 kW	46.8	53.8	46.8	53.8	47.1	54.1
	[3] **15 kW**	Circuit 1	- - -	- - -	46.8	53.8	47.1	54.1
		Circuit 2	- - -	- - -	22.6	26	22.6	26
[2] **Minimum Circuit Ampacity with Optional Single-Point Power Supply**		**5 kW**	24.3	27.7	24.3	27.7	24.6	28
		7.5 kW	35.6	40.8	35.6	40.8	35.9	41.1
		10 kW	46.8	53.8	46.8	53.8	47.1	54.1
		15 kW	- - -	- - -	69.4	79.8	69.7	80.1

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.
NOTE - Extremes of operating range are plus and minus 10% of line voltage.
1 HACR type breaker or fuse.
2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
3 A separate compressor circuit is required.

ELECTRICAL/ELECTRIC HEAT DATA — LRP14AC Only (Contd.)

Model No.			LRP14AC42		LRP14AC48		LRP14AC60	
Line voltage data - 60Hz - 1 phase			208/230V		208/230V		208/230V	
Compressor	Rated Load Amps		15.9		18		24.3	
	Locked Rotor Amps		85		117		144.2	
Outdoor Fan Motor	Full Load Amps		1.7		1.7		1.7	
	Locked Rotor Amps		3.2		3.2		3.2	
Indoor Blower Motor	Rated Load Amps		2.8		2.8		7.6	
	Locked Rotor Amps		5.4		6.8		- - -	
[1] Maximum Overcurrent Protection	**Voltage**		**208V**	**240V**	**208V**	**240V**	**208V**	**240V**
	Unit only, no electric heat		40	40	40	40	60	60
	5 kW		30	30	30	30	35	35
	7.5 kW		40	45	40	45	45	50
	10 kW		50	60	50	60	60	60
	[3] 15 kW	Circuit 1	50	60	50	60	60	60
		Circuit 2	25	30	25	30	60	60
	[3] 20 kW	Circuit 1	50	60	50	60	60	60
		Circuit 2	50	60	50	60	60	60
[1] Maximum Overcurrent Protection with Optional Single-Point Power Supply	**5 kW**		40	40	40	40	60	60
	7.5 kW		40	45	40	45	60	60
	10 kW		50	60	50	60	60	60
	15 kW		80	90	80	90	80	90
	20 kW		100	110	100	110	100	125
[2] Minimum Circuit Ampacity	Unit only, no electric heat		24.4	24.4	26.9	26.9	38.9	38.9
	5 kW		25.4	28.8	25.4	28.8	30.2	33.6
	7.5 kW		36.7	41.9	36.7	41.9	41.5	46.7
	10 kW		47.9	54.9	47.9	54.9	52.7	59.7
	[3] 15 kW	Circuit 1	47.9	54.9	47.9	54.9	52.7	59.7
		Circuit 2	22.6	26	22.6	26	22.6	26
	[3] 20 kW	Circuit 1	47.9	54.9	47.9	54.9	52.7	59.7
		Circuit 2	45.1	52.1	45.1	52.1	45.1	52.1
[2] Minimum Circuit Ampacity with Optional Single-Point Power Supply	**5 kW**		25.4	28.8	26.9	28.8	38.9	38.9
	7.5 kW		36.7	41.9	36.7	41.9	41.5	46.7
	10 kW		47.9	54.9	47.9	54.9	52.7	59.7
	15 kW		70.5	80.9	70.5	80.9	75.3	85.7
	20 kW		93	107	93	107	97.8	111.8

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.
NOTE - Extremes of operating range are plus and minus 10% of line voltage.
1 HACR type breaker or fuse.
2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
3 A separate compressor circuit is required.

ELECTRICAL DATA — LRP14GE Only

Model No.		LRP14GE24	LRP14GE30	LRP14GE36	LRP14GE42	LRP14GE48	LRP14GE60
Line voltage data - 60hz - 1 phase		208/230V		208/230V		208/230V	
[1] Maximum Overcurrent Protection (amps)		25	30	30	40	40	60
[2] Minimum Circuit Ampacity		16.7	18.7	20.6	24.4	26.9	38.9
Compressor	Rated Load Amps	11.2	12.8	14.1	15.9	17.9	23.7
	Locked Rotor Amps	60.8	64	72.2	85	96	152.5
Outdoor Coil Fan Motor	Full Load Amps	1.0	1.0	1.0	1.7	1.7	1.7
	Locked Rotor Amps	1.9	1.9	1.9	3.2	3.2	3.2
Indoor Blower Motor	Full Load Amps	1.7	1.7	2.0	2.8	2.8	7.6
	Locked Rotor Amps	3.9	3.9	4.4	5.4	6.8	- - -

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

ELECTRICAL DATA — LRP16GE Only

Model No.		LRP16GE24	LRP16GE36	LRP16GE48	LRP16GE60
Line voltage data - 60hz - 1 phase		208/230V			
[1] **Maximum Overcurrent Protection (amps)**		25	35	50	60
[2] **Minimum Circuit Ampacity**		17.0	22.7	31.2	41.7
Compressor	Rated Load Amps	11.7	15.3	21.2	28.8
	Locked Rotor Amps	58.3	83.0	104.0	152.9
Outdoor Coil Fan Motor	Full Load Amps	1.0	1.0	1.7	1.7
	Locked Rotor Amps	1.9	1.9	3.2	3.2
Indoor Blower Motor	Full Load Amps	1.1	2.3	3.1	4.0
	Locked Rotor Amps	4.3	4.3	6.8	9.1

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

ELECTRICAL/ELECTRIC HEAT DATA — LRP16HP Only

			Model No.	LRP16HP24		LRP16HP36		LRP16HP48		LRP16HP60	
			Line voltage data - 60hz - 1 phase	208/230V		208/230V		208/230V		208/230V	
Compressor			Rated Load Amps	11.7		16.1		21.2		27.1	
			Locked Rotor Amps	58.3		83.0		104.0		152.9	
Outdoor Fan Motor			Full Load Amps	1.2		1.4		2.3		2.4	
Indoor Blower Motor			Full Load Amps	1.7		3.6		4.5		5.5	
[1] Maximum Overcurrent Protection			**Voltage**	**208V**	**240V**	**208V**	**240V**	**208V**	**240V**	**208V**	**240V**
	Unit only, no electric heat			25	25	40	40	50	50	60	60
			5 kW	25	30	30	35	30	35	35	35
			7.5 kW	40	45	40	45	40	45	45	50
			10 kW	50	60	50	60	60	60	60	60
		[3] 15 kW	Circuit 1	- - -	- - -	50	60	60	60	60	60
			Circuit 2	- - -	- - -	25	30	25	30	25	30
		[3] 20 kW	Circuit 1	- - -	- - -	- - -	- - -	60	60	60	60
			Circuit 2	- - -	- - -	- - -	- - -	50	60	50	60
[1] Maximum Overcurrent Protection with Optional Single-Point Power Supply			**5 kW**	45	50	50	60	70	70	80	90
			7.5 kW	60	60	60	70	80	80	90	100
			10 kW	70	80	80	80	90	90	100	110
			15 kW	- - -	- - -	100	110	110	125	110	125
			20 kW	- - -	- - -	- - -	- - -	125	150	150	150
[2] Minimum Circuit Ampacity	Unit only, no electric heat			18.0	18.0	25.6	25.6	33.8	33.8	42.3	42.3
			5 kW	24.7	28.2	27.1	30.5	28.2	31.7	29.5	32.9
			7.5 kW	36.0	41.2	38.3	43.6	39.5	44.7	40.7	45.9
			10 kW	47.3	54.2	49.6	56.6	50.8	57.7	52.0	59.0
		[3] 15 kW	Circuit 1	- - -	- - -	49.6	56.6	50.8	57.7	52.0	59.0
			Circuit 2	- - -	- - -	22.6	26.0	22.6	26.0	22.6	26.0
		[3] 20 kW	Circuit 1	- - -	- - -	- - -	- - -	50.8	57.7	52.0	59.0
			Circuit 2	- - -	- - -	- - -	- - -	45.1	52.1	45.1	52.1
[2] Minimum Circuit Ampacity with Optional Single-Point Power Supply			**5 kW**	40.6	44.0	48.2	51.6	56.4	59.8	64.9	68.3
			7.5 kW	51.8	57.1	59.4	64.7	67.6	72.8	76.1	81.3
			10 kW	63.1	70.1	70.7	77.7	78.9	85.9	87.4	94.3
			15 kW	- - -	- - -	93.3	103.7	101.5	111.9	110.0	120.4
			20 kW	- - -	- - -	- - -	- - -	124.1	137.9	132.5	146.4

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.
NOTE - Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.
NOTE - Extremes of operating range are plus and minus 10% of line voltage.
1 HACR type breaker or fuse.
2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.
3 A separate compressor circuit is required.

HIGH ALTITUDE DERATE

Units may be installed at altitudes up to 4500 feet (1372 m) above sea level without any modification. At altitudes above 4500 feet (1372 m), units must be derated as shown in table 1.

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

Table 1. Manifold Pressure Versus Altitude

Natural Gas				Propane (LP)		
Altitude (ft.)	Heating value* (BTU/ft³)	Manifold Pressure (in. w. c.)		Heating value* (BTU/ft³)	Manifold Pressure (in. w. c.)	
		High	Low		High	Low
2000	948	3.50	2.00	2278	10.00	5.60
3000	914	3.50	2.00	2196	10.00	5.60
4000	881	3.50	2.00	2116	10.00	5.60
4500	865	3.50	2.00	2077	10.00	5.60
5000	849	3.29	1.88	2039	9.41	5.38
5500	833	3.27	1.87	2000	9.35	5.34
6000	818	3.25	1.86	1964	9.29	5.31
6500	802	3.23	1.84	1927	9.24	5.28
7000	787	3.21	1.83	1891	9.18	5.25
7500	771	3.19	1.82	1853	9.12	5.21

* Consult local utility for actual heating value.
Furnace input = Input Factor X Nameplate Input
Above 7500 feet, call Lennox Technical Services for additional assistance.

TYPICAL PARTS ARRANGEMENT

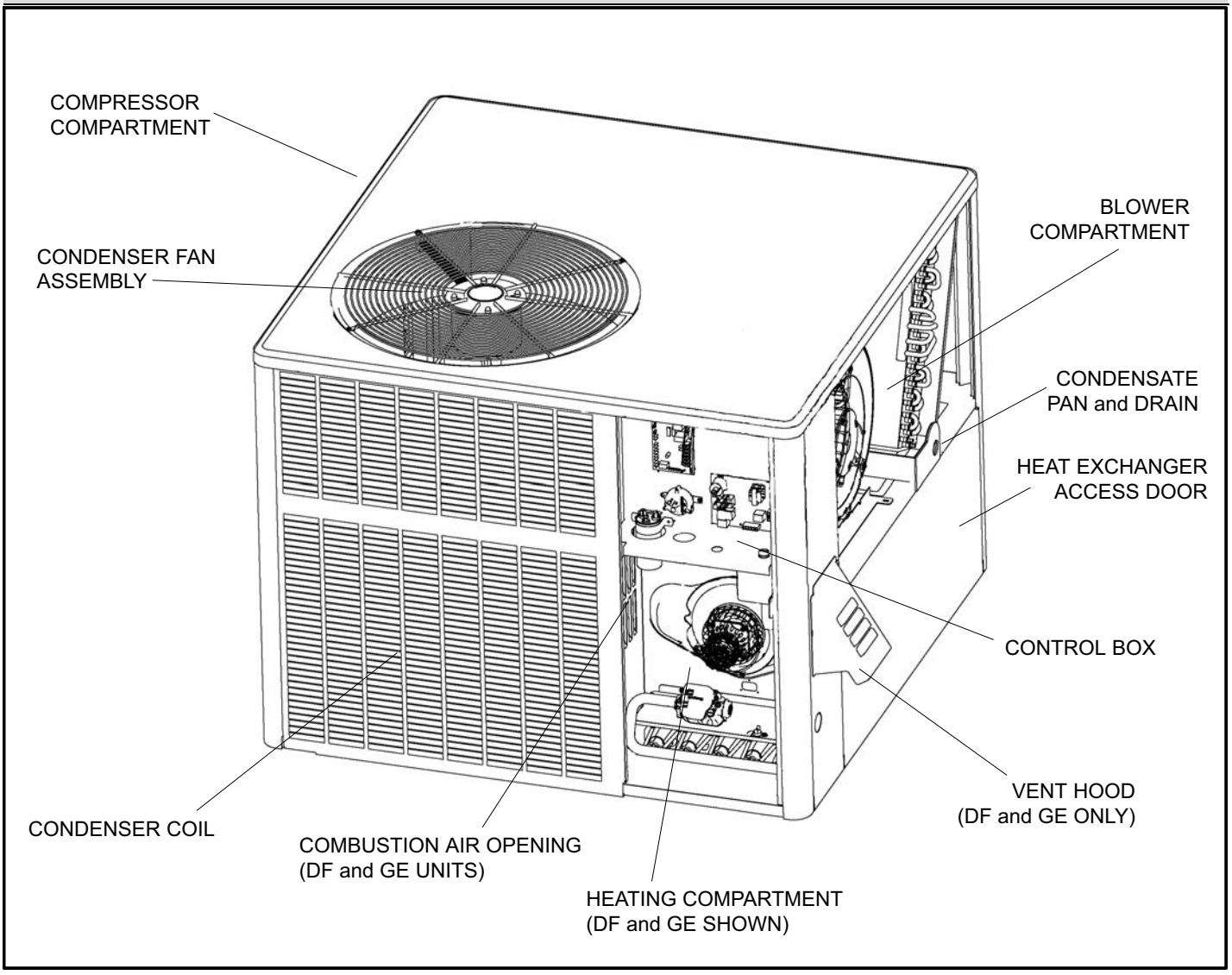


FIGURE 1. Typical Parts Arrangement (LRP14DF and LRP14GE shown)

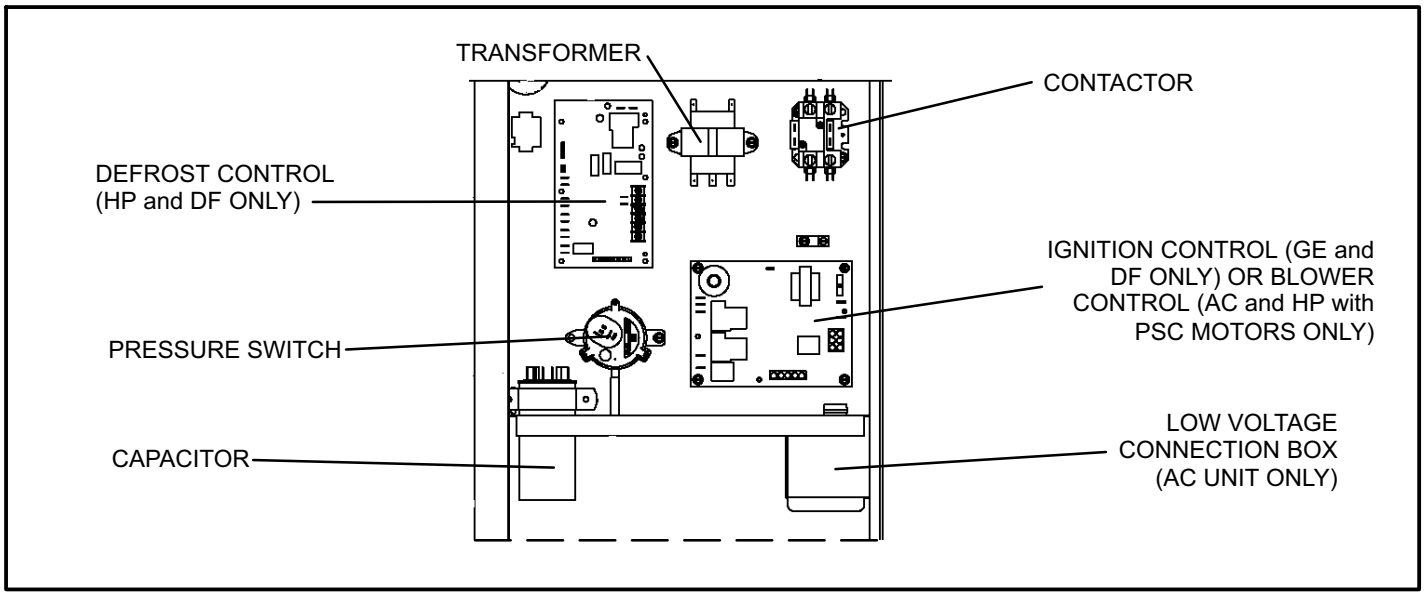


FIGURE 2. Typical Control Box

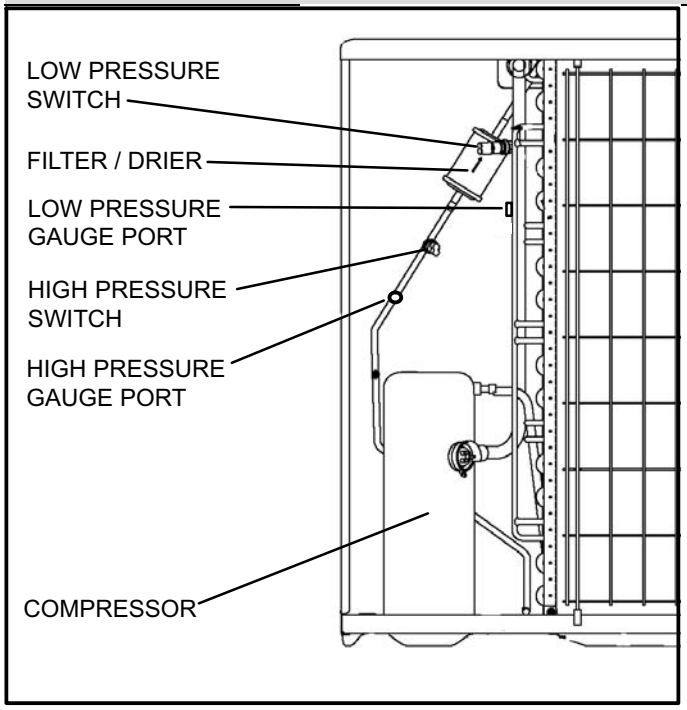


FIGURE 3. Compressor Compartment — AC and GE units

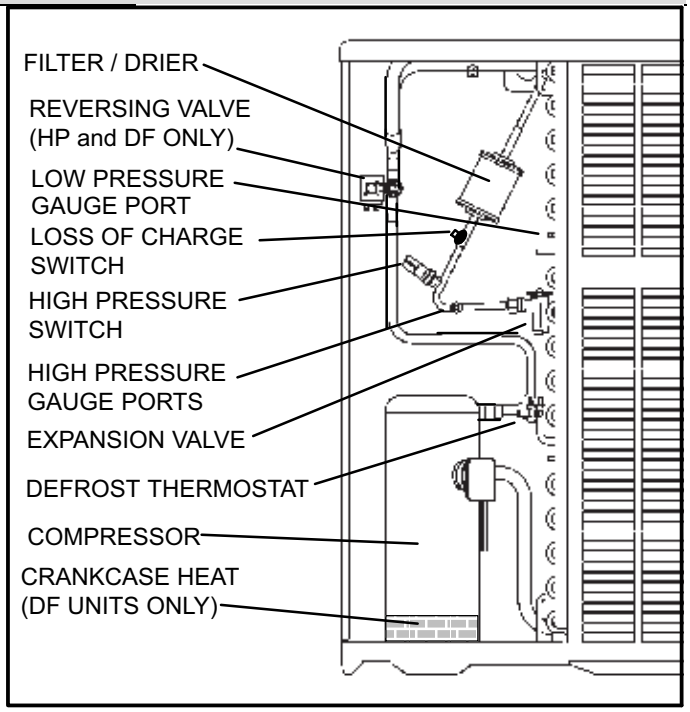


FIGURE 5. Compressor Compartment — (-2 build) HP and DF units

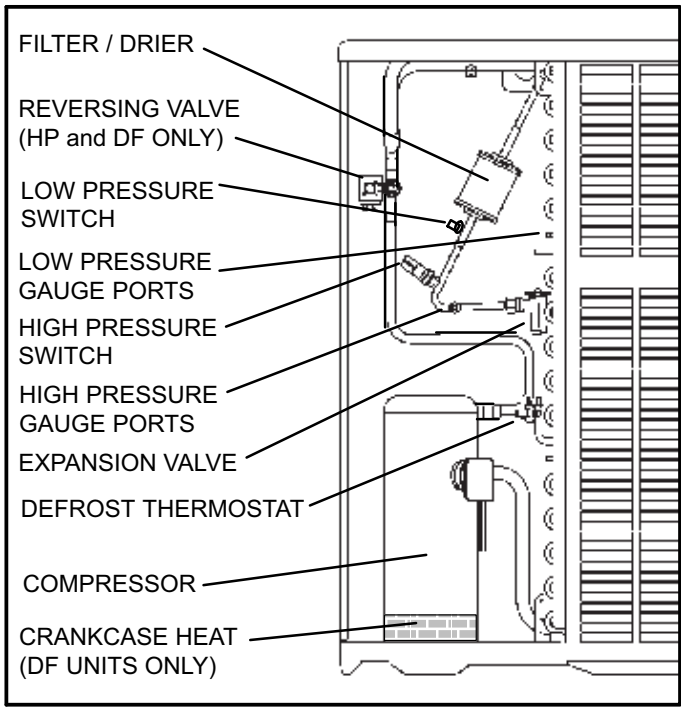


FIGURE 4. Compressor Compartment — HP and DF units

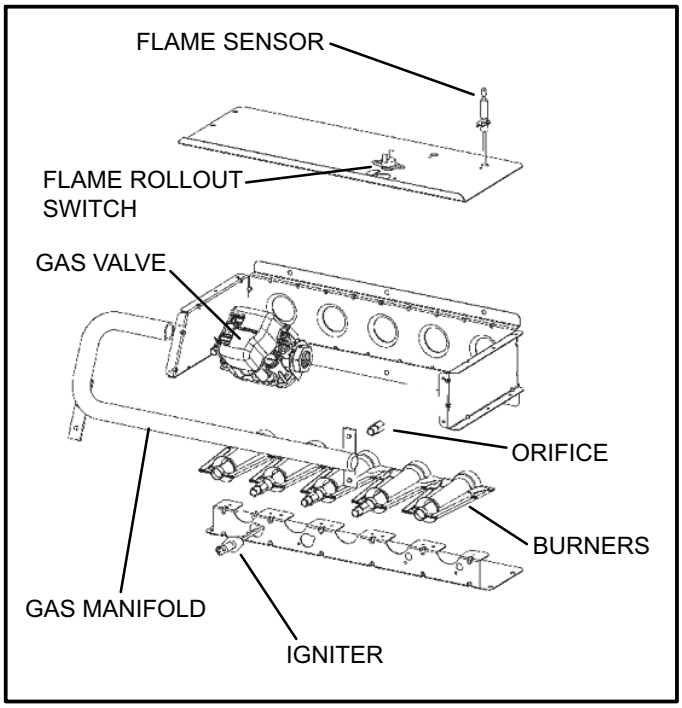


FIGURE 6. Burner Box Components — DF and GE units

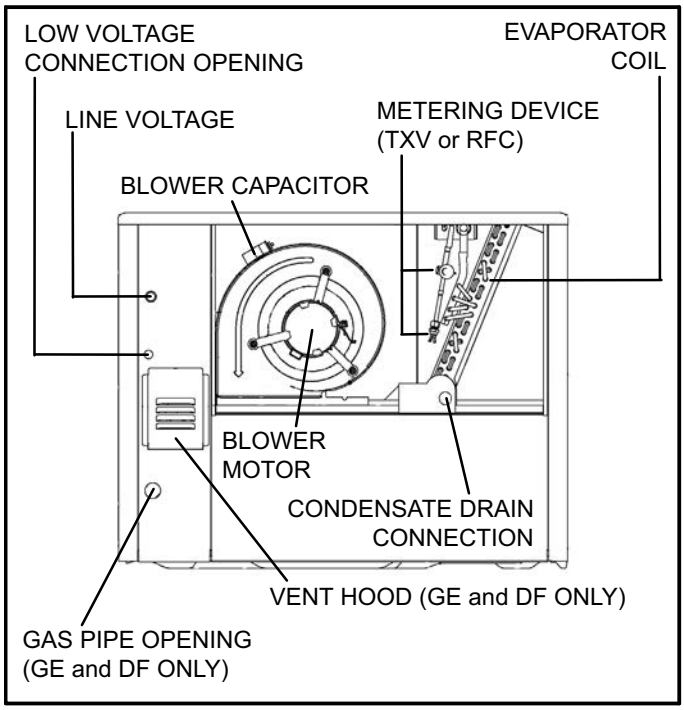


FIGURE 7. Blower Compartment

UNIT APPLICATIONS

LRP14HP

LRP14HP, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged heat pump units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes. Optional electric heat must be field installed if required. Units are available with constant torque or PSC blower motors.

In heating mode, the unit operates the heat pump for 1st stage heating. If 1st stage is not satisfied, the 2nd stage activates electric heat sections (secondary heat source). Refer to Product Specifications (EHB) for auxiliary heat selections.

All heat pump units are equipped with single-stage cooling only.

LRP14DF

LRP14DF, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged dual fuel heat pump units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes. Gas-fueled supplemental heat is factory installed for use in dual fuel units. Refer to page 4 for gas heat capacities. Units are available with constant torque or PSC blower motors.

In heating mode, the heat pump is used to satisfy 1st stage heating demand. If more heat is needed, W1 will activate gas heating to satisfy the heating call.

All dual fuel units are equipped with single-stage cooling only.

LRP14AC

LRP14AC, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged air conditioning units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes. Optional electric heat must be field installed if required. Refer to Product Specifications (EHB) for electric heat options. Units are available with constant torque or PSC blower motors. All LRP14AC units are equipped with single-stage cooling only.

LRP14GE

LRP14GE, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged air conditioning units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes.

A gas heat component is factory installed. Units are available with constant torque or PSC blower motors. All LRP14GE units are equipped with single-stage cooling and gas heat.

LRP16HP

LRP16HP, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged heat pump units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes. Optional electric heat must be field installed if required. Units are equipped with variable-speed ECM blower motors. All LRP16HP units are equipped with a two-stage Copeland compressor providing two-stage cooling.

In heating mode, the unit operates the heat pump for 1st stage heating. If 1st stage is not satisfied, the 2nd stage activates electric heat sections (secondary heat source). Refer to Product Specifications (EHB) for auxiliary heat selections.

LRP16GE

LRP16GE, 2 through 5 ton (7.0 through 17.6kW) model units, are single phase packaged air conditioning units designed for outdoor installation on a slab or rooftop in residential applications. The units are available in two cabinet sizes.

A gas heat component is factory installed. Units are equipped with variable-speed ECM blower motors. All LRP16GE units are equipped with a two-stage Copeland compressor providing two-stage cooling and gas heat.

UNIT COMPONENTS / OPERATION

Unit components are shown in figure 1.

Control Box Components

Control box components are shown in figure 2.

Compressor Contactor K1

K1 is a 24VAC to line voltage single-pole contactor, which energizes the compressor and condenser fan in response to thermostat demand.

Control Transformer T1

All LRP14 series units use line voltage to 24VAC transformer mounted in the control box. The transformer supplies power to control circuits in the unit. Transformers use two primary voltage taps as shown in figure 8.

NOTE - *The unit is factory-shipped at 230/240 volts.*

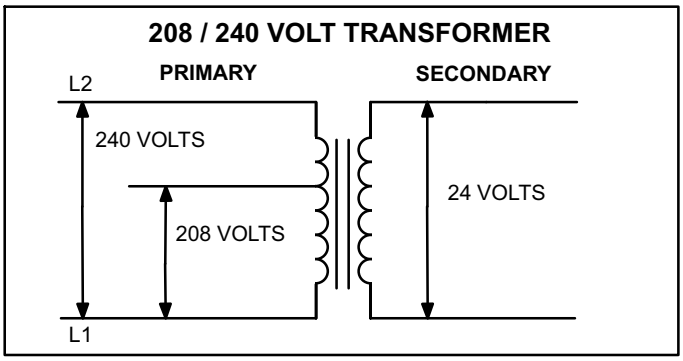


FIGURE 8

Dual Capacitor C12

The compressor and condenser fan in the LRP14/16 series units use permanent split capacitor motors. The capacitor is located in the control box. A dual rated capacitor is used for both the condenser fan motor and the compressor (see unit wiring diagram per respective unit). The fan side and the compressor side of the capacitor have different MFD ratings. See repair parts or nameplate for correct capacitor.

Ignition Control (A3)

⚠ WARNING

Shock hazard.

Disconnect power before servicing. Control is not field repairable. If control is inoperable, simply replace entire control.

Can cause injury or death. Unsafe operation will result if repair is attempted.

The LRP14DF and LRP14/16GE units include an ignition control which controls the combustion air inducer, gas valve and spark electrode. It receives signals from the limit switch, the rollout switch, the pressure prove switch and the flame sensor. The ignition control is shown in figure 9. LED codes are in table 1.

Electronic Ignition

On a W1 call the ignition control checks high temperature limit and rollout switch to make sure they are closed. The control then verifies that the pressure switch is open. If the pressure switch is closed, the control will flash code 3 on the LED and will wait indefinitely for the pressure switch to open. If the pressure switch is open, the control proceeds to the 15-second pre-purge.

The ignition control energizes the combustion air inducer, flashes a code 3 on the LED, and waits for the pressure switch to close.

When the pressure switch has closed, the LED code 3 flash stops and the control begins the 15-second pre-purge period. When the pre-purge time has expired, the control begins the ignition trial.

The ignition control energizes the gas valve and spark. The control ignores the flame sense signal for the first two seconds of the ignition trial. If the flame is established within 10 seconds, the control de-energizes the spark. If flame is not established within 10 seconds, the gas valve and spark are de-energized and the ignition control initiates a 30-second inter-purge sequence.

Approximately 30 seconds after the flame has been established, the circulating air blower starts. The ignition control inputs are continuously monitored to ensure that the limit switch, rollout switch and pressure switch are all closed, and that the flame remains established and heating demand is present. Single-stage gas valve, single-speed combustion air inducer and circulating blower remain energized. If the thermostat signals a requirement for second-stage heat (W2) on the dual fuel unit, the ignition control initiates auxiliary or back-up heat operation.

When a signal for second-stage heat is received by the ignition control, the control energizes the gas valves on dual fuel units and single-speed combustion air inducer until the demand is satisfied.

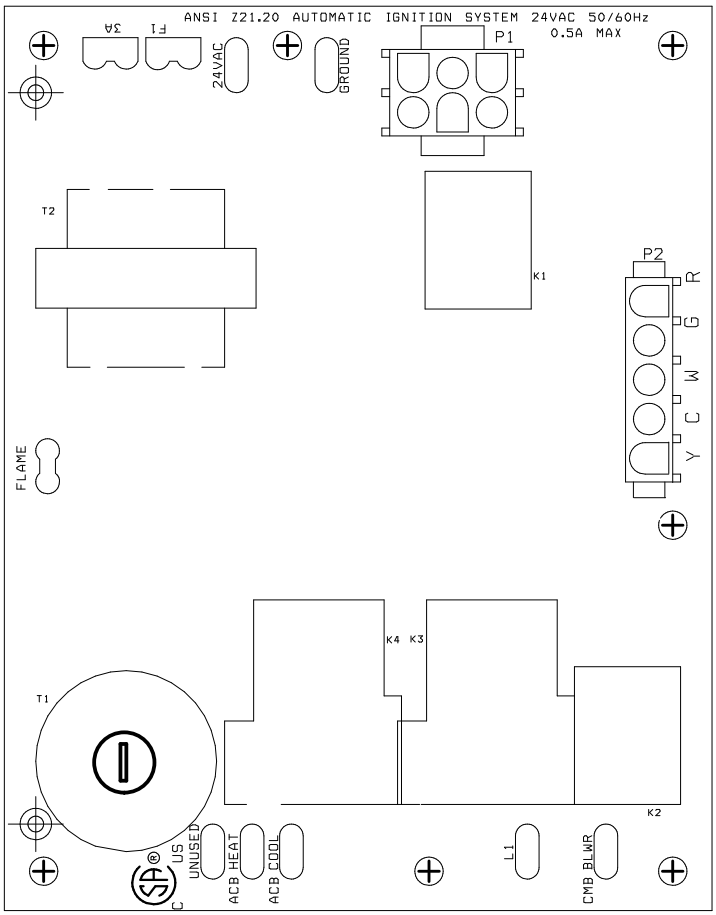
If a first-stage heat demand continues after the second-stage heat demand has been satisfied, the ignition control immediately de-energizes the gas valve. Heat pump operation continues until heating demand is satisfied.

When the heating demand is satisfied for dual fuel first stage, the control immediately de-energizes the compressor. The combustion air inducer remains energized for a 30-second post-purge period. The circulating air blower operates for 90 seconds after the gas valve is de-energized (GE units only).

The combustion air inducer is energized for 30 seconds at a Y1 call for cooling to clear warm humid air out of the heat exchanger.

The ignition control LED flashes codes which indicate normal or abnormal operations. See table 1.

IGNITION CONTROL (A3)



QUICK CONNECT CONNECTIONS:

.25 MALE QUICK CONNECTS:

TI - SPARK MODULE
24 VAC HOT
GROUND = 24 VAC RETURN
CMB BLOWER = COMBUSTION BLOWER (LINE VOLTAGE)
LI = LINE VOLTAGE
ACB COOL = AIR CIRCULATING BLOWER COOL SPEED (LINE VOLTAGE)
ACB HEAT = AIR CIRCULATING BLOWER HEAT SPEED (LINE VOLTAGE)
UNUSED

.I9 MALE QUICK CONNECT:

FLAME = FLAME PROBE

MOLEX/AMP PLUG-IN DESCRIPTION:
1. ROLLOUT SWITCH RETURN
2. HI LIMIT RETURN/PRESSRUE SWITCH OUT
3. GAS VALVE COMMON
4. GAS VALVE OUT
5. PRESSURE SWITCH RETURN
6. ROLLOUT SWITCH OUT

THERMOSTAT INPUT:
R = 24 VAC TO THERMOSTAT (RED)
G = MANUAL FAN INPUT FROM THERMOSTAT (GREEN)
W = HEAT DEMAND INPUT FROM THERMOSTAT (WHITE)
C = COMMON GROUND TO THERMOSTAT
Y = COOL DEMAND INPUT FROM THERMOSTAT (YELLOW)

HEAT MODE:
PREPURGE: 30 SEC.
INTER-PURGE: 30 SEC.
POST PURGE: 5 SEC.
TRIAL TIME: I0 SEC.
TRIAL: 3
BOARD TO RESET FROM LOCKOUT AFTER 60 MIN.

FAN ON DELAY:
COOL: 5 SEC. (FIXED)
HEAT: 30 SEC. (FIXED)

FAN OFF DELAY:
COOL: 90 SEC. (FIXED)
HEAT: I20 SEC. (FIXED)

FIGURE 9. Ignition Control – Gas-Heat Units Only

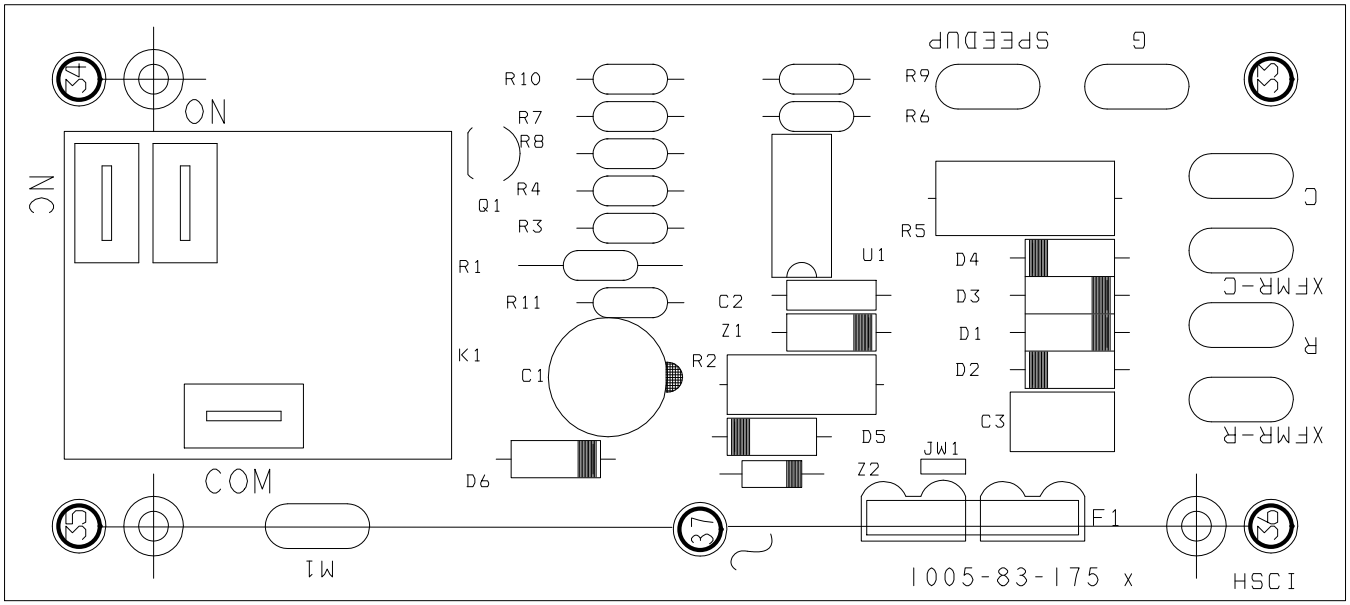
TABLE 1. LED Diagnostic Codes — Ignition Control

Slow Flash - 1 per second	Normal operation, no call for heat
Fast Flash - 2 per second	Normal operation, call for heat
Steady Off	Internal failure or no power
Steady On	Internal control failure
Code 2 - 2 flashes in 1 sec with 1 sec pause	Lockout, failed to detect or sustain flame, gas valve knob or switch off.
Code 3 - 3 flashes in 1 1/2 sec with 1 sec pause	Pressure switch open or closed
Code 4 - 4 flashes in 2 sec with 1 sec pause	High temp limit or rollout switch open
Code 5 - 5 flashes in 2 1/2 sec with 1 sec pause	Flame sensed with gas valve de-energized

⚠ 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.

BLOWER CONTROL (A15) – LRP14 UNITS



NOTES:

1. INPUT VOLTAGE: 18 TO 30 VAC
2. INPUT CURRENT: 100 mA. MAX. @ 24 VAC
3. THE DELAY BLOWER CONTROL PROVIDES POWER TO THE BLOWER MOTOR WITH A DELAY OF 0 SECONDS AFTER 24VAC IS APPLIED TO "G". AFTER 24VAC IS REMOVED FROM "G", THE BLOWER MOTOR OUTPUT IS DE-ENERGIZED AFTER A DELAY OF 90 SECONDS.

NORMAL TIME DELAYS:	60Hz	50Hz
TURN ON DELAY	0.0 SEC.±1%	0.0 SEC.±1%
TURN OFF DELAY	90.0 SEC.±1%	108.0 SEC.±1%

4. FIELD TEST MODE: SHORTING THE .250 SPEEDUP QUICK CONNECT TO "C" DECREASE TIMES AS FOLLOWS:

SPEEDUP TIMES	60Hz	50Hz
TURN ON DELAY	0.0 SEC.±1%	0.0 SEC.±1%
TURN OFF DELAY	5.0 SEC.±1%	6.0 SEC.±1%

FIELD TEST MODE IS CANCELLED WHEN THE .250 SPEEDUP QUICK CONNECT TO "C" SHORT IS REMOVED.

FIGURE 10. Blower Control LRP14 – PSC Motor – AC & HP Units

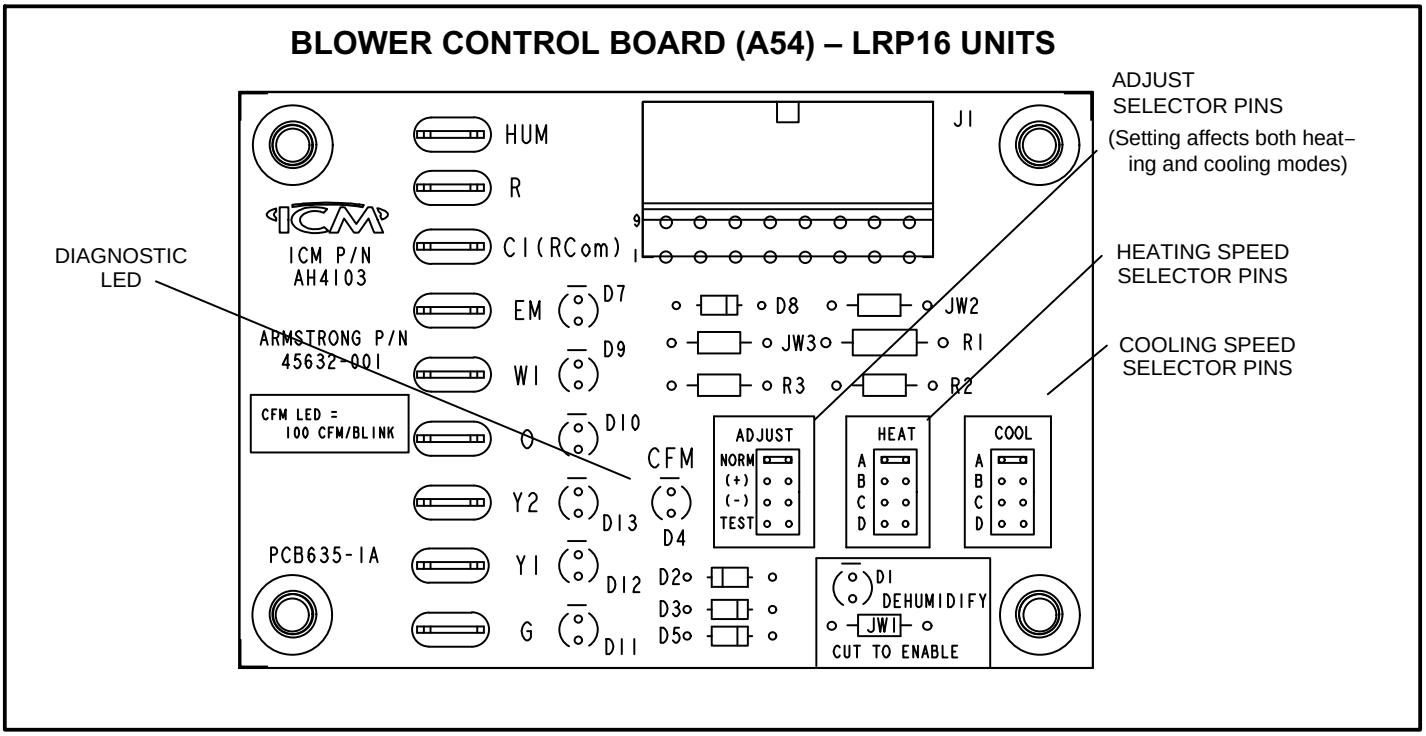


FIGURE 11. Blower Control Board (A54) – ECM Motor – LRP16GE / LRP16HP Units

Figure 10 shows the blower control utilized with PSC motors. On LRP14AC and HP units that are equipped with the PSC motor and a blower control, the indoor blower is energized by the G terminal on the room thermostat.

On LRP14DF and GE units that are equipped with the PSC motor and a blower control, the indoor blower is energized by the ignition control.

Blower Control — Units with Constant Torque Motors

LRP14 units that are equipped with constant torque blower motors are energized from the W, G and Y 24 volt terminals from the room thermostat, which are connected to the control board in each unit. The constant torque motor is capable of maintaining a specified CFM throughout the external static range. Constant torque units are not equipped with a separate blower control.

BLOWER SPEED ADJUSTMENT / OPERATION LRP14 UNITS

Speed Taps — PSC Units Only

Adjust the speed taps on the motor, if needed, to achieve the correct airflow in units equipped with PSC motors.

Factory positions for the blower speed jumpers are given in the PSC unit wiring diagrams. Use tables on pages 13-19 to determine the correct air volume for operation in heat and cool modes.

Blower Speeds — Constant Torque Units

Fan speed on units equipped with constant torque motors is field-adjustable. See blower CFM chart for unit size.

Blower Speeds — LRP16GE/HP Units

Fan speed on the HEAT and COOL stage air volume selections are made by jumper pins.

Continuous Fan Operation

When the thermostat is set for “Continuous Fan” operation and there is no demand for heating or cooling, the blower on units with PSC motors will operate at cooling speed. On units with constant torque motors, the blower will operate at low speed with a G call.

NOTE - *With the proper thermostat and sub-base, continuous blower operation is possible by closing the R to G circuit. Cooling blower delay is also functional in this mode.*

Blower Control Board (A54) LRP16GE/HP Units

These units are equipped with a variable-speed motor which is controlled by a blower control board. See figure 11.

On LRP16GE/HP units equipped with ECM motor and a two-stage electronic blower control, the indoor blower is energized by the ignition control.

The variable speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (COOL, HEAT, and ADJUST) on the blower control board. The HEAT and COOL jumpers are labeled A, B, C and D. Each of the letters corresponds with an air volume (CFM) setting. The ADJUST jumper is labeled NORM, +, - and Test. The + and - pin settings are used to add or subtract a percentage of the CFM selected. The Test jumper is used to operate the motor in the test mode. See figure 11.

Factory settings for the blower speed jumpers are given in the wiring diagram in figure 11. Use the blower data tables in this manual to determine the correct air volume for operation in heat and cool mode.

The CFM LED located on the blower control board flashes one time per 100 cfm to indicate selected blower speed. For example, if the unit is operating at 1000 CFM, CFM LED will flash 10 times. If the CFM is 1150, CFM LED will flash 11 full times plus one fast or half flash.

At times the light may appear to flicker or glow. This takes place when the control is communicating with the motor between cycles. This is normal operation.

Read through the jumper settings section before adjusting the jumper to obtain the appropriate blower speed.

To change jumper positions, gently pull the jumper off the pins and place it on the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one. Refer to figure 11.

After the CFM for each application has been determined, the jumper settings must be adjusted to reflect those given in the blower tables. From the tables, determine which row most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections.

The variable speed motor slowly ramps up to and down from the selected air flow during both cooling and heating demand. This minimizes noise and eliminates the initial blast of air when the blower is initially energized.

ADJUST

The **ADJUST** pins allow the motor to run at normal speed, approximately 15 percent higher, or approximately 15 percent lower than normal speed. The blower data tables give three rows (+, NORMAL, and -) with their respective CFM volumes. Notice that the normal adjustment setting for heat speed position C in table 1 is 900 CFM. The + adjustment setting for that position is 1035 CFM and for the - adjustment setting is 765 CFM. After the adjustment setting has been determined, choose the remaining speed settings from those offered in the table in that row.

The TEST pin is available to bypass the blower control and run the motor at approximately 70 percent to make sure that the motor is operational. This is used mainly in troubleshooting. The G terminal must be energized for the motor to run.

COOL

The **COOL** jumper is used to determine the CFM during cooling operation. This jumper selection is activated for cooling when Y1 is energized.

The blower motor runs at 80 percent of the selected air flow for the first 7-1/2 minutes of each cooling demand. This feature allows for greater humidity removal and saves energy.

In the cooling mode, the blower control board delays blower operation for 5 seconds after the compressor starts. The blower continues to operate for 90 seconds after the compressor is de-energized.

HEAT

The **HEAT** jumper is used to determine CFM during gas heat operation only. These jumper selections are activated only when W1 is energized.

In the heating mode, the blower control board delays blower operation for 30 seconds after the flame is established. The blower continues to operate for 90 seconds after the gas valve is de-energized.

CONTINUOUS FAN

When the thermostat is set for “Continuous Fan” operation and there is no demand for heating or cooling, the blower control will provide 50 percent of the **COOL** CFM selected.

NOTE - With the proper thermostat and subbase, continuous blower operation is possible by closing the R to G circuit. Cooling blower delay is also functional in this mode.

DEHUMIDIFICATION

The blower control board includes an HUM terminal which provides for connection of a humidistat. The JW1 resistor on the blower control board must be cut to activate the HUM terminal. The humidistat must be wired to open on humidity rise. When the dehumidification circuit is used, the variable speed motor will reduce the selected air flow rate by 25 percent when humidity levels are high. An LED (D1) lights when the blower is operating in the dehumidification mode.

NOTE - This unit is not approved for installation as part of a zoning system.

BLOWER DATA — LRP14HP

LRP14HP24 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)				
	Tap 1	Tap 2	Tap 3	[1] Tap 4 (Low Static Electric Heat)	[1] Tap 5 (High Static Electric Heat)
0.10	680	890	1000	890	- - -
0.20	590	830	960	830	- - -
0.30	550	800	930	800	- - -
0.40	500	760	880	760	- - -
0.50	450	710	840	- - -	840
0.60	380	680	810	- - -	810
0.70	- - -	640	770	- - -	770
0.80	- - -	600	730	- - -	730

NOTE - All air data measured external to unit with dry coil and less filter.
[1] Taps 4 and 5 are used with Optional Electric Heat. Refer to Electric Heat nameplate for proper heat tap selection.

LRP14HP30 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)				
	Tap 1	Tap 2	Tap 3	[1] Tap 4 (Low Static Electric Heat)	[1] Tap 5 (High Static Electric Heat)
0.10	680	1100	1180	1100	- - -
0.20	640	1070	1160	1070	- - -
0.30	600	1050	1130	1050	- - -
0.40	570	1020	1090	1020	- - -
0.50	530	990	1070	- - -	1070
0.60	490	960	1040	- - -	1040
0.70	- - -	930	1010	- - -	1010
0.80	- - -	900	960	- - -	960

NOTE - All air data measured external to unit with dry coil and less filter.
[1] Taps 4 and 5 are used with Optional Electric Heat. Refer to Electric Heat nameplate for proper heat tap selection.

LRP14HP36 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)				
	Tap 1	Tap 2	Tap 3	[1] Tap 4 (Low Static Electric Heat)	[1] Tap 5 (High Static Electric Heat)
0.10	900	1330	1520	1330	- - -
0.20	860	1280	1490	1280	- - -
0.30	830	1250	1460	1250	- - -
0.40	770	1230	1430	1230	- - -
0.50	720	1200	1380	- - -	1380
0.60	680	1180	1340	- - -	1340
0.70	620	1130	1250	- - -	1250
0.80	560	1100	1170	- - -	1170

NOTE - All air data measured external to unit with dry coil and less filter.
[1] Taps 4 and 5 are used with Optional Electric Heat. Refer to Electric Heat nameplate for proper heat tap selection.

LRP14HP42 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1790	1500	1070
0.20	1740	1470	1050
0.30	1670	1430	1010
0.40	1590	1370	980
0.50	1510	1310	920
0.60	1410	1240	870
0.70	1310	1140	820
0.80	1210	1010	690

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14HP48 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1970	1730	1520
0.20	1890	1690	1480
0.30	1790	1600	1430
0.40	1690	1540	1370
0.50	1600	1450	1310
0.60	1510	1360	1230
0.70	1400	1270	1140
0.80	1280	1150	1050

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14HP60 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)				
	Tap 1	Tap 2	Tap 3	[1] Tap 4 (Low Static Electric Heat)	[1] Tap 5 (High Static Electric Heat)
0.10	1400	1920	2240	1920	- - -
0.20	1320	1870	2200	1870	- - -
0.30	1260	1820	2140	1820	- - -
0.40	1200	1770	2100	1770	- - -
0.50	1120	1720	2060	- - -	2060
0.60	1060	1670	2020	- - -	2020
0.70	980	1450	1980	- - -	1980
0.80	900	1360	1950	- - -	1950

NOTE - All air data measured external to unit with dry coil and less filter.
[1] Taps 4 and 5 are used with Optional Electric Heat. Refer to Electric Heat nameplate for proper heat tap selection.

BLOWER DATA — LRP14DF

[1] LRP14DF24 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 1	Tap 2	Tap 3
0.10	680	890	1000
0.20	590	830	960
0.30	550	800	930
0.40	500	760	880
0.50	450	710	840
0.60	380	680	810
0.70	- - -	640	770
0.80	- - -	600	730

NOTE - All air data measured external to unit with dry coil and less filter.

[1] LRP14DF30 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 1	Tap 2	Tap 3
0.10	680	1100	1180
0.20	640	1070	1160
0.30	600	1050	1130
0.40	570	1020	1090
0.50	530	990	1070
0.60	490	960	1040
0.70	- - -	930	1010
0.80	- - -	900	960

NOTE - All air data measured external to unit with dry coil and less filter.

[1] LRP14DF36 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 1	Tap 2	Tap 3
0.10	900	1330	1520
0.20	860	1280	1490
0.30	830	1250	1460
0.40	770	1230	1430
0.50	720	1200	1380
0.60	680	1180	1340
0.70	620	1130	1250
0.80	560	1100	1170

NOTE - All air data measured external to unit with dry coil and less filter.

[1] MOTOR SPEED TAP SETTINGS (24, 30 and 36 Models with Constant Torque Blower Motor Only)

Tap 1	Fan Only
Tap 2	Low Static Cooling
Tap 3	High Static Cooling
Tap 4	Nominal 0.2 exterior static pressure
Tap 5	Nominal 0.5 exterior static pressure
Taps 4 and 5	Taps 4 and 5 designated for Heating mid-point temperature rise

LRP14DF42 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1790	1500	1070
0.20	1740	1470	1050
0.30	1670	1430	1010
0.40	1590	1370	980
0.50	1510	1310	920
0.60	1410	1240	870
0.70	1310	1140	820
0.80	1210	1010	690

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14DF48 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1970	1730	1520
0.20	1890	1690	1480
0.30	1790	1600	1430
0.40	1690	1540	1370
0.50	1600	1450	1310
0.60	1510	1360	1230
0.70	1400	1270	1140
0.80	1280	1150	1050

NOTE - All air data measured external to unit with dry coil and less filter.

[1] LRP14DF60 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 1	Tap 2	Tap 3
0.10	1400	1920	2240
0.20	1320	1870	2200
0.30	1260	1820	2140
0.40	1200	1770	2100
0.50	1120	1720	2060
0.60	1060	1670	2020
0.70	980	1450	1980
0.80	900	1360	1950

NOTE - All air data measured external to unit with dry coil and less filter.

[1] MOTOR SPEED TAP SETTINGS (For 60 Model with Constant Torque Blower Motor Only)

Tap 1	Fan Only
Tap 2	Low Static Cooling
Tap 3	High Static Cooling
Tap 4	Nominal 0.2 exterior static pressure
Tap 5	Nominal 0.5 exterior static pressure
Taps 4 and 5	Taps 4 and 5 designated for Heating mid-point temperature rise

BLOWER DATA — LRP14AC

LRP14AC24 and LRP14AC30 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)			
	Tap 2	Tap3	Tap 4	Tap 5
0.10	1350	1110	970	840
0.20	1310	1080	950	820
0.30	1270	1050	920	800
0.40	1210	1000	890	770
0.50	1140	970	850	750
0.60	1080	920	820	720
0.70	1020	870	770	680
0.80	950	800	710	620

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14AC36 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1460	1350	1080
0.20	1380	1280	1030
0.30	1280	1200	960
0.40	1190	1130	900
0.50	1100	1060	830
0.60	990	950	750
0.70	880	870	700
0.80	760	750	650

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14AC42 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1790	1500	1070
0.20	1740	1470	1050
0.30	1670	1430	1010
0.40	1590	1370	980
0.50	1510	1310	920
0.60	1410	1240	870
0.70	1310	1140	820
0.80	1210	1010	690

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14AC48 BLOWER PERFORMANCE (PSC Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)		
	Tap 2	Tap 3	Tap 4
0.10	1970	1730	1520
0.20	1890	1690	1480
0.30	1790	1600	1430
0.40	1690	1540	1370
0.50	1600	1450	1310
0.60	1510	1360	1230
0.70	1400	1270	1140
0.80	1280	1150	1050

NOTE - All air data measured external to unit with dry coil and less filter.

LRP14AC60 BLOWER PERFORMANCE (CT Motor)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)				
	Tap 1	Tap 2	Tap 3	[1] Tap 4 (Low Static Electric Heat)	[1] Tap 5 (High Static Electric Heat)
0.10	2240	1920	1400	1920	- - -
0.20	2200	1870	1320	1870	- - -
0.30	2140	1820	1260	1820	- - -
0.40	2100	1770	1200	1770	- - -
0.50	2060	1720	1120	- - -	1120
0.60	2020	1670	1060	- - -	1060
0.70	1980	1450	980	- - -	980
0.80	1950	1360	900	- - -	900

NOTE - All air data measured external to unit with dry coil and less filter.
[1] Taps 4 and 5 are used with Optional Electric Heat. Refer to Electric Heat nameplate for proper heat tap selection.

BLOWER DATA — LRP14GE

BLOWER PERFORMANCE (PSC Motor 24-48 Models) (CT Motor 60 Models)

External Static Pressure in w.g.	Air Volume at Specific Blower Taps (cfm)															
	LRP14GE24 LRP14GE30				LRP14GE36			LRP14GE42			LRP14GE48			[1] LRP14GE60		
	Tap 2	Tap 3	Tap 4	Tap 5	Tap 2	Tap 3	Tap 4	Tap 2	Tap 3	Tap 4	Tap 2	Tap 3	Tap 4	Tap 1	Tap 2	Tap 3
0.10	1350	1110	970	840	1460	1350	1080	1790	1500	1070	1970	1730	1520	1400	1920	2240
0.20	1310	1080	950	820	1380	1280	1030	1740	1470	1050	1890	1690	1480	1320	1870	2200
0.30	1270	1050	920	800	1280	1200	960	1670	1430	1010	1790	1600	1430	1260	1820	2140
0.40	1210	1000	890	770	1190	1130	900	1590	1370	980	1690	1540	1370	1200	1770	2100
0.50	1140	970	850	750	1100	1060	830	1510	1310	920	1600	1450	1310	1120	1720	2060
0.60	1080	920	820	720	990	950	750	1410	1240	870	1510	1360	1230	1060	1670	2020
0.70	1020	870	770	680	880	870	700	1310	1140	820	1400	1270	1140	980	1450	1980
0.80	950	800	710	620	760	750	650	1210	1010	690	1280	1150	1050	900	1360	1950

NOTE - All air data measured external to unit with dry coil and less filter.

[1] MOTOR SPEED TAP SETTINGS (For 60 Model with Constant Torque Blower Motor Only)

Tap 1	Fan Only
Tap 2	Low Static Cooling
Tap 3	High Static Cooling
Taps 4 and 5	Taps 4 and 5 designated for Heating mid-point temperature rise
Tap 4	Nominal 0.2 exterior static pressure
Tap 5	Nominal 0.5 exterior static pressure

BLOWER DATA — LRP16GE

LRP16GE24 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	B	C	D	A	B	C	D	A	B	C	D
+	1100	880	660	440	1100	1000	900	815	550	440	330	220
NORM	1000	800	600	400	1100	1000	900	815	500	400	300	200
—	900	720	540	360	1100	1000	900	815	450	360	270	180

NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode. In heating mode, low stage airflow is optimized for a 40°F temperature rise.

LRP16GE36 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	B	C	D	A	B	C	D	A	B	C	D
+	1540	1320	1100	880	1400	1200	1100	975	770	660	550	440
NORM	1400	1200	1000	800	1400	1200	1100	975	700	600	500	400
—	1260	1080	900	720	1400	1200	1100	975	630	540	450	360

NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode. In heating mode, low stage airflow is optimized for a 40°F temperature rise.

LRP16GE48 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	B	C	D	A	B	C	D	A	B	C	D
+	1980	1760	1540	1320	1350	1200	1100	1000	990	880	770	660
NORM	1800	1600	1400	1200	1350	1200	1100	1000	900	800	700	600
—	1620	1440	1260	1080	1350	1200	1100	1000	810	720	630	540

NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode. In heating mode, low stage airflow is optimized for a 40°F temperature rise.

LRP16GE60 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	B	C	D	A	B	C	D	A	B	C	D
+	2200	1980	1760	1540	1480	1380	1280	1180	1100	990	880	770
NORM	2000	1800	1600	1400	1480	1380	1280	1180	1000	900	800	700
—	1800	1620	1440	1260	1480	1380	1280	1180	900	810	720	630

NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode. In heating mode, low stage airflow is optimized for a 40°F temperature rise.

BLOWER DATA — LRP16HP

LRP16HP24 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	[1]B	C	D	A	[1]B	C	D	A	B	C	D
+	1100	880	660	440	1150	1035	690	690	550	440	330	220
NORM	1000	800	600	400	1000	900	600	600	500	400	300	200
—	900	720	540	360	1000	900	600	600	450	360	270	180

[1] Factory Settings.
NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode.

LRP16HP36 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	[1]B	C	D	A	[1]B	C	D	A	B	C	D
+	1430	1320	1100	880	1495	1380	1150	1150	715	660	550	440
NORM	1300	1200	1000	800	1300	1250	1000	1000	650	600	500	400
—	1170	1080	900	720	1300	1200	1000	1000	585	540	450	360

[1] Factory Settings.
NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode.

LRP16HP48 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	[1]B	C	D	A	[1]B	C	D	A	B	C	D
+	1980	1760	1540	1320	2070	1840	1610	1610	990	880	770	660
NORM	1800	1600	1400	1200	1800	1600	1400	1400	900	800	700	600
—	1620	1440	1260	1080	1800	1600	1400	1400	810	720	630	540

[1] Factory Settings.
NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode.

LRP16HP60 Blower Performance

0 through 0.80 in. w.g. External Static Pressure Range

"ADJUST" Jumper Setting	Blower Control Jumper Speed Positions											
	"COOL" Speed – cfm				"HEAT" Speed – cfm				"CONTINUOUS FAN" Speed – cfm			
	A	[1]B	C	D	A	[1]B	C	D	A	B	C	D
+	2200	1980	1760	1540	2300	2070	1840	1840	1100	990	880	770
NORM	2000	1800	1600	1400	2000	1800	1600	1600	1000	900	800	700
—	1800	1620	1440	1260	2000	1800	1600	1600	900	810	720	630

[1] Factory Settings.
NOTE – All air data is measured external to unit without air filters.
NOTE – 1st Stage airflow is 70% of 2nd Stage airflow (full capacity) in cooling mode.

DEFROST CONTROL CMC1

NOTE - *For geographic areas that experience low temperature and high humidity conditions (below 32°F and above 80% RH), the defrost timer pin must be field set at installation to a 60 or 30 minute defrost interval in order to ensure reliable system operation while in heating mode.*

LRP14HP/DF and LRP16HP units are equipped with a defrost control that includes the combined functions of time/temperature defrost control, defrost relay, diagnostic LEDs and a low voltage terminal strip. See figure 12.

The control provides automatic switching from call for heating to defrost mode and back. During the compressor cycle (call for defrost), the control accumulates compressor run time at 30, 60 or 90-minute field-adjustable intervals. If the defrost thermostat is closed when the selected compressor run time interval ends, the defrost relay is energized and the defrost begins.

-1 Builds: the **defrost timing jumper** is factory-installed to provide a 90-minute defrost interval. **-2 Builds:** the **defrost timing** is factory set to provide a 30-minute defrost interval. If the timing selector jumper is not in place, the control defaults to a 90-minute defrost interval. The maximum defrost period is 14 minutes and is not adjustable. See figure 12 for the location of the defrost interval timing pins.

A **test option** is provided for troubleshooting. The test mode may be started any time the unit is in the heating mode and the defrost thermostat is closed or jumpered. If the jumper is in the TEST position at power up, the control will ignore the test pins. When the jumper is placed across the TEST pins for 2 seconds, the control will enter the defrost mode. If the jumper is removed before an additional 5-second period has elapsed (7 seconds total), the unit will remain in defrost mode until the defrost thermostat opens or 14 minutes have passed. If the jumper is not removed until after the additional 5-second period has elapsed, the defrost will terminate and the test option will not function again until the jumper is removed and reapplied.

NOTE - *On early defrost controls, the defrost timing jumper must be in the 90-minute defrost interval before testing the defrost mode or the control will not enter defrost test mode.*

The defrost control includes a **compressor delay** function which cycles the compressor off for 30 seconds while going into and coming out of the defrost cycle. This function is activated when the jumper is removed from the compressor delay pins.

NOTE - *The 30-second compressor delay is not functional when the TEST pins are jumpered.*

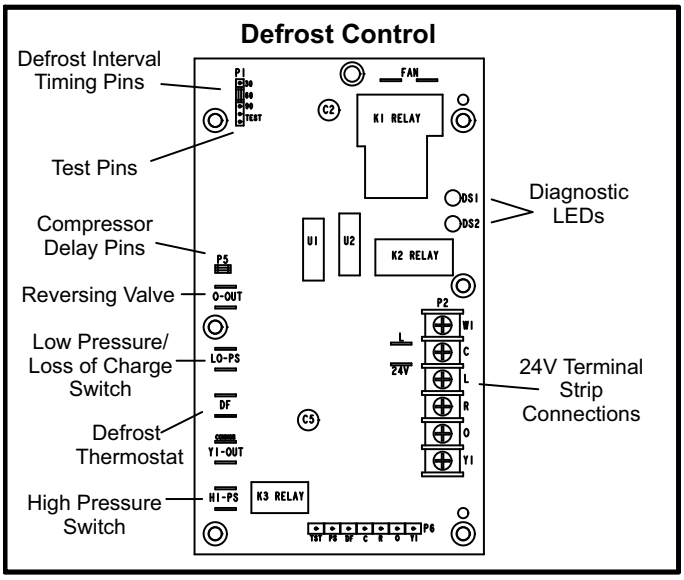


FIGURE 12

The **defrost thermostat (S6)** is located on the outdoor coil, near the bottom of the coil, affixed to the ⅜" stub. When the defrost thermostat senses a coil temperature of 42°F or cooler, the thermostat contacts close and send a signal to the defrost control to begin the defrost timing. The defrost thermostat also terminates the defrost when the coil distributor tube temperature warms to 70°F.

The defrost control includes **HI-PS and LO-PS terminals** to receive signals from the unit high pressure switch and loss of charge switch.

During a single demand cycle, the defrost control locks out compressor operation after the fifth time that the circuit is interrupted by any pressure switch wired to the control. In addition, the diagnostic LEDs indicate a locked-out pressure switch after the fifth open pressure switch occurrence. Compressor operation remains locked out until power to the control is interrupted, then re-established, or until the jumper is applied to the TEST pins for 0.5 seconds.

NOTE - *The defrost control ignores input from the loss of charge switch terminals as follows:*

During the test mode;
During the defrost cycle;
During the 90-second start-up period;
During the first 90 seconds following a reversing valve switch between the heating and cooling modes.

EXCEPTION -- If the TEST pins are jumpered and the 5-minute delay is being bypassed, the LO-PS terminal signal is not ignored during the 90-second start-up period.

The defrost control includes two diagnostic LEDs. LED codes indicate operating status. The diagnostics codes are given in table 1.

TABLE 1
Defrost Control Diagnostic LEDs

Mode	Green LED (DS2)	Red LED (DS1)
No power to control	OFF	OFF
Normal Operation / Power to Control	Simultaneous Slow Flash	
Anti-Short Cycle Lockout	Alternating Slow Flash	
Low Pressure Switch Fault	OFF	Slow Flash
Low Pressure Switch Lockout	OFF	ON
High Pressure Switch Fault	Slow Flash	OFF
High Pressure Switch Lockout	ON	OFF

BLOWER COMPARTMENT

Access panels can easily be removed for service.

Blower Wheel

Blower wheel size varies between models. See SPECIFICATIONS.

⚠ DANGER

Disconnect power from unit and wait at least five minutes to allow capacitors to discharge before attempting to adjust motor speed tap settings. Failure to wait may cause personal injury or death.

REFRIGERATION COMPONENTS

Compressor B1 – LRP14 Units

All LRP14 series units utilize a scroll compressor. Compressors are energized by the K1 contactor found in the unit control box. Compressor specifications are found in the "ELECTRICAL DATA" section in this manual.

Compressor B1 – LRP16GE/HP Units

All LRP16GE units utilize a two-stage Copeland scroll compressor. Compressors are energized by the K1 contactor found in the unit control box. Compressor specifications are found in the "ELECTRICAL DATA" section in this manual.

Crankcase Heater HR1

All DF units have compressor crankcase heaters factory installed to protect the compressor if the gas backup heat is used for extended periods of time.
On all other units, the crankcase heater is an available option.

⚠ 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.

Condenser Fan B4 / Fan Motor B3 – LRP14 Units

LRP14 series units are equipped with either a constant-torque blower motor or an indoor PSC motor. The constant torque motor is capable of maintaining a specified CFM throughout the external static range. On units equipped with the PSC blower motor, a particular CFM can be obtained by adjusting the speed tap.
All LRP14 series units use single phase condenser fan motors. Specifications for the condenser fans are at the front of this manual. See figure 13 for fan and motor replacement dimensions.

Condenser Fan B4 / Fan Motor B3 – LRP16GE/HP Units

LRP16GE/HP units are equipped with a variable-speed direct-drive blower operated by a variable-speed ECM motor. The ECM motor maintains a specified air volume from 0 through 0.80 in. w.g. static range.
All LRP16GE/HP units use single phase condenser fan motors. Specifications for the condenser fans are at the front of this manual. See figure 13 for fan and motor replacement dimensions.

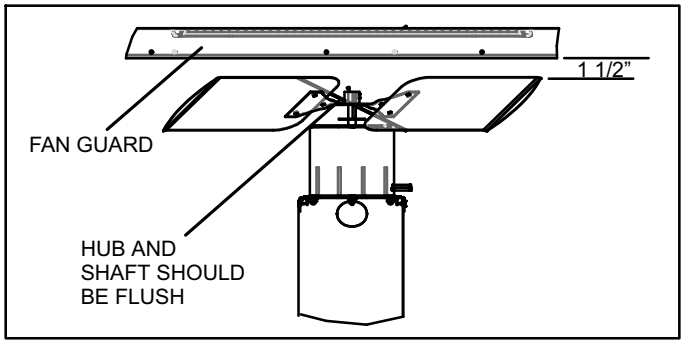


FIGURE 13

Reversing Valve L1

Reversing valve L1 has a 24 volt solenoid coil which reverses refrigerant flow during unit operation in all LRP14HP, LRP14DF and LRP16HP units. The reversing valve is in the refrigerant circuit vapor line. The reversing valve coil is energized during cooling demand and during defrost.

Low Pressure Switch S79 (LRP14GE, AC, LRP16GE Units)

S79 is a N.C. auto-reset low pressure switch located on the suction line. The switch shuts off the compressor when suction pressure falls below the factory setting. The switch is ignored during the first 90 seconds of compressor start up and during defrost operation. On the LRP14/16 series units, the switch is set to open at 25 ± 5 psi and close at 40 ± 5 psi. S79 is not adjustable.

Loss of Charge Pressure Switch S79 (LRP14HP-02 – LRP16HP Units)

The low pressure switch is an auto-reset N.C. switch that opens on pressure drop. The switch is wired into the defrost board low pressure terminals and is located on the liquid (high pressure) line . When suction pressure drops to 40 psig (275.8 kPa) the switch opens and the compressor is de-energized. When suction pressure rises to 90 psig (620.5 kPa) the pressure switch will close.

High Pressure Switch S4

S4 is a N.C. auto-reset high pressure switch located on the discharge line. The switch shuts off the compressor when discharge pressure rises above the factory setting. The switch on LRP14/16 series units is set to open at 590 ± 10 psi and close at 418 ± 10 psi. S4 is not adjustable.

Float Switch

A float switch is included with the downflow kit or can be ordered as an accessory (float switch is factory installed on the LRP16 series). The float switch is designed to prevent condensate water from overflowing the condensate pan due to a restriction in the condensate drain line.
The float switch is field-installed in the condensate drain pan near the drain exit (float switch is factory installed on the LRP16 series). Refer to the installation instruction for the float switch kit or the downflow kit for location and cutting of the red wire located in the blower compartment.

ELECTRIC HEAT

Matchups and Ratings

Matchups and ratings are listed with “ELECTRICAL DATA”.

Electric Heat Components

See figure 14 for electric heat parts arrangement.

Limit Switches 1, 2, 3 and 4

Limit switches 1, 2, 3 and 4 are N.C. auto-reset high temperature limits located on the electric heat vest panel. Each heating element is wired in series with a high temperature limit. When the limit opens, the corresponding heating element is de-energized. All other heating elements remain energized. The limits will automatically close when temperatures return to normal. Limit rating will be on front side.

Heating Element HE1 through HE4

Heating elements are composed of helix-wound bare nichrome wire exposed directly to the air stream. The elements are supported by insulators mounted to the wire frame. Each element is energized independently by a corresponding relay located on the heat vest panel. Once energized, heat transfer is instantaneous.

PHK VESTIBULE PARTS ARRANGEMENT (PHK-10)

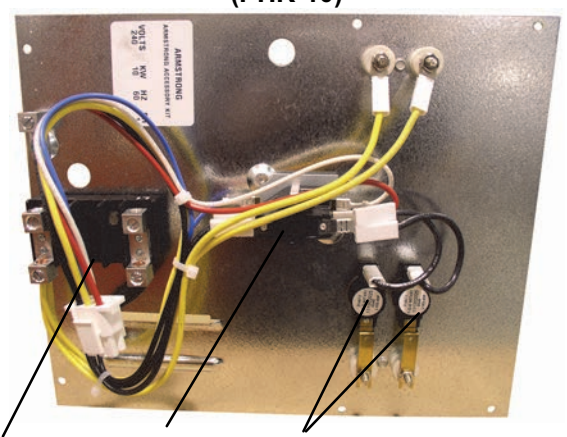


FIGURE 14

Terminal Strip TB2 PHK-05, -07, -10

All heating elements require either a second-line voltage power source or the use of the single-point power connection kit. For electric heat sections without circuit breakers or fuses, line voltage connections are made to terminal strip TB2.

Sequencer Relays 1 and 2

Relays 1 and 2 are N.O. sequencer relays with a resistive element for a coil and bi-metal disk which actuates the contacts. The relays are located on the electric heat vest panel and are energized by a 24V heating demand (W1 and W2) via jack/plug P2 which is used to connect electric heat to the blower control circuit. When energized, the internal resistance heats the bi-metal disk causing the contacts to close. When the relay is de-energized the disk cools and the contacts open. The relays energize different stages of heat, as well as the blower. The blower is always first on and last off.

NOTE - *As of 2015, all electric heaters must be equipped with a second relay to break the line voltage on the return side so that a path for the electrical voltage is broken on both sides if an element goes to ground.*

Circuit Breaker CB1 and CB2 (option) PHK-15, -20

Line voltage connections are made to circuit breakers CB1 and CB2 in electric heat sections with circuit breakers. Table 2 shows amp rating for each circuit breaker used. Two-pole circuit breakers are used.

TABLE 2

Circuit Breakers		
UNIT	CB1 AMPS	CB2 AMPS
PHK15CP	60 AMPS	30 AMPS
PHK20CP	60 AMPS	60 AMPS

GAS HEAT

Gas Valve (GV1) LRP16GE Units

The LRP16GE uses a gas valve manufactured by White-Rodgers. The valve is two-stage internally redundant to assure safety shut off. If the valve must be replaced the same type valve must be used. The valve can be converted to LP (see options gas specifications for LP kit) and is adjustable on both high and low fire.

24VAC and gas control knob / switch are located on top of the valve. Terminals on the gas valve are connected to wires from the ignition control (A3). Inlet and outlet taps are located on the valve.

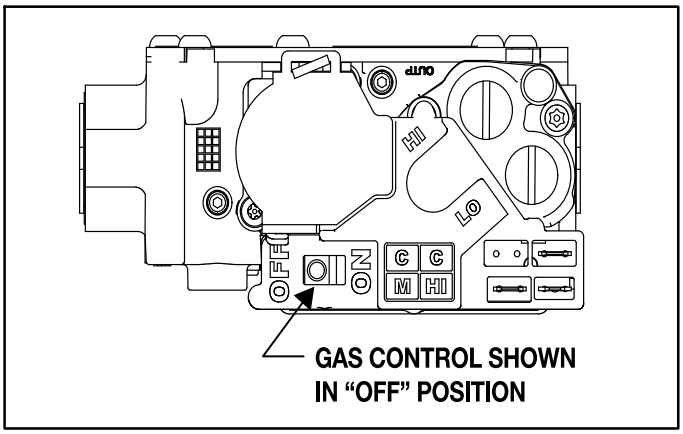


FIGURE 15

CHARGING

⚠ CAUTION

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

⚠WARNING

This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

For maximum performance of the cooling system, the operating temperatures and pressure should be checked and subcooling determined at Standard ARI test conditions of 82° F outdoor temperature / 80° F indoor dry bulb / 67° F indoor wet bulb.

For maximum performance of the heat pump, the operating temperatures and pressure should be checked and subcooling determined at Standard ARI test conditions of 47° F outdoor temperature / 70° F indoor dry bulb.

If subcooling measurement deviates, refrigerant charge should be adjusted accordingly for maximum performance.

TABLE 3

AC Unit Cooling System Performance Values - LRP14		
Model	Suction Superheat + / - 3º	Liquid Subcooling + / - 2º
2 Ton		10
2.5 Ton		14
3 Ton	13	
3.5 Ton	12	
4 Ton	14	
5 Ton	17	
Based on outdoor ambient temperature of 82º F and indoor entering air of 80º F db, 67º F wb.		

TABLE 4

Heat Pump Cooling System Performance Values - LRP14HP/LRP16HP		
Model	Suction Superheat + / - 3º	Liquid Subcooling + / - 2º
2 Ton	18	
2.5 Ton	16	
3 Ton	14	
3.5 Ton		9
4 Ton		8
5 Ton		5
Based on outdoor ambient temperature of 82º F and indoor entering air of 80º F db, 67º F wb.		

TABLE 5

Heat Pump Heating System Performance Values - LRP14HP/LRP16HP	
Model	Liquid Subcooling + / - 2º
2 Ton	25
2.5 Ton	15
3 Ton	11
3.5 Ton	22
4 Ton	24
5 Ton	28
Based on outdoor ambient temperature of 47º F and indoor entering air of 70º F db.	

TABLE 6

Unit Cooling System Performance Values - LRP16GE	
Model	Liquid Subcooling + / - 3º
2 Ton	10
3 Ton	12
4 Ton	10
5 Ton	9
Based on outdoor ambient temperature of 82º F and indoor entering air of 80º F db, 67º F wb.	

MAINTENANCE

The heating and air conditioning system should be inspected and maintained twice each year (before the start of the cooling and heating seasons) by a licensed professional HVAC technician. The technician is expected to check the following items. **These checks may only be conducted by a licensed professional HVAC technician.**

1. Inspect component wiring for loose, worn or damaged connections. Check for any rubbing or pinching of wires. Confirm proper voltage plus amperage of outdoor unit.
2. Check the cleanliness of fan and blade condition (cracks) and clean or replace them, if necessary.
3. Inspect drain pan for debris and clean as necessary.
4. Inspect the condition of refrigerant piping and confirm that pipes are not rubbing copper-to-copper. Also, check the condition of the insulation on the refrigerant lines. Repair, correct, or replace as necessary.
5. Test capacitor. Replace as necessary.
6. Inspect contactor contacts for pitting or burn marks. Replace as necessary.
7. Check fan motor for worn bearings/bushings. Replace as necessary.
8. Inspect and **clean** coils, if necessary and note any damage to coils or signs of leakage.

Filters

1. Internal filter kits containing filter rails for 1 in. thick filters are available. Filters are not provided and must be field supplied. A filter is required, whether installed in the unit, in the ductwork or behind a filter grill in the conditioned area.

   NOTE - If PCO is installed, an internal filter kit is not recommended.
2. Filters should be inspected monthly. Replace disposable filters or clean permanent-type filters as necessary. Dirty filters are the most common cause of inadequate heating or cooling performance. Replace existing filter with a filter of like type and size. DO NOT replace a permanent-type filter with a disposable filter. Install new/clean filters with the arrows on the side pointing in the direction of airflow.

Healthy Climate® Photocatalytic Oxidation (PCO) Air Purification Accessory

1. The Healthy Climate® PCO cartridge and UVA lamp require annual replacement. An annual maintenance kit is available that includes the PCO cartridge and UVA lamp. More frequent replacement may be required in applications with heavier dust or dirt loads or in applications where a lower MERV filter is installed before the Healthy Climate® PCO cartridge. The field supplied filter should be changed at least annually, or according to the manufacturers recommended replacement cycle.

General System Test with System Operating

1. Perform a general system test. Turn on the air conditioner to check operating functions such as the start-up and shut-off operation. Check for unusual noises or odors, and measure indoor/outdoor temperatures and system pressures as needed. Check the refrigerant charge per the charging sticker information on the unit.
2. Refer to the nameplate to determine the correct temperature rise for all gas units (GE / DF).
3. Verify that system total static pressure and airflow settings are within specific operating parameters.
4. Verify correct temperature drop across indoor coil.

POST START-UP CHECKLIST (GAS)

After the control circuit has been energized and the heating section is operating, make the following checks:

1. Use soap solution to check for gas leaks in the unit piping as well as the supply piping.
2. Check the supply gas pressure. It must be within the limits shown on rating nameplate. Supply pressure should be checked with all gas appliances in the building at full fire. At no time should the supply gas pressure exceed 10.5 inches w.c., nor drop below 5.0 inches w.c. for natural gas units. For propane gas, supply gas pressure should not drop below 11 inches w.c. If gas pressure is outside these limits, contact your gas supplier for corrective action.
3. Check for correct manifold gas pressures. See Check and Adjust Manifold Pressure.
4. Adjust temperature rise to the range specified on the rating plate.

Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Refer to figure 16 for location of manifold pressure adjustment screw and pressure tap outlet.

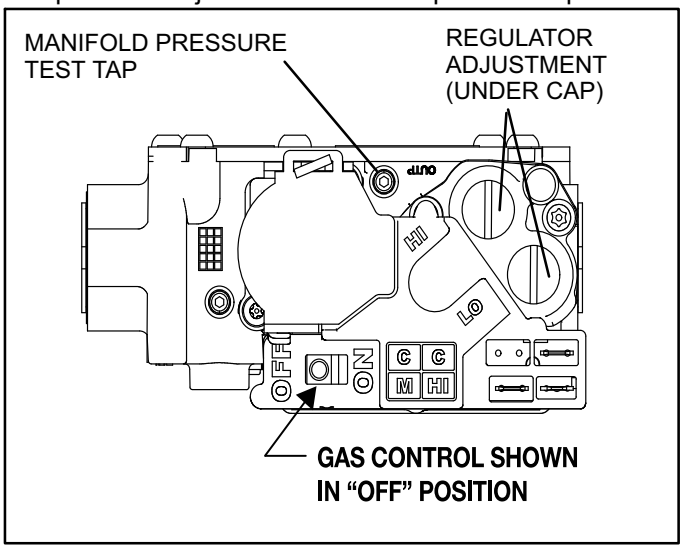


FIGURE 16

The gas valve is factory set and should not require adjustment. See the table below for pressures. The gas valve should completely and immediately cycle off in the event of gas or power failure. The manual shut-off knob or switch can be used to immediately shut off gas supply.

Manifold Pressure " w.c.		
1st Stage Heat	Natural	2.0 ± 0.3
	LP	5.6 ± 0.3
2nd Stage Heat	Natural	3.5 ± 0.3
	LP	10.0 ± 0.5

⚠ IMPORTANT

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

1. Connect a test gauge to the outlet pressure tap on the gas valve. Start the unit 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 head. Natural gas should burn blue. L.P. gas should burn mostly blue with some orange streaks.
3. After allowing the unit to stabilize for five minutes, record the manifold pressure.
4. Disconnect heating demand as soon as an accurate reading has been obtained.

Proper Gas Flow (Approximate)

Final first-stage and second-stage manifold pressures must be within the allowable ranges for the gas being used. **For Natural Gas:** Check the furnace rate by observing gas meter, making sure all other gas appliances are turned off. The test hand on the meter should be timed for at least one revolution. Note the number of seconds for one revolution.

$$\text{BTU/HR INPUT} = \frac{\text{Cubic Feet Per Revolution} \times 3600 \times \text{Heating Value}}{\text{No. Seconds Per Revolution}}$$

The heating value of your gas can be obtained from your local utility.

For LP/Propane Gas: The only check for the output rate is to properly adjust the manifold pressure using a manometer. Typical manifold setpoint for installations at altitudes from 0 to 4500 feet above sea level is 10.0 inches W.C.

Wiring Diagrams and Sequence of Operation

LRP14HP Unit Wiring Diagram – Constant Torque Blower

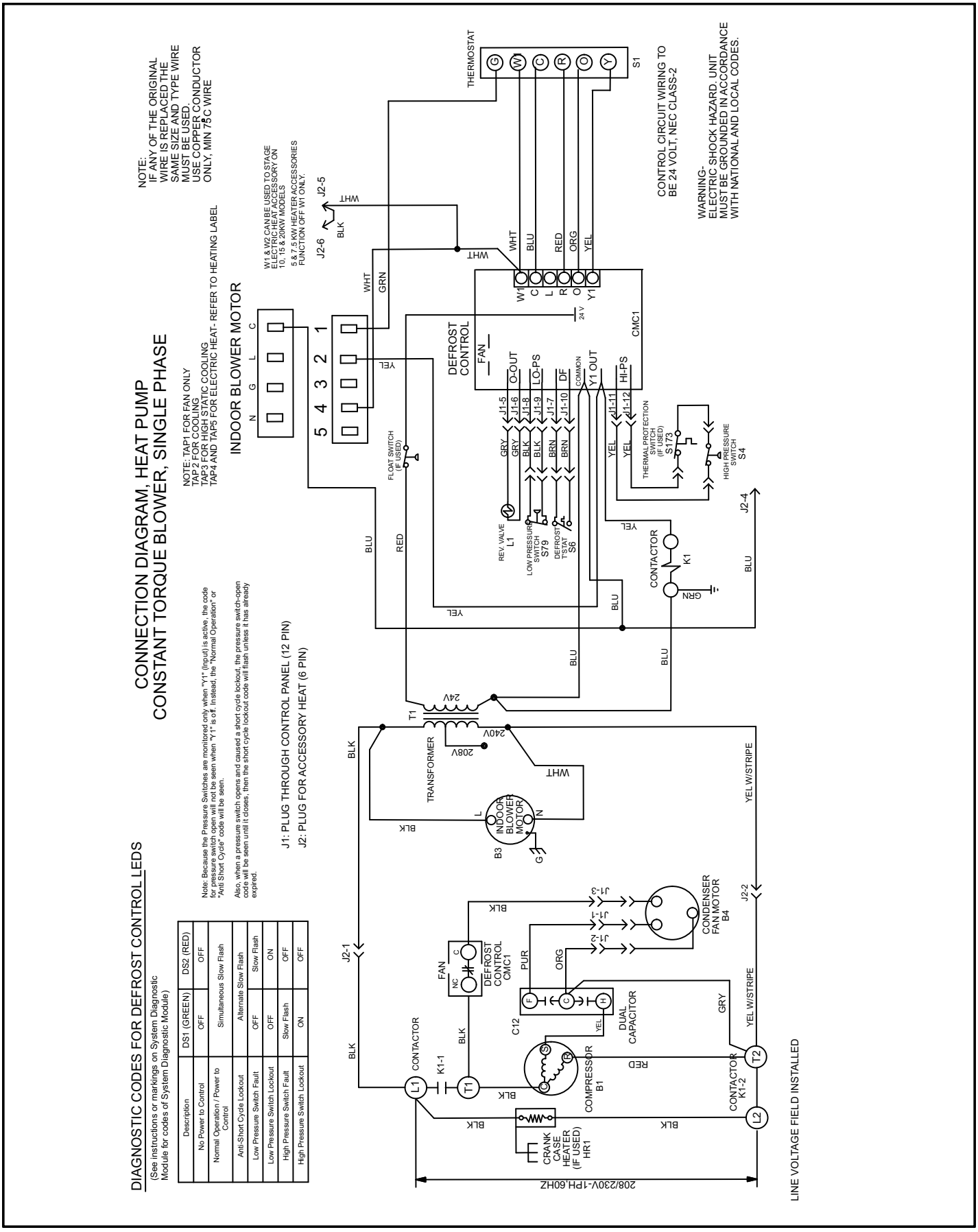


FIGURE 17

LRP14HP Unit Wiring Diagram – PSC Blower

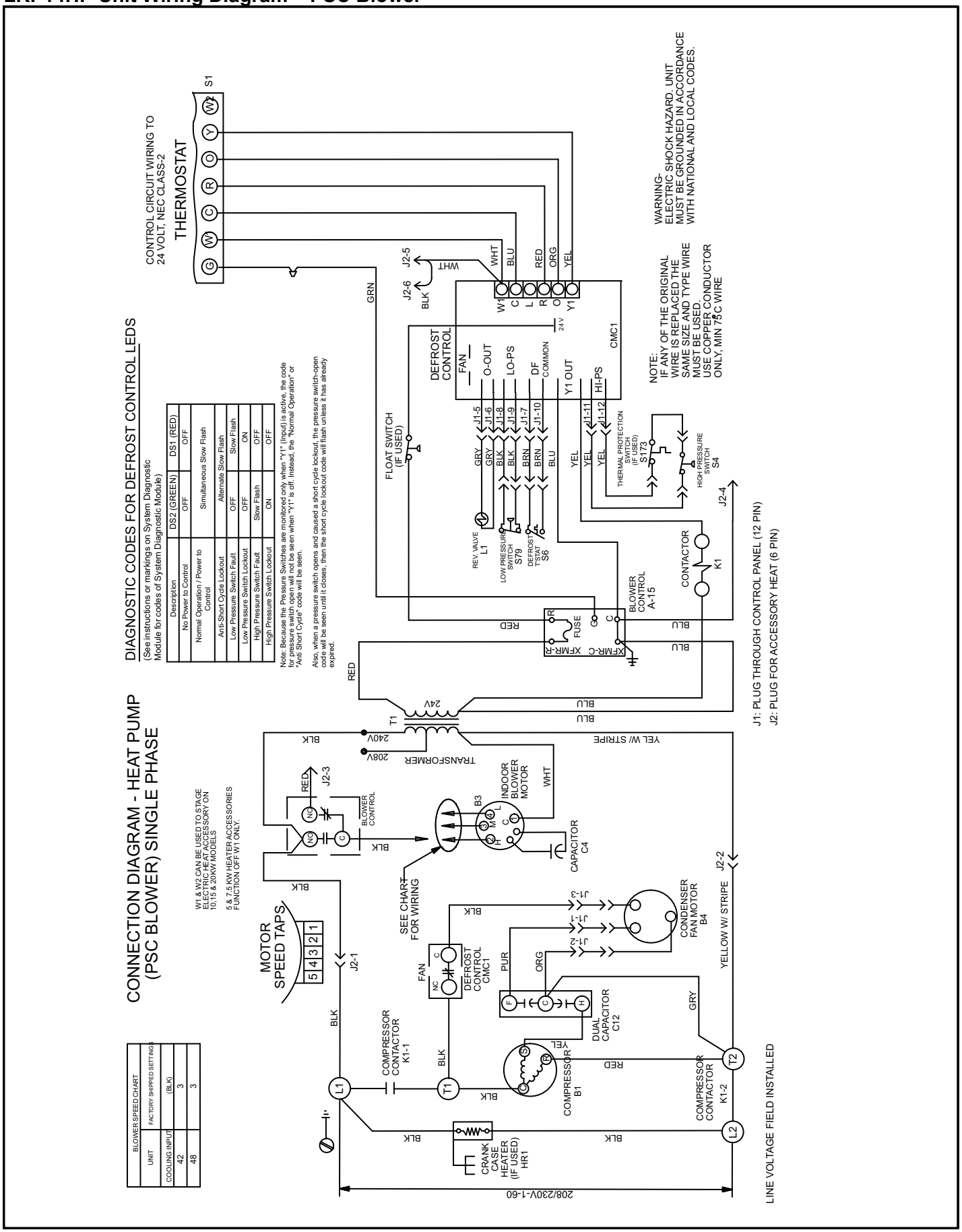


FIGURE 18

LRP14DF Unit Wiring Diagram – Constant Torque Blower

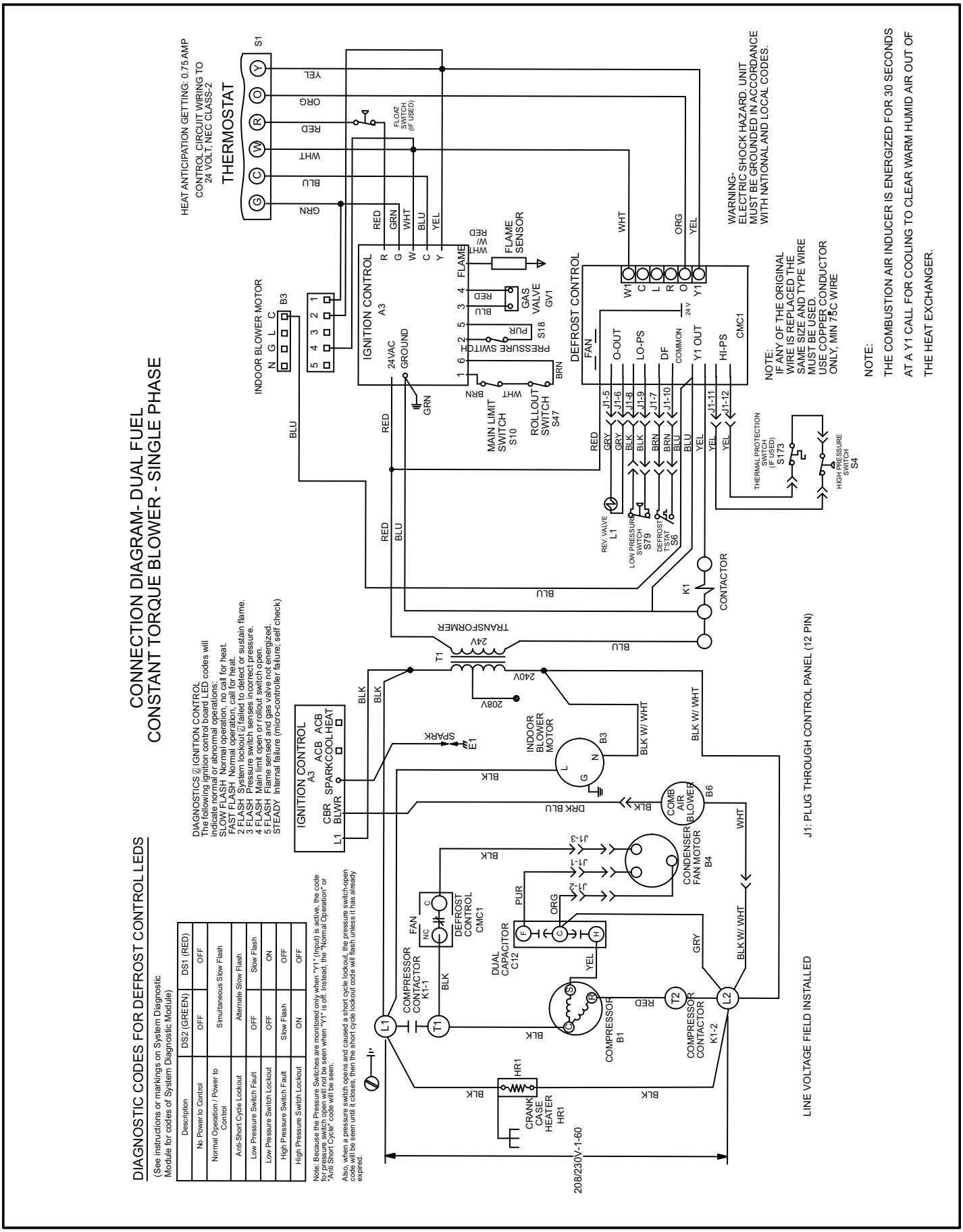


FIGURE 19

LRP14DF Unit Wiring Diagram – PSC Blower

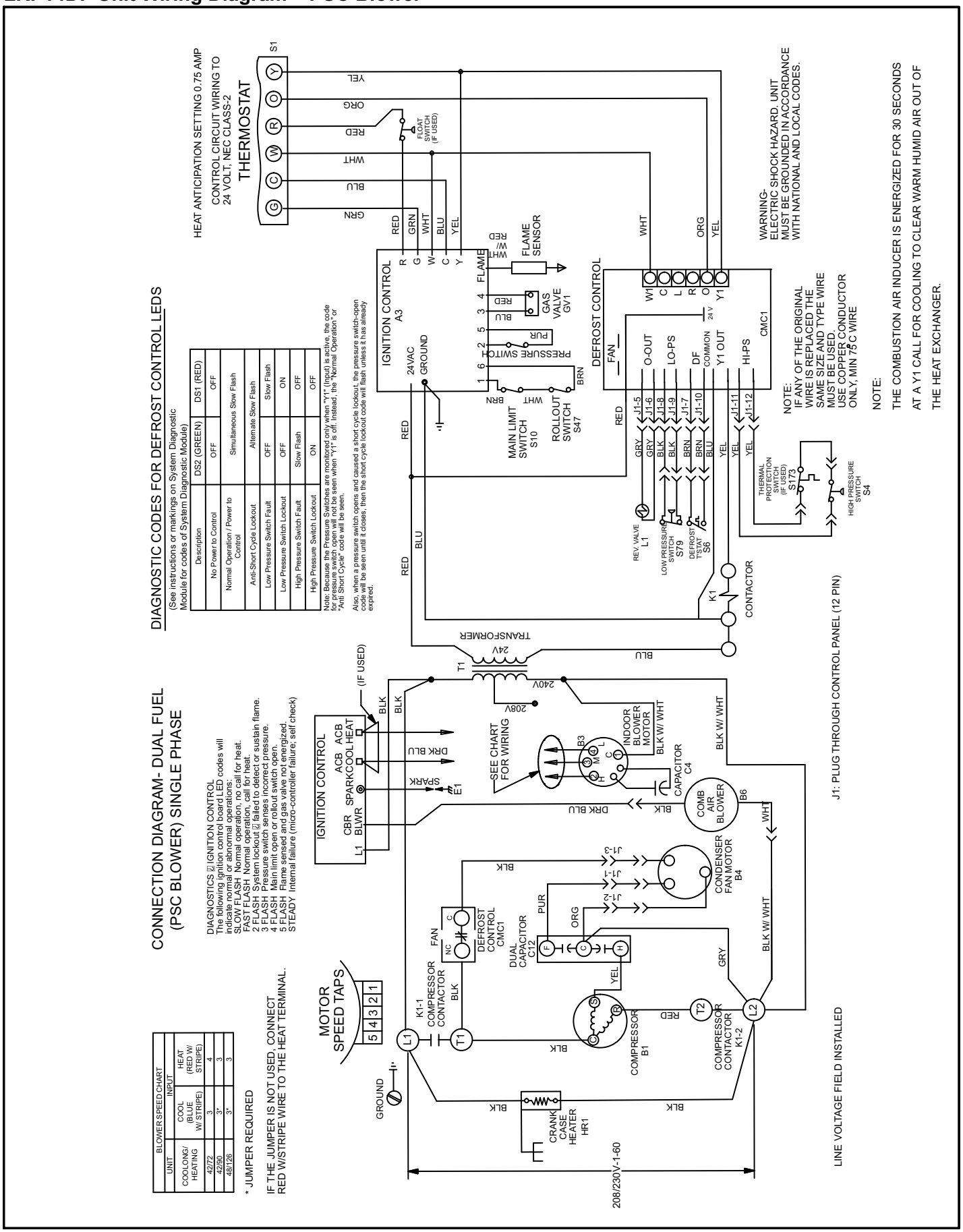


FIGURE 20

LRP14AC Unit Wiring Diagram – Constant Torque Blower

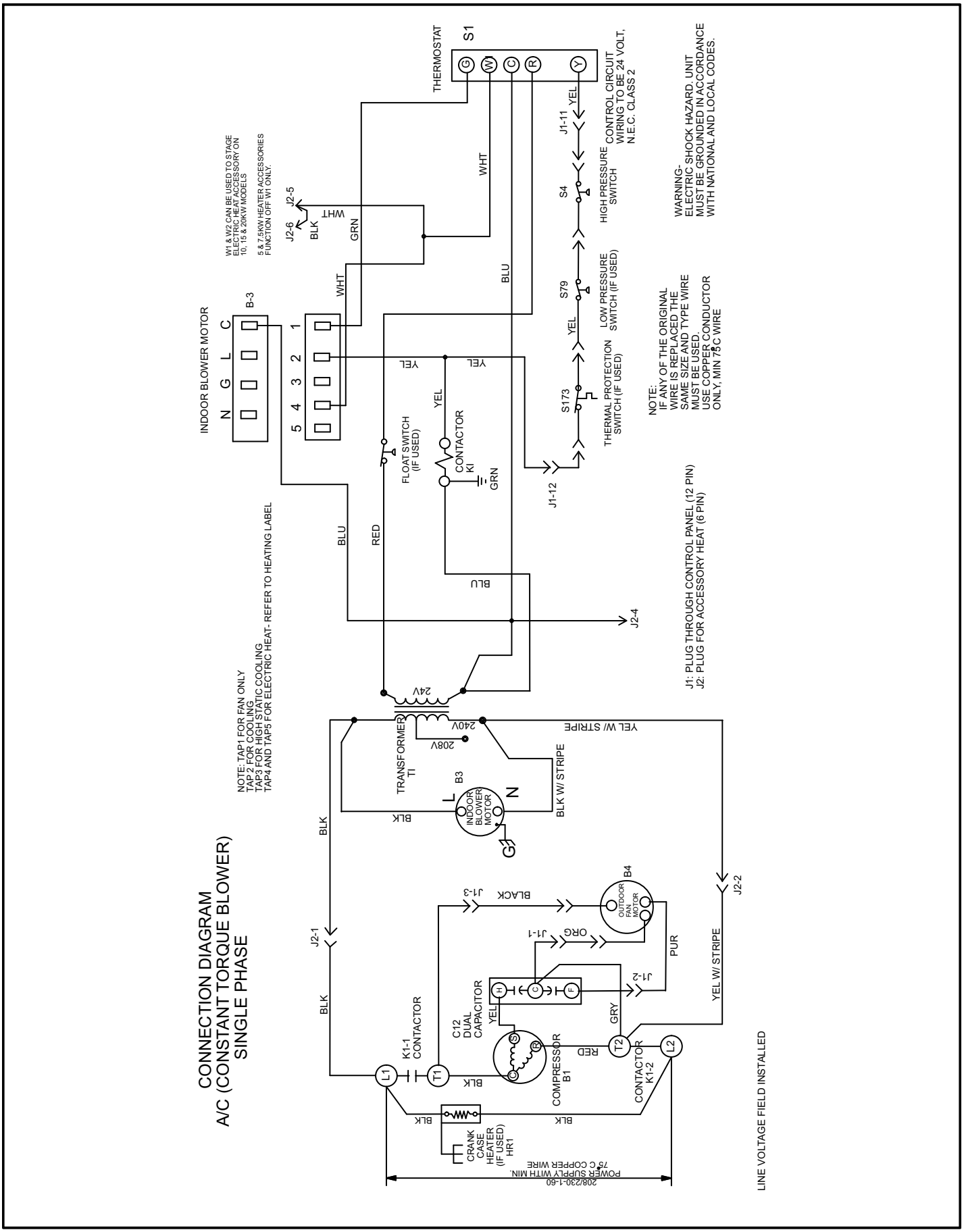


FIGURE 21

LRP14AC Unit Wiring Diagram – PSC Blower

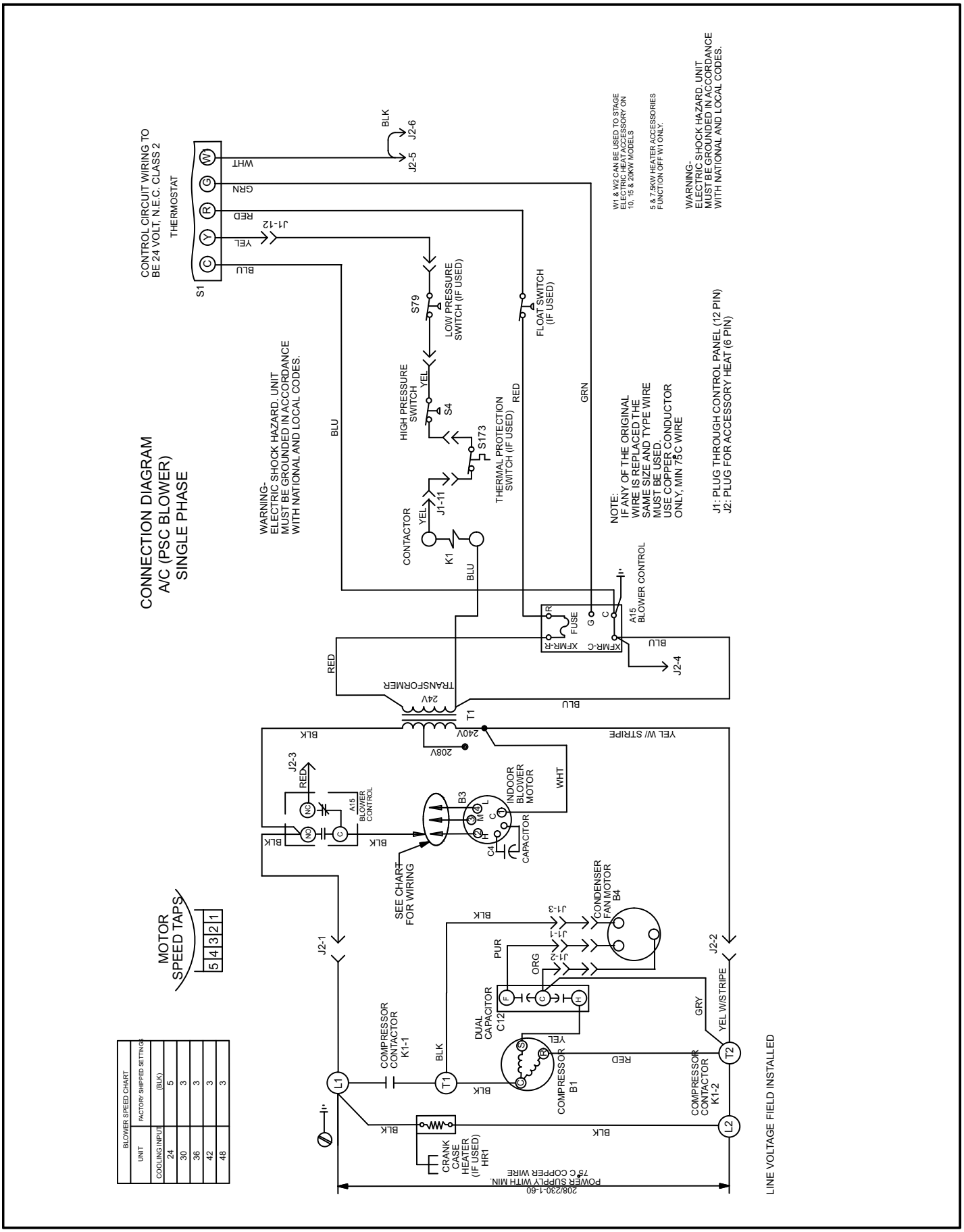


FIGURE 22

LRP14GE Unit Wiring Diagram – Constant Torque Blower

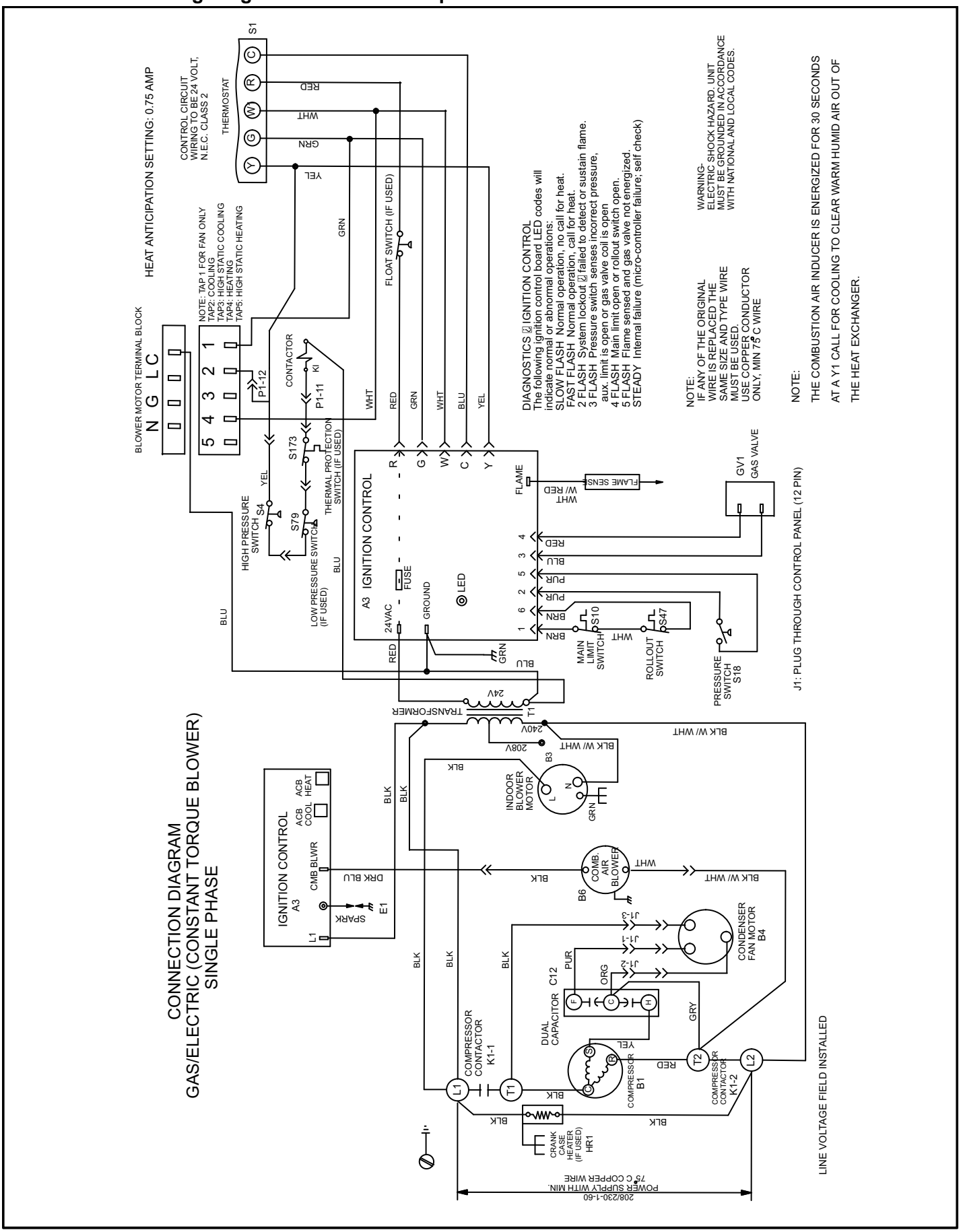


FIGURE 23

LRP14GE Unit Wiring Diagram – PSC Blower

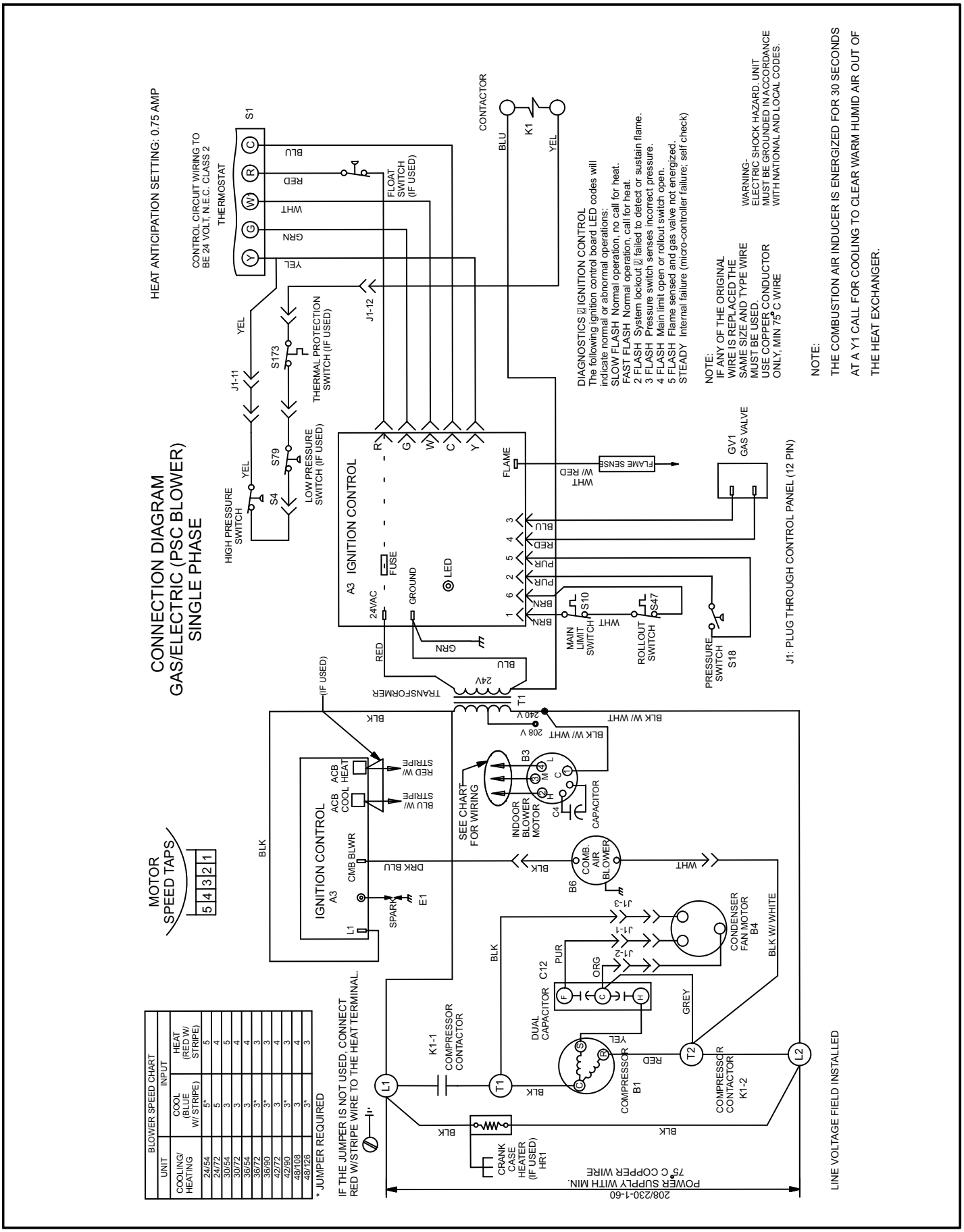


FIGURE 24

LRP16GE Wiring Diagram

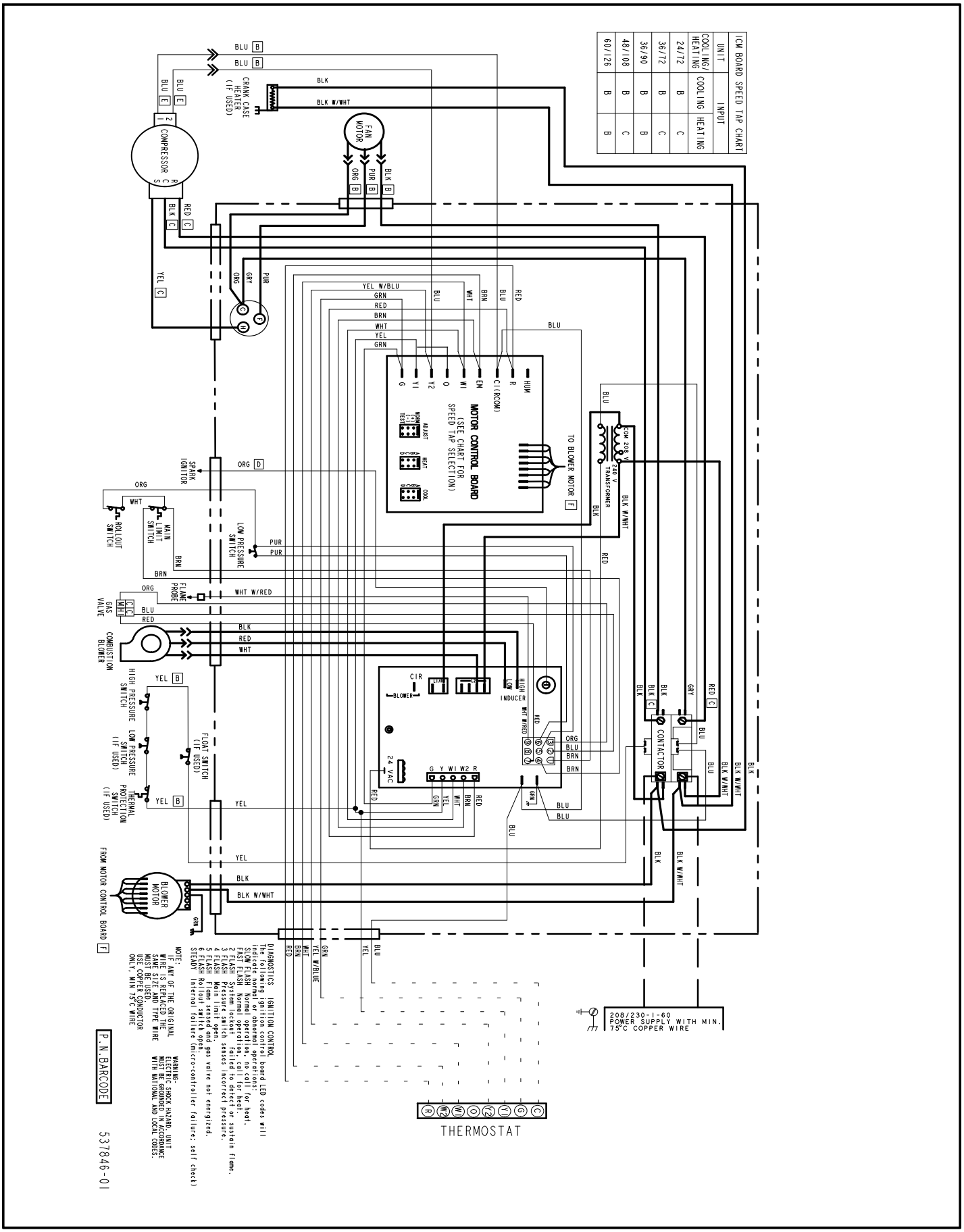


FIGURE 25

LRP16GE Unit Wiring – Single Phase

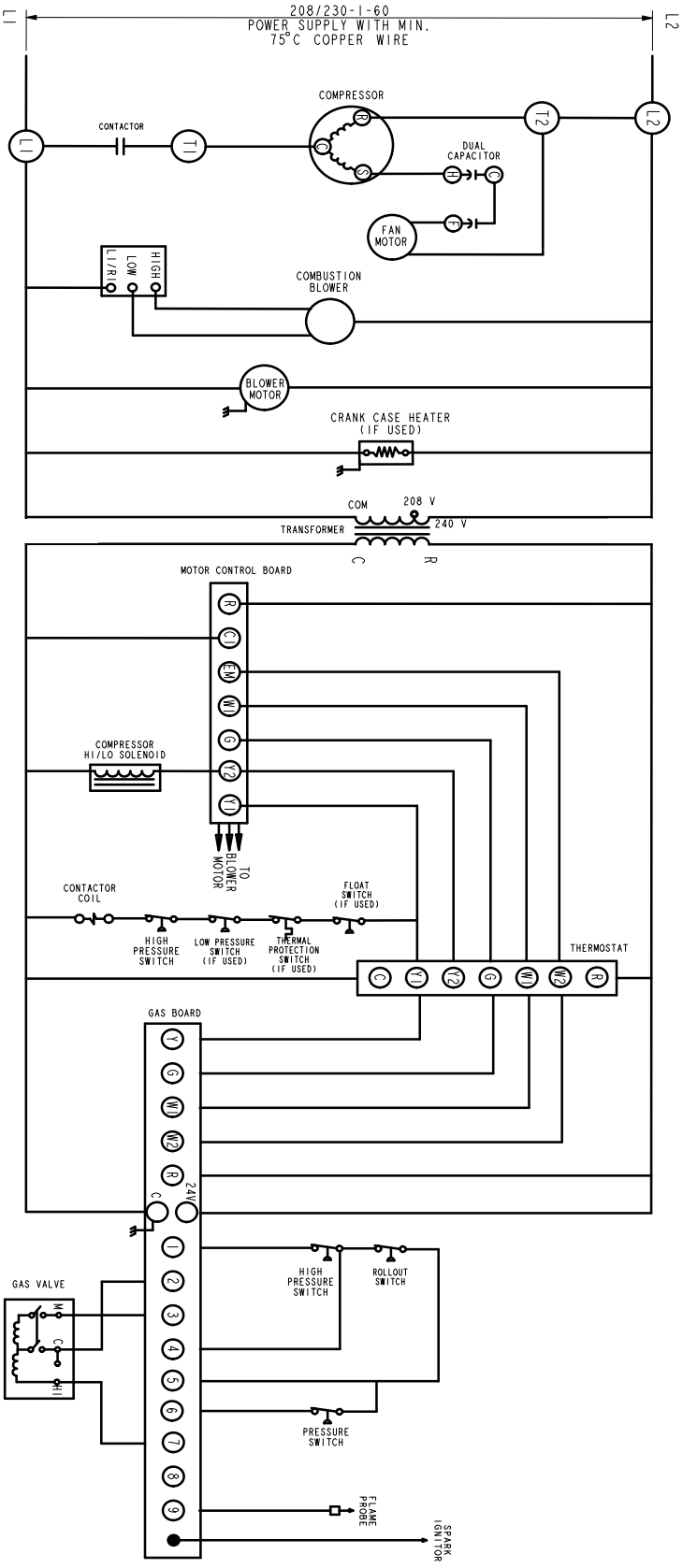


FIGURE 26

LRP16HP Wiring Diagram

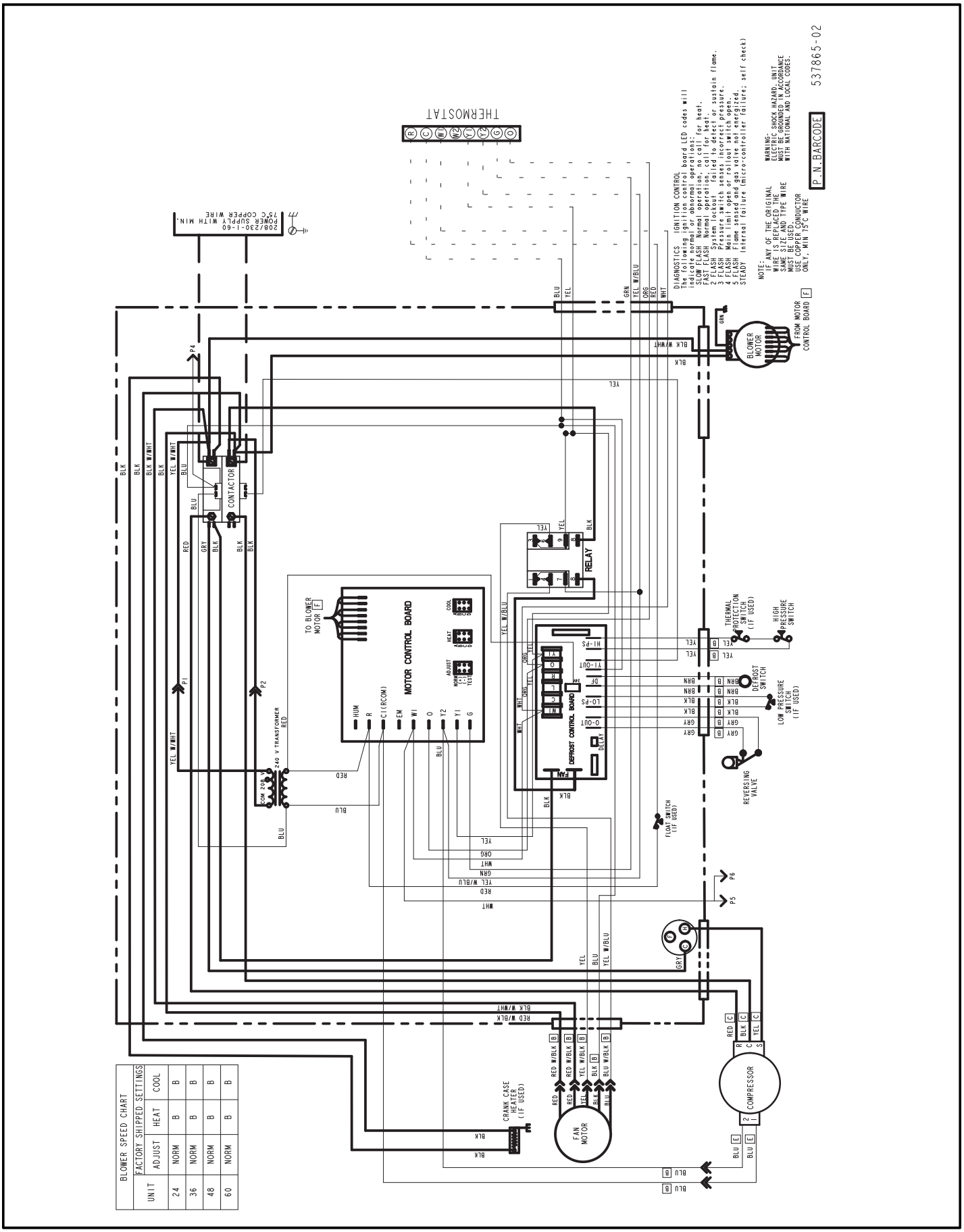


FIGURE 27

LRP16HP Unit Wiring – Single Phase

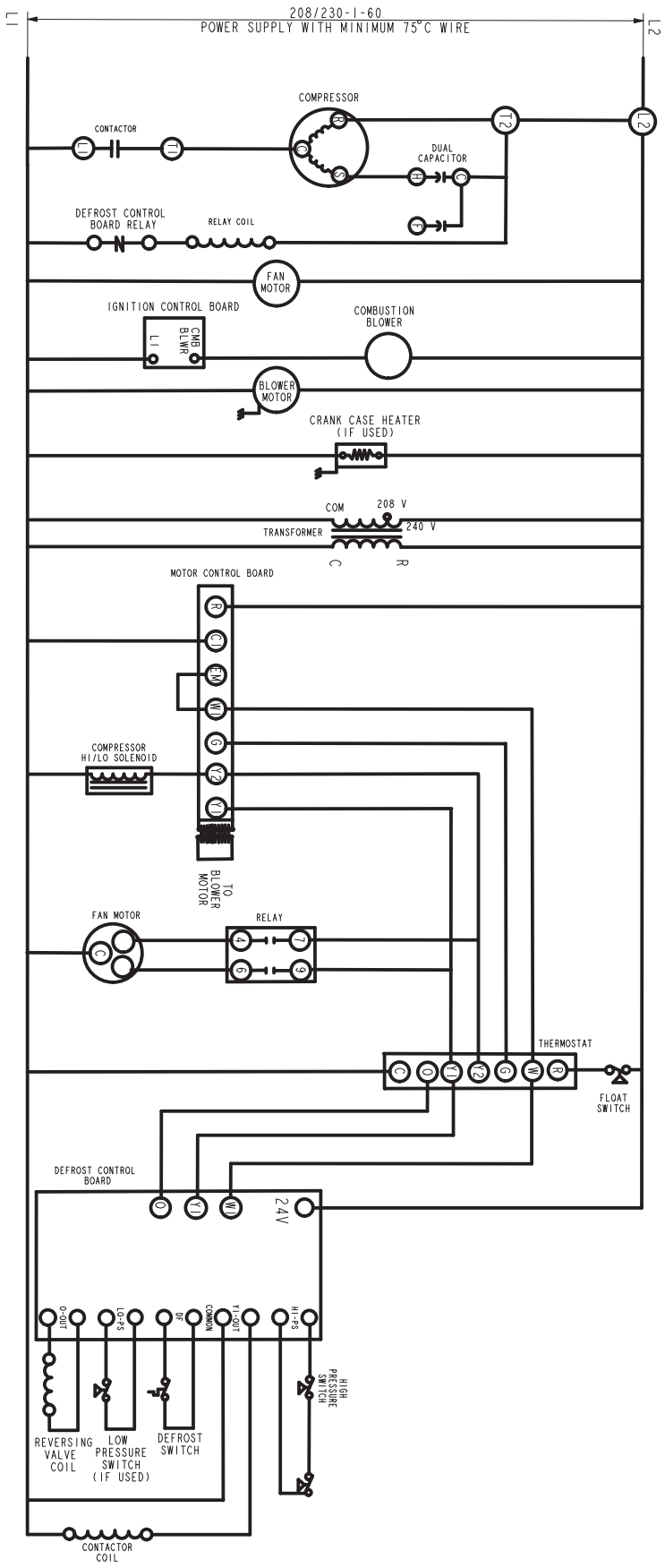


FIGURE 28

A-PHK Electric Heat

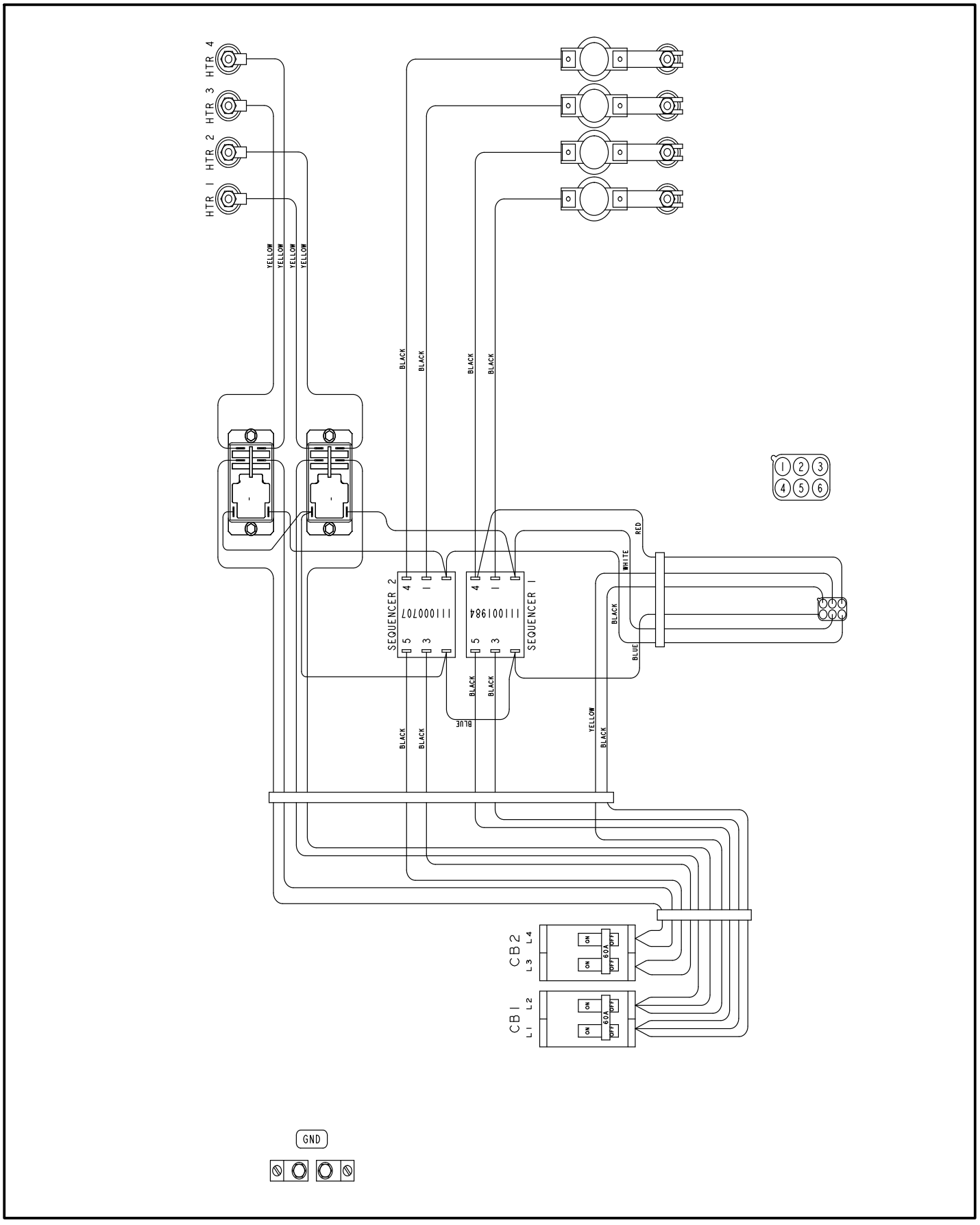
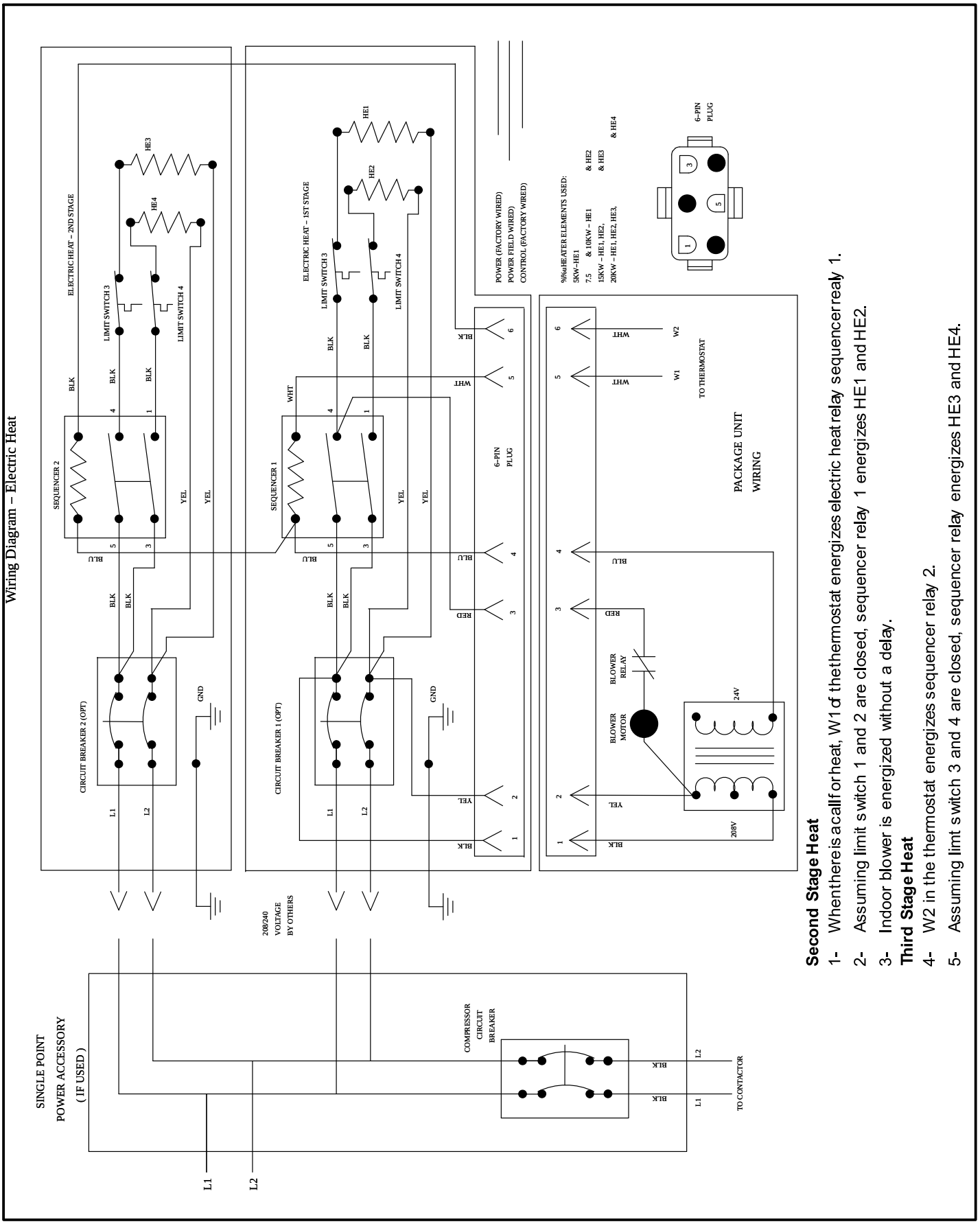


FIGURE 29

B-PHK Electric Heat – Older Models



Second Stage Heat

1- When there is a call for heat, W1 of the thermostat energizes electric heat relay sequencer relay 1.

2- Assuming limit switch 1 and 2 are closed, sequencer relay 1 energizes HE1 and HE2.

3- Indoor blower is energized without a delay.

Third Stage Heat

4- W2 in the thermostat energizes sequencer relay 2.

5- Assuming limt switch 3 and 4 are closed, sequencer relay energizes HE3 and HE4.

FIGURE 30

SEQUENCE OF OPERATION – SINGLE-STAGE COMPRESSOR

NOTE - *The combustion air inducer is energized for 30 seconds at a Y1 call for cooling to clear warm humid air out of the heat exchanger.*

Cooling

1- Internal thermostat wiring energizes terminal ”O” by cooling mode selection, energizing reversing valve L1.

2- Cooling demand initiates at Y1 in the indoor thermostat.

3- 24VAC from Y1 energizes compressor contactor K1.

4- K1-1 closes energizing compressor B1 and outdoor fan motor B4.

5- Compressor B1 and outdoor fan B4 begin immediate operation.

6- Evaporator blower B3 begins operation.

7- When cool demand is satisfied, ”Y1” in the indoor thermostat de-energizes K1 contactor. K1-1 opens de-energizing compressor B1 and outdoor fan B4. Evaporator blower B3 de-energizes after 90 seconds of time delay.

8- Terminal ”O” is de-energized when internal thermostat is out of cool mode, de-energizing reversing valve L1.

First Stage Heat Pump

1- Heating demand initiates at ”Y1” in the thermostat.

2- 24VAC energizes compressor contactor K1.

3- K1-1 closes energizing compressor B1 and outdoor fan B4.

4- Evaporator blower B3 energizes after 5 seconds.

5- When heat demand is satisfied, Y1 in the indoor thermostat de-energizes K1. K1-1 and K1-2 open and de-energizes compressor B1 and outdoor fan B4.

6- Evaporator blower B3 de-energizes after 90 seconds.

Second Stage Auxiliary Heat

1- Heating demand initiates at ”Y1” and ”W” in the thermostat. ”W” can either be strip heat in a HP unit or gas burners in a DF unit.

Emergency Heat

1- Emergency heat is energized by the room thermostat through ”W”.

Defrost Mode

1- During heating operation when liquid line temperature drops to 42°F or lower defrost switch S6 closes.

2- Defrost control CMC1 begins timing. If defrost thermostat S6 remains closed at the end of 30, 60 or 90 minute period, defrost control energizes and defrost begins

NOTE - *On early defrost controls, the defrost timing jumper must be in the 90-minute defrost interval before testing the defrost mode or the control will not enter defrost test mode.*

3- During defrost CMC1 energizes the reversing valve L1 and de-energizes the outdoor fan B4. If the compressor delay jumper is set, the compressor will turn off for 30 seconds while the reversing valve shifts either in or out of defrost mode.

4- Defrost continues for 10 minutes or until defrost thermostat switch S6 opens (S6 will open when liquid line temperature reaches 70°). When defrost thermostat switch opens, defrost control CMC1 loses power and resets.

5- When CMC1 resets, reversing valve L1 is de-energized while outdoor fan B4 is energized.

Gas Heat

1- Heating demand W1 initiates at the indoor thermostat.

2- Assuming all safety circuits are closed (with the exception of the pressure-prove switch open), A3 energizes the combustion air inducer blower B6. When the N.O. combustion air inducer pressure-prove switch S18 closes, a pre-purge period of 30 seconds follows.

3- Ignition control A3 begins spark and energizes gas valve GV1.

4- Gas valve GV1 opens. When flame is sensed, spark stops.

5- After 30 seconds, ignition control A3 energizes circulating air blower B3.

6- When heat demand is satisfied, the indoor thermostat de-energizes control A3 which de-energizes gas valve GV1 and combustion air inducer blower B6. Circulating air blower B3 runs for a designated period of 90 seconds.

SEQUENCE OF OPERATION – TWO-STAGE COMPRESSOR

The two−stage scroll compressor operates much like the standard scroll compressor. The two−stage compressor steps between low capacity and high capacity as required to meet cooling demand. The steps occur when gas is bypassed through a vent port in the first suction pocket. This bypassing of gas allows the compressor to operate at low capacity if thermostat demand allows, creating a more cost effective and efficient compressor. Full capacity is achieved by blocking the vent port with a slider ring. The slider ring (vent port cover) is controlled by a 24VDC internal solenoid in the open position allowing low capacity. When energized the internal solenoid closes the slider ring, blocking the vent port and bringing the compressor to full capacity.

Stepping can occur during a single thermostat demand as the motor runs continuously while the compressor steps from low to full capacity.

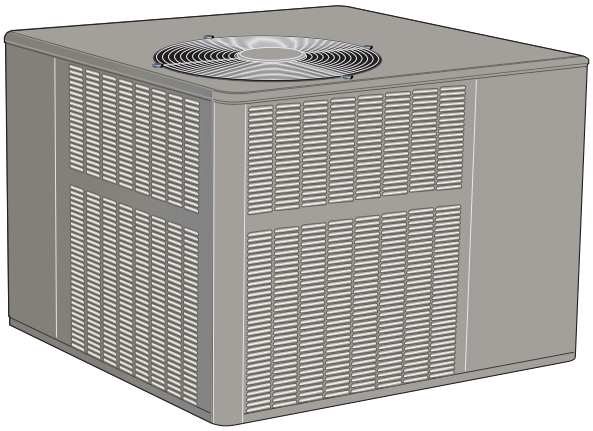
First and second stage cooling operate independent of each other and can modulate back and forth according to the thermostat demand.

First Stage Cooling (Low Capacity)

1. Cooling demand initiates at Y1 at the thermostat.
2. Voltage from terminal Y passes through S4 high pressure switch, energizes K1 compressor contactor, passes through the low pressure switch (S87) and returns to common side of the 24VAC power.
3. K1 closes, energizing B1 compressor and B4 outdoor fan.
4. Solenoid L34 is not energized so the slider ring remains open, limiting compressor to low capacity.

Second Stage Cooling (High Capacity)

Compressor is operating in first stage cooling. Second stage thermostat demand sends voltage to rectifier plug D4. D4 converts the AC voltage to DC voltage and energizes L34 unloader solenoid. L34 closes the slider ring, allowing the compressor to operate at high capacity.



THIS MANUAL MUST BE LEFT WITH THE HOMEOWNER FOR FUTURE REFERENCE

⚠ WARNING

This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

⚠ WARNING

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

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs and HFCs) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

INSTALLATION INSTRUCTIONS

LRP16HP Packaged Units

RESIDENTIAL PACKAGED UNITS
Heat Pumps
507697-01
3/2017

Table of Contents

Installation 2
Condensate Drain.....4
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System Performance 8
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⚠ CAUTION

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

General Information

This unit is designed and approved for use as a self-contained air-to-air outdoor heat pump.

The units are factory-equipped with a transformer and blower control for applications without auxiliary heat. Electric heat accessory kits (PHK-) can be ordered for field installation of additional heat where required.

0317
507697-01

Installation

These instructions explain the recommended method of installation of the packaged heat pump unit and associated electrical wiring.

These instructions are intended as a general guide only, for use by qualified personnel and do not supersede any national or local codes in any way. Compliance with all local, state, provincial, or national codes pertaining to this type of equipment should be determined prior to installation.

Inspection of Shipment

Upon receipt of equipment, carefully inspect it for possible shipping damage. If damage is found, it should be noted on the carrier's freight bill.

Location

The unit is designed to be located outdoors with sufficient clearance for free entrance to the air inlet and discharge air openings. The location must also allow for adequate service access.

The unit must be installed on a solid foundation that will not settle or shift. Adequate structural support must be provided. Install the unit in level position. Isolate the base from the building structure to avoid possible transmission of sound or vibration into the conditioned space.

The heat pump unit foundation should be raised to a minimum of 3" above finish grade. In areas which have prolonged periods of temperature below freezing and snowfall, the heat pump unit should be elevated above the average snow line. Extra precaution should be taken to allow free drainage of condensate from defrost cycles to prevent ice accumulation. The unit should not be located near walkways, to prevent possible icing of surface from defrost condensate.

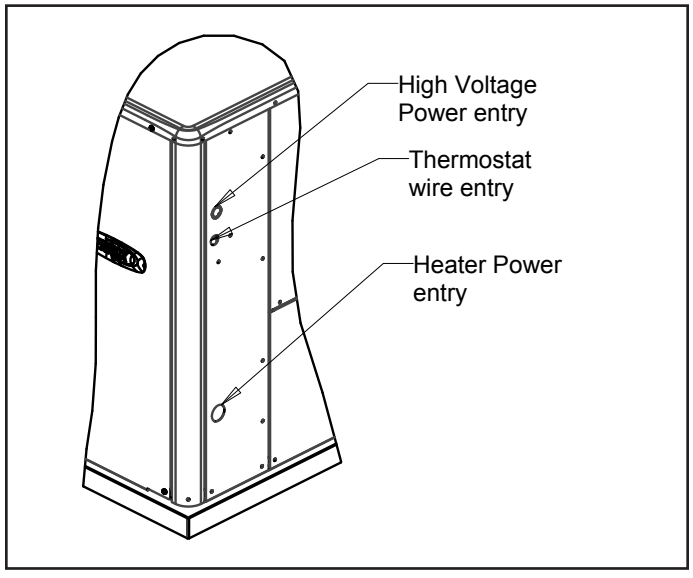


Figure 1. Typical Field Wiring

Unpacking

Carefully remove outer packaging material and discard. Locate the four (4) shipping brackets that attached the unit to the wood pallet and remove. Locate the supply duct corner and seal the shipping openings in the base from the underside with silicone or other approved sealant to prevent air leakage during unit operation.

Service Access

Access to all serviceable components is provided by four removable panels: upper access panel (for blower, ID coil, and optional filter), Aux heat access, control access panel, and compressor access.

Clearances

All units require certain clearances for proper operation and service. Refer to Table 1 for the minimum clearances to combustibles required for construction, servicing, and proper unit operation.

Table 1. Minimum Clearances

	Clearance to Combustibles	Clearance for Service Access
Front of unit	0 in.	24 in.
Back of unit	0 in.	0 in.
Left side	0 in.	24 in.
Right side	0 in.	24 in.
Base of unit	0 in.	0 in.
Top of unit	0 in.	48 in.
For any future service, installer must provide access to screws of top and rear panels.		

Compressor

Units are shipped with compressor mountings factory adjusted and ready for operation. Do not loosen compressor mounting bolts.

Electrical Wiring

All field wiring must be done in accordance with National Electrical Code recommendations, local codes, and applicable requirements of UL Standards, or in accordance with Canadian Electrical Code recommendations, local codes, or CSA Standards.

Power wiring, disconnect means, and over-current protection are to be supplied by the installer. Refer to the unit rating plate for maximum over-current protection and minimum circuit ampacity, as well as operating voltage. The power supply must be sized and protected according to specifications supplied.

Low voltage control wiring are terminal strip or pigtail leads located on the main control box and are color-coded to match the connection called out on the wiring schematic.

Units are factory wired for a 230-volt power supply. If power supply is 208 volts, it will be necessary to change a wire connection on the unit transformer from 240V terminal to 208V terminal as shown on the wiring diagram.

Use only copper conductors.

If any of the original unit wiring is replaced, the same size and type wire must be used.

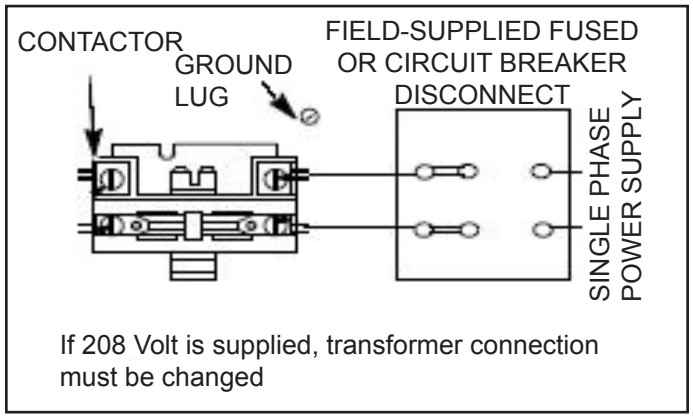


Figure 2. 208 / 230 Line Voltage Wiring

Thermostat

The room thermostat should be located on an inside wall where it will not be subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow the manufacturer's instructions enclosed with the thermostat for general installation procedure. Color-coded insulated wires (#18 AWG) should be used to connect the thermostat to the unit. A minimum of five wires are required for proper installation.

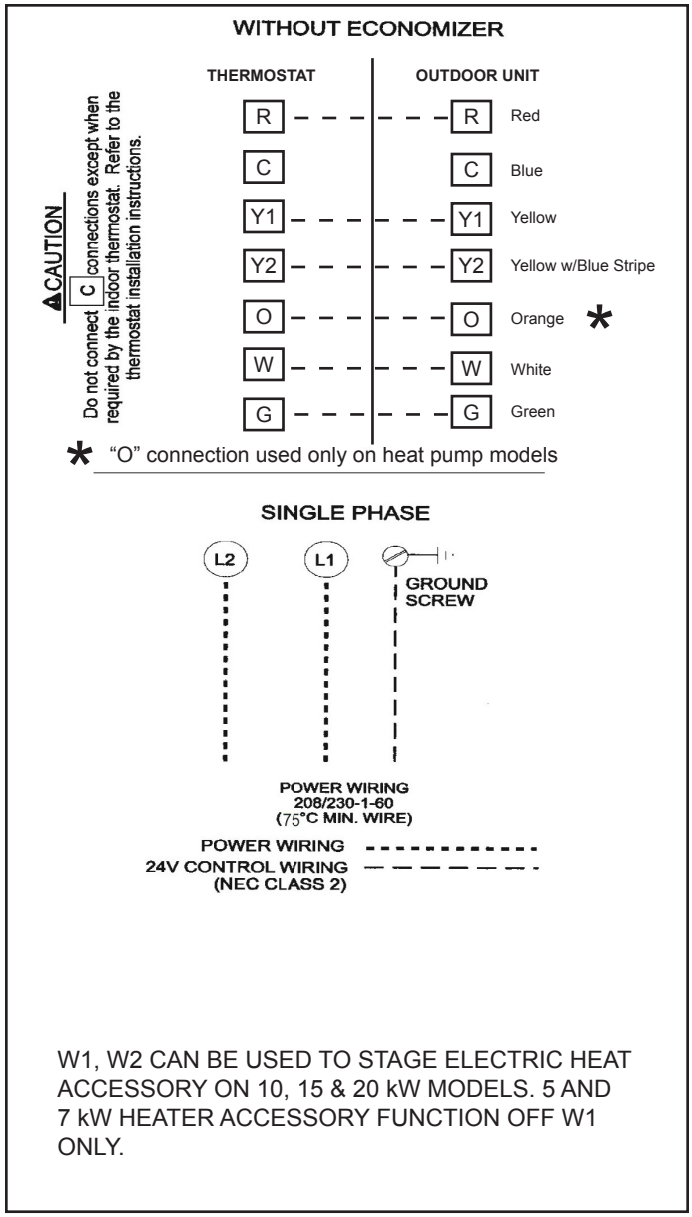


Figure 3. Typical Wiring Connections

Duct System

Duct sustem should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. It is recommended that supply and return duct connections at the unit be made with flexible joints.

The supply and return air duct systems should be designed for the CFM and static requirements of the job. They should not be sized to match the dimensions of the duct connections on the unit.

The unit is shipped ready for horizontal flow (side duct connections). Before attaching side ducts, bend perforated duct tabs out to assist with duct alignment and attachment.

Duct attachment screws are intended to go into the duct panel. Duct to unit connections must be sealed and weather proofed.

If downflow duct system is desired, a down flow conversion kit is required, and the following conversion is required.

1. Using a knife, cut following the marked cut lines on the unit base insulation to access bottom metal covers underneath the insulation.
2. Remove the screws securing the bottom covers, and discard the bottom covers (supply and return).
3. Remove screws located between the supply and return openings that attach the blower deck to the base, and discard these screws. These screws can interfere with bottom duct connections or roof curb seals.
4. Secure side duct covers provided in the downflow conversion kit over the side duct openings (use dimples on back panel to locate cover attachments).
5. This unit comes with a factory-installed drain pan overflow switch. This switch will interupt the thermostat operation if the water level in the drain pan becomes excessive. To insure proper function, the unit must be level and the switch secure to the drain pan. When secured, the overflow switch bracket should be positioned completely down on the wall of the drain pan.

Filters

Air filters are not supplied with the unit. A field-provided air filter must always be installed ahead of the evaporator coil and must be kept clean or replaced. Dirty filters will reduce the airflow of the unit.

An optional filter rack kit may be purchased separately for installation inside the unit's coil compartment. Air filter sizes are shown in table 2 for use with filter rack kit.

NOTE:

The filter rack must be installed prior to installation of the unit in applications where access to the rear panel is limited.

Table 2. Unit Air Filter Sizes - inches

Unit Model	Filter 1	Filter 2
24,36	14 X 20	20 X 20
48,60	20 X 20	20 X 20

A Photocatalytic Oxidation (PCO) air purification system is available as a field-installed accessory for this product. A wiring harness for the installation of this accessory has been factory installed. If this accessory is going to be installed, it becomes critical that the system filter be installed ahead of this unit's return. Therefore, see the PCO accessory for filter requirements, plan the installation of filter ahead of this unit, and **do not use the internal filter rack described above**.

Condensate Drain

This package unit is equipped with a 3/4" FPT coupling for condensate line connection. Plumbing must conform to local codes. Use a sealing compound on male pipe threads.

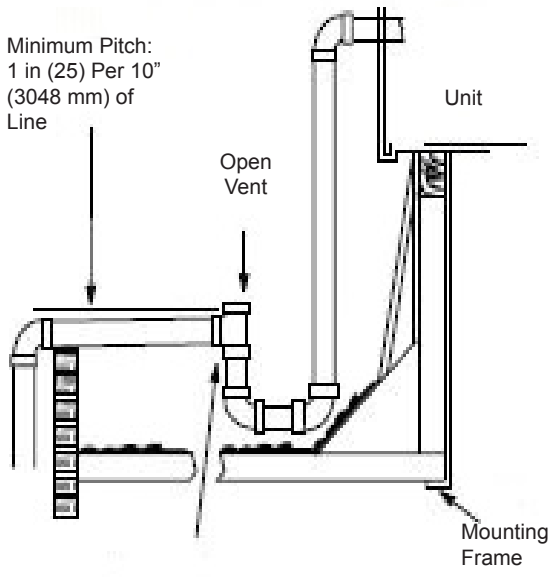
Do not operate unit without a drain trap. The condensate drain is on the negative pressure side of the blower; therefore, air being pulled through the condensate line will prevent positive drainage without a proper trap.

The condensate drain line must be properly trapped, routed to a suitable drain and primed prior to unit commissioning.

NOTE: *Install drain lines and trap so they do not block service access to the unit.*

See Figure 4 for proper drain arrangement. The drain line must pitch to an open drain or pump to prevent clogging of the line. Seal around the drain connection with suitable material to prevent air leakage into the return air system.

To prime trap, pour several quarts of water into drain, enough to fill drain trap and line.



Trap must be deep enough to offset maximum static difference (generally, 3 inches (76 mm) minimum). In addition, the drain line must be supported if longer than 10 feet.

Trap must be primed at start-up.

Figure 4. Typical Condensate Drain Connection

Crankcase Heater (if used)

Some models may be equipped with a crankcase heater to prevent excessive migration of liquid refrigerant into the compressor during off cycles. Power must be maintained to the unit to keep this feature active.

Except as required for safety while servicing, **do not open the system disconnect switch.**

Heater Kit Accessory (if used)

The unit is fully equipped for operation without auxiliary heat. A heater kit accessory may also be used. To install the heater kit accessory (see Figure 5):

1. Disconnect the power and open the main control access.
2. Disconnect the plug separating the high voltage wire harness. Remove the high voltage wire harness plug and discard.
3. Remove the heater blockoff by removing the four screws holding it in place.
4. Insert the heater into the control panel and fasten in the same mounting holes.
5. Plug the heater wiring harness into the wire harness on the control assembly. Field wiring of the auxiliary heater is separate from the unit power supply. Wire the power supply wiring for the heater to the appropriate connections on the heater kit. Optional single-point power kit can be used when installing heater kit.

Sequence of Operation

Blower Control

Units are equipped with a variable speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (COOL, HEAT, and ADJUST) on the blower control.

The HEAT and COOL jumpers are labeled A, B, C and D. Each of the numbers corresponds with an air volume (CFM) setting. The ADJUST jumper is labeled Test, -, +, and Norm. The + and - pin settings are used to add or subtract a percentage of the CFM selected. The Test jumper is used to operate the motor in the test mode. Figure 6 shows the blower control.

The CFM LED located on the blower control flashes one time per 100 cfm to indicate selected blower speed. For example, if the unit is operating at 1200 CFM, the CFM LED will flash 12 times. If the CFM is 1150, the CFM LED will flash 11 full times plus one fast or half flash. At times, the light may appear to flicker or glow. This takes place when the control is communicating with the motor between cycles. This is normal operation. Read through the jumper settings section before adjusting the jumper to obtain the appropriate blower speed.To change jumper positions, gently pull the jumper off the pins and place it on the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one. Refer

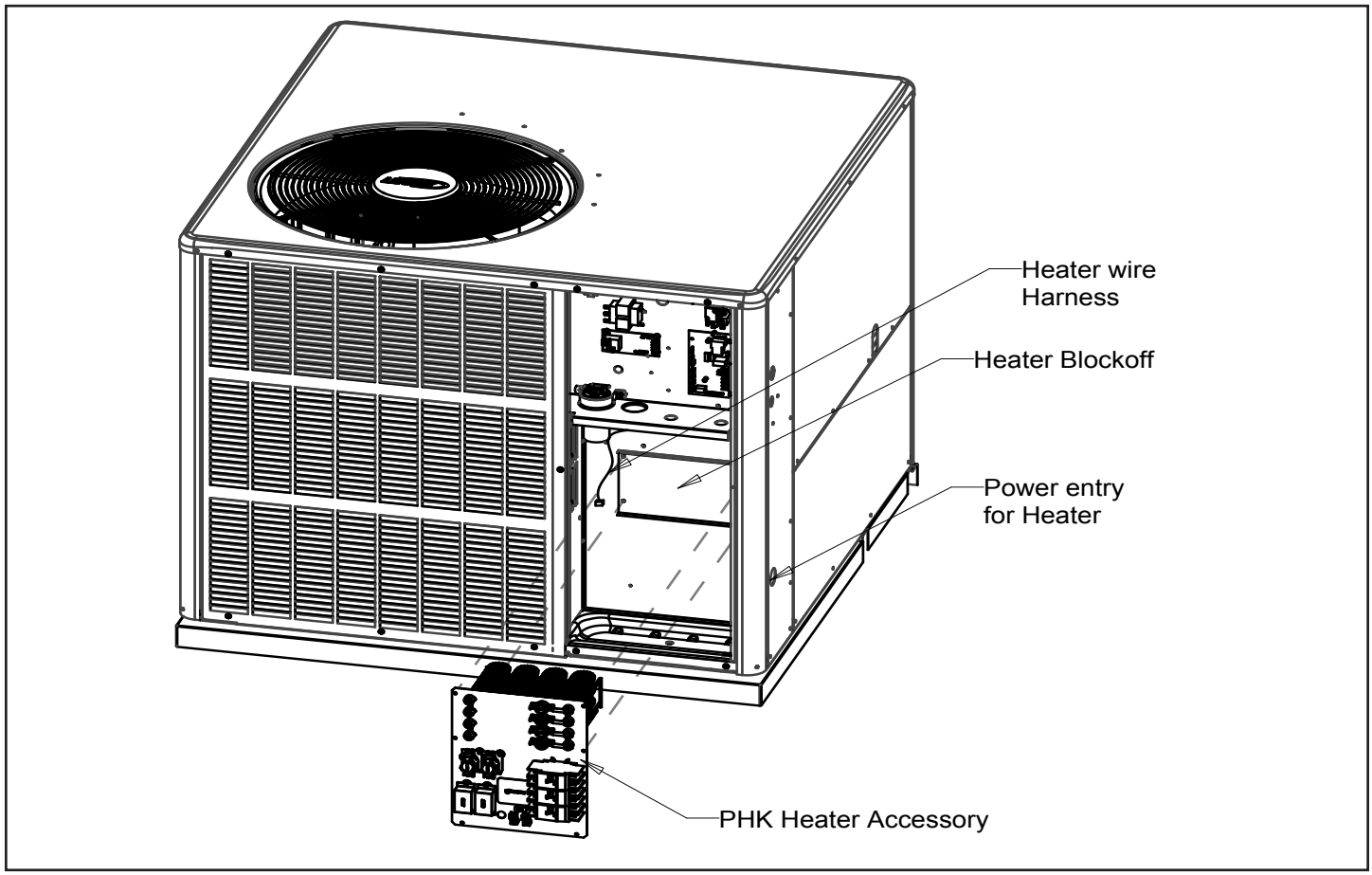


Figure 5

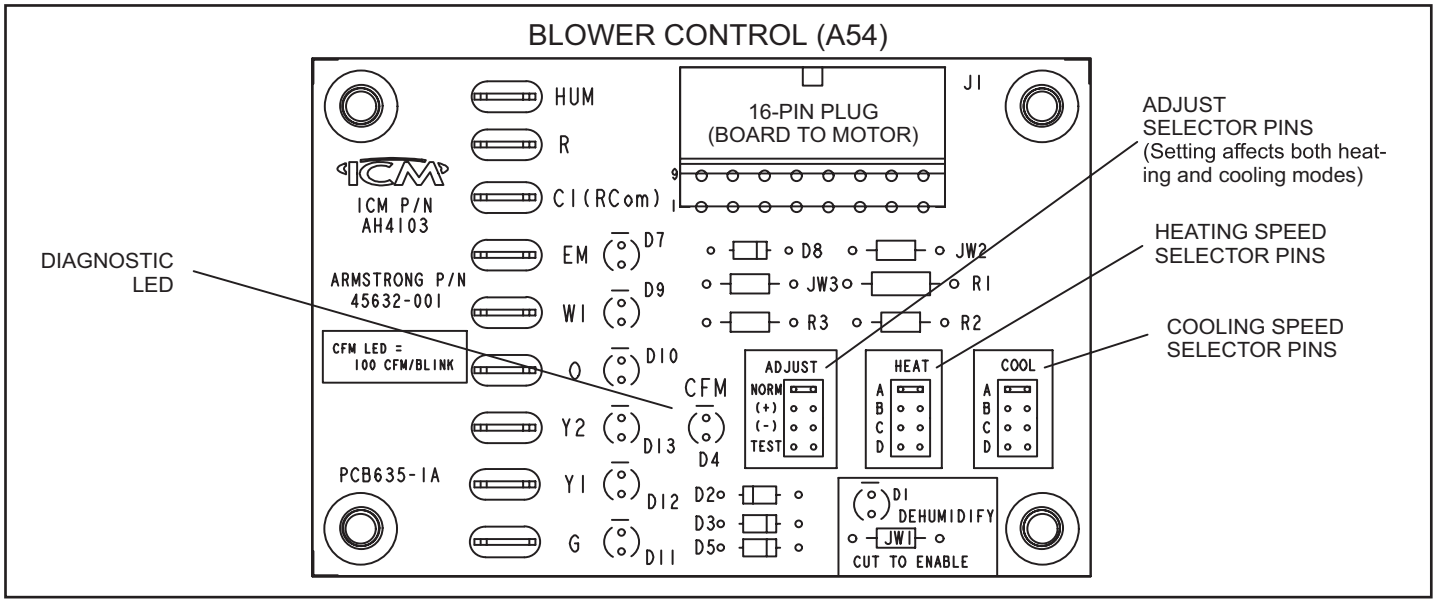


Figure 6

to Figure 7.

From the engineering handbook and/or specification sheet, determine which row most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections. The variable speed motor slowly ramps up to and down from the selected air flow during both cooling and heating demand. This minimizes noise and eliminates the initial blast of air when the blower is initially energized.

ADJUST

The ADJUST pins allow the motor to run at normal speed, approximately 10 percent higher, or approximately 10 percent lower than normal speed.

The TEST pin is available to bypass the blower control and run the motor at approximately 70 percent to make sure that the motor is operational. This is used mainly in troubleshooting. The G terminal must be energized for the motor to run.

COOL

The COOL jumper is used to determine the CFM during cooling operation. This jumper selection is activated for cooling when Y1/Y2 and O are energized.

The blower motor runs at 80 percent of the selected air flow for the first 7-1/2 minutes of each cooling demand. This feature allows for greater humidity removal and saves energy.

In the cooling mode, the blower control delays blower operation for 5 seconds after the compressor starts. The blower continues to operate for 90 seconds after the compressor is de-energized.

HEAT

The HEAT jumper is used to determine CFM during electric heat operation only. These jumper selections are activated only when W1/W2 is energized.

CONTINUOUS FAN

When the thermostat is set for “Continuous Fan” operation and there is no demand for heating or cooling, the blower control will provide 50 percent of the COOL CFM selected.

DEHUMIDIFICATION

The blower control includes an HUM terminal, which provides for connection of a humidistat. The JV1 resistor on the blower control must be cut to activate the HUM terminal. The humidistat must be wired to open on humidity rise. When the dehumidification circuit is used, the variable speed motor will reduce the selected air flow rate by 25 percent when humidity levels are high. An LED (D1) lights when the blower is operating in the dehumidification mode.

Cooling System

The cooling system is factory-charged with HFC-R-410A. The compressor is hermetically sealed and base-mounted with rubber-insulated bolts.

Cooling

When the thermostat calls for cooling, R is closed to Y1 and O (see the wiring diagrams starting on page 13). This action completes the low voltage control circuit, energizing the compressor, condenser fan motor, and blower motor.

Second stage cooling is initiated by the thermostat energizing Y2 and O.

Unit compressors have internal protection. In the event there is an abnormal rise in the temperature of the compressor, the protector will open and cause the compressor to stop. The thermostat automatically closes the R to G circuit,which also brings on the indoor blower at the same time. Upon satisfying cooling demand, the thermostat will open the above circuits and open the main contactor, stopping the compressor and outdoor fan. If the unit is equipped with a delay timer, the blower will continue to operate for 60 to 90 seconds, which improves system efficiency.

Heating - Heat Pump Stage

Upon heating demand, the thermostat closes circuit R to Y1, which closes the unit contactor, starting the compressor and outdoor fan. Second stage heating is initiated when the thermostat energizes Y2. The reversing valve is not energized in the heating mode. The thermostat again automatically brings on the indoor fan at the same time. Upon satisfying heating demand, the thermostat opens above circuits and stops unit operation.

NOTE: *O is de-energized in heat pump mode*.

Heating - Auxiliary Electric Heat

Upon heating demand for auxiliary electric heat, the thermostat closes circuit R to W, which energizes the heater sequencers as well as the indoor blower. Upon satisfying auxillary heat demand, the thermostat opens above circuits and heating elements sequence off; the blower continues to operate until all heating elements have turned off.

Auxillary electric heat can be staged using W1, W2 on 10, 15 and 20 kW models. Staged wiring diagrams are included with the installation instructions of electric heater kits.

Heating - Emergency Mode

When the thermostat calls for emergency heat, the R to W circuit is closed. Upon satisfying heat demand, the circuit is open and the blower continues to operate through an off delay period. The primary function of emergency mode is to provide emergency heat should the heat pump operation fail.

Defrost System

The defrost system includes two components: the defrost thermostat and the defrost control.

Defrost Thermostat

The defrost thermostat is located on the outdoor coil. When the defrost thermostat senses 35°F or cooler, the thermostat contacts close and send a signal to the defrost control board to start the defrost timing. It also terminates defrost when the liquid line warms up to 60°F.

Defrost Control

The defrost control board includes the combined functions of time/temperature defrost control, defrost relay, diagnostic LEDs and terminal strip for field wiring connections (see Figure 7).

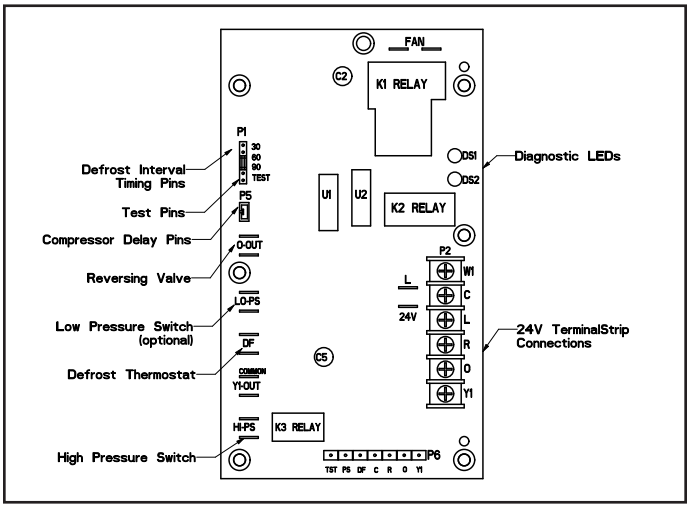


Figure 7. Defrost Control Board

The control provides automatic switching from normal heating operation to defrost mode and back. During the compressor cycle (call for defrost), the control accumulates compressor run time at 30, 60, and 90 minute field-adjustable intervals. If the defrost thermostat is closed when the selected compressor run time interval ends, the defrost relay is energized and the defrost begins.

Defrost Control Timing Pins

Each timing pin selection provides a different accumulated compressor run time period during one thermostat run cycle. This time period must occur before a defrost cycle is initiated. The defrost interval can be adjusted to 30 (T1), 60 (T2), or 90 (T3) minutes. **It is intended that this product should be set at the 60-minute time interval at initial installation**. If the timing selector jumper is not in place, the control defaults to a 90-minute defrost interval. The maximum defrost period is 14 minutes and cannot be adjusted.

NOTE:

For geographic areas that experience low temperature and high humidity conditions (below 35°F and above 80% RH), the defrost timer pin must be field set at installation to a 60 or 30 minute defrost interval to ensure reliable system operation while in heating mode.

A test option is provided for troubleshooting. The test mode may be started any time the unit is in the heating mode and the defrost thermostat is closed or jumpered. If the jumper is in the TEST position at power up, the control will ignore the test pins. When the jumper is placed across the TEST pins for 2 seconds, the control will enter the defrost mode. If the jumper is removed before an additional 5-second period has elapsed (7 seconds total), the unit will remain in defrost mode until the defrost thermostat opens or 14 minutes have passed. If the jumper is not removed until after the additional 5-second period has elapsed, the defrost will terminate and

the test option will not function again until the jumper is removed and reapplied.

Compressor Delay

The defrost board has a field-selectable function to reduce occasional sounds that may occur while the unit is cycling in and out of the defrost mode. The compressor will be cycled off for 30 seconds going in and out of the defrost mode when the compressor delay jumper is removed.

NOTE: *The 30-second "off" cycle is not functional when jumpering the TEST pins.*

Time Delay

The defrost control includes a compressor timer, which ensures the compressor is off for a minimum amount of time between operating cycles.

The timed-off delay is 5 minutes long. The delay helps to protect the compressor from short cycling in case the power to the unit is interrupted or a pressure switch opens. The delay is bypassed by placing the timer select jumper across the TEST pins for 0.5 seconds.

Pressure Switch Circuit

High and low pressure switches are connected to the defrost control board (see Figure 8).

During a single demand cycle, the defrost control will lock out the unit after the fifth time that the circuit is interrupted by any pressure switch wired to the control board. In addition, the diagnostic LEDs will indicate a locked-out pressure switch after the fifth occurrence of an open pressure switch (see Table 3).

The unit will remain locked out until power to the board is interrupted, then re-established, or until the jumper is applied to the TEST pins for 0.5 seconds.

NOTE: *The defrost control board ignores input from the low pressure switch terminals as follows:*

- During the TEST mode
- During the defrost cycle
- During the 90-second start-up period
- For the first 90 seconds each time the reversing valve switches heat/cool modes

If the TEST pins are jumpered and the 5-minute delay is being bypassed, the LO PS terminal signal is not ignored during the 90-second start-up period.

Diagnostic LEDs

The defrost board uses two LEDs for diagnostics. The LEDs flash a specific sequence according to the condition as shown in Table 3.

Table 3. Defrost Control Board Diagnostic LEDs

Mode	Green LED (DS2)	Red LED (DS1)
No Power to Board	Off	Off
Normal Operation/ Power to Board	Simultaneous Slow Flash	
Anti-Short Cycle Lockout	Alternating Slow Flash	
Low Pressure Switch Fault	Off	Slow Flash
Low Pressure Switch Lockout	Off	On
High Pressure Switch Fault	Slow Flash	Off
High Pressure Switch Lockout	On	Off

System Performance

This equipment is a self-contained, factory optimized refrigerant system, and should not require adjustments to system charge when properly installed. If unit performance is questioned, perform the following checks.

Ensure unit is installed per manufacturer's instructions and that line voltage and air flow is correct. Refer to the tables below for proper performance value. The indoor metering device varies by model.

If the measured performance value varies from table value allowance, check internal seals, service panels and duct work for air leaks, as well as restrictions and blower speed settings. If unit performance remains questionable, remove system charge, evacuate to 500 microns, and weigh in refrigerant to nameplate charge. It is critical that the exact charge is re-installed. Failure to comply will compromise system performance.

If unit performance is still questionable, check for refrigerant-related problems, such as blocked coil or circuits, malfunctioning metering device or other system components.

Maintenance

⚠ WARNING

Electric Shock Hazard. Can cause injury or death. Unit must be properly grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

Periodic inspection and maintenance normally consists of changing or cleaning the filters and cleaning the outdoor coil. On occasion, other components may also require cleaning.

Filters

Filters are not supplied with the unit. Inspect once a month. Replace disposable or clean permanent type as necessary. Do not replace permanent type with disposable.

Motors

Indoor and outdoor fan and vent motors are permanently lubricated and require no maintenance.

Some models may be equipped with a permanent magnet, constant torque indoor blower motor. These motors remain energized and are controlled by 24V signals. For high static applications, use tap 3 for cooling speed and tap 5 for heating speed. Refer to the heater installation label for limitations to blower tap selection on heating speeds.

Outdoor Coil

Dirt and debris should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep the coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure the power to unit is shut off prior to cleaning. Care should be used when cleaning the coil so that the coil fins are not damaged.

Table 4. Cooling Performance - HP Models

80 DB / 67 WB Deg. Return Air		Air Temperature Entering Outdoor Coil, Degree F											
COOLING INPUT (1000 BTU)	**Pressure**	**65°**	**70°**	**75°**	**80°**	**82°**	**85°**	**90°**	**95°**	**100°**	**105°**	**110°**	**115°**
24	Suction	141	142	142	143	143	144	145	147	148	149	149	150
36		132	134	136	137	138	139	140	142	144	145	147	148
48		136	138	140	142	143	144	145	147	148	149	150	151
60		134	135	137	138	139	140	141	142	144	145	147	148
24	Liquid	237	257	278	298	306	320	343	366	392	419	445	471
36		239	260	280	301	309	323	347	370	397	424	451	478
48		243	264	284	305	313	327	351	374	401	428	454	481
60		249	270	292	313	322	337	361	385	414	443	472	501

Table 5. Heating Performance - HP Models

70 Deg. F Return Air		Air Temperature Entering Outdoor Coil, Degree F												
COOLING INPUT (1000 BTU)	**Pressure**	**0°**	**5°**	**10°**	**17°**	**20°**	**25°**	**30°**	**35°**	**40°**	**47°**	**50°**	**55°**	**60°**
24	Suction	28	36	44	56	61	69	78	86	94	106	113	124	135
36		26	33	40	50	54	61	68	75	83	95	103	117	131
48		28	36	43	53	57	65	72	79	89	102	107	116	125
60		31	39	46	56	60	68	75	82	89	99	106	117	128
24	Liquid	264	271	279	289	294	301	309	316	324	335	340	348	357
36		272	282	291	305	311	321	330	340	348	359	365	374	383
48		283	291	298	308	312	320	327	334	342	353	358	367	376
60		285	295	304	316	321	330	339	348	357	370	375	383	392

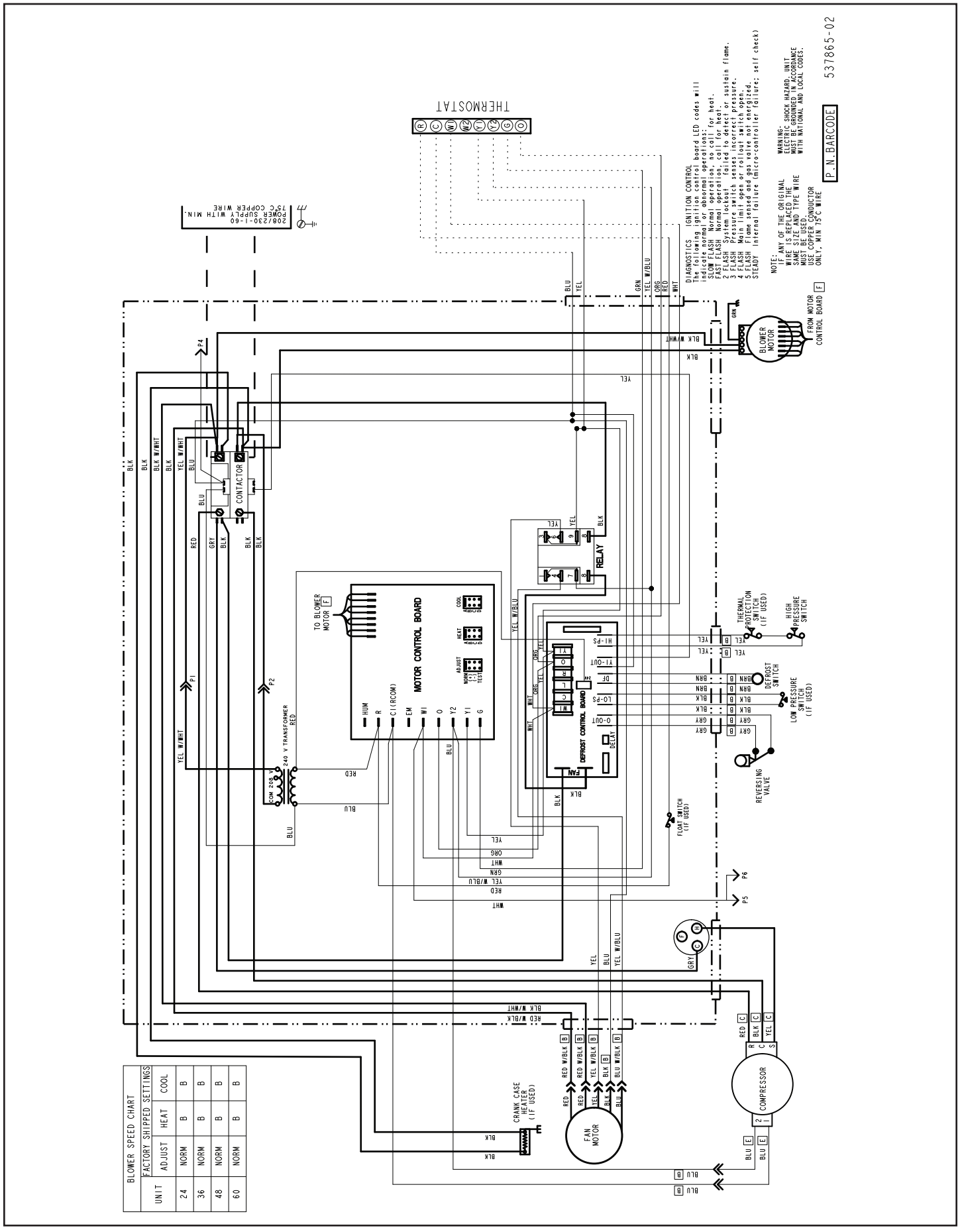


Figure 9A. HP Wiring Diagram

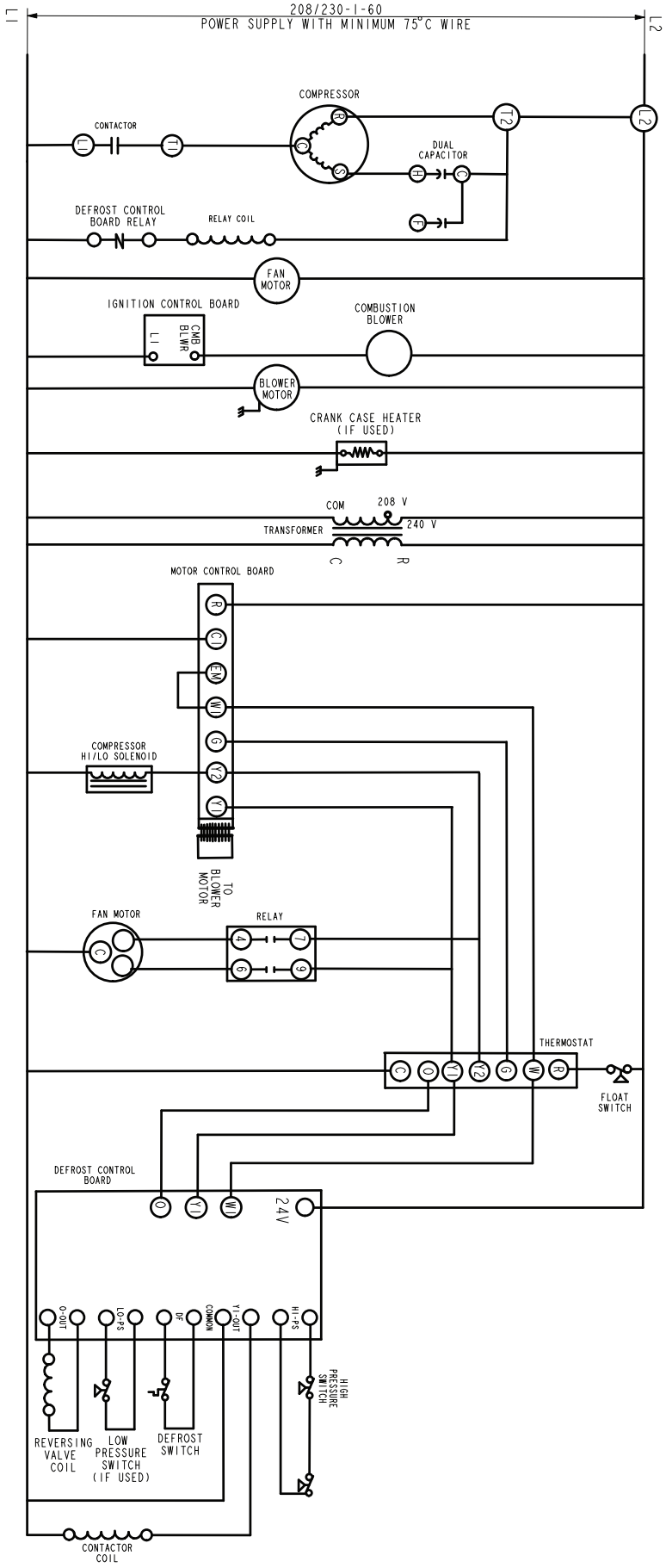


Figure 9B. HP Wiring Schematic

A-PHK Electric Heat

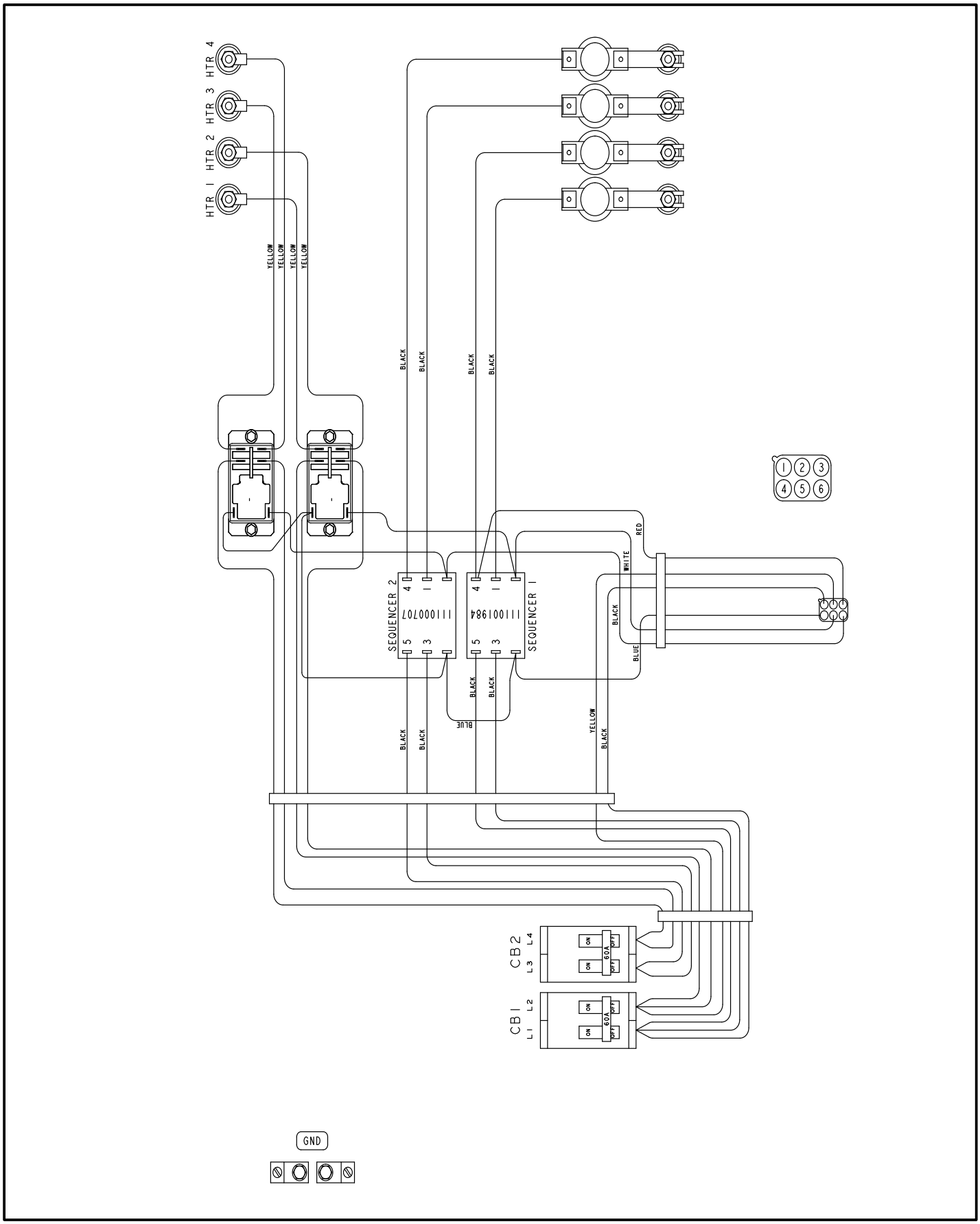
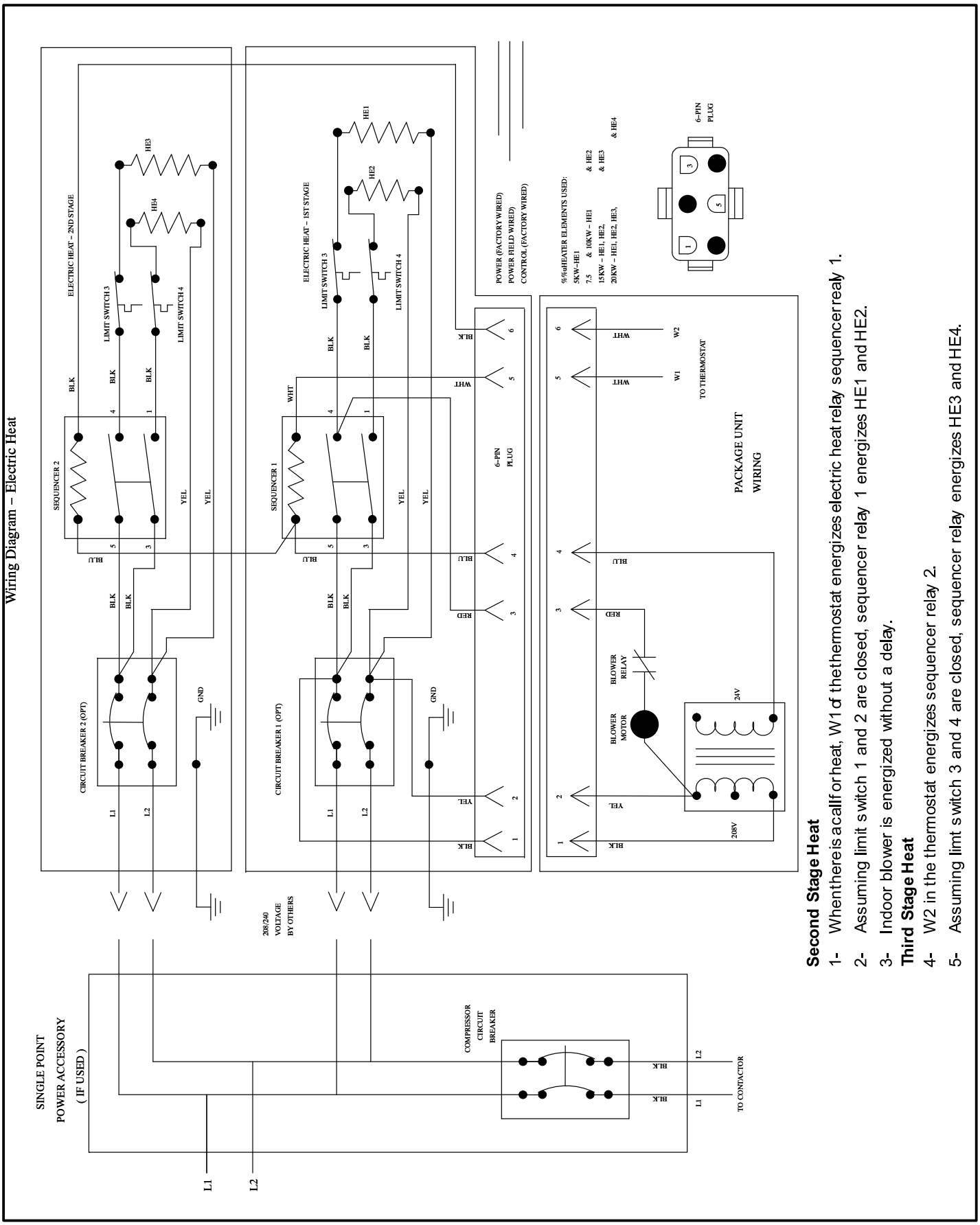


Figure 10. Auxillary Heat

B-PHK Electric Heat – Older Models



Second Stage Heat

1- When there is a call for heat, W1 of the thermostat energizes electric heat relay sequencer realy 1.

2- Assuming limit switch 1 and 2 are closed, sequencer relay 1 energizes HE1 and HE2.

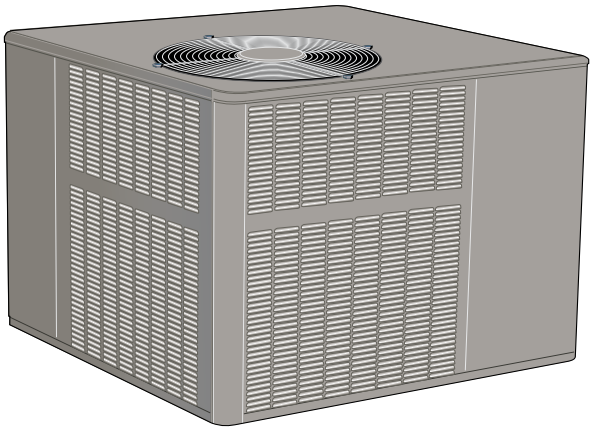
3- Indoor blower is energized without a delay.

Third Stage Heat

4- W2 in the thermostat energizes sequencer relay 2.

5- Assuming limt switch 3 and 4 are closed, sequencer relay energizes HE3 and HE4.

Figure 11. Auxillary Heat



THIS MANUAL MUST BE LEFT WITH THE HOMEOWNER FOR FUTURE REFERENCE

INSTALLATION AND MAINTENANCE INSTRUCTIONS

*RP16GE SERIES UNITS

RESIDENTIAL PACKAGED UNITS
Gas/Electric
507620-01
06/2016

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⚠ WARNING

Do not store combustible materials, including gasoline and other flammable vapors and liquids, near the unit, vent pipe, or warm air ducts. Such actions could cause property damage, personal injury, or death.

⚠ WARNING

Install, operate, and maintain unit in accordance with manufacturer's instructions.
Warning: This product contains a chemical known to the state of California to cause cancer, birth defects or other reproductive harm.

⚠ WARNING

If this unit is to be installed in a mobile or manufactured home application, the duct system must be sized to achieve static pressures within the manufacturer's guidelines. All other installation guidelines must also be followed. Failure to do so may result in equipment damage, personal injury, and improper performance of the unit.

⚠ WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a licensed professional (or equivalent), HVAC installer, service agency, or the gas supplier.

See unit Nameplate for Manufacturer

(P) 507620-01

⚠ CAUTION

The installation of the unit, wiring, warm air ducts, venting, etc. must conform to the requirements of the National Fire Protection Association; the National Fuel Gas Code, ANSI Z223.1 (latest edition) and the National Electrical Code, ANSI/NFPA No. 70 (latest edition) in the United States; the Canadian Installation Codes CAN/CGA-B149.1 & .2 (latest edition) and the Canadian Electrical Code Part 1, CSA 22.1 (latest edition) in Canada; and any state or provincial laws, local ordinances, or local gas utility requirements. Local authorities having jurisdiction should be consulted before installation is made. Such applicable regulations or requirements take precedence over the general instructions in this manual.

Save these instructions for future reference

Installation

These instructions must be saved for future reference.

These units are single package air conditioners with gas heat designed for outdoor installation on a rooftop or a slab.

The units are completely assembled. All piping, refrigerant charge, and electrical wiring are factory installed and tested. The units require only electric power, gas piping, condensate drain, and duct connections, plus installation of the vent cover at the point of installation.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or customer's expense.

The size of unit for the proposed installation should be based on heat loss/heat gain calculation made according to the methods of Air Conditioning Contractors of America (ACCA).

⚠ WARNING

In the State of Massachusetts:

This product must be installed by a licensed Plumber or Gas Fitter. When flexible connectors are used, the maximum length shall not exceed 36". When lever-type gas shutoffs are used, they shall be T-handle type.

These installation instructions are intended as a general guide only, for use by an experienced, qualified contractor.

These units are certified by E.T.L. Testing Laboratories, Inc.:

- For use as a forced air furnace with cooling unit.
- For outdoor installation only.
- For installation on combustible material.
- For use with natural gas or propane gas. (Conversion kit required for propane gas application.)

These units are not suitable for use with conventional venting systems.

Inspection

As soon as the unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing.

Location

Use the following guidelines to select a suitable location for these units.

1. Unit is designed for outdoor installation only. Unit must be installed so all electrical components are protected from water.
2. Condenser coils must have an unlimited supply of air.
3. For ground level installation, use a level prefabricated pad or use a level concrete slab. Do not tie the slab to the building foundation.
4. Maintain level within a tolerance of 1/4" maximum across the entire length or width of the unit.

⚠ CAUTION

Unit levelness is critical for proper float switch operation.

5. Do not locate the unit where the combustion air supply will be exposed to any of the following substances:

   - Permanent wave solutions
   - Chlorinated waxes and cleaners
   - Chlorine-based swimming pool chemicals
   - Water softening chemicals
   - Deicing salts or chemicals
   - Carbon tetrachloride
   - Halogen-type refrigerants
   - Cleaning solvents (such as perchloroethylene)
   - Printing inks, paint removers, varnishes, etc.
   - Cements and glues
   - Antistatic fabric softeners for clothes dryers
   - Masonry acid washing materials
   - Chlorinated laundry products
   - Hydrochloric acid

Clearances
All units require certain clearances for proper operation and service. Refer to Table 1 for the minimum clearances to combustibles, servicing, and proper unit operation. In the U.S., units may be installed on combustible floors made from wood or class A, B, or C roof covering material. In Canada, units may be installed on combustible floors. Units must be installed outdoors.

Clearance to combustibles below the unit flue is 10 inches since the flue points down.

Do not permit overhanging structures or shrubs to obstruct condenser air discharge outlet, combustion air inlet, or vent outlet.

Minimum Clearances

	Clearance to Combustibles	Clearance for Service Access
Front of unit	0 in.	24 in.
Back of unit	0 in.	0 in.
Left side	0 in.	24 in.
Right side (from vent hood)	12 in.	24 in.
Base of unit	0 in.	0 in.
Top of unit	0 in.	48 in.

Minimum clearance to combustible material below the flue is 10 inches to allow proper dissipation of flue gasses and temperatures. For any future service, installer must provide access to screws of top and rear panels.

Table 1

Roof Curb Installation
If a roof curb is used, follow the manufacturer's Installation Instructions and be sure that all required clearances are observed (see Clearances section on this page).

Rigging Unit
Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. An optional lifting lug kit may be purchased separately for use in rigging the unit for lifting. Spreaders whose length exceeds the unit depth dimension by 6 inches MUST be used across the top of the unit.

Units may also be moved or lifted with a forklift while still in the factory supplied packaging. **The lengths of the forks of the forklift must be a minimum of 42 inches.**

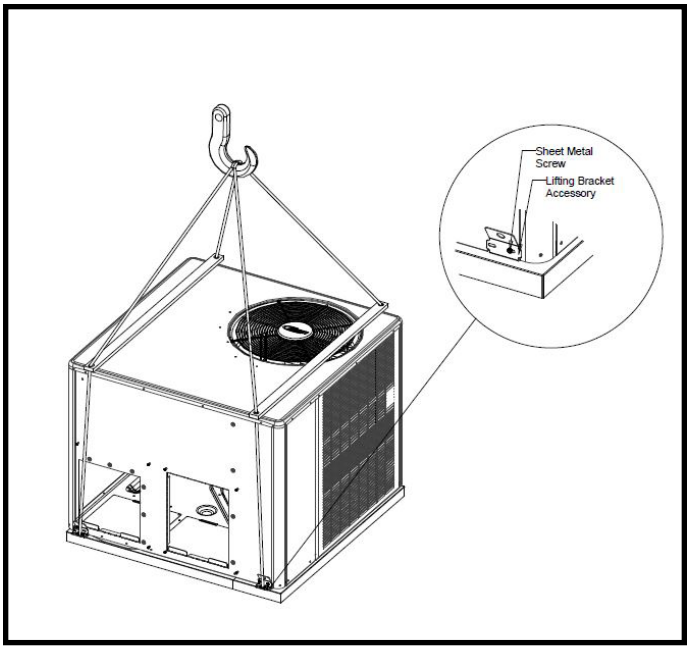


Figure 1

⚠ CAUTION

Before lifting a unit, make sure that the weight is distributed equally on the cables so that it will lift evenly.

Unpacking
Carefully remove outer packaging material and discard. Locate the four (4) shipping brackets that attached the unit to the wood pallet and remove. Locate the supply duct corner and seal the shipping openings in the base from the underside with silicone or other approved sealant to prevent air leakage during unit operation.

Service Access
Access to all serviceable components is provided by four removable panels: upper access panel (for blower, ID coil, and optional filter), heat exchanger access, control access panel, and compressor access.

⚠ CAUTION

As with any Mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

⚠ WARNING

This unit is charged with HFC-410A refrigerant. Operating pressures for units charged with HFC-410A are higher than pressures in units charged with HCFC-22. All service equipment MUST be rated for use with HFC-410A refrigerant.

Venting

The vent outlet must be installed in a location as to prevent building degradation and must be consistent with the National Fuel Gas Code, Z223.1 or CAN/CGA-B149.1 & .2.

The products of combustion are discharged through a screened opening on the gas heat side panel. The horizontal vent system shall terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into the building. The vent system shall terminate at least 3 feet above any forced air inlet located within 10 feet.

The unit shall be installed in a manner such that snow accumulation will not restrict the flow of flue products.

Minimum horizontal clearance of 4 feet from electric meters, gas meters, regulator, and relief equipment is required.

In addition to the above requirements, consideration must be given to prevent unwanted ice buildup from the vent condensate. The vent should not be located on the side of a building where the prevailing winter winds could trap the moisture, causing it to freeze on the walls or on overhangs (under eaves). The vent should not be located over a sidewalk, patio, or other walkway where the condensate could cause the surface to become slippery.

The products of combustion must not be allowed to accumulate within a confined space where they may be recirculated.

Vent Hood Installation

The unit is shipped with the vent hood inside the control compartment. Locate the vent hood and attach to side of utility panel with screws provided in the instruction bag (see figure 2).

Installing the Vent Cover

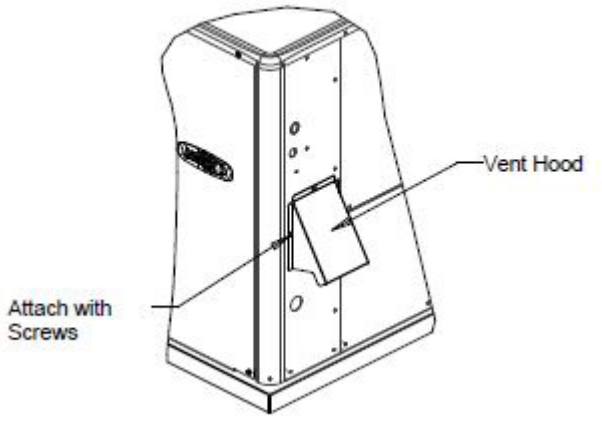


Figure 2

NOTE:

If an existing gas furnace is being removed from a common venting system when this packaged unit is installed, then read and follow the instructions in the "Removal of Unit from Common Venting System" section that follows. Otherwise, you may skip this section.

Removal of Unit from Common Venting System

When an existing furnace is removed from a common venting system serving other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances. The following test should be conducted with each appliance while the other appliances connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows between the space in which the appliances remaining connected to the common venting system are located and other spaces in the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Following the lighting instructions, place the unit being inspected in operation. Adjust the thermostat so the appliance will operate continuously.
5. Test for spillage at the draft control relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
6. Follow the preceding steps for each appliance connected to the common venting system.
7. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers, and any other fuel burning appliance to their previous condition of use.

8. If improper venting is observed during any of the above tests, the common venting system must be corrected. See **National Fuel Gas Code, ANSI Z223.1** (latest edition) or **CAN/CGA B149.1 & .2 Canadian Installation Codes** to correct improper operation of common venting system.

Duct System

The duct system should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return air duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. It is recommended that supply and return air duct connections at the unit be made with flexible joints.

The supply and return air duct systems should be designed for the CFM and static requirements of the job. They should not be sized by matching the dimensions of the duct connections on the unit.

The unit is shipped ready for horizontal flow (side duct connections). Before attaching side ducts, bend perforated duct tabs out to assist with duct alignment and attachment. Duct attachment screws are intended to go into the duct panel. Duct to unit connections must be sealed and weather proofed.

If downflow duct system is desired, a downflow conversion kit is required, and the following conversion is required.

Step 1 – Using a knife, cut following the marked cut lines on the unit base insulation to access bottom metal covers underneath the insulation.

Step 2 – Remove the screws securing the bottom covers, and discard the bottom covers (supply and return).

Step 3 – Remove screws located between the supply and return air openings that attach the blower deck to the base, and discard these screws. These screws can interfere with bottom duct connections or roof curb seals.

Step 4 – Secure side duct covers provided in the downflow conversion kit over the side duct openings (use dimples on back panel to locate cover attachments).

Step 5 – This unit comes with a factory-installed drain pan overflow switch. This switch will interupt the compressor operation if the water level in the drain pan becomes excessive. To insure proper function, the unit must be level and the switch secure to the drain pan. When secured, the overflow switch bracket should be positioned completely down on the wall of the drain pan.

Filters

Air filters are not supplied with the unit. A field-provided air filter must always be installed ahead of the evaporator coil and must be cleaned or replaced if necessary. Dirty filters will reduce the airflow of the unit.

An optional filter rack kit may be purchased separately for installation inside the unit's coil compartment. Air filter sizes are shown in table 2 for use with filter rack kit.

NOTE:

The filter rack must be installed prior to installation of the unit in applications where access to the rear panel is limited.

Unit Air Filter sizes - inches

Unit Model	Filter 1	Filter 2
24, 36	14 X 20	20 X 20
48, 60	20 X 20	20 X 20

Table 2

A Photocatalytic Oxidation (PCO) air purification system is available as a field installed accessory for this product. A wiring harness for the installation of this accessory has been factory installed. If this accessory is going to be installed it becomes critical that the system filter be installed ahead of this unit's return. Therefore, see the PCO accessory for filter requirements, plan the installation of filter ahead of this unit, and **do not use the internal filter rack described above**.

Condensate Drain

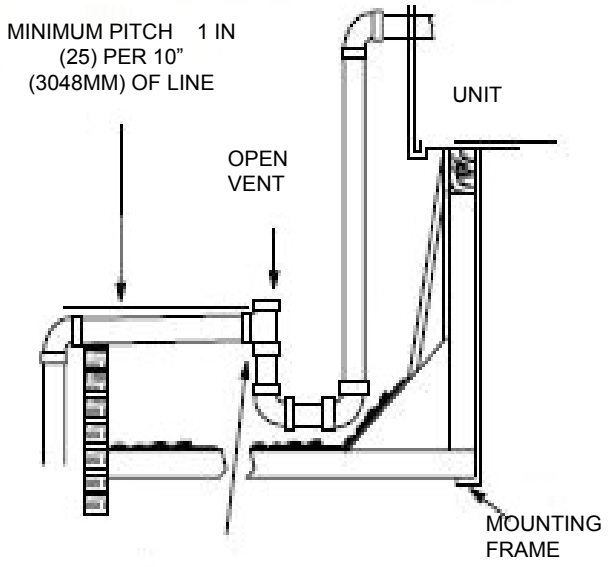
This package unit is equipped with a 3/4" FPT coupling for condensate line connection. Plumbing must conform to local codes. Use a sealing compound on male pipe threads.

The condensate drain line must be properly trapped and routed to a suitable drain. See Figure 3 for proper drain arrangement. The drain line must pitch to an open drain or pump to prevent clogging of the line. Seal around the drain connection with suitable material to prevent air leakage into the return air system.

⚠ CAUTION

Drain lines should be hand-tightened only. Do not use tools to tighten fitting into drain.

Typical Condensate Drain Connection



TRAP MUST BE DEEP ENOUGH TO OFFSET MAXIMUM STATIC DIFFERENCE (GENERALLY, 3 INCHES (76 MM) MINIMUM). IN ADDITON, THE DRAIN LINE MUST BE SUPPORTED IF LONGER THAN 10 FEET.

Figure 3

Gas Piping

Proper sizing of a gas piping depends on the cubic feet per hour of gas flow required, specific gravity of the gas, and length of run. National Fuel Gas Code Z223.1 latest edition should be followed in all cases unless superseded by local codes or gas company requirements. In Canada, refer to CAN/CGA B.149.1 & .2 (latest edition).

The heating value of the gas may differ with locality. The value should be checked with the local gas utility. For temperature rise of unit, see unit rating plate.

Gas piping recommendations:

- A drip leg and a ground joint union must be installed in the gas piping. A ground joint union is recommended by the manifold/valve.
- When required by local codes, a manual shutoff valve may have to be installed outside of the unit.
- Use pipe thread sealing compound resistant to propane gas sparingly on male threads.
- The gas supply should be a separate line and installed in accordance with all safety codes listed on page 1. After the gas connections have been completed, open the main shutoff valve admitting normal gas pressure to the mains. Check all joints for leaks with soapy solution or other material suitable for the purpose.

⚠ WARNING

Never use a flame to check for gas leaks. Explosion causing injury or death may occur.

- The furnace and its field supplied manual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 PSIG (3.48kPa).
- A 1/8" N.P.T. plugged tapping, accessible for test gauge connections, must be installed immediately upstream of the gas supply connection to the furnace.

Gas Connection

The gas supply line is routed through the gas entry location on the side of the unit (See Figure 4). A grommet is provided in the instruction bag and should be used to seal gas supply line to gas entry of control compartment.

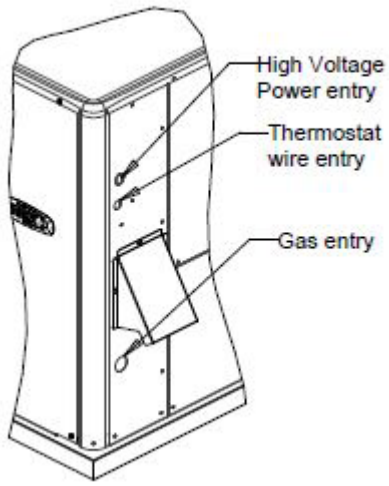


Figure 4

⚠ WARNING

The furnace must be isolated from the gas supply piping system by closing the field supplied manual shutoff valve during any pressure testing of gas supply piping system at test pressures equal to or less than 1/2 psig or 14" w.c. If the piping system is to be tested at pressures in excess of 1/2 psig, the furnace and its individual shutoff valve must be disconnected from the gas supply piping system.

NOTE: LPG/Propane Units, Tanks, and Piping
Units are shipped equipped for use with natural gas, but can be converted to LPG/propane in the field by an approved licensed technician. If conversion is required, use the approved conversion kit.

When converting a low NO_x unit (designated by an L in some model numbers) to propane, **the NO_x inserts must be removed**.

All LPG/propane gas equipment must conform to the safety standards of the National Fire Protection Association.

For satisfactory operation, LPG/propane gas pressure must be a minimum of 11" w.c. at the unit under full load.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and LPG/propane gas suppliers.

Check all connections for leaks when piping is completed, using a soapy, non-chlorine based solution. **Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after completing leak detection.**

⚠ WARNING

Danger of explosion. Can cause injury or product or property damage. Do not use matches, candles, flame or other sources of ignition to check for leaks.

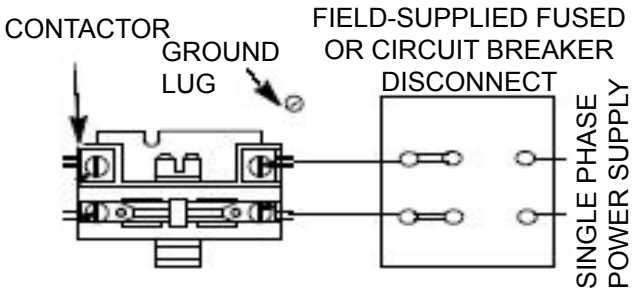
⚠ CAUTION

If a flexible gas connector is required or allowed by the authority that has jurisdiction, black iron pipe shall be installed at the gas valve and must extend outside the cabinet. The flexible connector can then be added between the black iron pipe and the gas supply line.

Electrical Wiring ***(See Figures 4 & 5)***
All wiring should be done in accordance with the **National Electrical Code, ANSI/NFPA No. 70 (latest edition); Canadian Electrical Code Part 1, CSA C22.1 (latest edition); or local codes where they prevail.** Use wiring with a temperature limitation of 75°C minimum. Run the 208 or 230 volt, 60 hertz electric power supply through a fused disconnect switch to the control box of the unit and connect as shown in the wiring diagram located on the inside of the control access panel.

Power supply to the unit must be N.E.C. Class 1, and must comply with all applicable codes. A fused disconnect switch should be field provided for the unit. The switch must be separate from all other circuits. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram. Electrical wiring must be sized to carry minimum circuit ampacity marked on the unit. **Use copper conductors only.** Each unit must be wired with a separate branch circuit and be properly fused.

208/230 Line Voltage Wiring



If 208 Volt is supplied, transformer connection must be changed

Figure 5

⚠ CAUTION

When connecting electrical power and control wiring to the unit, waterproof type connectors must be used so that water or moisture cannot be drawn into the unit during normal operation.

Thermostat
The room thermostat should be located on an inside wall where it will not be subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow the manufacturer's instructions enclosed with thermostat for general installation procedure. Color-coded insulated wires (#18 AWG) should be used to connect the thermostat to the unit.

Compressor
Units are shipped with compressor mountings factory-adjusted and ready for operation.

⚠ CAUTION

Do not loosen compressor mounting bolts.

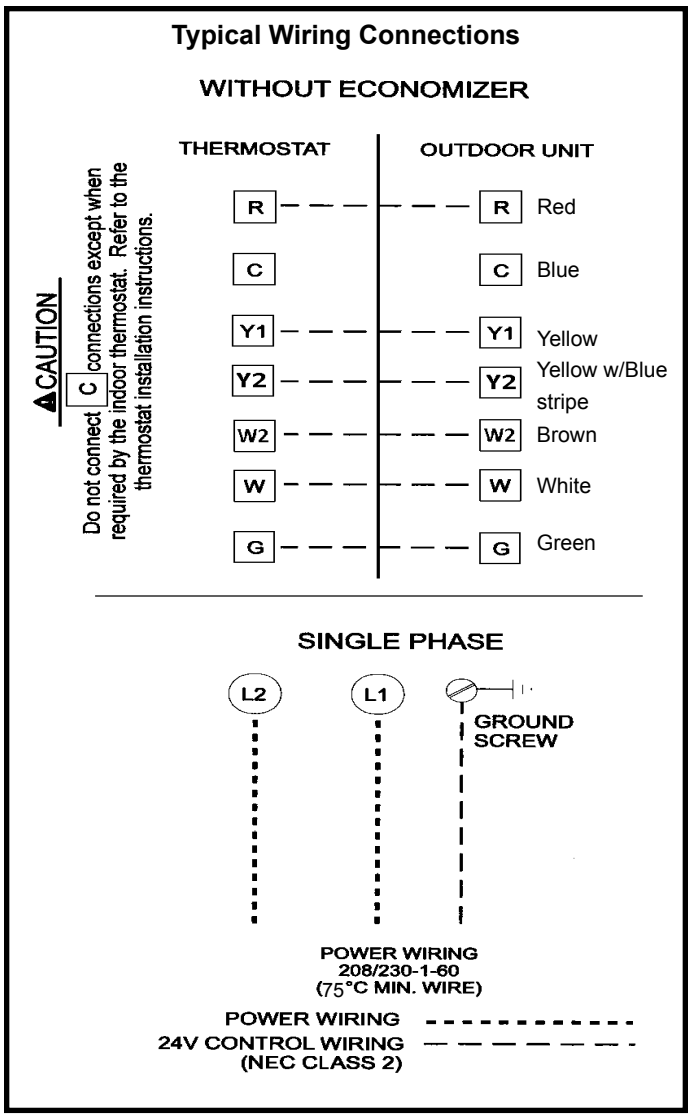


Figure 6

Heating Start-Up

For Your Safety Read Before Lighting

> **⚠ CAUTION**
>
> Furnace is equipped with a direct ignition control. Do not attempt to manually light the burners.

Pre-Start Check List
Complete the following checks before starting the unit:

1. Check the type of gas being supplied. Be sure it is the same as listed on the unit nameplate.

2. Make sure that the vent cover has been properly installed.

To Light Main Burners:

1. Turn off electrical power to unit.
2. Turn the thermostat to lowest setting.
3. Slide the gas valve switch to the “ON” position (see Figure 7).
4. Turn on electrical power to the unit.
5. Set the room thermostat to the desired temperature. (If the thermostat “set” temperature is above room temperature after the pre-purge time expires, main burners will light.)

To Shut Down Main Burners:

1. Turn off electrical power to unit.
2. Slide the gas valve switch to the “OFF” position (see Figure 7).

Gas Valve

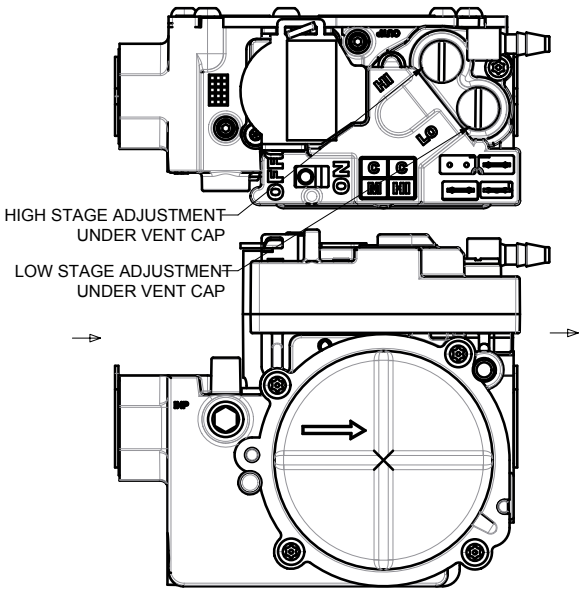


Figure 7

Post-Start Check List
After the entire control circuit has been energized and the heating section is operating, make the following checks:

1. Check for gas leaks, using soapy solution, in the unit piping as well as the supply piping.

2. Check for correct manifold gas pressures (see Manifold Gas Pressure Adjustment Regulator sections).

3. Check the supply gas pressure. It must be within the limits shown on the rating plate. Supply pressure should be checked with all gas appliances in the building at full fire. At no time should the standby gas pressure exceed 13” w.c., nor the operation pressure drop below 5” w.c. for natural gas units or 11” w.c. for propane gas. If gas pressure is outside these limits, contact the gas supplier for corrective action.

4. Adjust temperature rise to the range specified on the rating plate.

Manifold Gas Pressure Adjustment Regulator – Natural Gas

For purpose of input adjustment, the minimum permissible gas supply pressure is 5" w.c. for natural gas.

Gas input must never exceed the input capacity shown on the rating plate. **Units fueled by natural gas are rated for manifold pressures of 2.0 inches W.C. for first stage and 3.5 inches W.C. for second stage.**

The manifold pressure can be measured by shutting off the gas, removing the pipe plug in the downstream side of the gas valve, and connecting a water manometer or gauge. **Under no circumstances should the final manifold pressure vary more than 0.3" w.c. from the above specified pressures.** To adjust the regulator, turn the adjusting screw on the regulator clockwise to increase pressure and input or counterclockwise to decrease pressure and input. See Figure 7 to assist in locating the regulator on the gas valve.

Check the furnace rate by observing the gas meter, making sure all other gas appliances are turned off. The test hand on the meter should be timed for at least one revolution, noting the number of seconds per revolution. The heating value of the gas can be obtained from the local utility.

Example: By actual measurement, it takes 38 seconds for

$$\text{BTU/HR INPUT} = \frac{\text{Cubic Feet Per Revolution}}{\text{\# Seconds Per Revolution}} \times 3600 \times \text{Heating Value}$$

the hand on the 1-cubic foot dial to make a revolution with a 100,000 BTU/HR furnace running. The result is 99,750 BTU/HR, which is close to the 100,000 BTU/HR rating of the furnace.

Manifold Gas Pressure Adjustment Regulator – *LPG/Propane Gas*

LPG/propane units require a LPG regulator on both the gas valve and on the LPG/propane tank.

IMPORTANT: For purpose of input adjustment, the minimum permissible gas supply pressure (inlet side of gas valve) is 11" w.c. for LPG/propane.

If at any time ignition is slow and burner does not seem to be operating correctly, check manifold pressure (outlet side of the gas valve). **It should be 10" to 10.5" w.c. pressure for LPG/propane.**

Units fueled by LP/propane gas are rated for manifold pressures of 5.6 inches W.C. for first stage and 10.0 inches

High Altitude

The input rate shown on the rating plate is for elevations up to 2000 feet. For elevations from 2001 to 4500 feet, the input rate is reduced by 5%. For elevations above 4500 feet, refer to the National Fuel Gas Code Z223.1 (latest edition) or the Canadian Installation Codes CAN/CGA-B149.1 & B149.2 for further details.

To check this pressure:

1. Slide the gas valve switch to the "OFF" position (see Figure 7).
2. Remove plug on valve marked "OUTLET PRESSURE."
3. Install a water manometer.
4. Slide the gas valve switch to the "ON" position and initiate a call for heat. If manifold pressure must be adjusted, the gas valve has separate adjusting screws for first stage (LO) and second stage (HI) (see figure 7). Turn the adjusting screws clockwise to increase pressure and input; turn counterclockwise to decrease pressure and input. The pressure regulator adjustment is sensitive. One turn of the adjusting screw results in a large change in manifold pressure. Final first-stage and second-stage manifold pressures must be within the allowable ranges for the gas being used.
5. After checking pressure, turn gas off, remove manometer fitting, and replace pipe plug and regulator cap.
6. Put furnace in operation and check plug for leaks using soapy solution.

Burner and Burner Orifice Instructions

To check or change burners or burner orifices:

1. Close the main manual gas shutoff valve and turn off all power to unit.
2. Remove the burner access panel.
3. Disconnect the union in the gas supply line upstream of the gas valve and downstream of the manual shutoff valve.
4. Label wires going to the gas valve, then disconnect the wires.
5. To change orifice:

   a. Remove screws that fasten the manifold to the burner box assembly and remove the manifold.
   b. Remove the orifices, then install replacement orifices.
   c. To reassemble: Reverse above steps, making sure orifices are inserted into the orifice holders on the back end of the burners, and that burners are level and centered on each burner opening in the vest panel.

6. To remove or service burners:
   a. Label and disconnect the wires to the rollout switch and disconnect the igniter and flame sensor leads at the ignition control.
   b. Remove the screws that secure the burner box assembly to the vest panel and remove the assembly from the unit.
   c. Remove the screws that fasten the burner rack and bottom shield assembly to the burner box. Burners are now accessible for removal.
   d. To Reassemble: Reverse above steps.

7. After reassembly of all parts is complete and all wires are reconnected, open the main manual gas shutoff valve; check for and correct any gas leaks. Turn electrical power on, initiate a call for heat, and check for proper burner operation.

8. Install burner access panel.

Heat Anticipator

The heat anticipator setting is 0.70 amp. It is important that the anticipator setpoint be correct. Too high of a setting will result in longer heat cycles and a greater temperature swing in the conditioned space. Reducing the value below the correct setpoint will give shorter "ON" cycles and may result in the lowering of the temperature within the conditioned space.

Operation

Blower Control

Units are equipped with a variable speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (COOL, HEAT, and ADJUST) on the blower control. The HEAT and COOL jumpers are labeled A, B, C and D. Each of the numbers corresponds with an air volume (CFM) setting. The ADJUST jumper is labeled Test, -, +, and Norm. The + and - pin settings are used to add or subtract a percentage of the CFM selected. The Test jumper is used to operate the motor in the test mode. Figure 8 shows the blower control.

The CFM LED located on the blower control flashes one time per 100 cfm to indicate selected blower speed. For example, if the unit is operating at 1200 CFM, CFM LED will flash 12 times. If the CFM is 1150, CFM LED will flash 11 full times plus one fast or half flash. At times the light may appear to flicker or glow. This takes place when the control is communicating with the motor between cycles. This is normal operation.Read through the jumper settings section before adjusting the jumper to obtain the appropriate blower speed.To change jumper positions, gently pull the jumper off the pins and place it on the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one. Refer to figure 8. From the engineering handbook and/or specification sheet, determine which row most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections. The variable speed motor slowly ramps up to and down from the selected air flow during both cooling and heating demand. This minimizes noise and eliminates the initial blast of air when the blower is initially energized.

ADJUST

The ADJUST pins allow the motor to run at normal speed, approximately 15 percent higher, or approximately 15 percent lower than normal speed.

The TEST pin is available to bypass the blower control and run the motor at approximately 70 percent to make sure that the motor is operational. This is used mainly in troubleshooting. The G terminal must be energized for the motor to run.

COOL

The **COOL** jumper is used to determine the CFM during cooling operation. This jumper selection is activated for cooling when Y1/Y2 is energized.

The blower motor runs at 80 percent of the selected air flow for the first 7-1/2 minutes of each cooling demand. This feature allows for greater humidity removal and saves energy.

In the cooling mode, the blower control delays blower operation for 5 seconds after the compressor starts. The blower continues to operate for 90 seconds after the compressor is de-energized.

HEAT

The HEAT jumper is used to determine CFM during gas heat operation only. These jumper selections are activated only when W1/W2 is energized.

In the heating mode, the blower control delays blower operation for 30 seconds after the flame is established. The blower continues to operate for 90 seconds after the gas valve is de-energized.

CONTINUOUS FAN

When the thermostat is set for "Continuous Fan" operation and there is no demand for heating or cooling, the blower control will provide 50 percent of the COOL CFM selected.

DEHUMIDIFICATION

The blower control includes an HUM terminal which provides for connection of a humidistat. The JV1 resistor on the blower control must be cut to activate the HUM terminal. The humidistat must be wired to open on humidity rise. When the dehumidification circuit is used, the variable speed motor will reduce the selected air flow rate by 25 percent when humidity levels are high. An LED (D1) lights when the blower is operating in the dehumidification mode.

Cooling System

The cooling system is a factory-charged with HFC-R-410A. The compressor is hermetically sealed and base-mounted with rubber-insulated bolts.

Cooling Sequence of Operation

When the thermostat calls for cooling, R is closed to Y1 (see the wiring diagram found on page 14). This action completes the low voltage control circuit, energizing the compressor, condenser fan motor, and blower motor. Second stage cooling is initiated by thermostat energizing Y2.

Unit compressors have internal protection. In the event there is an abnormal rise in the temperature of the compressor, the protector will open and cause the compressor to stop.

Unit is equipped with drain pan overflow protection. In the event of a restriction/blockage to the condensate disposal system, the overflow switch will open and cause the compressor to stop.

Blower Delay – Cooling

The circulating air blower includes integrated delay timing. Timings are not adjustable. Blower "ON" delay is 5 seconds after the compressor starts and blower "OFF" timing is 60 seconds after the compressor shuts down.

NOTE: *There is no blower OFF delay when there is a call for G (fan only).*

Cooling System Performance

This equipment is a self-contained, factory-optimized refrigerant system. The unit should not require adjustments to system charge when properly installed. If unit performance is questioned, perform the following checks.

Ensure unit is installed per manufacturer's instructions and that line voltage and air flow are correct. Refer to table 3 for proper performance value. When checking performance of a unit that uses an expansion valve for metering refer to the subcooling value to judge system performance. If the measured performance value varies from table value allowance, check internal seals, service panels and duct work for air leaks, as well as restrictions and blower speed settings. If unit performance remains questionable, remove system charge, evacuate to 500 microns, and weigh in refrigerant to nameplate charge. It is critical that the exact charge is re-installed. Failure to comply will compromise system performance. If unit performance is still questionable, check for refrigerant related problems such as, blocked coil or circuits, malfunctioning metering device or other system components.

COOLING PERFORMANCE VALUES	
Model	Liquid Subcooling +/- 3°
2 Ton	10
3 Ton	12
4 Ton	10
5 Ton	9
Based on outdoor ambient temperature of 82°F, and indoor entering air of 80°F db, 67°F wb.	

Table 3

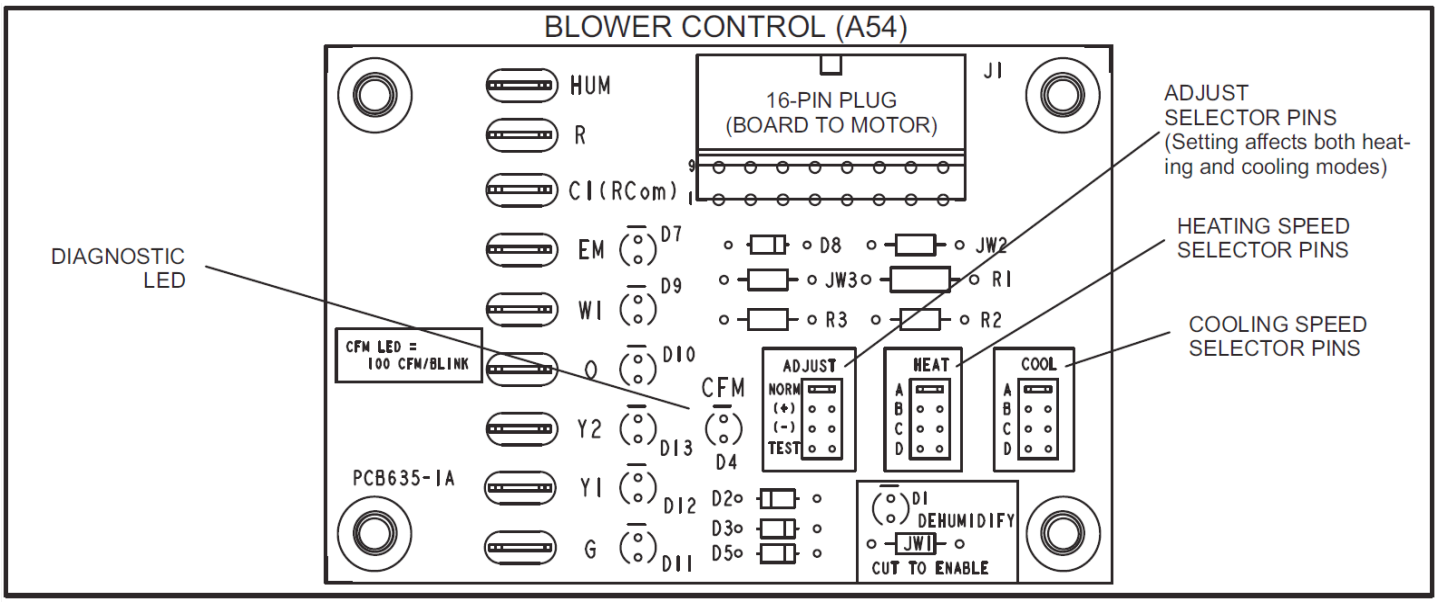


Figure 8

Heating System
With the proper thermostat and sub-base, continuous blower operation is possible by closing the R to G circuit.

Heating Sequence of Operation

When the thermostat calls for heating, W1 is energized.

NOTE - The ignition control ignores a call for second-stage heat until first-stage heat has been established.

The ignition control checks high temperature limit and roll out switches to make sure they are closed. The control then verifies that the pressure switch is open. If the pressure switch is closed, the control will flash code 3 on the LED and will wait indefinitely for the pressure switch to open. If the pressure switch is open, the control proceeds to the 15-second pre-purge.

The ignition control energizes the combustion air inducer on high speed, flashes a code 3 on the LED, and waits for the pressure switch to close.

When the pressure switch has closed, the LED code 3 flash stops and the control begins the 15-second pre-purge period. When the pre-purge time has expired, the control begins the ignition trial.

The ignition control energizes the gas valve and spark. The control ignores the flame sense signal for the first two seconds of the ignition trial. If the flame is established within 10 seconds, the control de-energizes the spark. If flame is not established within 10 seconds, the gas valve and spark are de-energized and the ignition control initiates a 30-second inter-purge sequence.

Approximately 30 seconds after the flame has been established, the circulating air blower starts and the combustion air inducer is switched to low speed. The ignition control inputs are continuously monitored to ensure that limit switch(es), roll out switch and pressure switch are all closed, and that the flame remains established and heating demand is present. First-stage gas valve, low-speed combustion air inducer and circulating blower remain energized. If the thermostat signals a requirement for second-stage heat W2, the ignition control initiates high heat operation. When a signal for second stage heat is received by the ignition control, the control energizes the second-stage gas valve and high-speed combustion air inducer until the demand is satisfied.

If a first-stage heat demand continues after the second-stage heat demand has been satisfied, the ignition control immediately de-energizes the second-stage gas valve. The combustion air inducer is held in high speed operation for an additional 1 second after the second-stage gas valve is de-energized. First-stage heat operation (first-stage gas valve and low-speed combustion air inducer) continues until heating demand is satisfied.

When the heating demand is satisfied, the control immediately de-energizes the gas valve. The combustion air inducer remains energized for a 30-second post-purge period. The circulating air blower operates for 90 seconds after the gas valve is deenergized.

Blower Delay - Heating
In the heating mode, the circulating air blower operation is delayed for 30 seconds after the flame is established. The blower continues to operate

Safety Controls
The control circuit includes the following safety controls:

Limit Control This control is located inside the heating compartment and is designed to open at abnormally high circulating air temperatures. It resets automatically. The limit control operates when a high temperature condition, caused by inadequate airflow, occurs. This closes the main gas valve.

Pressure Switch If the combustion air blower should fail, the pressure switch prevents the spark electrode and gas valve from being energized.

Flame Sensor If the ignition control does not receive a signal from the flame sensor indicating that the burners have established flame, the gas valve closes after the 10-second trial for ignition period.

Rollout Switch The switch is located on the top of burner box. In the event of a sustained main burner rollout, the rollout switch shuts off the ignition control and closes the main gas valve. To reset, push the button on top of the switch.

Secure Owner's Approval
When the system is functioning properly, secure the owner's approval. Show the owner the location of all disconnect switches and the thermostat. Instruct the owner on how to start and stop the unit and how to adjust temperature settings within the limitations of the system.

Maintenance

Periodic inspection and maintenance normally consists of changing or cleaning the filters and cleaning the outdoor coil. On occasion, other components of the furnace may also require cleaning.

⚠ WARNING

Shut off all electrical power to the unit before conducting any maintenance procedures. Failure to do so could cause personal injury.

Filters
Filters are not supplied with the unit. Inspect once a month. Replace disposable or clean permanent type as necessary. **Do not replace permanent type with disposable.**

Motors
Indoor and outdoor fan and vent motors are permanently lubricated and require no maintenance.

Outdoor Coil
Dirt and debris should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure the power to unit is shut off prior to cleaning. **Care should be used when cleaning the coil so that the coil fins are not damaged.**

Do not permit the hot condenser air discharge to be obstructed by overhanging structures or shrubs.

Burners
To clean the burners, first remove them from the furnace as explained in Burner Instructions on page 9. Vacuum and/ or brush as required.

Vent Outlet
Visually inspect vent outlet periodically to make sure that there is no buildup of soot or dirt. If necessary, clean to maintain adequate opening to discharge flue products.

Heat Exchanger
With proper combustion adjustment, the heat exchanger of a gas-fired furnace will seldom need cleaning. Sooting of a gas appliance is highly irregular and once cleaned, the cause of the sooting must be determined. If the heat exchanger should become sooted, it can be cleaned as follows:

1. Remove the burner assembly as outlined in Burner Instructions on page 9.

2. Remove the combustion blower.

3. At the bottom of the heating section, remove the screws holding the flue collector box. Carefully remove the flue collector box without ripping the adjacent insulation.

4. Using a wire brush on a flexible wand, brush out the inside of each heat exchanger from the burner inlet and flue outlet ends.

5. Brush out the inside of the flue collector box.

6. Run the wire brush down the heat exchanger tubes from the flue collector end.

7. If soot buildup is excessive, remove the vent motor and clean the wheel and housing. Run the wire brush down the flue extension at the outlet of the vent housing.

8. After brushing is complete, blow all brushed areas with air. Vacuum as needed.

9. Replace parts in the reverse order they were removed in Steps 1 through 3.

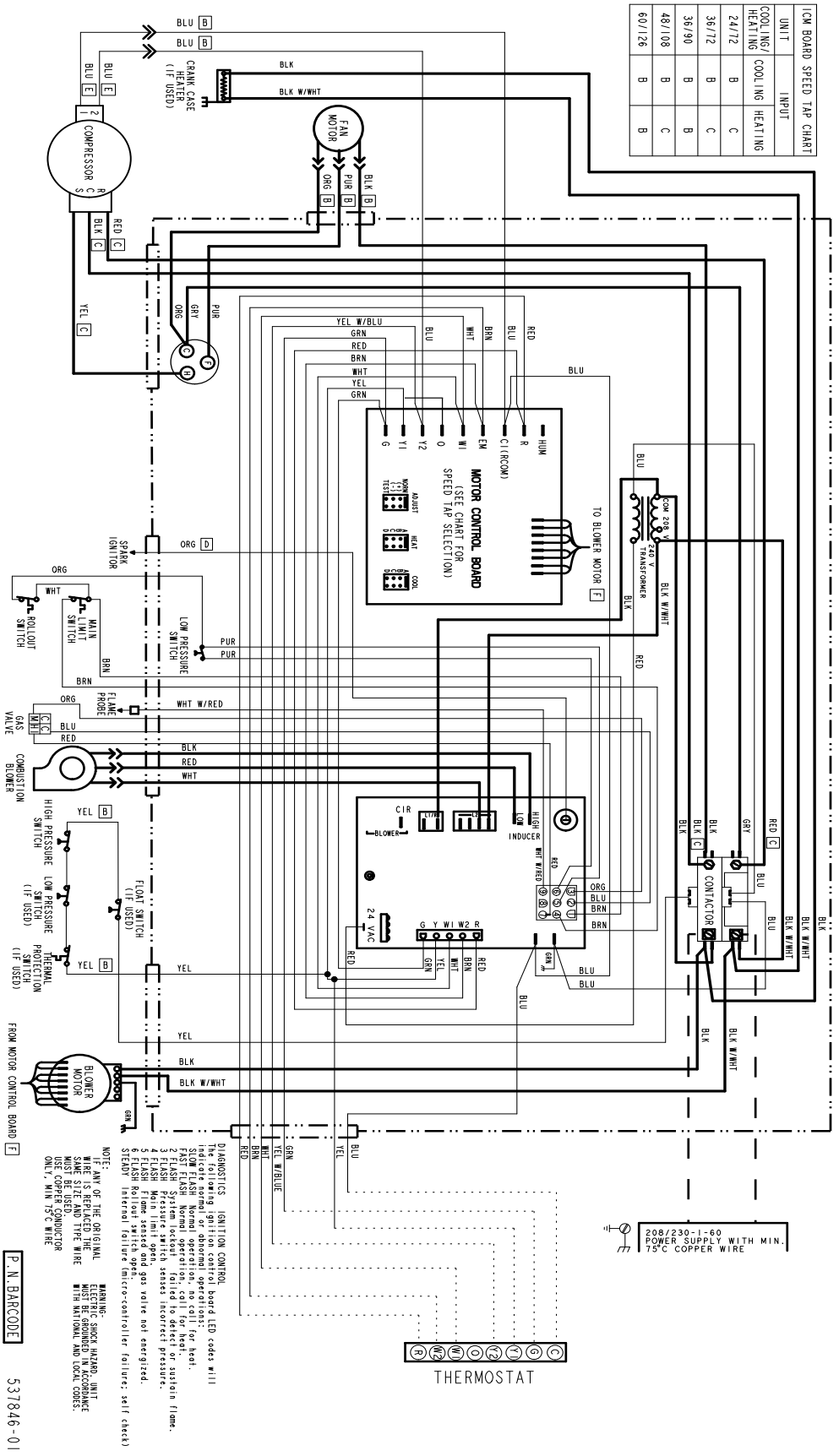
10. When replacing the flue collector box, be careful so as not to tear the adjoining insulation.

11. Assure that all joints on the vent side of the combustion system are air tight. Apply a high temperature (+500°F) sealing compound where needed.

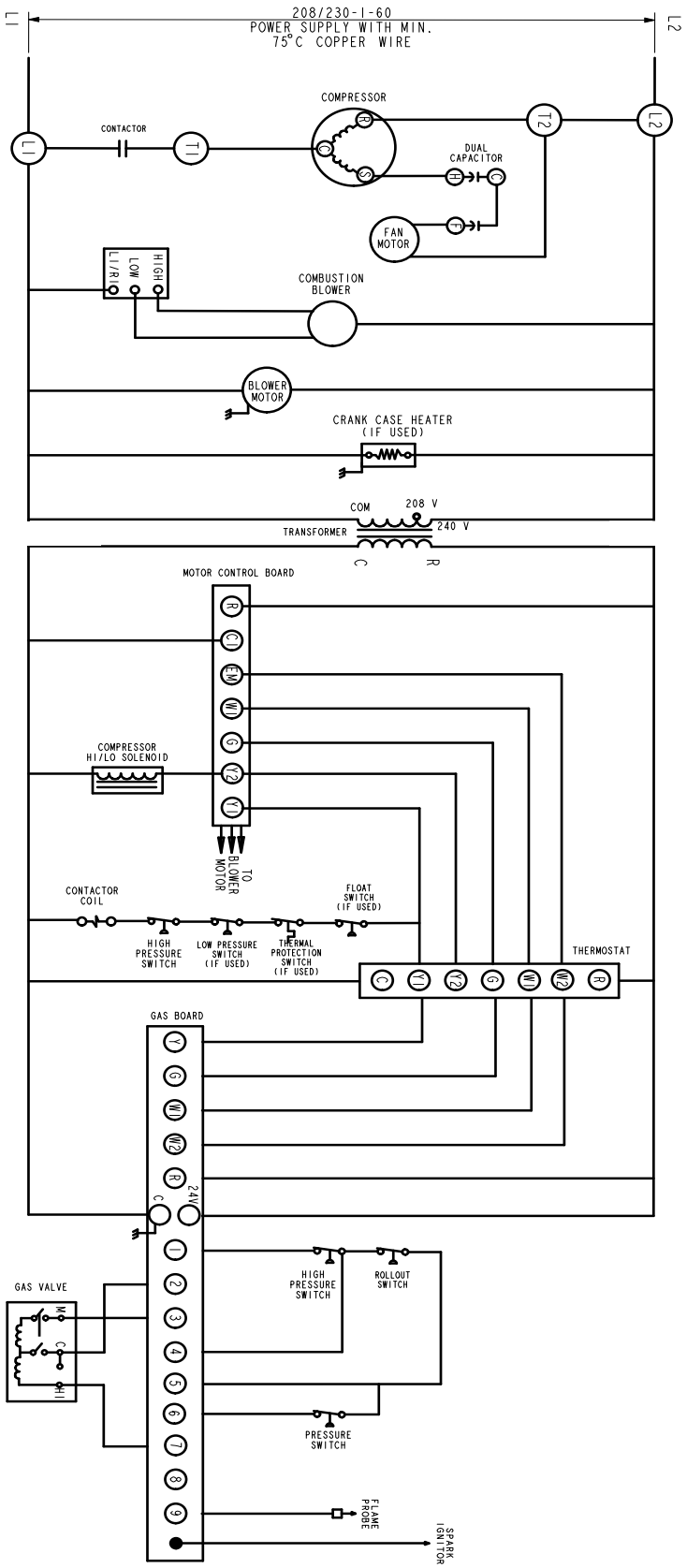
Ignition Control LED Codes
The ignition control LED flashes codes which indicate normal or abnormal operations:

Slow Flash	Normal operation, no call for heat. One flash per second.
Fast Flash	Normal operation, call for heat. Two flashes per second.
Steady Off	Internal failure or no power. (Micro-controller failure; self-check.)
Steady On	Internal control failure. (Micro-controller failure; self-check).
Code 2	System lockout -- Failed to detect or sustain flame or gas valve knob or switch off. Two flashes in 1 second with a 1-second pause.
Code 3	Pressure switch open with inducer on or closed with inducer off. Three flashes in 1-1/2 seconds with a 1-second pause.
Code 4	High limit /or rollout switch open. Four flashes in 2 seconds with a 1-second pause.
Code 5	Flame sensed while gas valve de-energized. Five flashes in 2-1/2 seconds with a 1-second pause.
Code 6	Roll out switch is open. Six flashes in three seconds with a one-second pause.

Table 4



Wiring Diagram – Single Phase
Figure 9



Wiring Diagram – Single Phase
Figure 10